ACCESSING WATER SERVICES IN DAR ES SALAAM: STORIES FROM FORMAL AND INFORMAL ACTORS

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ABSTRACT
A significant proportion of urban residents in developing countries has no access to potable water provided by public water authorities. Often urban residents rely on unofficial sources. They buy water from small scale water vendors or collect it from unimproved water sources. This paper draws on qualitative research to document citizens' strategies for accessing water services in the city of Dar es Salaam. Semi-structured interviews were conducted with public officials, private water providers and citizens in planned and unplanned areas of the city. It was found that the capacity of public authorities to provide good quality water is only partially available. Informal and small scale private water providers fill the gap. As a consequence, micro and/or face-to-face interactions between citizens and a variety of providers are evident in abundance. This creates a complex mix of contrasting aspects in quality and type of water services between planned and unplanned settings. Moreover, the study reveals that the incentives for corruption in the water sector are significant given that people are cognizant about the failures of public service delivery.

KEY WORDS
Access to water; coping strategies; informal water providers; Dar es Salaam; systemic corruption.
INTRODUCTION
In many developing countries, citizens’ access to reliable and safe water remains a challenge. Current trends show more pronounced deficiencies in sub-Saharan Africa. In 2010, only 61% of the population in sub-Saharan Africa had access to improved water (UNICEF/WHO, 2012). Yet, the statistical estimates often misrepresent the actual situation on the ground (Satterthwaite, 2003, p. 184). Thus, when issues of water quality and quantity are brought into the equation, the reality is more disheartening. Authors have demonstrated the limitations of how access to water is defined and represented in official statistics. Using household surveys, Zérah (2000), for example, finds disparities between access to water as stated by official statistics and the actual water supply situation from a user's point of view.

Apparently, similar trends are manifest in Tanzania. In Dar es Salaam, 51% of the population is estimated to get water directly from the official public water supplier (EWURA, 2012). Still, water service in the city is extremely unreliable and characterized by extensive rationing and low pressures (Kjellén, 2006; Kyessi, 2005). In most cases, urban populations develop strategies to cope with intermittent water supply. These include storing, collecting, importing, boiling, filtering, pumping, treating, and purchasing water. In some instances, exit strategies are also observed whereby rich households withdraw from official water suppliers and resort to private means (Kjellén, 2006; Twaweza, 2008). The poor who often live in informal settlements are mostly affected by unreliable water supply.

While a large proportion of the urban population in developing countries relies on informal and private water providers, little is known about the way citizens cope with unreliable water supply at the household level. This paper draws on qualitative research to examine citizens' strategies for accessing water services in Dar es Salaam. It aims to document day-to-day experiences of citizens as they search for water. By examining the formal and informal actors that mediate citizens’ access to water, this study contributes to efforts that seek to understand factors affecting the motivation of citizens to report problems of water in Tanzania.

The rest of the paper is organized as follows. Section 2 presents a brief overview of the existing literature on strategies of the poor to access water in developing countries in general and Tanzania in particular. The section also provides an overview of the current understanding regarding citizens’ strategies to cope with intermittent water supply. The methodology is provided in Section 3. Section 4 presents the case study areas while section 5 discusses the results by outlining strategies of citizens in Dar es Salaam as they cope with poor access to water. Discussion and conclusion are presented in section 6.

LITERATURE REVIEW
DEFINING ACCESS TO WATER FOR URBAN POPULATIONS
Defining access to water has been a contentious issue. Stakeholders in the water sector, particularly donors, governments and researchers, often disagree on the appropriate definition. The most frequently used definitions compare water coverage within and between countries in order to quantify the global status and progress of international interventions like the millennium development goals (MDGs). WHO/UNICEF Joint Monitoring Programme (JPM) defines access to ‘drinking water’ as the “proportion of population using an improved drinking-water source” (UNICEF/WHO, 2012). This
definition is often accompanied with a definition of access to basic sanitation. Critics contend that JMP’s definition does not capture the complex nature of water particularly from the perspective of the users. Kristof (2005), for example, introduces other variables that are important for assessing peoples’ access to water and includes adequate quality, adequate quantity, reliability and convenience. Others substitute access to water with ‘water use’ arguing that mere provision of water does not necessarily indicate actual use by the people (Kayaga et al., 2009).

Kudat et al. (1993) also argue that households are more likely to demand certain attributes of water and not water itself. They observe that different attributes of water have different value depending on the intended use by the households. For instance, the quality of water may be very important for uses such as drinking and cooking as opposed to water for watering plants. They also argue that coping strategies of households are responses to one or more attributes of water (ibid).

In this study we adopt the definition by Kristof (2005) which recognizes four important dimensions of water access: reliability, convenience, quantity and quality. Good access to water then implies access to “a reliable source of water which supplies adequate quantity and adequate quality of water in a convenient way” (Kristof, 2005, p. 3).

COPING STRATEGIES OF CITIZENS WITH POOR ACCESS TO WATER
It is well known that a significant proportion of urban population in developing countries has no access to potable water (WHO/UNICEF, 2013). Governments in the global South are failing to provide adequate piped water to their growing urban populations. Citizens connected to piped water experience intermittent water supply (UNICEF/WHO, 2012). Citizens who live in informal and poor neighbourhoods are not even connected to piped water systems. Surprisingly, citizens do not respond to this problem with city-wide protests. Apparently, there is a fertile middle ground between heroic demonstrations and fatalistic acceptance of problematic situations, with ample space for coping strategies. Urban residents seek to access water through private and local initiatives. They secure water from a myriad sources such as buying from door-to-door water resellers, fetching from neighbours with piped connections, fetching water from shallow open wells and buying bottled mineral drinking water. This phenomenon has attracted significant interest among researchers, donors, policy makers and governments who wish to understand how citizens cope with poor access to water and find ways to improve the situation (Adeniji-Oloukoi et al., 2013; Nyarko et al., 2008; Pattanayak et al., 2005; Virjee & Gaskin, 2010). Although all agree that poor access to water is an important issue demanding a solution, studies of citizens’ coping strategies take different angles depending on the way researchers conceive the problem. In the next section, we classify the body of literature studying strategies of citizens as they cope with poor access to water in urban areas.

a) ESTIMATES OF DEMAND FOR WATER AND WILLINGNESS TO PAY FOR IMPROVED WATER
Authors in this category investigate the determinants of household demand for piped water systems which aim to extend pipe connection to all residents in urban areas. Cost recovery objectives and economic efficiency have high priority in the design of these systems (Goldblatt, 1999, p. 28). Instead of depending on government subsidies, sustainability of the water service will depend on the fees collected from water sales, and therefore, on the urban residents’ willingness to pay. Thus, studies have attempted to “forecast the fraction of a population willing to pay for a pipe connection at different price levels and for different attributes of the piped water, which would provide planners with an essential input for system design, operation, and pricing” (Madanat & Humphlick, 1993, p. 1353).
Using survey data in Kathmandu, Nepal, Pattanayak et al. (2005) examined coping behaviours of unconnected residents to estimate their daily water expenditures and how these correlate with willingness to pay (WTP), income and type of water uses. They found that unconnected households were engaging in five main types of coping behaviours: collecting, pumping, treating, storing, and purchasing water. They also found that the monthly water expenditures of unconnected households were almost twice as high as the monthly bills of households connected to the official piped water system. However, the costs were lower than the hypothetical estimates of WTP for improved services.

