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# ‘They don’t read metres, they only bring bills’: Issues surrounding the installation of prepaid water metres in Karoi town, Zimbabwe

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## ABSTRACT

City and town administrators in Zimbabwe continue to push for the installation of prepaid water meters (PWMs). This is despite the residents' objections to the proposal. The merits and demerits of PWMs continue to be debated, and more empirical information will help chart a new course especially in smaller cities in poor countries. The paper adopts a qualitative research design and case study approach in eliciting information from respondents. Water governance institutions and 35 residents in Karoi town were purposively sampled to understand how they viewed the impact of PWMs installation in the water supply chain. Data collection tools included questionnaires, documents, observations and focus group discussions (FGDs). Findings revealed that respondents perceived water is an indispensable commodity, a right and one that should be enjoyed by every citizen regardless of their social or economic status. The installation of PWMs also runs contrary to the Zimbabwean Constitution as it deprives low-income citizens of water if they could not afford to pay. Instead, a more appropriate delivery mechanism is the traditional post-paid system, which allows consumers to access water based on affordability.

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## Overview

Over 50% of the population estimated to be living in Africa's towns and cities attests to the rapid urbanization of the continent (Manzungu et al., 2013). Indeed, the shortage of portable water in developing countries continues to worsen by the day. To be specific, more than two and a half billion people currently lack safe portable water (Haylamicheal & Moges, 2012) and almost a billion people live without access to water (Abatneh, Sahu, & Yimer, 2014). On average, cities and towns in Africa are growing at 5% per annum faster than anywhere else in the world (Hope, 1998). This is particularly worrisome because the majority of the over one billion people without access to clean and safe water are found in slum settlements where clean and safe water is unlikely to be available (Abatneh et al., 2014; Agnew & Woodhouse, 2010). Water service providers face considerable challenges to meet the growing demand for water as most of

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them lack the resources to do so. Meeting the demand, especially in the rapidly expanding poor settlements where basic infrastructures are lacking requires new thinking and innovation. One option for meeting consumers' demand would entail the dedication of more state resources for the purpose of enhancing poor people's needs (Wilk & Jonsson, 2013). However, this option could be an uphill task due to the commonly witnessed state budget deficits, which is a function of macro-economic pressures generally endorsed by elites who are uninterested in serving the poorest citizens (López, 2013). To counterbalance the problem of unconcerned elites, a social movement pressure on state authorities is initiated by civil organizations to compel state authorities to comply with the needs of the citizens. Thus many Zimbabweans, including those in Mashonaland west region have fought for the introduction of post-paid water meters (PPWMs) (see Mapfumo & Madesha, 2014; Zivanai, Onias, Nhamo, Isaac, & Roselyn, 2014) and opted for the traditional billing system where the clients pay for water services after use as opposed to the pre-paid water meters (PWMs) in which clients have to pay first before use.

Already, families survive on less than the WHO recommended minimum water consumption for life of at least 25 litres per day for basic survival (Cole & Stewart, 2013). The introduction of austerity measure aimed at lowering water demand has a detrimental effect of reducing the per capita water usage. Lower water consumption severely limits the ability of development and weakens an undignified situation for the poor (Kidd, 2011). Literature has shown that in the United Kingdom, PWMs were associated with an increase in dysentery when families self-disconnected after being unable to pay for services (Bakker, 2001; Gambe, 2015; Hope et al., 2011). Closer to home, in South Africa, the city of Ngwelezane in KwaZulu Natal witnessed the epicentre of a cholera epidemic affecting 113 966 people due to pre-payment requirements imposed in mid-2000 (Kidd, 2011; Mugeru & Hoque, 2001; Nash, 2013). This paper assesses residents' opinions on the merits and demerits of PWMs in revenue collection in Karoi Town; analyses stakeholders' perceptions on the installation of PWMs; and suggests some recommendations on how to improve water delivery in high-density residential areas in Zimbabwe.

## **Historical background on water billing in urban Zimbabwe**

The political-economic situation of Zimbabwe had its origin in the much-disputed land reform programme which culminated into a financial meltdown of 14 November 1997, popularly known as the 'Black Friday'. At the time, the Zimbabwean currency fell from around Z\$10 to below Z\$30 to US\$1 over four hours of trading time (Bond & Manyanya, 2002). In spite of the government efforts to save the situation, the subsequent months witnessed a severe economic and political meltdown. The much-disputed presidential and parliamentary elections in 2002 further worsened the country's economic situation. The development resulted in service providers paying much attention to economic and elections gains rather than service delivery including water provision. This eventually led to water crisis and has since then become burdensome mainly to poor women and girls living in high-density, water-stressed residential areas. Since women are responsible for providing water for their households, increasing water scarcity intensified the burden on women and girls who have to spend more time and effort sourcing portable water from

afar and unsafe sources. Thus, the impact of water shortage in Zimbabwe and indeed in Karoi was felt differently by men and women.

Traditionally, water supply and billing has been subsidized by Zimbabwean government (Nhema & Zinyama, 2016), and households (HHs) have always paid for this service in arrears<sup>1</sup> (Gambe, 2015) under a block tariff system where users pay different amounts for different consumption levels. In the past, a huge state subsidy was provided for white farmers through an irrigation scheme and Karoi residents have had such subsidized water for the former plantations. However, due to constrained fiscal budget, the subsidies were removed as an austerity measure to reduce budget deficit. Water bills (indicating the volume of water consumed and amount due to resident) are usually delivered to residents at the end of each month or the beginning of a new water supply cycle. This arrangement has significantly affected the Zimbabwe National Water Authority (ZINWA) revenue collection efficiency as the economy plummeted from the beginning of 2008 and has not recovered since then. Specifically, Zimbabwe's economic environment has thus been characterized by hyperinflation leading to incessant price adjustments. Although the adoption of a multi-currency monetary policy in February 2009 tended to have stabilized the economy, the real value of the US dollar has been distorted (Gambe, 2015), which invariably has affected economic transactions at all levels.

