

41st WEDC International Conference, Egerton University, Nakuru, Kenya, 2018

**TRANSFORMATION TOWARDS SUSTAINABLE
AND RESILIENT WASH SERVICES**

**Analysis of household access to water and sanitation in
rural communities in southwest, Nigeria**

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PAPER 2861

Access to water and sanitation is vital for achieving the sustainable development goals. The study analyzed household access to water and sanitation in the rural communities in the southwest, Nigeria. Data were sourced from 400 households using stratified systematic sampling technique. Both descriptive and multivariate analysis was employed for the data. The result shows that borehole is the predominant source of about 31.5%. Majority of the households 23% use an open pit latrine. Only 50.8% and 48% of the households have access to water and sanitation respectively. Test statistics indicate a significant difference between the regions and access to water and sanitation at $p < .000$. The factor analysis explained 65.25% of the total variance. The study concluded that household size, income and poor water supply and sanitation facilities are the major factors affecting access to water and sanitation in the area. Investment into water and sanitation infrastructure was recommended.

Background

Sustainable access to an improved water and sanitation has a strong relationship with healthy and productive life as well as environmental sustainability (UNICEF, 2014). Efforts at ensuring access to clean and proper sanitation have witnessed tremendous progress globally and also at local levels. However, there is still a wide gap regarding access to clean water and decent sanitation in the rural areas compared to the urban centers (UN, 2013). Lack of access to clean water has gross implications on the socioeconomic development, personal hygiene and places the health of about 40 million Nigerians at risk (UNICEF and WHO, 2012; Gbadegesin and Olorunfemi, 2009). According to FMWR (2014), about 122,000 Nigerians including 87,000 children less than 5 years die annually due to diarrhea. This has been attributed to water, sanitation, and hygiene. Poor sanitation in Nigeria has resulted in huge losses running to almost US\$ 3 billion annually. This amount represents about 1.3% of Nigeria's gross domestic product (FMWR, 2014).

Some remarkable progress has been made by the Nigerian government in the area of policy formulation e.g. the national water-sanitation policy which is geared towards promoting sanitation and hygiene, along with drinking water. The policy encouraged all tiers of government to earmark 15% of their annual appropriation for water supply to implement sanitation programs (FGN, 2013). Despite these giant strides, the trends in sanitation facility from 1990 through 2015 indicate a decline from 38% to 29%. Currently, there is a substantial improvement at the national and urban levels compared to the rural areas. For example, about 91% of the population gained access to an improved water supply at the national level while 99% and 86% respectively had access in the urban and rural areas of Nigeria respectively. Access to improved sanitation facilities shows that 60%, 79%, and 48% gained access at the national, urban and rural areas respectively (WHO and UNICEF, 2017).

Considering the low access to water and sanitation in the rural areas, available statistics revealed that, in order for Nigeria to achieve the sustainable development goal 6 targets by 2030, an estimated population of about 8 million people would need to be reached annually (Guy and Mili, 2016). Literature abounds on water access and sanitation. There is a scanty focus on rural communities with regards to water access and sanitation. Therefore, this study seeks to fill this gap in knowledge with the view to assessing household access to water and sanitation in rural communities in southwest Nigeria.

Methodology

Data employed for this study was obtained through structured survey questionnaires with appropriate rating scales at the household level using stratified systematic sampling. A sample size of 400 was chosen according to (Yamane, 1967). The survey was conducted between April and May 2016 covering two rural communities each from Lagos, Ogun and Oyo state (Table 1). The survey focused on household access to water and sanitation and the environmental conditions in the study area. The IBM statistical package for social sciences (version 22) was employed for data analysis. Descriptive statistics were employed to determine household's attributes while bivariate (chi-square) and multivariate (factor analysis) statistical techniques established the interdependence of the variables and factors affecting access to water supply and sanitation respectively. The benchmark according to WHO and UNICEF (2014) was adopted for the definitions of improved water source and improved sanitation. ArcGIS software 10.3 version was employed to generate the map of the study area (Fig.1).

Result

The result shows that gender distribution indicates that approximately 50% each of the respondents were either male or female. On the marital status, 77.5% of the households were married. The educational attainment reveals that majority of the households 42.30% were secondary school certificate holders. The occupational distribution showed that traders and artisans were in the majority and jointly accounted for 72 per cent. The household's members were largely low-income earners with an average income of \$ 41 per month. The age distribution of respondents interviewed indicated that the residents were relatively young. The household size was generally low with an average of 3 persons per household. The predominant water treatment method in the study area is boiling representing 31.3% while 12.8% do not treat their water. The least method is filtration (Fig.2). The environmental conditions in the study area revealed that approximately 66%, 12% and 6.3% of the households reported the presence of solid waste piles, stagnant water and the availability of waste water network. A study conducted by Oloruntoba et al. (2014) asserts that hygiene and sanitation conditions were the major risk factors for diarrhoea among under-five children in Ibadan, Nigeria. The major source of water is borehole representing 31.5% (Fig.3) while open pit latrine is the predominant sanitation facility in the area. A study conducted by Akpabio et al. (2015) reported that 85% of the respondents in Akwa-Ibom rely on pit latrine system. Similarly, Alepu et al. (2016) reported that 60% of households interviewed in Calabar depend on pit latrines and open defecation. The result of access to water and sanitation show that 50.8% and 48% of the households have access to water and sanitation respectively. Only 8% of the households have access to piped water supply (Fig.3). Emenike et al. (2017) reported that household access to water in Ado-Odo, Ogun state; Nigeria is limited to the private sources while the reliance on government water facilities has dwindled drastically.