Furthermore, long term coping strategies reduce people’s willingness to pay for improved water services. For instance, Virjee and Gaskin (2010, p. 295) found that the improvement in the reliability of supply would not increase the willingness to pay for the households who had long lasting coping mechanisms since capacity to cope remains at no additional cost to the user. Similar observations were made in Delhi, India, where people who had personal groundwater bore wells were less likely to pay more than the cost of running the wells for an improved water supply since they had already invested a significant amount in securing a reliable water supply (Dutta et al., 2005, p. 453).

Overall, authors that have attempted to estimate water demand have shown that price affects household water supply choices and decision to connect to piped water connections. Household surveys and contingent valuations (contingent valuations – offering households with hypothetical improved water use situations and asking them questions about how they would behave or willing to pay) are frequently used to study the water demand behaviours of households (The World Bank Water Demand Research Team, 1993; Virjee & Gaskin, 2010; Whittington et al., 1998). However, estimation of water demand in developing countries faces challenges of unavailability and inaccuracies of data. For instance, many households can hardly estimate exactly how much water they use (Nauges & Whittington, 2010, p. 273). Assuming that access to water will be improved when citizens are willing to pay for the services ignores other issues that affect the provision of water services like the capacity of utility companies.

b) CONSEQUENCES OF POOR ACCESS TO WATER FOR THE USERS

A few authors in this category have focused explicitly on documenting the consequences of poor access to water, while others examined such consequences only incidentally. For instance, Wutich and Ragsdale (2008) examined the prevalence of water-related emotional distress among household heads in a squatter settlement in Cochabamba, Bolivia. Water-related emotional distress was the consequence of three dimensions of water insecurity: inadequate water supply, insufficient access to water distribution systems, and seasonal scarcity of water. Emotional distress was common among households who had to pay for water and changed forms over time: from fear, to worry, to anger, to ‘molestia’ (being “upset about a situation that they believe should not have to be endured” (Wutich & Ragsdale, 2008, p. 2122)). Furthermore, they found that use of seasonal water sources (river water and rainwater) was not associated with emotional distress due to unrestricted access. They argued that water-related emotional distress is the consequence of the social and economic negotiations people employ to gain access to water distribution systems in the absence of clear procedures or established water rights rather than absolute scarcity of water.

Other authors have documented the consequences of coping strategies incidentally as they were studying issues related to intermittent supply of water. Choe et al. (1996) found that households in India were forced to buy storage facilities in order to cope with unreliable water supply. Other consequences included the loss of time to conduct economic activities as households spend a
significant amount of time fetching water. The opportunity cost of the hours spent fetching water implies loss of wage income (Boone et al., 2011).

Authors have also raised concerns over disparities in the way the consequences of coping affect water users depending on their gender, economic status and geographical location. For instance, poor households spend a significant amount of time collecting water than non-poor households. Consequently, poor households spend long hours looking for water and have less time for other economic activities. In Kenya, Gulyani et al. (2005, p. 1269) found that poor households without private piped connections were spending an average of 42 minutes in collecting water while non-poor households spent only 15 minutes. Similar observations on disparities on water collection time were made in India (Choe et al., 1996) and Madagascar (Boone et al., 2011). In Bolivia, Wutich and Ragsdale (2008) found that women experienced significantly more emotional distress over water insecurity than men.

c) WATER VENDING

Urban residents with poor access to water are left with two choices – to buy water from (re)sellers or get it for free from sources like rivers, lakes or unprotected dug wells. Usually charged water is considered better than free water (Persson, 2002), hence choosing the latter is often considered as the last resort. Water sellers exist in different forms: ‘resellers’ - those connected to the public pipe-water system who sell to others (Kjellén, 2000, p. 143) and ‘water vendors’ - mobile water distributors who carry water to the premises of the consumers (ibid, p.144). However, in this study, water vending will refer to forms of non-utility water provision for fees.

A notable discussion within water vending literature is the comparison between prices households pay to private independent providers and piped water connections provided by public utility companies. Such comparisons are motivated by the quest for equity - the premise that water should be accessible and affordable to all. A number of authors have shown that poor households pay more than their counterpart rich households (Kjellén & McGranahan, 2006; Wutich & Ragsdale, 2008). However, others defend these high prices arguing that they are caused by cost mark-up particularly when the vendors buy water from utility companies and have to transfer it to users at a different location (Gulyani et al., 2005). The result of these comparisons have created a dilemma among researchers, practitioners, donors, and policymakers on the role of private water providers. On one hand, authors like (Collignon & Vézina, 2000; Gulyani et al., 2005; Kjellén & McGranahan, 2006; Schaub-Jones, 2008; M. P. van Dijk, 2008) recognize the role played by small scale water providers and suggest that they should be considered as an integral part of water provision systems. On the other hand, many governments and water utility companies object or ignore the involvement of small scale providers claiming that they are driven by profit making – they charge high prices for poor quality water (see Collignon and Vézina (2000)). Many critics consider non-utility providers as temporary solutions (Kjellén & McGranahan, 2006).

With regard to water vending, studies on coping strategies of citizens have also focused at understanding how households manage the cost of water. The vast majority of people without a piped water connection often works in the informal sector and thus has no regular income and low savings. In contrast to water utility companies who often charge monthly water bills, non-utility water providers offer flexible payment methods such as ‘pay-as-you-go’ billing and short term credit (Collignon & Vézina, 2000, p. 21). These flexible payment methods allow poor households to continue to access water even when they temporarily have no money.
d) RELATIONSHIP OF CITIZENS WITH GOVERNMENT AND INTERMEDIARIES

Recent reforms in the provision of public services have imposed institutional changes that demand stronger accountability relationships between policymakers, providers, and citizens. Current developments in public service delivery emphasise the participation of the users in the design, management and maintenance of water projects (World Bank, 2004). Participation of users is assumed to put them at the centre of service provision, by enabling them to monitor and discipline service providers, by amplifying their voice in policymaking, and by strengthening the incentives for providers to serve them (ibid). Authors in this category have attempted to examine the relationship between citizens and actors that influence provision of water such as governments (policy makers), water utility companies, media and non-government organizations (NGOs).