Ever since the beginning of this problem in 2009, HHs in both large and small urban centres were unable to settle their bills in time owing to either low incomes (ZINWA, 2013) or because they were boycotting. Incidentally, residents in Harare, for instance in 2014 boycotted paying council rates in protest against erratic water supplies and poor service delivery. The residents agreed that they should not pay for water bills until the billing system was attended to (Matenga, 2014). A long history of non-payment of water bills resulted in a total abandonment of this obligatory duty by water consumers (see Gambe, 2015; Zivanai et al., 2014), leading to a huge debt of US\$5 million being incurred by ZINWA (ZINWA, 2013). The ripple effect of water supply inefficiency comes to bear in the mismatch between piped water availability and bill issuance. Water consumers experience sustained water shortages, which could last for weeks or months but consumers would in turn receive inflated water bills. For instance, most of Karoi experienced water shortages for two months in 2017, prompting residents to resort to digging up open wells and to fetch and use raw water (Murwira, 2018). In order to enhance water supply efficiency, the local government intends to introduce the pre-paid water meters (PWMs) in Karoi, among many other communities. Nonetheless, the new direction taken by the local government has been met with a stiff resistance by the residents of Karoi community. However, stiff resistance was also happening in many Zimbabwe cities and towns. For instance, residents in Harare were up in arms with the town council in order to force the latter to ensure quality service delivery and improve on the existing obsolete water infrastructure facilities (Gambe & Dube, 2015). Furthermore, people in Gweru and Mutare also protested and boycotted paying council water bills due to persistent and erratic water supply (Kusena, Beckedahl, & Desai, 2017; Marunga, Hoko, & Kaseke, 2006). The same scenario happened in Masvingo in which residents protested against the installation of PPWMs (Mapfumo & Madesha, 2014).

Following the adoption of the Economic Structural Adjustment Programmes (ESAP) in the early 1990s, the Zimbabwean government resorted to the privatization of public services (Kanji & Jazdowska, 1993). The concept of Build-Operate-Transfer (BOT) was

adopted during this period. BOT is an approach used to enhance direct, private sector investment in large-scale infrastructural development such as water supply infrastructure among others (Orzes, Sartor, Nassimbeni, & Fratocchi, 2017). In its basic form, a BOT project is one in which government grants a concession for a pre-determined period to a private organization to build, operate and transfer the water supply infrastructure to either government or local authority (Pohlner, 2016). In this arrangement, the organization gradually recoups its investment costs and profit through charges (Lema, 2000) within a given timeframe. At the end of the concession period, the scheme is transferred to the government in its original conditions as stipulated in a predetermined contract agreement. This institutional arrangement eventually led to the establishment of ZINWA, which is a parastatal mandated to address water services in urban areas of Zimbabwe.

A combination of global and local factors provided a political-economic nexus for understanding the reason for pushing a privatization policy in Zimbabwe. Swyngedouw (2003) provides some reasons for a global drive towards the privatization of water, all of which help in contextualizing Zimbabwe's efforts in the privatization agenda. First, Zimbabwe's budgetary pressure associated with the high population growth in urban areas and the country's desire to settle its debt necessitated the need to seek assistance from the Bretton Woods comprising the International Monetary Fund (IMF) and World Bank. Nonetheless, obtaining an IMF loan goes with certain conditionalities meant to be observed by the loan beneficiary. The conditionalities tied to the structural adjustment programme include the deregulation of the economy, trade liberalization, downsizing the bureaucracy, currency devaluation, privatization and commercialization, etc. Government fiscal austerity as reflected in the downsizing of the workforce and allowing the private sector to play a leading role in the economy are tantamount to government minimalist economic approach and neoliberal ideologies meant to drive efficient economic and service delivery (Manzungu, Mudenda-Damba, Madyiwa, Dzingirai, & Musoni, 2016).

On the other hand, the drive for the commercialization of water was necessitated by the government's fiscal austerity measures including lack of central to local government fund transfer. This was the main factor especially in local authorities where the opposition political party had a grip after the 2000 general elections (Bond & Manyanya, 2002). Thus, Karoi was not an exception. Furthermore, the desire to commercialize water service stem from the withdrawal of donor support (especially donors from the West) due to political differences with the Zimbabwean government (Manzungu et al., 2016). Owing to a combination of political and economic challenges, water facilities and services deteriorated significantly not only in Karoi but in all other major cities including Harare from 2000 to 2008. Thus, town councils have tried to remedy the situation by implementing water demand management as well as financial mobilization towards investment in new water infrastructure and repair of the existing ones.

As such, the quest for economic efficiency endears privatization as an attractive option for the Zimbabwean government. And as global investors began to search for capital investment, water presented itself as a possible source of capital. Thus, competitiveness, profitability and the urban consumers' willingness to pay for water seem to have driven investors and urban water councils in Zimbabwe to privatize their service (Manzungu et al., 2016). Unfortunately, this drive runs contrary to the humanitarian goals such as

providing water for the poor as contained in the sustainable development goals (SDGs) and the Zimbabwean Constitution. Owing to this long water challenge as engendered by ZINWA's operations, Karoi Town Council (KTC) in 2010 began to plan to take over the responsibility of water distribution and billing from ZINWA in a bid to improve its cash inflows (Kaitano, 2011). Although the situation in other towns and cities has changed and local authorities have taken over the provision of water (except in Karoi, which is purportedly believed to lack capacity in terms of infrastructure and manpower), ZINWA has remained responsible for the town's water treatment, distribution and billing for the estimated 12 000 HHs (Zimbabwe National Statistics Agency [ZIMSTAT], 2012), even though, efforts are already underway to transfer water treatment and supply services from ZINWA to KTC under a deregulated regime. An excerpt from the minutes of the Council meeting on the subject expressly states thus:

The challenge is upon us. As long as we are able to procure and install prepaid water meters, the Ministry of Water said we could go ahead and take over treatment of water. We definitely have to take that route because as council we are losing a lot of potential revenue which could significantly improve service delivery in this town.

