

## Research Article

### People Perception of Domestic Water Supply Situation in Ogun State, Nigeria

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**Abstract:** Right or wrong, public perception impacts directly on environmental issues. Thus, the past two decades have seen an increase in the analysis of the human-environment relationship. This study assesses sources and providers of water to residents of Ogun state, Nigeria. Public perception, with respect to government performance in terms of water provision and, the willingness to pay for water services rendered, were gauged using stratified sampling technique. A total of 1,500 questionnaires were distributed to the sampled population spread in five out of the twenty local government areas of the state. Results indicated 81% of the residents obtained water from groundwater resources while only 14.9% receive water from public utilities. Also, over 75% of the respondents provide water for themselves while 65% indicated that they will prefer not to pay for water services even if the government makes the services available. The study showed that water agencies cannot be sustainably operated when public attitude to protection of same is not favorable. It was recommended that advocacy programs aimed at educating residents on inherent benefits of sustainably patronizing state water utilities rather than dependence on self-made efforts would prove helpful to both residents and government.

**Keywords:** Domestic, Nigeria, Ogun state, perception, sustainable, water supply

## INTRODUCTION

Nigeria got listed among few countries which may not meet the millennium development goal 7c which addressed the reduction by half, the global population without access to improved water sources (UNICEF/WHO, 2012; Omole, 2013). Although MDG 7c was realized in 2010 when it was documented that over 2 billion people gained access to improved water sources, projections showed that Nigeria may be an exception, even five years after the goal was met in most countries of the world (Omole, 2013). This problem is significant considering every fifth sub-Saharan African and every sixth African is a Nigerian (UNDESA, 2013). While several scholarly publications have offered explanations regarding the economic, technical and environmental dimensions on reasons why Nigeria is unable to achieve MDG goal 7c, hardly is there any reputable study that sought out the opinion of the affected population. Although it is widely recognized that public participation in decision making is vital to sustainable development, it is hardly ever practiced in developing countries (Omole and Ndambuki, 2014; Bi *et al.*, 2010). One of the most effective tools for harvesting public opinion for decision taking and prioritization of resource allocation is perception studies (Bi *et al.*, 2010; Hunter *et al.*, 2007). Perception study has been deployed for strategic planning, management of resources, acquisition of primary data and feedback system (Bi *et al.*, 2010; O'Kane *et al.*, 1999; Burgess, 1979). Bi *et al.* (2010)

carried out a perception study in China to show that charting of global environment policies is not an exclusive preserve of developed countries and the fact that residents of developing countries also have strong pro-environmental attitudes. Also, Hunter *et al.* (2007) discussed factors which influence environmental perception and the reasons why this perception is not uniform across the globe. They indicated that gender, religion and level of education are some of the major factors that may tilt public perception but they also argued that studies carried out across several countries prove that environmental concerns transcends material well-being. Lee and Zhang (2005) suggested that the provision of generalized solutions for all environmental problems may not be an efficient approach because of variations in public perception in different geographical locations. The current study therefore aims at harvesting public perception with respect to water supply in Ogun State, Nigeria, in the hope of having insight into water related problems in typical rural and urban areas of Nigeria.

## MATERIALS AND METHODS

**Study area:** The study was carried out in Ogun state, Nigeria, which is one of the 36 states of the federation. The state is situated in the south-west corner of Nigeria (Fig. 1). It is a coastal states, having borders with Lagos and Atlantic Ocean to the south and with Benin Republic to the west (Fig. 1).