A notable study is van Dijk’s analysis of how citizens access basic facilities including water in two Indian cities, Kalyan–Dombivli and Mira–Bhayandar (T. van Dijk, 2011). She found that citizens’ access to government services is mediated by ‘networks of urbanization’, various institutions and networks that bridge ‘structural and cultural holes’. She defines structural holes as “the gaps between both the formal-legal channels of entitlement actualization (and informal channels)” while cultural holes are “contingencies [and ruptures] of meanings, practices, and discourses that enable structural holes” (T. van Dijk, 2011, p. 307). Although van Dijk’s study does not explicitly study coping strategies of citizens as they cope with poor access to water, it provides a framework to understanding the factors driving citizens to use certain types of services among many alternatives.

With regard to Tanzania, (Kjellén, 2006) examines the effects of people’s own dealings and methods of escape from water problems on the water systems to the overall deterioration of services from the utility company. Instead of protesting, Dar es Salaam residents were ‘accustomed to living with crisis’ (Kjellén, 2006). Inequalities caused by mode of service or position in the water system, class or socio-economic groups and geographical location were found to impede Dar es Saalam residents from organizing city-wide protests.

e) COLLECTIVE RESPONSES TO POOR ACCESS TO WATER

The majority of urban residents in developing countries who live in informal settlements and peri-urban areas do not have access to public piped water connections. Lack of land tenure as well other institutional and economic factors impede public water providers from extending piped connections to informal settlements. Faced by limited resources, collective responses to water problems seem a plausible alternative for many citizens living in unplanned areas. Some governments also promote collective responses to poor access to water. For instance, the Tanzanian water authority provides for community water management for rural areas (URT, 2002). Similar arrangements are employed in informal and peri-urban areas. Different forms of collective responses exist such as community associations, non-governmental organizations (NGOs) or groups of people forming private companies. Authors in this category have attempted to understand the formation, management, effectiveness and sustainability of collective responses to poor access to water.

Akbar et al. (2007) examined the factors influencing the formation of community organizations in Dhaka, Bangladesh. Using a household survey, they observed that institutional and political factors were the main barriers to improved water supply in informal settlements. For example, corrupt staff of the public water provider did not extend piped water to informal settlements as they would lose extra income that they were earning through bribes. Similarly, informal dwellers were discouraged to pay for water improvements as they feared eviction. However, their study suggested a model that would
help improve community management of water improvements. The model emphasized engagement of the private sector to empower local communities.

In Tanzania, Kyessi (2005) found that while self-help community initiatives have the potential to improve access to water they are also confronted with constraints. With the help of financial and technical assistance from NGOs and local governments, communities in the fringe settlements of Dar es Salaam city were able to form neighbourhood associations and mobilized funds for water infrastructure improvements. Such initiatives, he argues, have the potential to utilize local resources and improve community organization and access to water. However, the sustainability of such processes is threatened by poverty of households, lack of transparency and “hidden interests such as political gains by local leaders and political parties” (Kyessi, 2005, p. 18).

Other authors have also raised concerns on the problems faced by citizens when working collectively to respond to problems of water. One notable study is by Dill (2009, p. 728) who observes that the organizational set up of many community-based organizations in Dar es Salaam echoes the conditions made by governments and donor community. For instance, creation of a community-based organization requires registration with the government authorities. Community organizations also need certification in order to be trusted by donors and consequently access funds. Although these conditions allow community organizations to acquire legitimacy and access to resources, they also act as hindrances as many community organizations can hardly afford to go through bureaucratic processes. Such a phenomenon is observed in Tanzania where delays in the replacement of water committees (a segment of lowest-level local government) by community organizations for water supply organizations (COWSOs) are evident. The new water policy replaced water committees by COWSOs in order to improve autonomy and efficiency in managing and operating community water projects (URT, 2002). COWSOs must be registered by the district council to attain legal status and become operational. A constitution and a bank account is part of the requirements for the registration of the COWSOs (ibid).

f) Users’ experiences and perspectives of poor access to water

Recent developments in the service provision include users as an integral part of the design, management and operation of water supply programmes. The involvement of users is thought to minimize previous failures of many top-down water projects. Authors in this category introduce issues of governance and institutional arrangements related to water provision. That is, studying users’ experiences and perspectives is integral to understanding the factors that are likely to influence the improvement of services.

More recent studies have also emphasised how water users respond to mechanisms of efficient revenue collection for water supply companies and utilities. Efficient revenue collection allows water utilities to achieve cost recovery which is critical for service reliability and sustainability of services. Hope et al. (2011) looked at water user experiences with recently introduced innovations such as mobile water payments of water bills. Mobile water payments are expected to offer a promising new approach to improve the financial performance of water service providers, offer time and cost savings to water users, and increase customer loyalty for mobile network operators (Hope et al., 2011, p. 2). Interestingly, they found that levels of wealth, education or water service satisfaction were not significant in inducing water users to adopt mobile transactions (ibid).

In Kenya, Kremer et al. (2006) studied the distribution of free WaterGuard (a drinking water treatment solution) and examined how two groups of households – those who received WaterGuard and those
who did not (a control group) – responded to the technology. They found that the wide-spread use of WaterGuard was much influenced by social networks. New users of the technology played a big role in dissemination among users of the drinking water treatment liquid. To their surprise, about 20% of the households who were given free WaterGuard did not use it and only a fraction of households were buying it despite being offered deep discounts. Their study could not explain such user behaviours. These findings raise important questions about the extent to which financial costs influence the adoption and use of water and other related products.

SUMMARY

The reviewed literature illustrates that problems of access to water are complex and have confronted citizens in the developing countries for many decades. Most of this research shows that citizens rely on a “variety of water sources, including piped and non-piped sources with different characteristics and levels of service [price, distance to the source, quality, reliability and so on]” (Nauges & Whittington, 2010, p. 264). Similarly, coping strategies employed by citizens vary significantly across localities, socio-economic and cultural boundaries.

Many authors reviewed in this paper have employed quantitative research methodologies employing household surveys and mathematical models (Whittington et al., 1991; Whittington et al., 2002), experimental methods (Kremer et al., 2008), and randomized evaluations (Kremer et al., 2006). Given the challenges of conducting surveys in the ‘data constrained environments’ of the developing world, it is likely that significant realities are overlooked. Similarly, although these studies provide quantitative estimates and generalization, one-size-fits-all solutions are likely to fail in diverse contexts and conditions (locality, economy, politics, institutions, living conditions, family and persons). Qualitative approaches have the ability to uncover realities that otherwise would be ‘little recognized’ or ‘passed unseen’ by quantitative studies (Rasmus Heltberg, 2012). The qualitative approach employed in this study will complement quantitative studies on how people cope with poor access to water particularly in Dar es Salaam, Tanzania.

The reviewed literature also shows that studies of citizens’ coping mechanisms have evolved over the last four decades. They have shifted from being mainly concerned with measurement of price and income elasticity to a more holistic approach of understanding the reality of access to water. However, little is known about the day-to-day experiences of citizens as they cope with poor access to water. In particular, knowledge is scarce on how Dar es Salaam residents get water to their houses – the decisions they make and the people they contact.