Further buttressing the above viewpoint, Karoi town clerk opined that *we feel it is our mandate to supply water to our residents. We are not the only local authority pursuing this matter as various councils have done the same thing*. However, this development seems unlikely to improve water delivery to residents as the motive behind this move seems to be about the commercialization of water. If this plan stands, the council needs to strictly address the ageing water reticulation system, amid evidence that 60% of treated water is lost through leakages (Herald, 2018; Kaitano, 2011).

## Theoretical approach

This study hinges on the neoliberalism conceptual framework as advanced by Milton Friedman (1912–2006) and Friedrich von Hayek (1899–1992) who argue that anti-libertarian tendencies sought to protect citizens from economic hardships. Although neoliberalism became comatose in the 1960s, it quickly resurfaced in the 1980s, beginning in the Western world and lastly reaching all South countries in the early 1990s (Castree, 2010). A neo-liberal approach and associated principles of privatization and commercialization are a bone of contention especially in Africa (Tshishonga & Mafema, 2011). Water privatization (achieved by either transferring full control of water supply system into the hands of a private company or through public–private partnership) is based on the proposition that without significant cost recovery, water supply services are unsustainable (Bakker, 2007). Increasing private sector involvement in water supply networks all over the world has been accompanied by a rise in the application of commercial principles to water supply systems. Commercializing water means emphasizing private sector norms which centre on profit-making and maximized efficiency. This entails the introduction of full-cost pricing; setting prices according to actual costs for service based on market value whereby water users pay according to the total amount of water consumed (Bakker, 2000, 2007; Mtetwa, 1999). While traditional government-run water utilities often subsidize prices for consumers in hope of attaining social equity (i.e. people pay according to what they can afford, or all contribute to reducing costs



because this is most socially beneficial), many private and publicly owned water systems today are choosing to adopt a commercial approach to water pricing (Bakker, 2007).

While in Karoi, people have a wide array of choices in terms of either buying bottled water from supermarkets, or getting water supply from ZINWA, or accessing water directly through open sources or wells, the current economic hardships may have limiting effect on the choices of the consumers, particularly when the first choice is considered. Relying on water supply from ZINWA may have been jeopardized because of the myriad of challenges (relating to inefficiency, corruption and staff turn-over) being faced by the service provider. As some residential areas in Karoi have no sewerage system and those that do have experience constant sewerage spillages, the only workable option left for water consumers is to resort to open water sources where water is of poor quality.

## Research methodology

The research is qualitative in nature and was based on document analysis complemented by unstructured interviews, focus group discussions (FGDs) and observations. Thus, KTC clerk and secretary, ZINWA-Karoi manager and residents were interviewed in order to elicit their opinions on PWMs. KTC was purposively chosen as it champions the advocacy for the use of PWMs. Convenience sampling was used to sample respondents that were drawn from water-stressed, high-density residential areas in Karoi town such as Chiedza B, Chiedza D, Garikai, Claudia and Chikangwe. These residential areas were dominantly characterized by low-income earners, except for Chiedza D, which is inhabited by middle-income earners (ZIMSTAT, 2012). Since Karoi town was founded by white colonialists, there is a physical separation of the races by residence in the town. Based on Williams and Collins (2016) separation of races by residence in certain areas was an institutional mechanism of racism during the colonial era in developing countries. The separation of residential areas was designed to protect the whites from social interaction with the blacks (Williams & Collins, 2016). Consequently, residential areas like Flamboyant Park and Westview have a few whites and coloureds. In these residential areas, there are also wealthy blacks. Middle income residents are found in Chiedza and Chikangwe. While a few people who have formal employment in retailer shops (like Farm and City Centre, Spar Rama and Harare Inn), the majority of the people in the town are in the informal sector where most of them could be seen selling all sorts of items from agricultural products to hardware along the Chirundu – Harare Highway.

Using convenience sampling, a total of 35 respondents were selected from the water points for this study. Of the 35, 10 were selected from Chiedza D, 10 from Chiedza B and 5 each from Garikai, Claudia and Chikangwe. Both primary and secondary data were utilized. Primary data were mainly obtained through observations and FGDs from respondents found fetching water at water points. FGDs were utilized in Claudia and Garikai, where residents did not have individual standpipes but rely on boreholes and open water sources. Structured and unstructured interviews were used to complement the data obtained from the FGD sessions. Secondary data were obtained through a review of existing literature and analysis of reports, newspaper articles and other relevant documents. Data, collected between December 2017 and January 2018, were arranged in different themes and analysed through comparative and content analysis techniques.

**Table 1.** Gender of respondents.

Parameter	%
<b>Gender</b>	
Male	17
Female	83
<b>Total</b>	<b>100</b>

## Results and discussion

Table 1 shows the distribution of respondents based on their gender. Data reveal that most (83%) of the respondents were females. The dominance of women was perhaps influenced by the fact that in Zimbabwe women are culturally required to fetch water for the HHs or it was probably because of the sampling in which data were collected from water fetching points. In Karoi, like in any other urban and rural areas in Zimbabwe, water fetching is mainly regarded as the responsibility of young women in the HHs as men are expected to do other jobs. Accordingly, gender plays a prominent role in water management discourses. However, literature has shown that men are more likely to be involved in water collection when the distance to a water point is far and the technological requirements to collect water are higher (Cleaver & Elson, 1995; Hawkins & Seager, 2010). Based on the analysis in this study, the mode of water collection in Karoi Town has shown that men are solely responsible for water collection through the use of vehicles when water is collected far away from the house. The study revealed that both men and women were likely to be negatively affected by the proposed installation of PWMs.