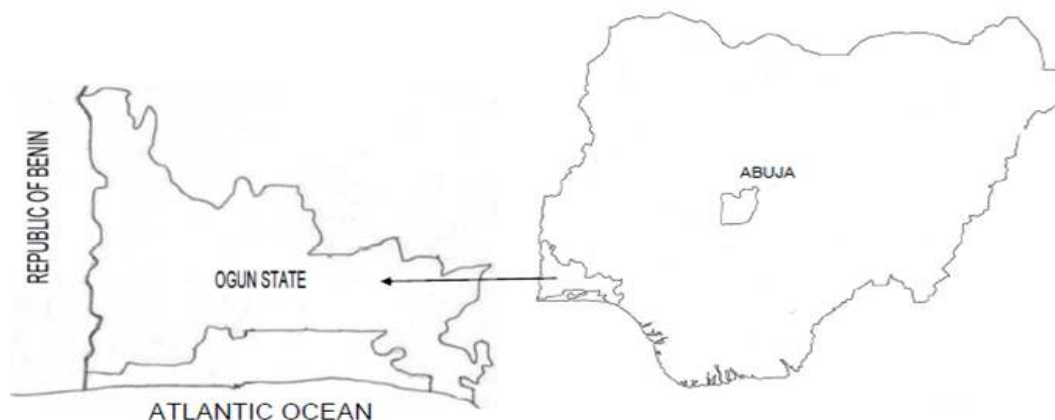


Fig. 1: Map of Nigeria showing Ogun State

Ogun state has twenty Local Government Areas (LGA). In 2006, the official census figures placed Ogun state population at 3,728,098 (FRN, 2007; Omole, 2011). With a growth rate of 3%, the current official population estimates of Ogun State is 4, 864, 322 respectively. Ogun state, has a population density of 223 persons per square kilometer (total land mass) and has its population spread in both rural and urban settings (Omole and Isiorho, 2011).

**Field study and data analysis:** Questionnaires were distributed to the sampled population using stratified random sampling method. This sampling method grants each member of the total population equal and known opportunity of being selected within a specific sample area. The stratification was aimed at receiving feedback from both high and low income earners of the state. Also, both males and females were targeted for their input, with priority being given to females because of their African traditional role of being tasked with supply of water to the households (Hunter *et al.*, 2007). Five LGAs namely Abeokuta North and South, Ijebu-Ode, Ado-Odo/Ota and Ifowere selected for sampling. The rationale for selecting these LGAs was informed by the fact the first two LGAs accommodate the state capital and has a high concentration of urban settlers while the other three contain a mixture of urban and rural areas in almost equal proportion. A total of 1, 500 questionnaires were distributed while 1089 (72.6%) were returned. Information sought through the questionnaires included size of the household, age grades in the household, sources of water to the household, reliability and convenience of obtaining water from the water source, average time taken to collect water from the water source, perception of the water quality, costs of securing water and level of satisfaction with water source. All data were entered into Microsoft Excel spreadsheet for storage, handling and analysis. General descriptive statistics was conducted on the retrieved data.

## RESULTS AND DISCUSSION

**General description of the respondents:** Domestic water supply is affected by several factors, among which is gender, age and family size (Bi *et al.*, 2010; Hunter *et al.*, 2007). In most developing countries where water is not available in-situ, women and young girls are tasked with the duty of procuring water for the family (Omole and Ndambuki, 2014). Also, Hunter *et al.* (2007) posited that women have higher environmental awareness than men and are more likely to adjust their behavioral patterns to protect the environment. As a direct result of this responsibility of African females, many lose as much as one quarter of the day in fetching water, thus depriving many girls the opportunity for education and the opportunity to engage their time in other economically beneficial activities (RSC, 2010). Thus, this study harvested more responses from the females and those between the ages of 18-25. The distribution properties of the respondents are presented in Table 1.

**Water sources:** The larger percentage of the respondents indicated that they obtained water from groundwater sources (Fig. 2). Of this proportion, 88.4% obtained water from boreholes, 9.2% from covered hand-dug wells and 2.4% from exposed hand-dug wells. The proportion of the sampled population that obtained water from the state water corporation were less than 18% while the other 1% obtained water from surface streams, vendors and packaged water sources for domestic use.

It could be noted that while 97% of the sampled population could be said to obtain water from safe sources, the other 3% of the sampled population are exposed to non-potable water sources such as exposed wells, surface water bodies and vendors. Exposed wells are subject to pollution arising storm run-off, dead rodents and other forms of contaminants while surface water bodies are well known to serve as sinks for industrial, agricultural and domestic wastewater (Omole

Table 1: Distribution characteristics of the respondents

S. no	Characteristics	Distribution	
1	Sex	Female	810
		Male	279
2	Age	18-25 years	677
		26-35 years	252
		32-45 years	85
		46-55 years	30
		>55 years	45
3	Local government area	Abeokuta North and South	312
		Ado-Odo/Ota	502
		Ijebu Ode	209
		Ifo	66
3	Average family size	6.1	

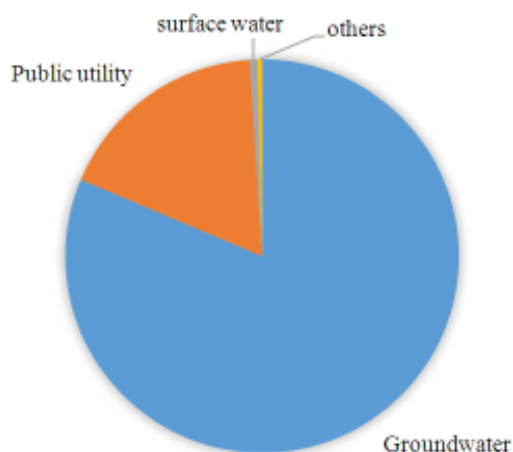


Fig. 2: Sources of water to households

et al., 2013; Omole and Longe, 2012). Furthermore, water vendors and packaged water seller are known to obtain water from cheap sources in order to maximize profit (Omole et al., 2015a). Thus, obtaining drinking water from these enumerated sources could prove detrimental to public health.

