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### **Full Length Research Article**

## **COMMUNITY-BASED WATER QUALITY OF NON-PIPED WATER SOURCES USED FOR DOMESTIC PURPOSES IN DODOMA URBAN, TANZANIA**

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#### **ABSTRACT**

The study was cross sectional with the aim of assessing the quality of water from non piped sources based on community views at Miyuji ward in Dodoma municipality. The study findings revealed that according to community-based water quality, water in the study area from non-piped sources has high salinity/ hardness, containing colour and smell. It is also rated by majority of dwellers that the quality is very poor. Number of water related diseases incidences and frequencies were also assessed. The assessed diseases were; diarrhoea, dysentery and cholera, all types of worms, and typhoid fever. Among them, diarrhoea was the leading one seems to be most frequently occurred as reported by 35% of respondents out of 85% reported incidences of different diseases. The study recommends that; Community in Miyuji ward should collaborate with the Dodoma Water Supply Authority (DUWASA) in Dodoma municipality so that the piped network system can be extended for them to obtain clean and safe water. Community sensitization should be done by the government to discourage people from using non-piped water and encourage in-house water treatment prior to the domestic uses. Education should be provided the people regarding the dangers of using non-piped water, and any other type of water which is not safe for consumption.

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#### **INTRODUCTION**

Non-piped water refers to the water system that is not obtained in-house through water pipes, but it may still be used for many other purposes, depending on its quality. Non-piped water sources can include groundwater, rainwater, storm water, swamp water and water obtained from various dams. The source may require further treatment to a quality suitable for its intended non-drinking water use(s) (Luthi, 2008). Water quality in Tanzania varies significantly within the country. In the semi-arid regions such as Dodoma and Singida, the colour and turbidity levels become problematic during the rainy season. Rivers in the fluoride belt (Dodoma and Singida), and regions of the Rift Valley have naturally high fluoride concentrations. The waters of lakes Tanganyika, and Nyasa have overall good water quality except in the vicinity of urban areas where effluent and storm water cause local contamination, whereas the water quality of lake Victoria is poor: high turbidity and nutrient levels lead to frequent blooms of algae and infestations of water weeds.

Controls of the quality of drinking water fall under the responsibility of local service providers at the point of water production. They refer to Water Quality Standards established for urban and rural areas in the 1970s (MWI, 2010). For a long period of time, non-pipe water system has caused a lot of anarchy in Tanzania and all over the world. Dodoma Urban Water Supply Authority (DUWASA) is the only legal and competent entity which can perform all water and service works in Dodoma Municipality to effectively invest in the development of the water sector in the designated capital (Chacha *et al.*, 2009). The water allocation of human settlements concerns both water quantity and quality. Providing accountable, efficient water and *sanitation* services along with *sustainable* and affordable access to safe water is one of the big challenges of our time. Similar living conditions can be found in many developing countries. Within the countries, varied socio-economic clusters exist, consisting of people living in large metropolis, bigger cities, medium cities, small towns, villages, small tribal settlements or isolated housings. The concentration of people in large urban regions brings an increasing pressure on water resources, while tribal settlements may be located in remote areas difficult to reach (World Bank, 1999).

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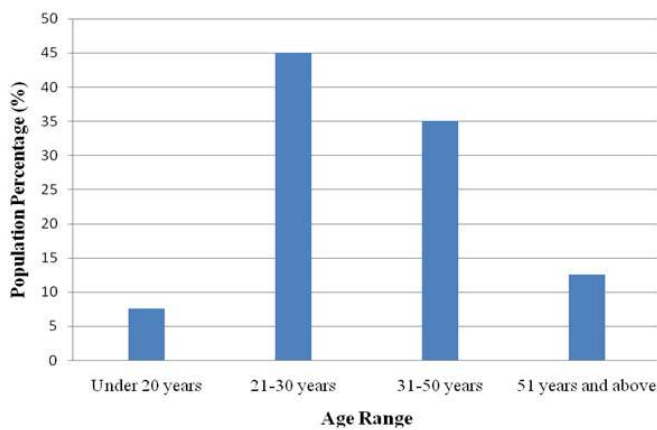