The dominance of females in this study is a reflection of the Zimbabwean traditional culture which seems to erroneously confer water fetching role on young women (Rutoro & Madimbo, 2015). This has implications on the educational performance of girls as they spend time fetching water during school hours. In other words, the installation of PWMs in Karoi's low-income residential areas is likely going to compromise the wellbeing of the poor residents and particularly girls of school-going age in as far as accessing portable water is concerned. Social evils like prostitution among others are likely to increase as girls would travel long distances to fetch water alone and at times at night. There is a possibility also of an increase in girl child school dropouts so that they do the house chores among them being fetching water.

### Average monthly water revenue collection for 2018 in Karoi town

Based on Annandale, Stirzaker, Singels, Van der Laan, and Laker (2011), measuring consumption forms the basis of most water accounts, and thus affects urban revenue directly as water meters are the cash registers of water suppliers. From a financial perspective, accurate water meter systems improve water sales and thus organization income. Metering makes it easy for water managers to implement water tariffs that can control water consumption and organization income, and cross-subsidize needy consumers.



**Table 2.** Average monthly water revenue collection in Karoi town in 2018.

Residential area	Average amount per month	Average possible amount per month	Percentage of actual collected/possible amount per month
Garikai	rtgs\$ 75.4	rtgs\$ <sup>2</sup> 281.60	26.80%
Chiedza B	rtgs\$124.5	rtgs\$833.30	14.90%
Chiedza D	rtgs\$139.5	rtgs\$664.00	21%
Claudia	rtgs\$65.85	rtgs\$361.50	18.20%
Chikangwe	rtgs\$57.55	rtgs\$3509.00	1.6%
<b>Total</b>	<b>rtgs\$462.8</b>	<b>rtgs\$5649.40</b>	<b>8.2%</b>

Source: Field survey, 2019.

Table 2 shows the five residential areas and the average amount of money collected per month in 2018 from households who pay for water using a convectional billing system in five residential areas in Karoi. It also shows that the average amount of money ZINWA actually collected per month and the possible average amount which could be collected. Data show that on average ZINWA collected rtgs\$75.40 from Garikai per month against a possible rtgs\$ 281.60 which could have been collected if all HHs in the residential area paid their water dues. It implies that on average ZINWA collected only 26.8% of the total revenue it was supposed to collect from Garikai. While ZINWA on average expected to collect rtgs\$833.30 from Chiedza B, the organization only collected rtgs\$124.50 per month which is about 15% of the total amount of money it should have generated if all the HHs had paid their water bills. In Chiedza D ZINWA collected an average of rtgs \$139.50 per month against the expected average of rtgs\$664. Accordingly, only 21% of the total revenue was collected. In Claudia, the organization collected an average of rtgs \$65.85 per month against the expected average of rtgs\$361.50. Along these lines, only 18.2% was realized per month. This implies a loss of 81.8% in revenue. Chikangwe, which is the most densely populated and oldest residential area in Karoi (Chinhanga, 2015), yields only an average of rtgs\$57.55 as compared to an expected average of rtgs\$3509 per month. Accordingly, 1.6% was realized. Overall, ZINWA collected only a grand average of RTGS\$462.80 per month against the expected average of RTGS\$5649.40 culminating to only 8.2% which is 91.8% less than the possible average anticipated revenue.

Given the scenario above, ZINWA Karoi had suggested the installation of PPWMs. Based on opinions of both KTC and ZINWA officials, the fact that PPWMs make it possible for consumers to manage their accounts more directly, with the knowledge of how much credit they have, would make HHs budgeting easier. This negates the use of conventional meters that have a risk of incurring high bills and an unpleasant surprise for consumers long after consumption, leaving them in debt (Heymans, Eales, & Franceys, 2014). Prepaid meters can, therefore, save consumers from wasting money and time on disputes over inaccurate bills. Municipalities acquire financial benefits from this arrangement because there is no risk of arrears (which might end in bad debts) for water service providers just as customers pay for water in advance, facilitating better cash flow and revenue (Heymans et al., 2014). Prepaid meters can also be used to facilitate debt recovery by connecting owing consumers to a PPWMs with a portion of their arrears deducted from each credit they purchase. With prepaid metering, the responsibility of securing access to water becomes the burden of the individual consumer and no longer that of the water supply organization. The burden of high water pricing could be minimised for the poor consumers if the government devises a fiscal system that compels

the rich to pay more for essential services. Doing so will ensure a better spread of service costs. From an administrative point of view, ZINWA saves on costs as there are no meter readings, no billing statements, and no arrears and credit control. Lastly, automatic water supply cut-offs (for prepaid meters) due to non-payment eliminates the travelling costs (for ZINWA personnel) for manual disconnection in conventional meters.

