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Challenges of Water Accessibility in Peri-Urban Areas in Tanzania: A Case of Kigamboni Dar es Salaam

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Abstract

The quantity and quality of water delivered and used for domestic purpose in household level is an important aspect of domestic water supplies, which influence hygiene and public health. The provision of water services by city authorities in the new settlement (Peri-urban) is often not sustainable. The main purpose of this study was to assess the challenges of water accessibility in peri-urban areas of Dar es Salaam Tanzania. The cross section research design was adopted, where by questionnaire survey; key informants interview, field observations and documentation reviews were used to collect data in the field. The finding revealed that sources of water in the study area, are groundwater (shallow well and borehole/tube wells), water kiosks and piped water, other sources of water available to the households, include rain and surface water. Majority of the respondent's main source of water was shallow well by (36.7%).The study revealed that water supply were reliable at different rates of which (75.5 %) explained is very low reliable, On accessibility of community members to clean water the findings revealed that less than 50 percent have access clean and safe water. Majority 70.4% of the respondents spent 1 hour to access water. Water Piped into dwelling source had the least time that they spent less than 20 minutes for fetching water. The results revealed that water payment was largely done on daily, few pays per month. The cost of water charged per 20 liters' bucket/Gallon range was between Tsh 100/= –Tsh 500/= and household's average water consumption per day was 17 buckets and average household expenditure on water was about Tsh 8,500/= per day and Tsh 255,000/= per month. The findings revealed inadequate budget from LGA,s and Central government, distance, inadequate water infrastructure services were the major challenges for community to access safe and clean water. Government through DAWASA and Ministry of Water should play their role by allocating enough funds to accomplishing the already drilled wells in Kisarawe II, Kimbiji and Kibada water project.

Keywords: Public services; Access to water; Community, Peri-urban.

1. Introduction

Water is one of the vital valuable and influential natural resource on the universal because of its benefits in both social and economic development on one hand. On the other hand access to safe and clean water is essential to sustain public health and dignified life in the community (Moyo, 2011). Inadequate water supply is today a global crisis that affects about 2.8 billion people globally, particularly in developing countries (Mbua, 2013). Although 75% of the earth surface is covered by water, access to portable water is still a challenge to many poor households in developing countries. Even during the rainy seasons in the equatorial rain forest of Africa where there is supposed to be abundant water, clean and safe water remains insufficient resource (Fonjong and Fokum, 2017). The lack of clean drinking water and improved toilet facilities undermines the sustainability of other critical needs, including education, economic development, nutrition, environmental health and gender equality (Sommer, 2010; Water Aid, 2008; Young, 2017). According to UNICEF (2017) about 2.4 billion people worldwide had no access to improved sanitation and 663 million people had no access to improved water sources.

Increasing access to improved water source and sanitation services was one of the MDGs that Tanzania, along with other nations worldwide, adopted and one the current SDGs that Tanzania has also ratified (Kessy and Mahali, 2017). Although, the MDGs target for water supply was not achieved, the UN did not remain silent; instead they included safe and clean water as goal 6 in the 2030 agenda for Sustainable Development commonly known as SDGs (UN, 2015). Using its own words the UN set ambitious and transformational vision among other things it demanding; "..A world where we reaffirm our commitments regarding the human right to safe drinking water and sanitation and where there is improved hygiene and sanitation facilities (UN, 2015)". The goal 6 specifically wants to "ensure availability and sustainable management of water sources and sanitation for all (UN, 2015). While improved water sources were accessible to more than 2 billion people from 1990 to 2010, Sub-Saharan countries had the lowest drinking water coverage compared to other regions of the world (UNICEF/WHO, 2012). Only 58% of the population in Sub-Saharan African befits to access clean and safe drinking water, and the gap is increasing as the

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results of urban population growth which pose a greater challenge to the existing water utility providers (Ghosh and Morella, 2011). Providing water services to new settlement in urban areas especially peri-urban and informal settlement is challenge to public water utility responsible for water provision taking into account the financial capability, high pricing, rationing and existing water supply infrastructure (Olajuyibe, 2010).