In addition, having a rate of 81% dependency on groundwater by Ogun state residents is an indication of low is the development of surface water resources in the state. High dependency on groundwater places undue demand pressure on groundwater resources and exacts relatively higher financial costs on prospectors

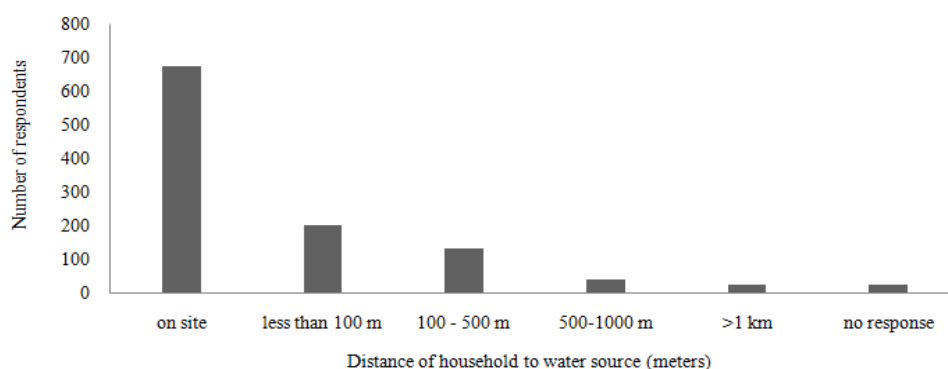


Fig. 3: Distribution of residents according to distance of water source to household

(Omole, 2013). Reports indicate surface water supplies approximately half of the world’s needed drinking water (Palaniappan et al., 2010). However, most of sub-Saharan Africa has low capacity in terms of investments in the development of their surface water resources program, thus having higher dependence on groundwater than surface water (Adelana et al., 2008). Also, RSC (2010) stated that Africa has been able to harness only 3.8% of its renewable water resources. Thus, the pervasive failure in the provision of clean drinking for African people is not the absence of water resource but that of incapacity to develop its resources.

**Distance to water source:** Economic losses occasioned by lack of water and adequate sanitation in Africa has been placed at US\$ 28 billion (Palaniappan et al., 2010). Much of this economic loss is incurred in terms of time lost to traveling for fetching water and time lost in treating diseases arising from use of polluted water (Omole et al., 2015b; Palaniappan et al., 2010; RSC, 2010). Figure 2 indicates only 2.2% of Ogun residents have to travel greater than 1 km distance (which is the maximum distance prescribed by WHO for accessing water) (UN, 2012). Nearly 62% said they had water within the household while others need to travel distances ranging from less than 100 m to 1 km (Fig. 3).

**Water provider:** Feedback from Ogun state residents indicate 75% of the residents are responsible for providing their own water for domestic use, while only about 15% are reached by public water utilities (Fig. 4). Comparatively, as many as 61% of United States residents are served water by public utilities (Palaniappan et al., 2010; NHDES, 2008).

Passing on the burden of providing water to individual households can directly impact on the income of the household, thereby impoverishing them (Jideonwo, 2014). Even then, the household source of water may be unsustainable because much of the prospecting for water is done without proper technical know-how. Sharp practices by quacks have led to loss of resources occasioned by failure of thousands of