David and Isha (2009) opined that policy failure and lack of reliable information on water demand and inefficient municipal water system dampen the major reforms necessary for efficient water delivery system in India. The test statistics indicate that there is a significant difference between the regions and access to water ($\chi^2 = 107.634$; $df = 2$; $p = .000$) and sanitation ($\chi^2 = 20.673$; $df = 2$; $p = .000$). The variations across the regions show that Lagos state recorded the highest access to water with 71.5% while households from Oyo state have the lowest (Fig. 4). Regarding access to sanitation, Ogun state recorded the highest with 63.0% while Oyo recorded the least (Fig.4). The chi-square test between income and access to water shows a significant difference ($\chi^2 = 26.442$; $P = .000$). Akpabio and Brown (2012) reported that the daily water and sanitation practices of the people in coastal settlements in Nigeria depend on the nature of the physical environment and their social and cultural status. Findings of Abdul and Sharma (2007) showed that high economic activities and population growth are responsible for declining per capita water availability in India.

The principal component analysis explained 68.86% of the total variance and extracted five components. The five components indicate three major factors namely demographic, environmental and source of water. The study concluded that household size/ income, stagnant water source of water are the major factors affecting household access to water and sanitation in the study area. The study recommended an investment in water infrastructure and sanitation in the rural communities.

Conclusion

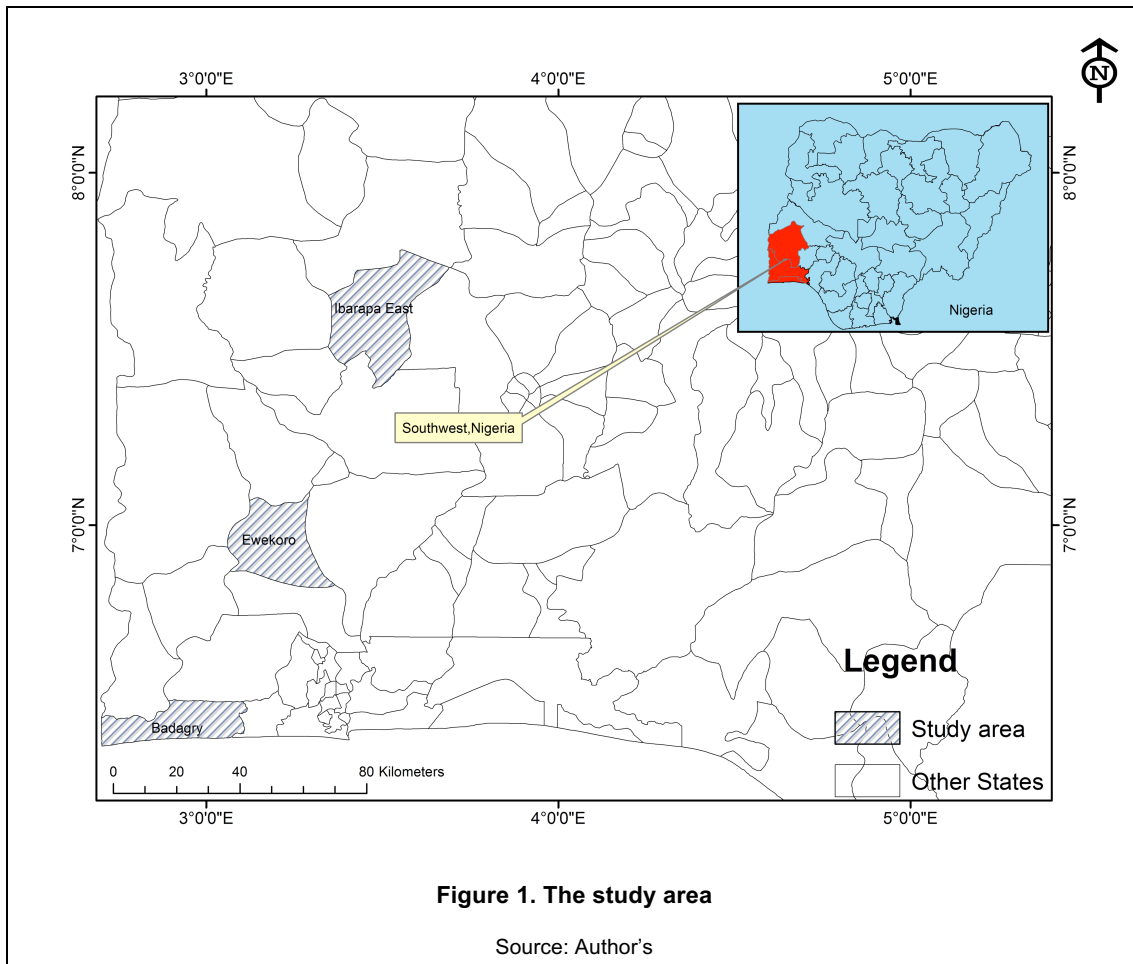
The study revealed poor environmental condition with the majority of the households having piles of solid waste around their houses. A greater proportion of the households use an open pit latrine. Access to piped