The government of Tanzania adopted the MDG definition and reported accordingly that "The proportion of people served by 19 urban water authorities using drinking water from improved sources increased from 74% in 2005 to 84% in December 2009" and population with access to improved sources of water within 400m or 30 minutes (United Republic of Tanzania, 2010;2013). Availability of water in relation to population size and urbanization has been a subject of number of studies in most of developing countries. Least Developed Countries (LDCs) especially in Sub-Saharan African are the most affected, having disproportionately more of the global population without access to improved sources than other major regions. Population growth, changing lifestyle, increasing pollution and urban dynamics will continue to widen the gap between the demand for water and available supply infrastructures especially in urban areas, and disproportionately affect informal settlements where majority of urban population resides. Distribution and allocation of water infrastructures will be affected by climatic variations-induced water stress, poor institution, weak governance and lack of political will. In addressing these challenge of water and mediate uncertainties in the future supply (Dos *et al.*, 2017; Muller, 2016; Romero-Lankao and Gnatz, 2016).

A large proportion of urban dwellers in developing countries has no access to reliable public water supply services to carter for their needs and always relies on unofficial, or even illegal, sources. They buy water from small scale water vendors or collect it from private wells or unimproved water source (Kapongola *et al.*, 2014). In Dar es Salaam the official figures estimates that 51% of the population access water directly from the public water supplier authority (EWURA, 2012). However, public piped water supply services authority (DAWASA) are characterized by unreliable water quantity, extremely rationing, and low pressure which has resulted to other community to access water from water vendors, private deep wells, open/shallow wells and buy bottled mineral drinking water (Kapongola *et al.*, 2014). Access to improved water sources in Dar es Salaam varies significantly across socio-economic and geographical boundaries. The variation is more pronounced between planned areas, where piped water is available and unplanned areas, where it is not available, and between affluent and poor households (Kapongola *et al.*, 2014).

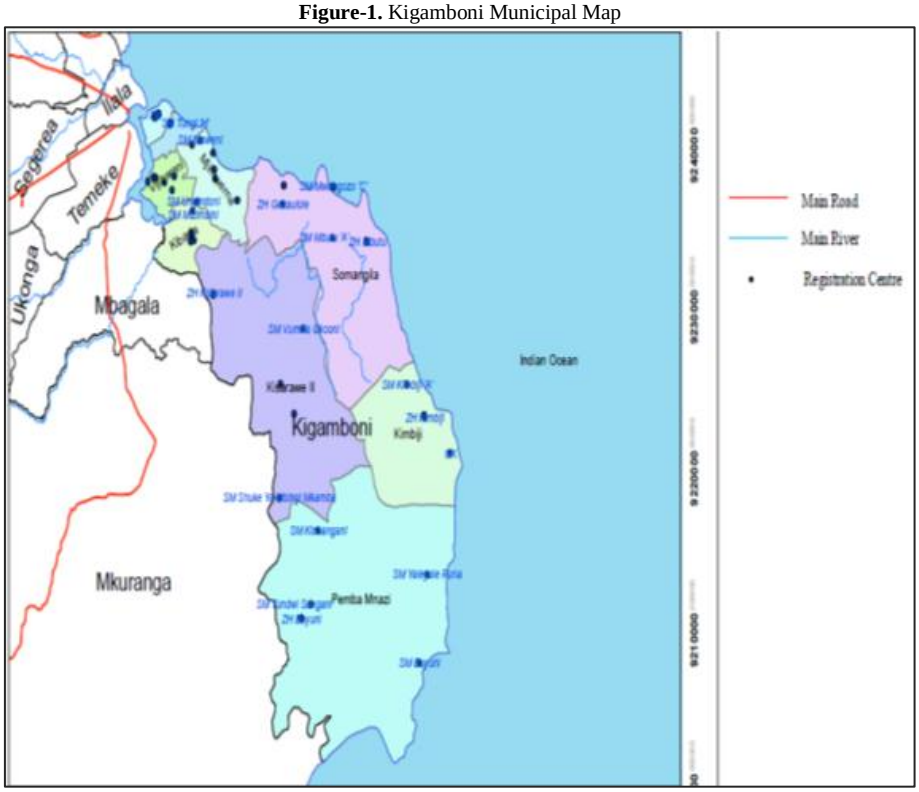
Information from routine data from the MoWI shows that water supply services in the 19 regional urban centres other than Dar es Salaam and Kibaha which are collectively referred to as other urban areas have increased from 78% in 2006 to 865 by December 2013. The coverage in district headquarters and small towns has remained at 53%. The water supply service coverage in Dar es Salaam reached 68% by December 2013 from 55% in 2006. However, the household Budget reported that survey data for all urban areas indicated a decrease in access from 81% in 2007 to 77% in 2011/12 (URT, 2007;2014); Information from the Population and Housing Census (PHC) of 2012 shows an overall decline in access from 61% reported in HBS to 57% in 2012 (URT, 2015). Therefore, the main objective of this paper document and examine the challenges of accessing water in peri-urban areas of Dar es Salaam particularly in Kigamboni Municipality.