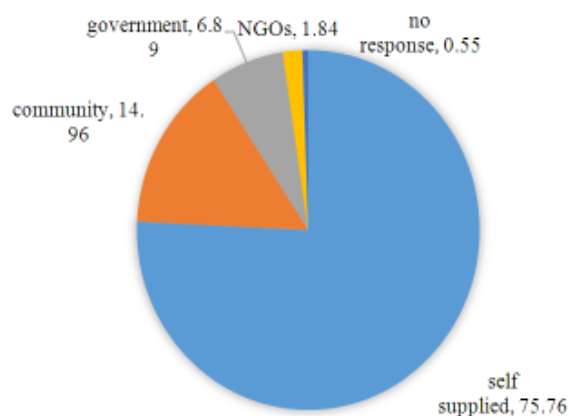


Fig. 4: Distribution of respondents by water providers

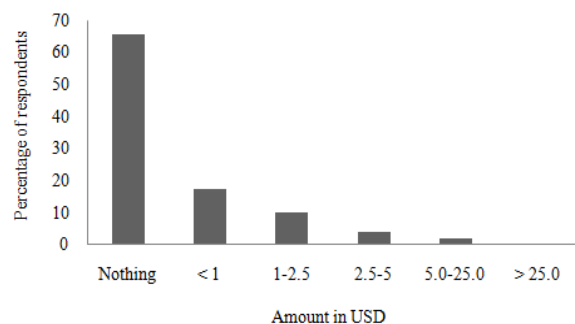


Fig. 5: Maximum amount residents are willing to pay per month for water services

boreholes (Eduvie, 2006). Many otherwells are also polluted because they are sited at close proximity to septic tanks, many of which leak into groundwater as a result of poor construction methods or aging facility. Thus, some form of regulation is needed in this regard to forestall groundwater contamination and the resultant epidemic outbreaks by non-professional groundwater explorers.

**Willingness to pay for water:** While the United Nations charter on human right to water did specify that people should not part with more than 5% of the household income, it has also not ruled that persons should not pay for water at all (UN, 2012). Recommended guidelines for water costs has, therefore, been based on relative terms rather than actual costs of producing and transporting water to households, thereby leaving room for debates and diverse interpretation of the meaning of human right to water. This entitlement mentality has also informed the anti-social behavior of many residents who resort to vandalism of public utilities in order to access water without approval and without payment for services rendered. When the question was posed to residents on how comfortable they were with respect to paying for water services rendered, more than 65% responded that

they would rather not pay anything (Fig. 5). Others indicated how much they were willing to pay for constant water services being delivered to the household by public utilities (Fig. 5).

In a similar vein, 91.83% of respondents believed government should bear the responsibility of supplying water to residents, 4.04% disagreed and 4.13% were undecided about who ought to pay for water services. Furthermore, 80.53% of the respondents believe government has failed them in the duty of providing water for them while 10.29 disagreed with this notion. The others were undecided on the issue. These responses suggests why many State water corporations in Nigeria have been unable to break even in their operations and why it may be near impossible to sustainably get piped water to most households (Omole and Ndambuki, 2015).

**Level of satisfaction with water supply:** Regardless of water source and water service provider, respondents were asked to comment on their level of satisfaction with water they currently use. They were also asked to comment on cause of dissatisfaction if there was any. Nearly 21% of the respondents indicated that their water had some sort of odor, 21.3% said the water tasted badly, 81.64% said they were unhappy they had had to spend money to obtain water and 85.68% indicated they incurred extra costs in terms of energy to secure water. The aggregation of these facts show that many Ogun residents are unsatisfied with their water source and that they pay far more for water than they are willing to part with. However, a deeper analysis will show that paying the state water corporation for water supplied would prove to be far cheaper than individual household effort, as shown by Jideonwo (2014) who reported that Lagos residents paid private vendors at least 5 times more the rates of the Lagos Water Corporation.

## CONCLUSION

When compared with world average dependence on groundwater, too many residents of Ogun state depend on groundwater resources for domestic use (Omole, 2013; Shah *et al.*, 2007). They also rely on self-efforts in the provision of potable water to the households, in contrast to depending on public utilities. These anomalies are traceable to under-development of surface water resources in the country as a whole, anti-social behavior by sections of the public and the unsustainable manner in which the government run water agencies are being managed. The unwillingness of the majority of residents to pay for water supplied and the attendant financial incapacitation of the state water agencies has placed residents at the mercy of

private vendors who charge higher than the state water agencies would. Yet, these residents would rather not pay for public water services, even when it is made available. Many would also rather invest in private water ventures, which in many cases fail. This pervasive and negative public attitude to water supply programs can prove detrimental to any effort or policy implementation on water supply in the state. The human dimension to environmental change has proven to be a major factor in shaping the environment and therefore cannot be left unattended (Bi *et al.*, 2010; Curran *et al.*, 2002; Dunlap, 1992). To address the water supply problem in Ogun State, massive public advocacy programs are necessary to educate and re-orientate the public to the dangers and de-merits of self-supply of water as against public water supply. They also need to be made to realize the economic losses and health risks associated with patronizing water vendors rather than professionally coordinated state water corporation. The proper education and the positive disposition of the public to water supply by government will be in the interest of both the government and the governed.