### **Impact of water shortage in Karoi**

The study has revealed a number of challenges emanating from water shortage in Karoi town. The challenges range from health to economic problems. For instance, an interview with one nurse in charge at Karoi District Hospital indicated that water shortage was impacting negatively on the health of both patients and the hospital staff. Water is in short supply to the extent that pregnant women make self-provision for water when on admission in the maternity ward. Nurses interviewed at the hospital confirmed water crisis in Karoi and they could foresee looming health hazards. A personal interview with nurses A and B portrayed water challenge at the hospital. *Water is a big challenge at our homes in Chikangwe, Chiedza and Claudia suburbs and who do you expect to give it to you during birth? We are also affected* (Personal interview with nurse A). Another nurse manning the male ward (nurse B) commented on the history of water shortage at the health institution by saying:

*During the cholera outbreak in the past years, we had no option but to tell some patients to go home as it was risky to keep them here where there is no water. Our water crisis has gone for too long.*

### **Popular viewpoints on the introduction of PWMs in Karoi**

Whilst the World Bank regards PWMs as a means of facilitating cost recovery and a way of accelerating private sector participation in provision of water services (Nhema & Zinyama, 2016), Karoi residents categorically agreed that PWMs were just a tool used under the guise of neoliberalism to secure profits for the stakeholders, and not access to water by the consumers. The FGDs conducted in Chiedza D and Chikangwe indicated that PWMs facilitate effective demand management in a cruel manner in which a consumer is simply cut off as soon as they cannot afford to pay water bills. Literature has also shown that PWMs reduce water demand by up to 65% (Nhema & Zinyama, 2016; Gambe, 2015; Zivanai et al., 2014; Cole & Stewart, 2013). Nonetheless, the use of PWMs has resulted in outbreaks of cholera elsewhere due to the use of polluted water (See Kidd, 2011; Nash, 2013).

In the context of this study, findings show that residents of Karoi regard PWMs as facilitating a change in social relationship, which HHs traditionally enjoyed with water providers (i.e. ZINWA and KTC). In the residents' opinions, PWMs remove all safeguards for consumers. And as the KTC officials are no longer available for negotiating erroneous billings and disconnections, water supply to HHs is likely to be automatically cut off as soon as they (HHs) have exhausted the units paid for water access. In such scenarios, there is likely to be no mechanisms for dispute resolution to address indiscriminate disconnection. An interview with one resident (a school teacher) suggests that

the installation of PWMs might violate human rights to water. The interviewee opined that the human rights to water as recognized in the United Nations International Covenant on Economic Social and Cultural Rights will greatly be violated by the installation of PWMs in Karoi. The teacher viewed PWMs as abusing the thrust of this international Treaty by denying access to clean water to those in need, especially those in Chikangwe, Chiedza and Claudia high-density residential areas. Whilst the use of PWMs improves water delivery and quality, they, in some way, compel poor families to use unsafe water sources such as rivers and open pools once they no longer have the ability to pay for water supply. Although citizens in low-income communities are increasingly recognized as customers deserving services, their inability to pay is being down-played because of the water sector's emphasis on cost recovery as a way to modernize water utilities (Wamuchiru, 2017). To minimize the shock, the adoption of a policy on water subsidy might be the best option to address water supply and access in high-density residential areas, where most of the residents are poor. This approach has been adopted in Botswana, South Africa and Zambia and apparently has assisted low-income residents to access water at very low cost (Kayaga & Franceys, 2008; Muller, 2008). However, water subsidies have attracted some mixed reactions amongst the people in places where the policy has been adopted. For instance, water subsidy was adopted in 1996 in South Africa and was perceived as a political issue. As the South African government realized that there were problems of access to water largely due to a large-scale poverty (Muller, 2008), the implementation of a policy addressing the provision of free water was seen by the government as a way to achieve social equity (Kidd, 2011). Thus, in 1996 a new policy was put in place that all South Africans should receive basic water supply free of charge (Kidd, 2011), even though such a policy ran contrary to the ESAP's conventional wisdom which regards water as an economic good for which people should be made to pay. Commenting on the importance of water subsidies by the government, Kayaga and Franceys (2008) applauded the Zambian government for adopting a fully subsidized water supply to poor residents in Lusaka. It is thus desirable for KTC to adopt water subsidies such as those in South Africa and Zambia to cushion the plight of poor people who cannot afford to pay for portable water. In other words, water pricing system in Karoi requires targeted subsidies to vulnerable groups if PWMs are to be socially acceptable. These could include recommendation made by Water Resources Management Strategy for Zimbabwe Module (n.d.) which says: *A life-line tariff [is needed] for a fixed volume of water so as to meet basic needs of the poor urban consumers. These would be financed by a cross subsidy from the more affluent consumers.* Although this initiative has its limitation of pre-determining the quantity of water supply at a given period, which might be a mismatch for different HHs' needs, it confers the advantage of making water available to a considerable degree for all those who need it.

The suggestion by KTC management that PWMs would start in Chikangwe and Chiedza has irritated residents who were of the opinions that the PWMs were promoted in poor areas in order to secure payments from HHs who have difficulties in paying under ordinary circumstances. The residents argued that PWMs were not promoted in areas where the affluent live or on government premises since the Zimbabwean government owes a huge chunk of local authority debts, residents were questioning on how KTC would ensure that government institutions pay for water. Even among the KTC staff where the idea of PWMs was initiated, there were disagreements as well. For instance, a KTC staff had this to say:

Communities traditionally share the burden of providing access to water for all. With the implementation of prepaid water meters, water will become an individualised marketed commodity and social relations in the communities erode when HHs run out of water. In desperate need, HHs steal water from each other when they are unable to buy the water they need for basic survival.

For instance, one resident of Claudia was miffed because of the installation of PWMs:

Karoi Town Council is insensitive. They want to impose their selfish wishes on the citizens of Karoi. The residents have not received acceptable and plausible justifications and explanations for the introduction of PWMs. We have no simple reasons to believe that they are introducing the PWMs to improve water supply, the quality of water and its acceptability (Personal interview with Claudia resident, 10 January 2018)

Given the opinions of the Claudia residents, absence of participation and consultation constitute bad water governance even though the Dublin Principle 2 calls for the development and management of water through a participatory approach involving users, planners and policymakers at all levels (McNeill, 1998). The FGDs conducted among Karoi residents revealed that the PWMs were not a welcome idea because they viewed the initiative as very expensive for the consumer. The participants commented thus:

Mvura upenyu hazviite kuti munhu agare asina mvura. Mvura yakasiyana nemagetsi ekuti munhu anogona kushandisa parafini, gasi, huni, marasha, asi mvura hapana chimwe chaunogona kushandisa panzvimbo yayo. Saka pamvura chero murombo anototi atsvage mari kuti chero asina chikafu nepekugara anototanga aitsvaga. Literally translated: Water is life and has no substitute under any circumstances. Unlike electricity which can be replaced by paraffin, gas, firewood, coal and charcoal, water remains without any alternative, meaning even the poor and marginalised will have to find money to buy water, even at the expense of other necessities like food and shelter.