Figure 2. Community Age range

### Non-piped Water Sources used

Since the large area in the ward included in the study is not connected to the piped water system. Results reveal that majority of the dwellers 83% are using water from the non-piped water mainly wells. However, 7% were using tap water, 5% and 5% were using water from swamps and other sources like rainwater or combination of sources respectively. The alleged reasons for a very few community to be connected to piped water system the tariffs charged for water supply cover the full cost of service provision.

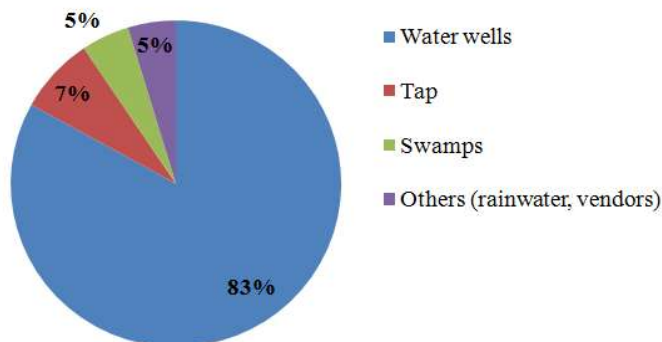


Figure 3. Types of water sources available

This is true as reported in other researches that, the identification of factors driving piped and non-piped water demand is a necessary prerequisite for predicting how consumers will react to such price increases. It is also the same to most of urban poor areas from other countries. In Sri Lanka, it is reported that more than 80% of people living in urban areas are using non-piped water systems including public wells, water vendors, rainwater harvesting and public taps (Nauges and van den Berg, 2009).

### Community-based Water Quality from Non-piped Sources

The water quality from non-piped sources was assessed based on the community views. The quality of water for human consumption especially used for domestic purposes was rated in range good, poor and very poor. The assessment on community-based quality was focused on physical parameter such as colour, smell, water hardness/salinity (through taste and soap consumption). Water hardness was the first parameter rated by the majority of the respondents (85%) non

piped water users and agreed water to be very poor. Water colour was the second to be rated by 10% who admitted that water from non piped sources is coloured especially during rain seasons and from rainwater and well water sources. 5% of the respondents reported that water is good except that during some reasons, water having muddy-like smell.

Table 1 shows the parameters assessed based on community-based water quality and their percentage of respondents. Large number of respondent rating the quality of water being very poor based on water hardness and salinity is common. This is because water especially from groundwater sources in Dodoma is naturally having high salinity in nature and it is experienced even for the piped water users. This has been realized even from the previous research done by laboratory analysis of water from piped water systems used in domestic purposes.

Table 1. Community-based water quality assessment using different water parameters (n=120)

Parameters assessed	Assessment rate indicators			% of respondents
	Good	Poor	Very Poor	
Colour		✓		10
Smell	✓			5
Water hardness/salinity			✓	85
TOTAL				100

On the other hand, the above information reflects the laboratory results of water analysis from the same study area carried out by Geological Survey of Tanzania (GST) which proved that the water does not meet the required standard for human consumption as per the Tanzanian standard and the international standards guideline (WHO, 2004). According to laboratory results carried out by Geological Survey of Tanzania that analysed Iron (Fe) Manganese (Mn) and Nitrite (NO<sub>3</sub>) and obtained to be 35.96ppm, 0.02ppm and 3652ppm respectively. In comparison to the Tanzanian standard, 2003 for the same parameters that suggests to be 1ppm for Iron, 0.5ppm for Manganese (Mn) and 75ppm for Nitrite (NO<sub>3</sub>) (National Environmental Standards Compendium, 2003). The laboratory results show that they are in line with community based quality, as they do not meet standards for human consumptions without prior treatment.