RESEARCH DESIGN

A qualitative research approach was selected for this study. The study employs an interpretive descriptive research strategy as it offers researchers a tool for understanding the entirety of an experience. Flexibility offered by qualitative research approach (Yin, 2011) fits well the main research question which aims to empirically investigate day-to-day experiences of citizens’ strategies as they cope with poor access to water.

Dar es Salaam was chosen as the case study. Dar es Salaam hosts major stakeholders in the water sector: ministerial offices, key media houses and prominent NGOs. Administratively, the city is divided into three municipalities: Kinondoni, Ilala and Temeke. This study was conducted in Kinondoni and Temeke as they provide cases that allow comparisons between planned and unplanned areas. Furthermore, four streets were selected to represent both affluent areas (Masaki and Oyster
Bay) and low income areas (Nyambwera and Mkunduge) and to allow formal/informal and rich/poor settlement comparisons.

The study employs purposive sampling for selecting the field area and citizens who we thought would yield the most relevant and plentiful data (Yin, 2011). In addition, non-random sampling was employed to select individual citizens for in-depth interviews. Eventually, a sample of 22 citizens participated in the study, enough to reach a saturation point—a situation where no new stories and themes are observed (Guest et al., 2006).

Furthermore, semi-structured interviews were conducted with Kinondoni and Temeke Municipal Water Engineers in order to ascertain their views on the current state of access to water within their jurisdiction. In addition, semi-structured interviews were also conducted with street leaders at Oyster Bay, Masaki, Mkunduge and Nyambwera with the objective to document their perspectives regarding access to water. Likewise, we interviewed NGO staff from WaterAid and the Belgian Technical Cooperation to understand their interactions with citizens in Mkunduge and Nyambwera. The two organizations have been assisting communities to improve access to water through underground water projects. Overall, views from the officials allowed a comparison with the information collected from citizens. Snow-balling was used to locate water vendors particularly in Mkunduge and Nyambwera streets.

In-depth interviews were conducted between November 2012 and May 2013 in order to collect data on individuals’ personal experiences on how they access water with particular interest on type of water sources, time of collection, and their interactions with water providers. Interview questions also focused at documenting day-to-day coping strategies for water. Interview guides were developed to steer the semi-structured interviews. Getting respondents in low income areas was easy given that many were at home during working hours. In contrast, it was a challenge to get respondents in Oyster Bay and Masaki areas because many people were not at home during working hours. Equally, actual access to the houses would not be possible without applying for a formal research permit from the street government office and recruiting a local guide. In some cases, two visits to a single house were required—first to make an appointment, followed by the actual interview on the second visit.

Review of published and unpublished documents from government, NGO and research institutions was also carried out. For the government, the review mainly focused at policy documents, strategies, and programs on water. Further emphasis was given to specific documents that document urban citizens’ attitude toward access to water. With regard to NGOs, document review focused at strategic plans and documents published for distribution to citizens such as brochures and press releases. This review helped to understand how NGOs perceive and represent problems with water as well as the way they interact with citizens.

The data analysis process began in the field by summarizing the key themes observed during data collection both through document review, interviews (with citizens, public officials, NGO staff) as well as informal discussions. Afterwards, the organization and analysis of the data was done using computer aided qualitative data analysis software (CAQDAS). Audio recordings of the interviews were first transcribed into Swahili, the language used in the interviews. Later, Swahili interview transcripts were translated into English and imported into CAQDAS. In addition, the first author’s field reports, field notes and secondary literature were also imported. In order to maintain the anonymity of respondents, all transcripts were given numbers e.g. OY1 = first respondent in Oyster Bay. Thematic coding (Bryman, 2012) was used to analyse the data of this study where meaningful
segments of text from the transcripts were assigned a code to signify that particular segment. For example, terms like ‘water prices’, ‘water quality’ were assigned to some of the recurrent issues in the text.

**CASE STUDY AREAS**

Dar es Salaam is one of the fast growing cities in the Africa with a population of 4.4 million people (NBS, 2013). Similar to other cities in developing countries, a significant proportion of Dar es Salaam population has no adequate access to water supply. Likewise, a large proportion of Dar es Salaam population lives in unplanned settlements creating a challenge for them to access piped water. As a result, the majority of the population rely on public standpipes and informal providers as their main source of water.

Dar es Salaam Water and Sewerage Corporation (DAWASCO) is the official supplier of water and sewerage services in the city. DAWASCO has three major sources of water i) Lower Ruvu, ii) Upper Ruvu and Mtoni. These sources were constructed in 1976, 1958 and 1947 respectively. Other sources include bore holes in Kizinga, which were constructed in 1997. In total, DAWASCO produces 245 million litres of water as compared to the estimated demand of 533 million litres (URT, 2013). However, not every drop of the produced water reaches the users and about 44% of the domestic connections do not get water (GIZ, 2012). The Ministry of Water estimates that 49% of the produced water by DAWASCO is lost due to old infrastructure and illegal water connections (URT, 2013). Official statistics show that only 68% of Dar es Salaam residents get “clean water” (ibid). However, DAWASCO performance report for 2010/2011 shows that it has a total of 109,633 domestic water connections which is estimated to serve 600,000 households in its service area (EWURA, 2012). The report also shows that DAWASCO only serves 18% of the total number of households within its service area (ibid).

Access to water in Dar es Salaam varies significantly across socio-economic and geographical boundaries. The distinction is more pronounced between planned and unplanned areas, and between rich and poor households. Rural water management frameworks are used for managing water supply in unplanned and peri-urban areas of the city. Unpredictability of the water services by DAWASCO has forced households to devise private means to cope with the situation. In areas where DAWASCO is completely absent, communal efforts have been adopted to ensure people get the precious liquid.

a) **MASAKI AND OYSTER BAY STREETS**

Masaki and Oyster Bay are representative of affluent streets in the Dar es Salaam city. They are located along the Indian Ocean peninsula and were inhabited by whites during the colonial period. After independence in 1961, the area was transferred to high profile public officials and diplomats. In the past decade, the houses were privatized to public officers. Currently, the construction of multi-storey apartment buildings, office blocks and estates characterize the settlement development in the area. As a result of these developments, population density is increasing thereby putting pressure to the old infrastructure including water distribution networks.

b) **MKUNDUGE AND NYAMBWERA STREETS**

Mkunduge and Nyambwera are representative of low income areas in the Dar es Salaam city. Mkunduge street is found in Tandale ward, Kinondoni Municipality while Nyambwera Street is found in Tandika ward, Temeke municipality. Both streets are located in informal settlements characterized
by unplanned settlement, poor public service and low and middle income residents. Major sources of water in Mkunduge include i) borehole vendors ii) pushcart water vendors selling water from water kiosks, borehole vendors and piped water from household resellers in the neighbouring streets iii) public water kiosks and iv) mosques. On the other hand, major sources of in Nyambwera include i) public water taps supplied by the community water project, ii) neighbours who own deep water wells, iii) mosques. In both streets, citizens also get water from shallow wells dug on the river banks and valleys. There is a DAWASCO piped water network in Mkunduge but it does not supply water. Nyambwera has no DAWASCO piped water network but few citizens get DAWASCO water through household resellers from a neighbouring street. In Nyambwera, only one household is connected to DAWASCO mains and sells water to neighbours.