The above viewpoint indicates that although the adoption of PWMs was meant to minimize cost, the infrastructures were provided at a higher price for users as compared to the traditional billing system. Some participants opined that: *As the prepaid water meters are expensive, they could be adopted by government and commercial enterprises and other companies that rely heavily on water beyond basic requirements.* In Karoi, like in many towns in Zimbabwe, the majority of people live on less than US \$1 a day (Murwira, 2018), paying up to 50% of their income as water bills. Invariably, such HHs have to choose between water and other necessities for survival. The findings from the FGDs conducted amongst the staff of the Ministry of Gender and Women Affairs showed that most people in the Ministry were not interested in PWMs. They remarked thus:

We will continue to fight against the installation of prepaid water meters until the decision is reversed. As people living in poorer sections of the community, we cannot afford to buy water. Prepaid water meters will be a burden for many women and the rest of the family. This means that lack of money to buy water is like allowing ourselves to be exposed to many diseases associated with inadequate water and poor sanitation. It is a setback to mothers because without access to water there is no life.

Residents in high-density residential areas like Chikangwe, Chiedza and Claudia raised concern over the inflated water bills issued to them. They complained that there

were a lot of irregularities in the water consumption units that were indicated on the bills. A Chikangwe resident who was overcharged for 13 months-worth of water provided a good example. The individual only discovered the billing anomaly after reading his water meter and comparing the figures with those shown on his bill. In another case, a Chiedza resident was being charged for the same amount of water consumption units on a monthly basis, even though water supplies were very erratic in the area. The residents had this to say:

*Zvinoshamisa chose izvi vanhu veZINWA havaverenge maimita emvura asi kuti vanongounza mabill chete pakupera kwemwedzi, zvingaitawo here kuti munhu anoshandisa mvura yakaenzana mwedzi nemwedzi. Literally translated: One wonders how a resident can consume the same volume of water on a monthly basis even when water supplies are not constant. These ZINWA people don't read meters but they only bring bills to us.*

Another Chikangwe resident expressed his frustration and blamed ZINWA workers in Shona: *Vashandi veZINWA havana nyadzi kutipa masamanisi emvura isingabudi. Pano hapabudi mvura asi chavanongoda imari chete* literally meaning: *ZINWA workers are a problem, although we have gone for years without running water, it is unfortunate that Zinwa officials have the gut to issue 48-hour final demand letters.* Yet another resident had this to say: *We normally get water when monthly statements are due so that we pay. Most residents who live in the high-density residential areas complained that they were getting water bills that range between rts\$15 and rts\$30 on a monthly basis. Residents in Chiedza A and D and Kubatana areas that had no water for many months were also getting monthly water bills ranging between rts\$25 and rts\$30 and the purported water consumption units were actually indicated on the bills. To make things worse for the consumers, ZINWA threatened defaulters of water supply disconnection. Chiedza A & D and Kubatana residents thus opine:*

*It defies logic to note that ZINWA is demanding money from residents who have not been getting any drop of water for several months now . . . ZINWA should be reminded that residents will not sit back and watch while they are being robbed of their hard-earned money and exposed to cholera outbreak at the same time. Water is a basic human right and residents should get constant supplies at all times. There should be no payment for non-existent services.*

The general consensus amongst the participants was that PWMs should not be installed. This was shown when the participants indicated that when HHs find themselves unable to pay for water services, they are forced to use alternative sources of water such as open shallow wells, unprotected reservoirs and rivers. In general, proponents of PWMs justify the use of PWMs because they feel that even the poor HHs are willing to pay increasing tariffs for access to clean water. Nonetheless, it is the general consensus among all respondents that HHs should not be forced to give up food in order to buy water.

The use of PWMs undermines the health gains associated with improved delivery of and access to clean water. In the event of fire outbreak, some residents in Chikangwe and Chiedza fear that PWMs could cut off water supply if HHs had to extinguish the fire. They had unanimously opined that *PWMs do not understand emergencies; if fire occurs at night where no fire hydrants exist, one is unable to buy additional credit for water* (Personal interview with Chiedza D resident on 3 January 2018)

The study, however, noted that there were mixed reactions between the KTC staff and residents regarding the use of PWMs. While the KTC staff members welcomed the use of PWMs, the residents demonstrated a resentment of the PWMs. One KTC staff said: *You use only what you paid for so you only use what you can afford*. The KTC staff members were of the opinion that PWMs raise payment levels, improve cash flows and avoid arrears and bad debt especially in high-density areas of Chikangwe, Chiedza and Claudia. They argued that PWMs make payment unavoidable and maximize the collection of revenue because it stops staff from colluding with customers to alter their credits on records, delete debt and understate metre readings.

