

Assessment of Rooftop Rainwater Harvesting among Households in Nsukka, Enugu State Nigeria

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ABSTRACT

This research assessed household rooftop rainwater harvesting among households in Nsukka, Enugu State Nigeria. The people's interest in rooftop rainwater harvesting is a consequent of epileptic water supply from municipal scheme and groundwater mining. Data for analysis was gathered through the use of questionnaire survey. The results show that only 68% of the respondent harvest rooftop rainwater while 34% do not practice rainwater harvesting. Over 30% of households in the study area don't harvest rainwater for contamination reasons. 89% use it for sanitary and other purposes. Only 11% drink rainwater which indicates unfitness of rainwater for drinking. The study concludes by recommending that since the fear of contamination is a major hindrance to the usage of rainwater, proper water treatment methods should be incorporated into rainwater harvesting system.

KEYWORDS: Rainwater; rooftop; Nsukka

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INTRODUCTION

Water plays a very significant role which cannot be overemphasized as it is of fundamental importance to all kind of plants and animals. Availability of drinking water and provision of water for sanitation purposes are the basic minimum requirements for healthy living. Rooftop rainwater harvesting is the interception of rainwater from rooftops and storing it in reservoirs. According to Omolara and Oloke (2013), rainwater harvesting as an alternative source to public water supply is growing due to increased potential catchment surfaces and failure of the conventional methods to meet the challenges of providing "clean water for all". Rainwater harvesting is mostly practiced in the Nigeria southern region, where rainfall is regular for at least eight (8) months of the year. All rainwater harvesting systems share several common components which are a catchment surface from which runoff is collected, a conveying system/delivery system, a first-flush system, a storage system, and a device for extracting water from the

reservoir. It is then used as principal or supplementary water supply source. Adequate potable water is one of the most basic human needs and one that is not met for about 2 billion people (26% of the world's population) (UNESCO, 2023). In Nigeria, a major challenge affecting the entire population is the issue of supplying adequate and accessible potable water to meet societal needs. Water scarcity has become a major problem due to increased urbanization, droughts, and changing climate patterns (Majumder, 2015).

Nsukka Metropolis is a growing urban settlement that is constantly experiencing water supply Inadequacy. Many of the residents do not have access to municipal water supply and therefore spend a significant part of their income on self-help water supply. The situation is further exacerbated by the absence of surface waters coupled with the deep water table ranging between 160 m to 220 m (Onwe et al. 2022). The deep water table makes the cost of borehole drilling

very expensive and beyond the reach of the average resident. As a result, rainwater can be considered a very important source of water supply for many during the rainy season.

MATERIALS AND METHODS

Questionnaire survey was used for data collection. The demographic concern included 200 households in Nsukka urban. Data analysis was aided by the use of SPSS 27 version.

RESULTS AND DISCUSSION

From the survey results, out of the 200 questionnaires that was distributed in the study area, only 136 respondents (68%) harvest rainwater from rooftop while the remaining 64(32%) do not. Fig 1 shows the percentage of respondents that harvest rooftop rainwater with reference to the ages of the buildings. This also shows that rainwater harvesting technology is yet to be fully tapped as an alternative source of water supply in the study area.