RESULTS

SOURCES OF DRINKING WATER
Several sources of drinking water are available for Dar es Salaam citizens namely DAWASCO, bore hole vendors and unimproved sources like rivers, streams and shallow open wells. Citizens access DAWASCO water directly through private in-house connections, private standpipes or public standpipes. In addition, citizens also access piped water through water vendors such as household resellers, tank trucks and pushcart vendors. Fig. 1 summarizes sources of drinking water in Dar es Salaam.
ACTORS

In this section we present key actors that enable citizens to access water. The selection is based on the interactions of actors and citizens at the ‘street level.’

DAWASCO Staff

DAWASCO staff falls both under formal and informal actors influencing access to piped water in Dar es Salaam. On one hand, citizens can interact with DAWASCO staff under official arrangements such as application for new water connections, reporting breakdowns, and payment of water bills. Likewise, DAWASCO water technicians are responsible for managing the water rationing timetable. Many of these processes require physical visits of citizens to DAWASCO offices. On the other hand, citizens interact with DAWASCO staff informally, to acquire illegal water connections. In most cases, face-to-face and personal interactions are preferred to virtual communication. For instance, one resident in the high income areas explained how they interacted with DAWASCO staff.

“In case of a problem, our father used to drive to DAWASCO offices, and if the problem required physical visit by water mechanics, then he would bring them in his car and drive them back upon finishing their work. Sometimes my mother gave them lunch. They liked my father, whenever he showed up at their offices, they would react without delay” [OY2].

With regards to monitoring illegal use of water, DAWASCO staff are also responsible for arresting people who have installed water pumps. In some cases, illegal water users collude with DAWASCO staff to connect into the water mains or divert water to areas which do not have piped connections. In addition, there are claims that DAWASCO staff tip-off illegal water users about planned operations designed to apprehend them.

Politicians

Besides fostering representation and participation of citizens, political parties are also considered to play a significant role in influencing access to water of many urban residents. This role is greatly felt within informal and semi-urban areas where piped water connection is lacking. Within these areas, access to water is often through community water projects which are managed by water committees [part of the local government] and overseen by the political leaders such as street chairpersons. In Dar es Salaam, the performance of community water projects in ensuring reliable access of water to citizens greatly depends on the performance of local political leaders (Bourque, 2010). In addition, there are high expectations from citizens that political leaders have a role to play in improving access to water within their jurisdictions. Citizens also expressed their disappointments with politicians. Statements like “we don’t have water in our area and we are wondering what is our MP doing?” [MK3] or “the neighbouring ward has a very strong councillor [political representative of ward] and I think that is what helped them to get water, a dispensary and a bridge” [NY2] demonstrate high expectation of citizens from politicians.

Municipal councils

According to the Tanzania water policy, local government authorities like municipal councils are responsible for the provision and monitoring of water and sanitation services. The role of municipal
councils differs between rural and urban populations. In Dar es Salaam, areas that are served by piped water networks have less direct interactions with municipal councils. Instead, day-to-day interactions take place between water users and the water utility company. On the other hand, a close relationship between municipal councils and water users is apparent. Municipal councils are responsible for construction of water wells and monitoring of the water committees particularly on performance on service delivery and financial management. Municipal councils are also responsible for registering community owned water supply organizations (COWSOS). Water committees are required to report to the municipal councils on monthly basis using paper based reporting tools. However, quick and day-to-day communications are often done through calling personal mobile phones.

NGOs and Donors

Non-governmental organizations (NGOs) are important actors in the improvement of access to water to Dar es Salaam residents particularly in areas without piped network. In most cases, NGOs provide both financial and technical support to citizens for the construction and management of community water projects. During construction of wells, NGOs require citizens to give monetary contributions with the belief that it will create sense of ownership, consequently, ensuring sustainability of the projects. The interaction of citizens and NGOs is through local governments and other forms of representation like water committees.

Water vendors

Water vendors play a great role in enabling citizens to access water. They exist in many forms and “may operate water kiosks, where they sell water from a shallow well, a borehole, a commercial water connection, or a household connection to the piped network” (Kjellén & McGranahan, 2006, p. 2). That is, water vendors act as intermediaries between citizens and other forms of water providers such as DAWASCO and community water projects. In areas where there is piped water network, the role of water vendors becomes more significant during DAWASCO breakdowns and stiff rationing. During such period, water becomes scarce and has to be collected water from long distances. Water vendors relieve citizens with the troubles to walk long distances or spend long hours looking for water. Yet, citizens pay money in exchange to the service they get from water vendors.

Private water mechanics and plumbers

Private water mechanics provide technical support to citizens regarding water supply system. They give advice on the type and quality of spare parts citizens have to buy, construct water wells and repair piped and non-piped water systems. Very often, private water mechanics fill the gap of DAWASCO water mechanics particularly during long delays and unsuccessful response.

Many private mechanics and plumbers work informally without any registration. Usually their interactions with water users does not involve any paper work. To a large extent, citizens reach water mechanics through word of mouth. Ubiquity of mobile phones has made it easier to link water mechanics and their clients. Plumbers and water mechanics can easily be reached through their mobile phones. It is common to find their contact details posted on tree barks, electric poles, bus stops and local government offices. Prices of their service are never fixed, instead, they are set through negotiations depending on the extent of work, distance travelled and relationship with the client. Cash payment is the most frequent modality of payment, however, some are adopting mobile money transfers. While many private mechanics can be reached with convenience and can respond quickly,
some citizens were concerned about poor quality of service and dishonesty. “We paid all the money but he didn’t turn up to finalize his work which was to fix an electric pump to a well” narrates one respondent regarding the experience with one private water mechanic.

Mosques

Mosques are an important water supplier for Dar es Salaam residents. Mosques have a long history of selling water in the city. “When the British colonial authorities, for health reasons, wanted to banish such sales, representatives of the “Islamic Community of Dar es Salaam” wrote a letter (dated 25 August 1938) to the Governor and Commander in Chief, defending their right to sell water. They insisted that water-selling had long been practised, and that the German authorities had always respected it” Kjellen & McGraham (2006, p. 10). Mosques as water providers are important in the low and middle income neighbourhoods of the city even in areas with piped water connections. Prior to prayers, Muslims are required to perform a ritual washing called Wudhu. In that respect, almost every mosque is equipped with a deep water well to ensure reliable water supply needed for prayers. Usually, the wells are fitted with electrical pumps to draw water to tanks. Since electricity in Dar es Salaam is not reliable, most of these mosques have bought generators to run the pump during power rationing. In Nyambwera, for instance, water from the mosque is considered more reliable than other sources which are affected by power cuts and low voltage.