The study revealed that the KTC staff felt PWMs would promote greater water conservation and reduce wastage. The pre-payment raises awareness of consumption and incentives among customers to close taps and repair leaks wherever applicable in their properties. Furthermore, PWMs were regarded as a way of reducing the cost of doing business; it is seen as a means of reducing the billing queries; estimates and human errors, as well as disputed bills, annoy customers and delay payments. PWMs also ensure disconnections are avoided. Another point noted amongst the people interviewed was that PWMs streamline revenue administration, by reducing the number of staff required for metre reading, issuing bills, responding to bill, following up arrears among others. In line with KTC staff members' viewpoints, PWMs give water users the benefit they enjoy with other utilities like electricity such as more control over consumption, more credible metering, no questionable bills and no debt or arrears.

## Conclusions and recommendations

The paper assessed residents' opinions on the merits and demerits of PWMs in revenue collection in Karoi Town; analysed the perceptions of stakeholders on the installation of PWMs; and proffered some solutions on how to improve water delivery in high-density residential areas in Zimbabwe. It has been shown that there is a conflict between KTC and the residents on the proposed installation of PWMs. Residents regard PWMs as violating their constitutional right to water while KTC argues that PWMs benefit both sides. Notwithstanding the disagreement, PWMs might, indeed, be beneficial to both the council and residents. The reasons are not far-fetched. First, the use of PWMs tends to reduce service delivery cost where effective revenue collection is ensured. Second, where the process is not abused, PWMs improves water billing and ensures that consumers pay for water that they have used. This study shows that Karoi residents have a tendency for not paying for water supply services (see [Table 2](#)).

Based on the foregoing, there is a need for government subsidy on water services to enhance the wellbeing of the poor majority. As Karoi residents are still not accustomed to the institutional arrangements on the pre-payment for water supply, it is recommended that the KTC assumes responsibility on water supply while it maintains the old billing system, which is implemented in good faith while other sustainable approaches are being explored. To pave the way for a more healthy payment regime, it is also important for the KTC to educate residents on the merits and demerits of pre-payment as well as those of post-payment methods. Among other measures that could be adopted for water-saving efficiency are the procurement and installation of pressure reducing valves. This is in a bid to minimize pipe burst and improve water supply to HHs. Also, it is desirable to



replace the currently used analogue manual meters and receipting with digital or computerized systems.

## Notes

1. Arrears denote the unpaid water charges incurred by a household.
2. rLgs\$ is Zimbabwe currency which stands for Real-Time Gross Settlement \$ (US\$1 = RTGS\$ 4.50).

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## References

- Abatneh, Y., Sahu, O., & Yimer, S. (2014). Purification of drinking water by low cost method in Ethiopia. *Applied Water Science*, 4(4), 357–362.
- Agnew, C., & Woodhouse, P. (2010). Climate change resilience and adaptation: Perspectives from a century of water resources development. *Environment and Society: Advances in Research*, 1 (2010), 156–183.
- Annandale, J. G., Stirzaker, R. J., Singels, A., Van der Laan, M., & Laker, M. C. (2011). Irrigation scheduling research: South African experiences and future prospects. *Water SA*, 37(5), 751–764.
- Bakker, K. (2001). Paying for water: Water pricing and equity in England and Wales. *Transactions of the Institute of British Geographers*, 26(2), 143–164. ISSN 0020-2754.
- Bakker, K. (2007). The “commons” versus the “commodity”: alter-globalization, anti-privatization and the human right to water in the global south. *Antipode*, 39(3), 430–455.
- Bakker, K. J. (2000). Privatizing water, producing scarcity: The Yorkshire drought of 1995. *Economic Geography*, 76(1), 4–27.
- Bond, P., & Manyanya, M. (2002). *Zimbabwe's plunge: Exhausted nationalism, neoliberalism and the search for social justice* (2nd ed.). Pietersburg: University of Natal Press.
- Castree, N. (2010). Neoliberalism and the biophysical environment 2: Theorising the neoliberalisation of nature. *Geography Compass*, 4(12), 1734–1746.
- Chinhanga, B. (2015). *Addressing urban poverty in context with urban community gardens: The case of Karoi town council*. Bsc project. Zimbabwe: Midlands State University.
- Cleaver, F., & Elson, D. (1995). *Women and water resources: Continued marginalisation and new policies*. Gatekeeper Series No. 49. London: International Institute for Environment and Development.
- Cole, G., & Stewart, R. A. (2013). Smart meter enabled disaggregation of urban peak water demand: Precursor to effective urban water planning. *Urban Water Journal*, 10(3), 174–194.
- Gambe, T. R. (2015). Prospects of prepaid smart water metering in Harare, Zimbabwe. *African Journal of Science, Technology, Innovation and Development*, 7(4), 236–246.
- Gambe, T. R., & Dube, K. (2015). Water woes in Harare, Zimbabwe: Rethinking the implications on gender and policy. *International Journal of Innovative Research and Development*, 4(6), 390–397.
- Hawkins, R., & Seager, J. (2010). Gender and water in Mongolia. *The Professional Geographer*, 62 (1), 16–31.
- Haylamicheal, I. D., & Moges, A. (2012). Assessing water quality of rural water supply schemes as a measure of service delivery sustainability: A case study of WondoGenet district, Southern Ethiopia. *African Journal of Environmental Science and Technology*, 6(5), 229–236.
- Herald. (2018, November) Retrieved from: <https://www.herald.co.zw>