2. Material and Methods

2.1. Study Area

This study was conducted in Kibada ward Kigamboni Municipal in Dar es Salaam, Tanzania. The Kigamboni municipal was selected purposively because is among of the leading municipal in Dar es Salaam experiencing water accessibility challenges. The selection of the Municipal also based on the existence of household with different level of income (low, medium and high). This is also a new established municipal which is near to the city center; therefore, one could expect a well organized in term of social services accessibility and delivery in this municipal. The municipal also is rapidly grown where different estate and housing agent have been operate their business in this area which means there is high demand for water. To the study the whole municipal was not possible, for that reason purposively sampling was employed to select one ward which has the same characteristics used in the selection of Municipal.

Figure-1. Kigamboni Municipal Map



2.2. Study Design

The study employ cross-sectional study design because it is emphasis on a full contextual analysis of a fewer events or conditions and their interrelations. The study concentrated with small niche of Kigamboni population to assess the challenges of accessing water.

2.3. Sample Size and Sampling Procedures

This study adopted purposive and simple random sampling. Purposively sampling was used to select key informants (DAWASA, District officials, wards officials) and water service providers (DAWASA water points, private boreholes and wells, water kiosks without a piped connection, community provision, water tankers and trucks, pushcart vendors) who were able to deliver the required data/information's regarding water service accessibility and it is challenges. Simple random sample was used to select respondent in the selected area. Through that procedures 98 house hold were selected, whereby the head of the household were interviewed and 4 key informants were selected.

Table-1. Household Characteristics

Age of respondents		**Level of education**		**Gender**		**Marital status**		**Household size**		**Income**	
Age	no.	Education	no.	sex	no.						
18 – 24	2	primary	57	M	52	Married	90	1-3	1	High	7
25 – 34	15	secondary	32	F	46	Single	6	4-7	42	medium	26
35 – 44	34	Tertiary	8			Divorced	2	7+	55	Low	46
45 – 54	35	Informal	1							Very low	19
55 – 64	9										
65+	3										
Total	98		98		98		98		98		98

2.4. Data Collection Techniques

The study employs multiple techniques where by documentary analysis was adopted in order to document the water situation at the study areas, the actors who involved in water services delivery and sources of water. The administered questionnaires survey was used to the household to understand their experience in accessing to water services and its affordability. The interview technique was employed to the key informants to collect data related to water availability, sources and affordability of water services. Direct field observation was also necessary in order to get a real picture of water services infrastructure in the study area.

2.5. Data Analysis and Presentation

The study was much qualitative, where the quantitative information was used to back up the quantitative data. The qualitative data was analyses through content analysis which based on themes. Quantitative data was analyzed through statistical package for social science where by frequency and percentages are generated.