Water Drilling Companies

Water drilling companies are an important actor that mediates citizens’ access to water in Dar es Salaam. Both public and private water drilling companies exist. Drilling and Dam Construction Agency (DDCA) is a government agency providing drilling, rehabilitation, service of boreholes and repair of pumps. On the other hand, small private companies and individuals also exist providing similar services to DDCA. However, many private companies repair pumps and provide spare parts such as starters and other safety gadgets. Depending on the quality of water pump, the cost of drilling a water well varies from one area to another, ranging between 5million to 10million Tshs. The majority prefers small drilling companies since they are regarded as financially cheaper and less bureaucratic. “…Most of our customers are public institutions and NGOs, for example most of our work is with local councils outside Dar es Salaam” “You have two options, either go with the official procedures or I refer you to one of our colleagues and he will settle your problem outside the formal processes. The latter is less expensive and may be more convenient as he will go with you to your site right now… Do you have transport?... So, Which one is better for you?... ”[WT1].

House owners

For households who are renting living quarters, their house owners or land lords play a significant role in ensuring their access water. For areas with piped water connections, all the interactions with the utility company are carried out by the land lords, including bill payments and reporting of problems.

Water mafia

Water mafias exist in many forms including individuals who facilitate illegal piped water connections, interfere with water rationing or collude officials to ‘massage’ water bills. Water mafias enables many citizens who would not afford a piped connection to access piped water, yet, in the detriment of others. Surprisingly, many citizens seemed to defend water mafia practices, however, picking out only few or
certain types such as individuals with illegal water connections who were selling water through public standpipes. “...The government should reconsider about this operation, they have arrested these people [illegal water users] and now we don’t have water. Just two days after the arrests, the price for a bucket of water has gone from TShs 300 to Tshs 700...” [MK3], one citizen in Mkunduge street describes the impact of arrests of illegal water users made by DAWASCO in collaboration with municipal officials and the police. This demonstrates the significance of water mafia.

CITIZENS’ COPING STRATEGIES

Many coping strategies found in Dar es Salaam correspond to certain dimensions of access to water such as reliability, quantity, quality or convenience. Still, a single coping strategy can solve more than one problem of water. For instance, buying water from vendors is likely to cater for problems of quantity, quality and convenience particularly if the vendor has collected water from a public utility piped system. Three main typologies can be suggested to distinguish different coping strategies observed in Dar es Salaam i) short term versus long term, ii) individual versus collective and iii) accommodation versus enhancement. Enhancement strategies refer to coping mechanisms intended to “increase the level and quality of water supply services by supplementing the available supply” such as buying water from vendors (Kudat et al., 1993, p. 3). On the other hand, accommodation strategies are “intended to adjust behaviour to accommodate the unreliable supply of water” such as consuming less water, or shifting hours of doing laundry to periods when water is available (Kudat et al., 1993, p. 3). However, the three categories mentioned above are not mutually exclusive, hence, we shall discuss the coping strategies according to the main problems they solve.

Drilling of private deep wells

Many households connected to piped water also have private deep wells as an alternative source of water during scarcity. Unfortunately, many of these wells provide salty water. In Masaki and Oyster Bay, the wells are mostly used for a single household. In contrast, deep wells in Nyambwera and Mkunduge are meant for selling to neighbours. In most cases, households use informal arrangements to drill the wells as it is cheaper and less bureaucratic. One resident in Oyster Bay explains her views on the quality of service provided by the informal mechanics.

“The thing is we don’t use qualified mechanics, we usually call a friend or relative and ask the people they use, so you never know if these people are qualified or not. As long as they can provide the service, that’s good for us...” [OY2].

The decision to drill wells is much influenced by recommendations from friends, colleagues and relatives. In some cases, seeing a neighbour drilling a well is enough to spur interest to do the same as it was explained by one resident in Oyster Bay.

“...We saw some men with machines at our neighbour’s house. We were then told that they were drilling a well. So we asked them to do the same at our house. We were also told that they come from the government drilling company but they wanted to do the work informally. This was a cheap option for us, we knew won’t be required to deal with the long process to get a permit. We were also told that official fees are bit higher than what they were charging us. However, we later got into problem with that arrangement. They didn’t complete the work, you know they have official roles and if they travel to other places you can’t get them. Our communication was mainly through phone and since it was an
informal arrangement, we couldn’t trace them or visit their office physically. We couldn’t get them to finalize the work, so we had to pay other guys to fix the water pump...” [OY4].

Buying water from vendors

During DAWASCO breakdowns, access to water for most households is through vendors. In contrast to other neighbourhoods of the city, Masaki and Oyster Bay are largely served by big motorized tanker trucks. In contrast, majority of residents in Mkunduge get water from water resellers, pushcart water vendors and water kiosks.

The water kiosks were originally introduced by DAWASCO as a means to supply water to communities that do not have in-house water connection. The kiosks are run by private agents who in return pay rent to DAWASCO. However, the kiosks do not get water from DAWASCO. Instead, they get water from bowsers or illegal connections from the neighbouring street. As one resident explained:

“The owner of the plot was not able to run the kiosk since there was no water. So this man came and rented the place. He dug a trench from Mwananyamala [a neighbouring street] and lined water pipes. He invested a lot of money. He installed a water pump in order to bring water to this place. That is when he started to sell water to us.” [MK1]

As opposed to other parts of Dar es Salaam, water vending using pushcarts is very minimal in Nyambwera. Water tanker trucks are non-existent.

The price of water sold by vendors in Dar es Salaam varies between sources of water, quality of the water and availability. The highest price is for bottled water ranging between 600Tshs to 1000Tshs per litre depending on the brand. Next is tap water which usually is sold at the price of 250Tshs per 20 litre bucket during normal situations. However, the price can get as high for the same quantity when water is scarce. For instance, the aftermath of the DAWASCO’s operation to arrest illegal water users in February 2013 (Kisanga, 2013), saw the prices going as high as 700Tshs per bucket. During this time, water has to be collected from distant neighbourhoods.

Trucks serving affluent neighbourhoods have set a limit on the minimum amount of 1000 litres of water a person can buy. In addition, the price of water gets low as the amount of water in a single purchase increases. For instance, the price for 1000 litres of water is 8000Tshs compared to 60,000Tshs for 10,000 litres. Thus, it is cheaper to buy water in large quantities. Some Masaki residents noted that they tried to propose to their neighbours to buy water together. The objective was to get water at a lower price. However, the proposal was not accepted.

Residents in Masaki showed concern for the quality of water particularly provided by water vendors. However, the taste of water i.e. salty water as opposed to non-salty water is usually the yardstick used by many. Sometimes the water vendor specifies the appropriate use of the water they sell.