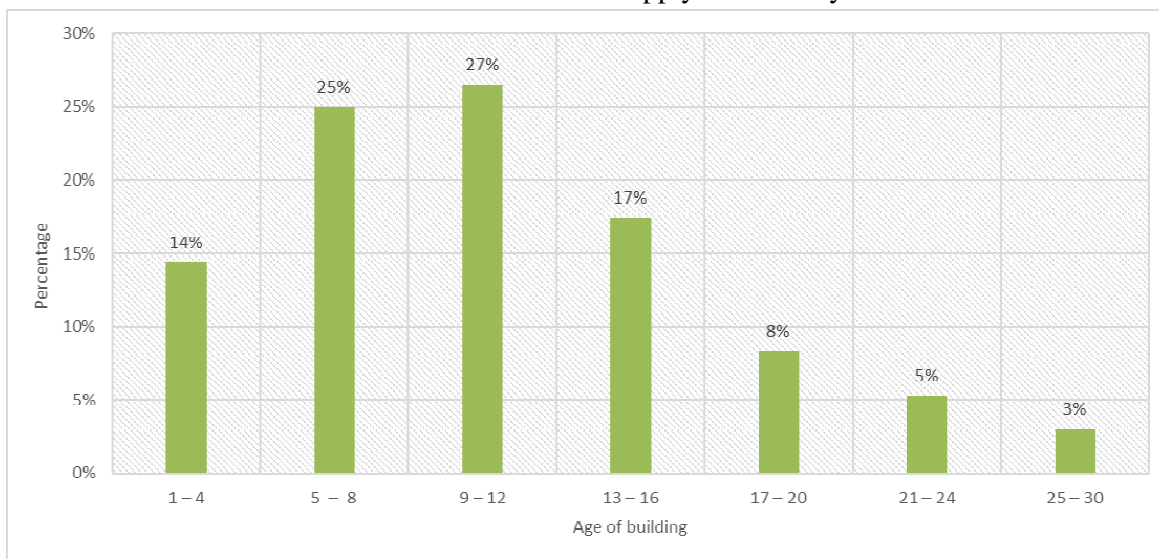


Fig 1. Percentage of buildings with rooftop rainwater harvesting system

Figure 2 show the respondent’s reasons for not harvesting rainwater from rooftop. Over 30% of the respondents indicated that rooftop rainwater is contaminated. Although there is no experimental evidence to their reasons, it indicates that proper water treatment methods should be adopted and integrated into rooftop rainwater harvesting system.