3. Results

3.1. Unreliability of Water Supply

Through documentary analysis the findings indicate that there are various water sources from which life of both fauna and flora is reliant on, for survival. The surface water as the main water source, piped water on premises includes piped household connection located inside the user's dwelling, plot or yard; Other improved water sources include public taps or standpipes, boreholes or tube wells, protected dug wells, protected, springs, and rainwater collection whereas unimproved water sources include unprotected dug wells, unprotected springs carts with small tank/drum, tanker truck, bottled water and surface water (river, dam, lake, pond, stream, canal, irrigation channels. Other sources of water include; water kiosks, mobile vendors and fixed-point vendors. Findings indicates that majority of the respondents 36.7 percent, explained shallow well were their main source of water, this was followed by 35.7 percent, who said their main source of water are borehole/tube wells. Other respondents about 22.4 percent were accessing water from water kiosks and very few 4.1 percent claimed their source of water as piped water. The reason for the small percentage of households having their main water services source as piped water is because the survey was largely carried out in the peri-urban areas where people live in their own homes. Piped water into dwelling, public tube, or standpipes, borehole or tube well, spring and rain water collection are found to be common source of water in the development county.

In addition respondents were asked about reliability of water supply, all of respondents claimed that water supply were reliable at different rates of which majority (75.5 percent) explained is very low reliable, followed by 9.2 percent who explained water sources are low reliable, only 15.3 percent of the respondents explained their water sources are very reliable as summarized in Table 1.

Table-2. Responses on the Reliability of water sources

Water reliability	Frequency	Percentage
Very high reliable	7	7.1
High reliable	8	8.2
Very low reliable	74	75.5
Low reliable	9	9.2
Total	98	100

3.2. Inaccessibility to Clean and Safe Water

The findings shows that despite of government effort in improving water accessibility to the community still water access is poor so far less than 50 percent have access clean and safe water. The problem escalates more in new Kigamboni District, which has rapid level of urbanization. It is expected by 2030 the district will have estimated around 83,400 new housing units and 500,000 residents. Being situated in Southern Dar es Salaam, the district not served by main DAWASA pipes. Through document reviews it is found that the area was partly supplied by DAWASA pipes around earlier 1990s, but the water was insufficient and hardly any water was reaching the area, hence the supply was eventually cut off. In line with this argument government officer at the municipal argued that:

"I have been dealing with water challenges in Kigamboni neighborhood for a long time now, but I tell you that, little attention is given to community who are living in scattered settlements by the government. Both politicians and DAWASA authority concentrate much on people who are direct connected with water pipes supplied by DAWASA.

3.3. Long Distance and More Time in Access to Water

The findings in this study indicates majority 97 percent of the respondents travel between 301 to 500m, while 501–1000m and very few 1 percent access water to less than 300m distance from water sources. This study established the amount of time that households spend to access water services. Respondents reported to spending between 20 minutes and an hour in fetching water. Water Piped into dwelling source had the least time with all respondents stating that they spent less than 20 minutes fetching water from this source. Majority 70.4 percent of the respondents spent 1 hour to access water, followed by 29.6 percent of those who spent between 0 to 30 minutes to fetch water. Majority of the households who reported that they take a long time in water accessing water were those from Nyakwale Street. This is because their street houses are a bit scattered, therefore the respondents have to walk for some distance. Besides, it was observed that they had to go down the other streets by foot and bicycles and carrying a 20 gallon of water up their home that proved difficult. This activity, on several occasions led to breakage of the water gallons and this meant spending more money, which was hardly enough, on purchasing a replacement. As also officer in the Municipal said that:

"I and my children we wake up early in the morning sometimes around 4:30am whereby we spent two hours on the way walking to reach source of water, this has become a punishment to our life, since, we are not happy with this situation" (Respondent in Kigamboni surveyed area, 15th July 2017). **"**We have serious shortage of water points here compared to the number of users. The problem is exacerbated by lack of direct water infrastructure system nearby our new settlement, whereby people from far community walk a long distance to fetch water from other neighborhood and sometimes they vandalize the service.