Buying water from neighbours

Although many residents in Masaki own deep wells, some households buy water or get it for free from their neighbours. Inability to afford drilling costs was frequently mentioned as the reason for choosing to get water from their neighbours. Likewise, some people have tried to drill wells within their plots but could not get water or the water was too salty. Some of the respondents who get water from neighbours reported to get it for free. Arrangement on whether to get water for free or payment was
reported to depend on the relationship between neighbours. However, such arrangements are prone to changes depending on changes in relationship or other factors. One respondent who was getting free water from his neighbour stated that he was asked to start paying after he had enjoyed six months of free water.

“There was this day when we were told that we need to pay since the water bill has gone up. We were not prepared for this, so we had to stop going there. We later learned that the owner was no longer living in the house. So it was just the guard who wanted to benefit from us – he wasn’t the one paying the bill” [OY3]

Various ways are used to transport water between neighbours. Some households were getting water through connecting plastic pipes while others carry buckets on their heads. Still, some respondents were not allowed to enter inside the fences. Instead, they get water from taps outside the fence and next to the gate.

Getting water from the neighbours has its own challenges particularly in affluent communities such as Oyster Bay and Masaki. Some water users are allowed to fetch water from their neighbour only at a specific time of the day. To them, this limits access to water when they need it most. Masaki and Oyster Bay feature an affluent community with maximum security including trained dogs. In some cases, they feared to be attacked by dogs.

**Illegal connections and stealing**

Different forms of illegal water connection or stealing from DAWASCO piped network were frequently reported in Masaki and Mkunduge streets.

In Mkunduge, it was reported that people have illegally connected their houses to DAWASCO water network. The DAWASCO distribution network in Mkunduge does not provide water; instead, people have connected water from neighbouring streets. One water vendor in Mkunduge testified to have connected water from Mwananyamala.

“I spent about two million shillings to lay pipes from Mwananyamala to this place. That is about two kilometres from here, I bought 20 rolls of pipes [one roll is 100m]. Still, I had to buy a pump to pull the water all that distance”. [MK4]

Given the high capital requirement to connect water from Mwananyamala and other neighbouring streets, those who can afford it do sell water to their neighbours. This is the main source of water for Mkunduge residents especially for drinking. Regular price of tap water is 250Tshs per bucket (20 litres). However, the prices go up when water is scarce, usually caused by DAWASCO breakdowns and lack of electricity.

This type of stealing is known to government authorities as well as DAWASCO. During the fieldwork, DAWASCO conducted an operation to arrest illegal water users. However, some respondents felt that the operation did not eliminate all the illegal water users.

“…Don’t think that they have arrested all criminals; some were tipped off by DAWASCO staff that the operation will be carried out. So they were not arrested as they knew what and when it was going to happen…”[MK3]
In Masaki, some households particularly large water consumers like apartments get water from organized criminal individuals here referred as “water mafia”. Water mafia usually targets rich people, expatriates and apartment owners since their customers cannot live without piped water. Their first step is to sabotage the water supply system by either cutting water pipes or cutting off the flow of water in other ways they deem fit. This is done to create demand for their service. Next, they approach the targeted customers to market their service ensuring them that they can provide reliable water supply for an agreed fee. The packages usually include provision of piped water for a flat rate monthly fee. Other services include reconnection of water and fixing long standing debts with the water authority. Discussion with residents from the high income areas revealed that the local government and high level leaders are aware of such practices.

One resident in Masaki described networked water theft practices:

“...Don’t call them middlemen. They are thieves, write it the way I am saying it - water thieves. ...I am very certain that water woes are largely caused by those people. They have their own means to create demand for their service, they sabotage water network, either they may cut off some pipes, or do anything so that you don’t get water. Then they come with their offer to supply reliable service. ...the local government knows them, DAWASCO knows them too... There was a day I asked DAWASCO people, the ones who move around in Bajajs, I asked him why these people are not arrested, to my surprise, the guy told me that even if he is going to arrest them the next day they will be back in the streets, his boss would have released them...” [MA2]

Similar claims of letting water criminals unpunished were made by one local government official in one of the affluent streets¹. “If the people higher up can’t do anything about this, then we have no option, our hands are tied up” he lamented. Some respondents knew of such practices but they do not to report them as they would be victimized. “I will keep my mouth shut as long as I don’t want to lose my teeth and nails” a resident from one of the affluent streets narrates echoing widespread fear that vocal individuals are tortured or killed. In 2012, a journalist and medical doctors’ representative were brutally beaten, their nails and teeth chipped off, and left to die in Mabwe Pande forest. Both cases were associated with the nature of their work –complaining about the practices of the water mafia.

Due to the sensitive nature of the issue and the difficult access to people involved in the water mafia, this study was not able to conduct interviews with these actors to understand the processes, motives and incentives of their actions.

**Buying water from Mosques**

Mosques are an important water supplier to the Dar es Salaam residents. The importance of mosques as water providers is well established in the low and middle income neighbourhoods of the city. Prior to prayers, Muslims are required to perform a ritual washing called *Wudhu*. In that respect, almost every mosque is equipped with a deep water well to ensure reliable water supply needed for prayers. Usually, the wells are fitted with electrical pumps to draw water to tanks. Since electricity in Dar es Salaam is not reliable, most of these mosques have bought generators to run the pump during power rationing. In Nyambwera, for instance, water from the mosque is considered more reliable than other sources which are affected by power cuts and low voltage.

¹ The name of the street is withheld due to sensitivity of the issue
Usually the members of the mosque contribute money to finance the drilling of the wells. However, all three mosques have benefited from external financial assistance from good Samaritans within the business community. Mosques sell water in order to generate income for maintenance and payment of electricity bills. The price for water at the mosque is lower than the community water project and private vendors. For instance, the quality of water in Nyambwerwa where there is no piped water supply, the water from the mosque is considered the best quality in the area.

**Buying bottled water**

Respondents reported the use of bottled water in all four streets, especially in high income areas like Masaki and Oyster Bay streets. Several respondents from Masaki reported that bottled water can also be used for bathing during periods of high water scarcity. For example, one resident in Oyster Bay mentioned that he uses bottled water for drinking. “*For drinking water, I get a 10 litre bottle every day from my work place. I have a shop at Msasani and I cycle to and from work every day*” [OY3] he reports.

Given the hot weather of Dar es Salaam, many households desire chilled water. However, a great number of households in poor and informal neighbourhoods hardly own refrigerators. Still, power outbreaks lessen the number of households who can afford cold drinking water. In Nyambwerwa and Mkunduge for example, households who have fridges and freezers sell chilled water to their neighbours. The water is sold either as cold or as ice, usually packed in small plastic sachets averaging between 30ml and 50ml. The price ranges between 20TShs and 50Tshs per sachet depending on the availability of electricity and the source of water. Iced sachets made by tap water are sold at a higher price than those made by salty water from wells. In Masaki and Oyster Bay, similar practices were only found within construction sites serving commuting labourers.