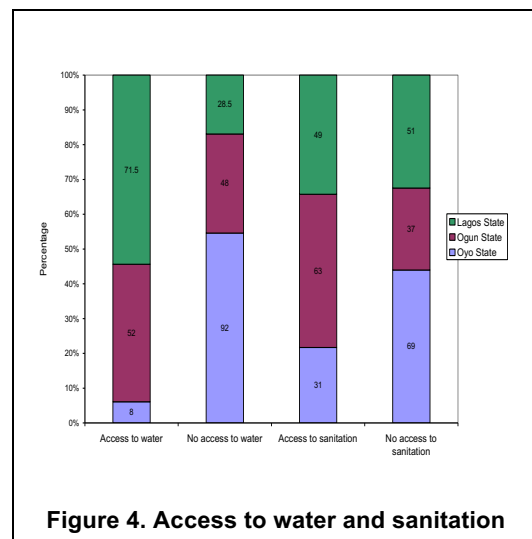
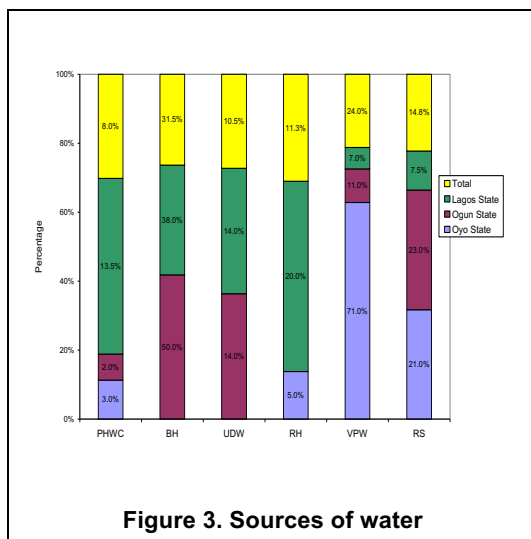
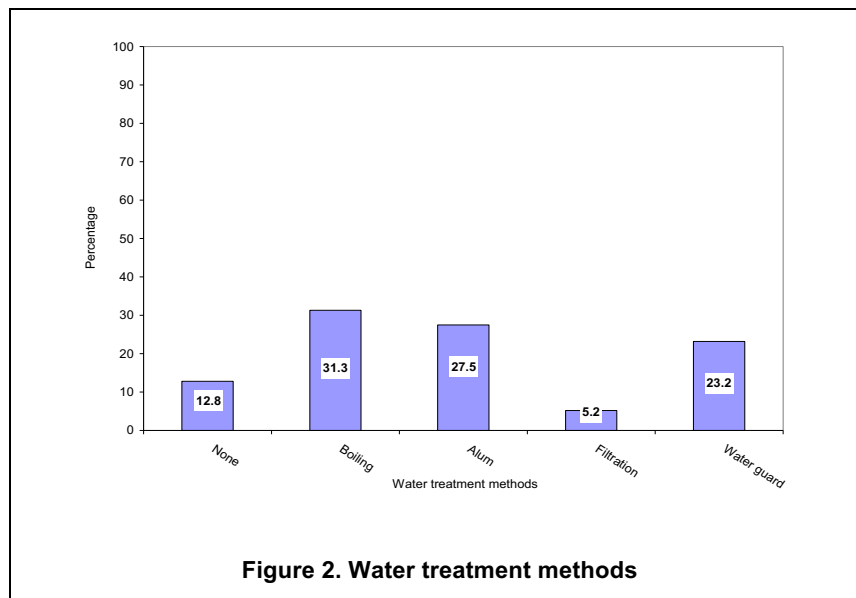
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water supply in the study area is generally low. A significant difference was found between the regions and access to water and sanitation. The study concluded that demographic, environmental and source of water are the dominant factors affecting household access to water and sanitation in the region. The study recommended regular and effective environmental sanitation, investment in the piped water system and sanitation infrastructure in the study area. For intervention purpose, Oyo state should be given higher priority because it has the weakest water and sanitation access.

Table 1. Breakdown of questionnaire administration in the study area

Communities	Local Government Area	State	Number of questionnaires
Ikoga	Badagry	Lagos	100
Apa	Badagry	Lagos	100
Itori	Ewekoro	Ogun	50
Ibeshe	Ewekoro	Ogun	50
Eruwa	Ibarapa East	Oyo	50
Lanlate	Ibarapa East	Oyo	50





NB: PHWC-piped household water connection, BH-borehole, UDW-unprotected dug well, RH-rainwater harvesting, VPW-vendor provided water, RS-River/Stream

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