3.4. High cost and low-income

This study sought to establish whether respondents made any monetary payments for the water they used in their households and if they did how often, the amount that paid and for what purpose. It has been established that all respondents 100 percent explained they normally make payments for water use. The findings indicate the cost of water was charged per 20 liters' bucket range between Tsh 100 and 500 per bucket. The findings further indicate that household's average water consumption per day was 17 buckets and household consumption per month was 480 buckets. The findings show on average household spent about Tsh 8,500/= per day for water and about Tsh 255,000/= per month for water consumption. The study also sought to find out what the money paid by households was used for. There were several responses to this. It was established that, water pipes and intake tanks maintenance, payment of the technicians, pipes leakage repair and cleaning of water wells were the main uses of the money paid as water bills. Most of these wells were cleaned after every six months. Expansion was also a reason why households made water payments but this was not done regularly but only when deemed necessary. This expansion included buying of a bigger pipe for tapping water from the main pipes.

Findings also indicate that income of a household is a key determinant of the kind of life members will live. It controls several aspects of their lives like the type of housing, education, healthcare, the household will enjoy among other things. Income does influence access to water in peri-urban areas of Dar es Salaam and the water sourcing behaviors of households in a great way as several studies have shown. In the study areas it was found that the low-income groups are hardly able to afford high connection fees to piped water and hence limit their connectivity. In most cases these people are almost never directly connected to the public utility. They not only buy water by the bucket at very high unit prices but also rely on vending systems, and therefore consume poor they further claimed that fewer poor households are connected to water networks. This was attested by one of the respondents who lamented that:

"…without having this kind of employment (street vendors) I could not manage to pay/buy water for home use. Water is expensive here…and if I could get good job and increase this little money I earn surely I would have water connected to my compound just like my neighbors. The biggest challenge I have is my income which totally depend in these small activities I am doing…"

3.5. Insufficient Water Accessibility Infrastructures

Peri-urban areas of Tanzania as other parts of the urban areas of the developing countries cities have been experiencing for long-time challenges of poor infrastructures. Findings from the study shows that many existing water infrastructure are very old, scrap and have not been modified or repaid/replaced for a long time. This has been note with reference to that water services infrastructure under DAWASA. During the interview one of the government officers said that:

"Insufficient water infrastructure in these areas is a long time problem and we've been explaining regularly to the central government but they often told us the budget is not enough and they promise us will be given priority in the coming budget. However, we receive many complaints from local residents sometimes we cannot even answer them because we do not have any money or facilities in hand to deal with their clams. But when we get money we are working hard in addressing these challenges and we give a great attention to the damaged infrastructures and those serve many people".

So it reflects the depravity and density of water infrastructure is largely caused by the absence of investments. This is a big problem that has been observed in the study area. It also noted that if the problem will not be handle in time many people will continue to suffer with water scarcity and the government later it will require a lot of investing in water infrastructure because the area also experience huge increase in people, so the demand will also increase.

4. Discussion

The paper aimed at highlighting and discussing the challenges of water accessibility in peri-urban areas. The findings indicate that access to water is an endless challenge in peri-urban areas of Tanzania which is associated unreliability of water sources, inaccessibility to clean and safe water, long distance and more time in access to water, high cost and low income and the insufficient water supply infrastructure. Such challenges has also addressed and discussed by other scholars such as Dos *et al.* (2017) notes that many urban areas of Sub-Saharan countries are still suffered with water access challenges since the water supply did not much with the increase of population. Emenike *et al.* (2017) added that this situation is worse since it also, limited to the private sources. This is because the private source is an alternative for those who did not connected to the piped water, which is majorities in the developing countries. Unreliable water supply is a burden to African cities. Smiley (2016), reports that in Dar es Salaam especially in the city center is characterized by unreliable water sources and force people to adopt unhealthy mechanism to adopt the situations. Most of the adopted mechanisms which are not good include changing consumption patterns, altering daily routines and using back-up sources of water.