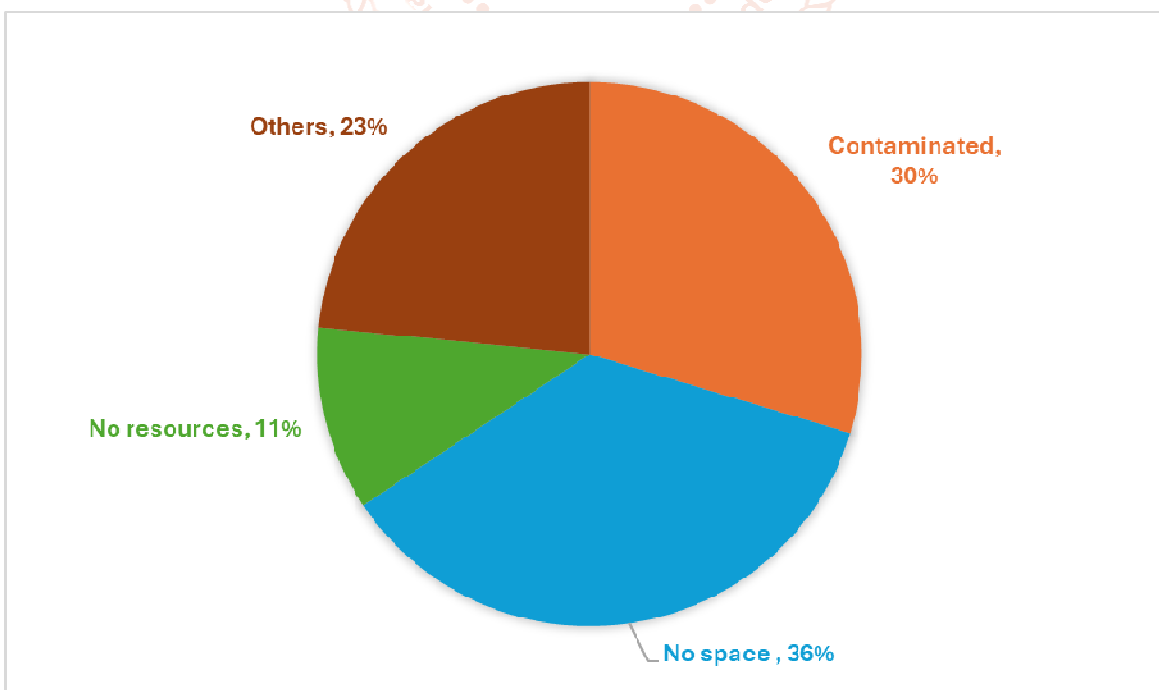


Fig 2. Respondent’s reasons for not harvesting rooftop rainwater

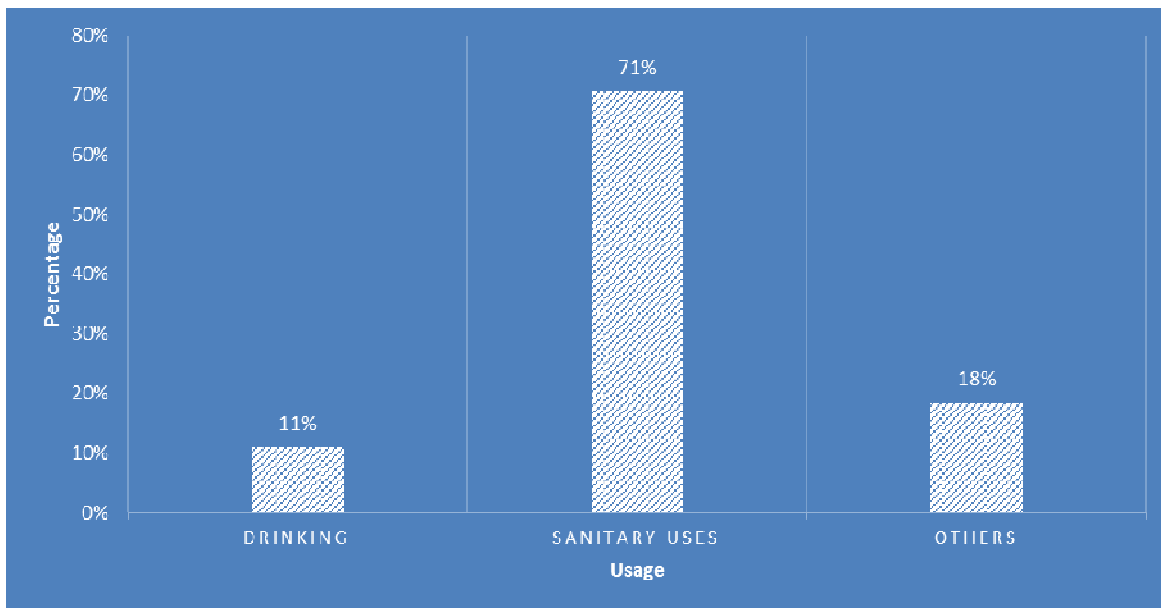


Fig 3. Respondent’s Usage of harvested rainwater

Figure 3 shows the household usage of rainwater. The results indicate that only 11% drink rainwater. Over 71% use it for sanitary purposes. This also indicates that people desire that rainwater should be treated before it can be considered for drinking.

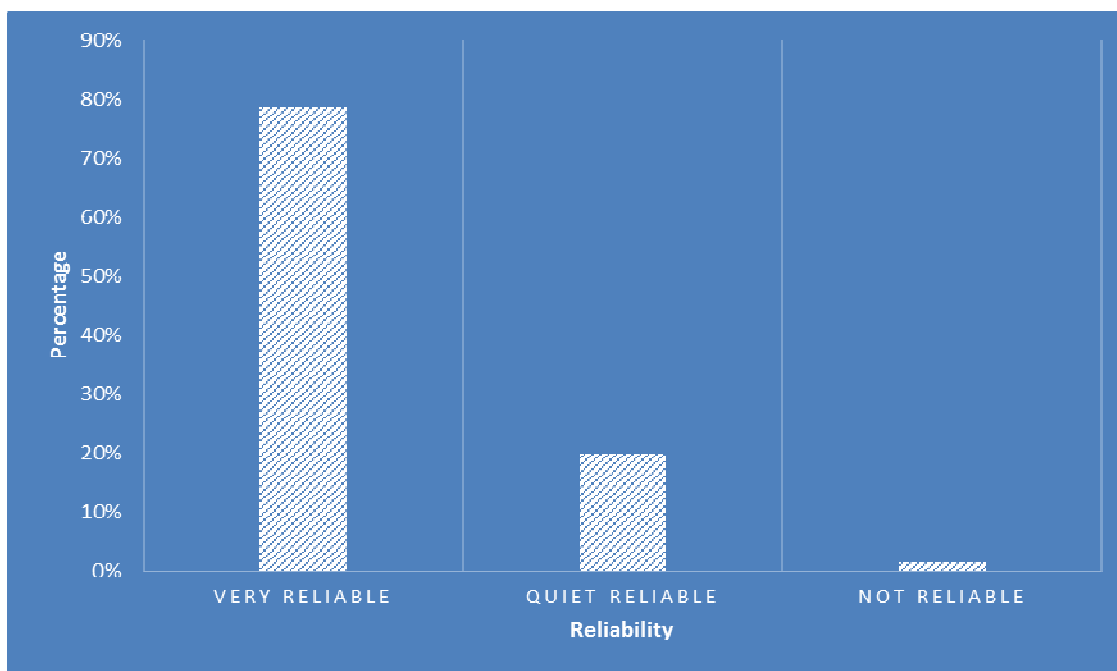


Fig 4. Reliability of other water sources

Figure 4 shows the reliability of other water sources of the respondents. As there is no river in the region, borehole supply reliability was measured. Out of the 136 (68%) that harvest rainwater, 107 (79%) considered underground (borehole) water sources as very reliable, 25 (18%) quiet reliable, and 4 (3%) not reliable. This also indicates that borehole water supply does not completely satisfy the water needs of the respondents’ every time.

Conclusion

From the findings of the study, rainwater is hardly used for drinking (over 30% rejected rainwater for reasons of high contamination). It is mostly used for sanitary purposes. It can be conclude that rainwater use has been limited on the grounds of water quality concerns. The study recommends that water treatment methods should be incorporated into rainwater

harvesting systems. With the provision of the required components and water treatment methods, rainwater can be relied upon as a supplementary source for household water supply.

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