- Heymans, C., Eales, K., & Franceys, R. (2014). *The limits and possibilities of prepaid water in urban Africa: Lessons from the field*. Washington DC: World Bank Group.
- Hope, K. R. (1998). Urbanization and urban growth in Africa. *Journal of Asian and African Studies*, 33(4), 345–358.
- Hope, R., Tim, F., Alex, M., Michael, R., Nic, M., & Mike, T. (2011, April) *Smart Water Meter Systems Project Report to UK DFID*. Oxford University Press
- Kaitano, M. (2011). Zinwa still holding onto water supply in Karoi, *Newsday*, 2 November, <https://www.co.zw>
- Kanji, N., & Jazdowska, N. (1993). Structural adjustment and women in Zimbabwe. *Review of African Political Economy*, 20(56), 11–26. ISSN 0305-6244; RIX #5602.
- Kayaga, S., & Franceys, R. (2008). Water services regulation for the urban poor: Zambia. *Proceedings of the ICE: Water Management*, 161(2), 65–71.
- Kidd, M. (2011). Poisoning the right to water in South Africa: What can the law do?. *International Journal of Rural Law and Policy*, (1), 1–17.
- Kusena, W., Beckedahl, H., & Desai, S. (2017). Civil society and residents' coping strategies with water shortages and household food insecurity in Gweru, Zimbabwe. *Journal of Arts and Humanities*, 6(2), 91–103. ISSN: 2167-9045 (Print), 2167-9053 (Online).
- Lema, N. M. (2000). An assessment of the Build-Operate-Transfer (BOT) model for infrastructure project financing in Tanzania. In *Proceedings of the 2nd International Conference of CIB Task Group Da es saalam* (Vol. 29, pp. 431–440).
- López, M. (2013). The state of poverty: Elite perceptions of the poor in Brazil and Uruguay. *International Sociology*, 28(3), 351–370.
- Manzungu, E., Jonker, L., Madaka, E., Naka, Z., Sithole, E., & Dzingirai, V. (2013). Emerging forms of social action in urban domestic water supply in South Africa and Zimbabwe. *Journal of Sustainable Development*, 6(3), 70–82.
- Manzungu, E., Mudenda-Damba, M., Madyiwa, S., Dzingirai, V., & Musoni, S. (2016). Bulk water suppliers in the city of Harare – an endogenous form of privatisation of urban domestic water services in Zimbabwe?. *Water Alternatives*, 9(3), 493.
- Mapfumo, A., & Madesha, W. M. (2014). Challenges for urban water supply: The case of Masvingo Municipality in Zimbabwe. *International Journal of Economics and Research*, v5i3, 01–05. ISSN: 2229-6158.
- Marunga, A., Hoko, Z., & Kaseke, E. (2006). Pressure management as a leakage reduction and water demand management tool: The case of the City of Mutare, Zimbabwe. *Physics and Chemistry of the Earth, Parts A/B/C*, 31(15–16), 763–770.
- Matenga, M. (2014). Residents threaten rates boycott, *Newsday*, 9 April, <https://www.newsday.co.zw>
- McNeill, D. (1998, November). Water as an economic good. In *Natural resources forum* (Vol. 22, No. 4, pp. 253–261). Blackwell Publishing Ltd. PII: S0165-0203(98)00020-8.
- Mtetwa, S. (1999). Experiences in the water resources development and management for sustainable use in Zimbabwe. In *Natural resources forum* (Vol. 23, No. 1, pp. 31–42). Oxford, UK: Blackwell Publishing Ltd.
- Mugero, C., & Hoque, A. K. M. (2001). *Review of cholera epidemic in South Africa, with focus on KwaZulu-Natal Province*. Provincial DoH KwaZulu-Natal.
- Muller, M. (2008). Free basic water—a sustainable instrument for a sustainable future in South Africa. *Environment and Urbanization*, 20(1), 67–87.
- Murwira, J. (2018). Karoi hit by water crisis, *Newsday*, 16 January, <https://www.newsday.co.zw>
- Nash, F. (2013). Participation and passive revolution: The reproduction of neoliberal water governance mechanisms in Durban, South Africa. *Antipode*, 45(1), 101–120.
- Nhema, A. G., & Zinyama, T. (2016). Prepaid water meters in Zimbabwe: The quest for an efficient water delivery and cost recovery system. *Global Business and Economics Research Journal*, 5(1), 1–30.
- Orzes, G., Sartor, M., Nassimbeni, G., & Fratocchi, L. (2017). Build–Operate–Transfer (BOT): An emerging entry mode for service offshoring. *Production Planning & Control*, 28(4), 295–309.

- Pohlner, H. (2016). Institutional change and the political economy of water megaprojects: China's south-north water transfer. *Global Environmental Change*, 38, 205–216.
- Rutoro, E., & Madimbo, M. (2015). Gender equality from the perspective of single womanhood. *Elna Mouton Gertrude Kapuma Len Hansen*, 325.
- Swyngedouw, E., & Heynen, N. C. (2003). Urban political ecology, justice and the politics of scale. *Antipode*, 35(5), 898–918.
- Tshishonga, N., & Mafema, E. D. (2011). The impact of neo-liberalism on water and sanitation provision in the informal settlements: Towards the re-enforcement of gendered roles or democratic emancipation? *Agenda*, 25(2), 54–70.
- Wamuchiru, E. K. (2017). *Rethinking the Networked City: The (co) production of Heterogeneous Water Supply Infrastructure in Nairobi, Kenya* (Doctoral dissertation). Technische Universität.
- Wilk, J., & Jonsson, A. C. (2013). From water poverty to water prosperity—A more participatory approach to studying local water resources management. *Water Resources Management*, 27(3), 695–713.
- Williams, D. R., & Collins, C. (2016). Racial residential segregation: A fundamental cause of racial disparities in health. *Public Health Report*, 116, 404–416.
- Zimbabwe National Statistics Agency (ZIMSTAT). (2012). *Zimbabwe population census 2012*. Harare: Zimstat.
- ZINWA. (2013). *Water Treatment in Zimbabwe* (Vol. 2). Harare: Zimbabwe.
- Zivanai, O., Onias, M., Nhamo, H., Isaac, M., & Roselyn, M. (2014). An assessment of revenue collection constraints in Zimbabwean local authorities: A case study of Bindura Municipality (2009-2013). *International Journal of Innovative Research and Development*, 3(9), 24–33.