Distance to travel or work to the water services is a global concern nowadays (Sarmento, 2015). In the developing countries travelling or working long distance for fetching water is a normal undertaking (Jameel, 2012; Pickering and Davis, 2012). For instance Sarmento (2015) reports that in Timor-Leste people travel even than one hour to get the water sources because the sources is far from where the residence live. In Nigeria Emenike *et al.* (2017) shows that majority travel from 251-10000m to access water and García-Valiñas and Miquel-Florensa (2013) repots the same findings in Tanzania. Urban areas in Ghana also faced with challenges of distance and time in access

to water; people travel long distance and spend more time for travel and waiting in the long queue (Peprah *et al.*, 2015). Under these circumstances, the poor, particularly women and girls, spend a significant amount of time travelling some distance to collect water. Water Aid (2017) concluded that it normal things for women and children in the developing countries to spend over two hours a day in accessing to water and up to seven hours in remote areas.

The income of a household is a key determinant of the kind of life members will live. It controls several aspects of their lives which include water accessibility. Smith and Hanson (2003) indicate that in South Africa especially Cape Town household with lower income (below 800 rands) have limited opportunities to access clean and safe water. This is because the low-income groups are hardly able to afford high connection fees to piped water and hence limit their connectivity (Bosch *et al.*, 2001). They not only buy water by the bucket at very high unit prices but also rely on vending systems, and therefore consume poor they further claimed that fewer poor households are connected to water networks (World Bank, 2003). Emenike *et al.* (2017) acknowledged that economic status of households is closely linked with the affordability of services such as water. Thus households with no reliable source of income are likely to use water from unimproved source. Mahama (2013) in a study to establish factors which influenced householders access to improved water and sanitation facilities in five selected low-income communities in Accra found out that income (wealth) statistically influenced the likelihood of access and use of improved water. Koskei *et al.* (2013) established that the occupation and income of the household head significantly influenced the type of water source used by household. Their study reviewed that the household expenditure (proxy of household welfare) is the fundamental factor; this compels households to rely on unimproved sources.

The existing water infrastructures are poorer in most of the urban areas of the developing countries and Tanzania in particular. This is associated with the rapid urbanization growth and climate change in many cities around the world. The rapid urbanization put more pressure to the existing drainage and water channels (Mikovits *et al.*, 2014; Parkinson *et al.*, 2016). Insufficient urban water infrastructure is turning peri-urban dwellers to experience water access stress. However, the poor water access infrastructures in urban areas affect the life of the people and the economy of a country at large (Hove *et al.*, 2013). According to Fonjong and Fokum (2017) cities like Buea in Cameroon are still use the water infrastructure which was used during colonial time. This creates big challenges since they cannot meet the current demand (Fonjong and Fokum, 2017). Asoka *et al.* (2013) comes with same finding that the water infrastructure in urban Kenya is poor hence leads to insufficient access of clean water to the majority. The pipes supply and serving water in many part of urban Nairobi were laid down in the late 1940s and early 1950s during colonial time. In Tanzania the Water Aid (2008) also comes with the same finding that the Dar es Salaam water supply infrastructure, where the infrastructures are not maintained and repaired for many years. Both central and local government did not come with the new investment of water infrastructures with reflects the current demand (Simon, 2008).

5. Conclusion and Recommendations

Water is an important factor in human life and overall development. So it is important to have honest and effective efforts and to invest on water services based from the internal budget. Many water projects have not been implemented in many poorest countries because of high dependence from foreign countries which sometimes fail to pay in line with what they have promised for various reasons. In order to solve the problem of water accessibility it important for government through the ministry of Water and Irrigation and its responsible authority sensitize the community members about the importance economic utilization of water, and integrated water resource management so as to have reliable and sustainable water sources. Government through DAWASA should play their role to supply water in the area by accomplishing the already 12 drilled wells where by 3 well is already tested for water uses in Kimbiji water project, which aimed to supply water for community especially in Kigamboni included Kibada ward. However, the other interventions including the provision of safe water sources as close as possible to household should not be neglected both because they are highly effective. This will solve out all problems related to water accessibility in the area.

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