**Installing water pumps and reserve tanks**

This strategy is common for households who have piped water connections but experience low pressure. Water users cannot be sure when they will have water and whether it will flow long enough to fill their storage facilities. Masaki and Oyster Bay residents frequently mentioned that they get water twice per week and often at night. Many households in these high income areas have connected electrical pumps that pump water to elevated reserve tanks. That is, the cost of connecting water from the public supplier is high. One respondent felt that having a private well is cheaper than piped water from DAWASCO. She had this to say:

“*...In general it is cheaper to have a private well than the problems we get with the water from DAWASCO. ...part of it is because DAWASCO billing system is speculative... They just estimate, and since this is an affluent area, they think everyone is rich. I feel that DAWASCO presumes that everybody living in Oyster Bay will be watering their gardens. When we started to use our own water we thought the bill would go down, but the bill kept coming unchanged for three consecutive months. We reported this to the meter reader; he was shocked, adding that he was unaware that we had a well. He also told us that he works as an agent for DAWASCO; he was shocked. The next month the bill went down. So you can see, their billing does not rely on meter reading...*”[OY2]

Some respondents in Masaki felt that water timetable interferes with their sleeping time hence affecting their efficiency at work during the day.
“...We wake up at night, switch on the pump and go back to sleep. The mechanics told us that the pump may explode if there is no water to pump. So we live with this fear but there is nothing we can do about it.”[OY2]

Buying electric generators

Power rationing and low voltages affect the supply of water from DAWASCO and private water wells. Electricity supply in Dar es Salaam is not reliable especially during dry seasons. Usually power breakdowns cause water shortage since both DAWASCO and private water cannot pump water to their reservoirs. Furthermore, poor communities which are often overcrowded, experience low voltage. Low voltage causes two problems; (i) it cannot run the water pumps, and (ii) creates high risk for electric shock to the pumps. Broken water pump due to electric shock was reported to affect Nyambwera community water project. This reduces citizens access to water with significant impact within poor households.

Most private vendors and rich households buy electric generators as coping strategy for the intermittent supply of electricity. This creates high entry and running costs for owning a private water well, consequently, excluding the poor from reliable water supply. Furthermore, water prices go high during power outbreaks as water vendors target to compensate fuel costs and other expenses associated with running electric pumps such as repairs and capital recovery.

DISCUSSION AND CONCLUSION

DISCUSSION

The findings of this research are many, however, we shall concentrate on the most significant and relevant issues that focus on i) state of access to water in Dar es Salaam, ii) available coping strategies and specific dimensions of access to water these strategies are likely to solve, and iii) conditions influencing citizens to adopt certain type of coping strategies.

The findings of this study confirm a widely known reality that access to water in Dar es Salaam is significantly inadequate and highly unreliable. Dar es Salaam residents are also very cognizant about this reality. However, these findings also shed light on the way various actors particularly water users, providers and politicians react to this widespread reality. Firstly, citizens become insensitive to water supply disruptions. This means that citizens can tolerate a certain amount of intermittence as well as poor quality of water. Periodic and temporary lack of water for a few days or weeks is rarely perceived as a crisis by the citizens.

As citizens acknowledge the lack of capacity of public water provider to provide adequate services they resort to informal and private efforts. In such conditions, survival of the fittest modalities become the norm and those in need of assistance communicate with close related individuals and networks. Likewise, those with resources see the opportunity to benefit from the gap created by the public water providers. Out of this fact, varieties of water vendors are created. These findings partly explain why city-wide protests are largely inexistent. On the other hand, widespread knowledge on the lack of capacity of public water provides an incentive for utility staff to become indifferent to reported problems as well as see it as opportunity to cash in money from water users. In the same way, politicians use this information as a cheap political point-scoring capital during elections. Promises to end Dar es Salaam water woes have been getting higher coverage in the past two recent presidential elections without fruitful results (Guardian, 2005; News, 2010). These unfulfilled promises and
delayed responses to water problems induce citizens to adopt long term coping strategies such as drilling deep wells.

The findings also depict that access to water for urban population in Dar es Salaam and probably in many other cities in the country is influenced by factors beyond the water sector, such as systemic corruption, regular electricity breakdowns, weak accountability, political capture of water policies and projects. Access to water in Dar es Salaam is influenced by a variety of factors depending on households demand for water and the source of water they can possibly afford. However, being connected to a piped water system does not guarantee a reliable water supply. More often, citizens cannot access water without private efforts to install water pumps or by colluding with water utility staff.

Citizens’ day-to-day efforts to access water are constrained by petty corruption and illegal practices. Both grand and petty corruption in the water sector significantly impact citizens’ access to water negatively, however, effects of petty corruption are directly felt in day-to-day life experiences of citizens. In Tanzania, petty corruption is considered by many as the way of life consequently making the poor and powerless vulnerable. Nyoka (2013) observes that people expect to be asked for a bribe as “…the briber has an impulse of giving before even being asked to do so…”. Although petty corruption enables some Dar es Salaam citizens to access water, it denies many others who cannot afford it particularly the poor. Despite the efforts by the government to combat corruption in the public sector, by establishing the Prevention and Combating of Corruption Bureau in 2007, its impacts have not been realized particularly at the grassroots level. Widespread petty corruption in the water sector has also been observed in earlier studies outside Tanzania (T. van Dijk, 2011; Zinnbauer & Dobson, 2008). Still, petty corruption commonly referred as water mafia often receives a good coverage in newspapers (Devanathan, 2013; Diani, 2009; Eichenseher, 2008).

Within poor households, it takes a short time to feel the absence of water due to small and few storage facilities. Here two types of reporting are observed: i) communication aimed at seeking information about availability of water i.e. talking to neighbours or calling water vendors to know if they have water, ii) communication during extreme periods of scarcity aimed at figuring out the cause of shortage and alternative ways to get water. The former is triggered when the household needs water but is not sure if it is available at the source (usually few houses away). The latter happens when a household fails to get water from the common sources of water i.e. the neighbours or usual water vendors. In such extreme periods, households may report to people who are not directly connected to the water sector but can influence the availability of water. The list includes local politicians, government officials and street leadership.

CONCLUSION

Taken together, the study has found that the capacity of public services to provide good quality water is partially available. Informal and small scale private service providers fill the gap. As a consequence, micro and/or face-to-face interactions are remarkably evident. This means that service providers are multiple and the distinction between citizens and service providers is often blurred. Moreover, the study revealed a complex mix of quality and type of water between formal and de facto planned settings.

Further research is need to explore water mafia practices especially the motives for the actors involved, processes and preventive measures. From the corruption perspective, new studies can
explore the contribution of mobile phone applications in reporting and therefore combating illegal practices in the water sector.

Dependency on formal and private means to access water in Dar es Salaam will remain a major means for many households to access water for the next near future. There is a need to acknowledge the contribution of informal and private ways to access to water and include them in official studies on access to water. Efforts to regulate informal and private vendors would also be beneficial for poor households who are at risk of consuming poor quality water at exorbitant prices.
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