### Problems Associated with the Use of Non-Piped Water

Different water-related and poor sanitation diseases incidences and frequencies were assessed to the community. Majority of respondents again who cater 85% of all respondents reported different number of problems in total associated with the use of non-piped water; these include water-related and poor sanitation diseases. Diseases assessed include diarrhoea, dysentery and cholera, all types of worms, and typhoid fever.

Diarrhoea is reported by most of respondent (35%) among the reported diseases and seems to be frequently occurring case. This can be seen as a common case in the area as it was reported by Kusiluka *et al*, undated that 35.9% of respondents reported occurrence of enteric or diarrhoeic cases amongst household members within the past three months before the study.

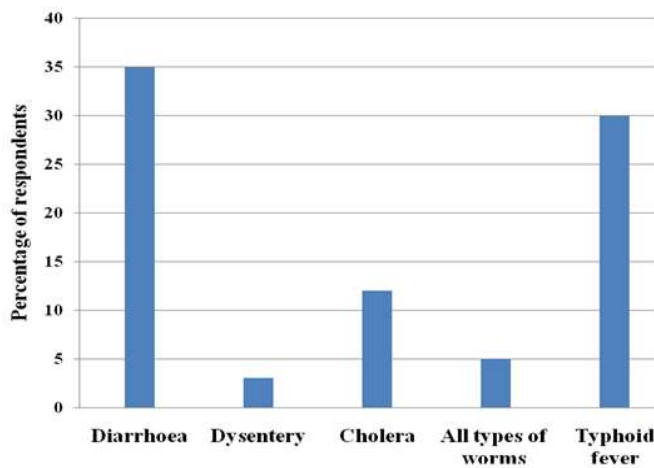


Figure 4. Water-related diseases reported by community in study area

### Government Concerns on Water Quality

Water is one of the most important agents to enable Tanzania achieve its development vision objectives (both social and economic), such as eradicating poverty, attaining water and food security, sustaining biodiversity and sensitive ecosystems. Most of respondents (78%) revealed that government through Dodoma Urban Water Supply and Sanitation Authority (DUWASA) is not concern for the water treatment of non-piped systems and they suggested that the government should improve the quality of water by treating and supplying it using pipes. The condition of government to rely only for piped water is because of tariff collected from those who connected to the piped water systems. Since the non-piped water users are not formally recognized by DUWASA, they don't pay any fees and hence there is no any water treatment services given to their sources. Respondents also suggested according to the National Water policy (2002) that the government should have criteria for prioritization of water allocations so as to ensure that socio-economic activities and the environment receive their adequate share of the water resources on the basis of its availability.

### Conclusion

According to the study findings, the impact of using non piped water without prior treatment is generally negative in nature since it has been associated with the outbreak of water-related diseases, which might threaten the human health. Improving access to piped water requires a combination of actions on hard infrastructure and systems. There is need to build pipes, irrigation systems and pumps in both urban and rural areas; as well as the development of new delivery mechanisms, such as partnerships with private operators and communities. There is also a need to rethink the distribution of responsibilities between the central and local governments and to be clearer on who will pay for water use. The government should engage local community to cooperatively get involved in water projects. The government should address the key priority threats to water quality and environmental flows, and establishing methods to continuously improve water quality for human consumption and domestic use. People in Dodoma Urban especially in study area, Miyuji Ward should

collaborate with the Dodoma Water Supply Authority (DUWASA) in Dodoma municipality so that the authority should extend clean and safe piped water. To ensure the extension of piped water system reaching most people in the areas mentioned, the authority should reduce the costs of water installation such that the poor people can as well afford. Community sensitization should be done by the government to discourage people from using non-piped water. Education should be provided the people regarding the dangers of using non-piped water, and any other type of water which is not safe for consumption.

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