## REFERENCES

- Adelana, S.M.A., A. Tamiru, D.C.W. Nkhuwa, C. Tindimugaya and M.S. Oga, 2008. Urban Groundwater Management and Protection in Sub-Saharan Africa. In: Adelana, S.M.A. and A.M. MacDonald (Eds.), Applied Groundwater Studies in Africa. Taylor and Francis, London, pp: 231-260.
- Bi, J., Y. Zhang and B. Zhang, 2010. Public perception of environmental issues across socioeconomic characteristics: A survey study in Wujin, China. *Front. Environ. Sci. Eng. China*, 4(3): 361-372.
- Burgess, J.A., 1979. Place-making: The contribution of environmental perception studies in planning. *Geography*, 64(4): 317-326.
- Curran, S., A. Kumar, W. Lutz and M. Williams, 2002. Interactions between coastal and marine ecosystems and human population systems: Perspectives on how consumption mediates this interaction. *Ambio*, 31: 264-268.
- Dunlap, R.E., 1992. Trends in Public Opinion toward Environmental Issues: 1965-1990. Taylor and Francis, Inc., Washington DC.
- Eduvie, M.O., 2006. Borehole failures and groundwater development in Nigeria. Proceeding of National Seminar on the Occasion of Water Africa Exhibition (Nigeria 2006), Lagos, Nigeria. Retrieved from: [http://www.nwri.gov.ng/userfiles/file/Borehole\\_Failure\\_in\\_Nigeria.pdf](http://www.nwri.gov.ng/userfiles/file/Borehole_Failure_in_Nigeria.pdf). (Accessed on: December 20, 2012).
- FRN, 2007. Legal Notice on Publication of the 2006 Census Report. Fed. Republic Niger. Official Gazette, 4(94): 1-8.
- Hunter, L.M., S. Strife and W. Twine, 2007. Environmental Perceptions of Rural South African Residents: The Complex Nature of a Post-material Concern. Research Program on Environment and Society. Working Paper ES2007-0001. Retrieved from: <http://www.colorado.edu/ibs/pubs/eb/es2007-0001.pdf>. (Accessed on: July 19, 2015)
- Jideonwo, J.A., 2014. Ensuring Sustainable Water Supply in Lagos, Nigeria. University of Pennsylvania Scholarly Commons. Retrieved from: [http://repository.upenn.edu/mes\\_capstones/58](http://repository.upenn.edu/mes_capstones/58). (Accessed on: July 24, 2015)
- Lee, H. and D. Zhang, 2005. Perceiving land-degrading activities from the perspective of lay public in northern China. *Environ. Manage.*, 36(5): 711-725.
- NHDES (New Hampshire Department of Environmental Services), 2008. Annual Compliance on Public Water System Violations. January 1, 2007-December 31, 2007 (NHDES-R-WD-08-10). Retrieved from: [http://des.nh.gov/organization/divisions/water/dwgb/documents/2007\\_annual\\_compliance\\_report.pdf](http://des.nh.gov/organization/divisions/water/dwgb/documents/2007_annual_compliance_report.pdf).
- O'Kane, B.L., D. Bonzo and J.E. Hoffman, 1999. Perception Studies. Proceeding of the RTO SC1 Workshop on "Search and Target Acquisition. Held in Utrecht, the Netherlands, June 21-23 1999 and Published in RTO MP-45.
- Omole, D.O., 2011. Reaeration Coefficient Modelling: Case study of River Atuwara, Ota, Nigeria. LAP Lambert Academic Publishing GmbH & Co. KG, Saarbrücken, Germany, ISBN: 978-3-8443-3177-6.
- Omole, D.O. and S.A. Isiorho, 2011. Waste management and water quality issues in coastal states of Nigeria: The Ogun state experience. *J. Sustain. Dev. Afr.*, 13(6): 207-217.
- Omole, D.O. and E.O. Longe, 2012. Reaeration coefficient modeling: A case study of river Atuwara in Nigeria. *Res. J. Appl. Sci. Eng. Technol.*, 4(10): 1237-1243.
- Omole, D.O., 2013. Sustainable groundwater exploitation in Nigeria. *J. Water Resour. Ocean Sci.*, 2(2): 9-14.
- Omole, D.O., E.O. Longe and A.G. Musa, 2013. An approach to reaeration coefficient modeling in local surface water quality monitoring. *Environ. Model. Assess.*, 18(1): 85-94.
- Omole, D.O. and J.M. Ndambuki, 2014. Sustainable living in Africa: Case of water, sanitation, air pollution and energy. *Sustainability*, 6(8): 5187-5202.
- Omole, D.O., J.M. Ndambuki and K.O. Balogun, 2015a. Consumption of sachet water in Nigeria: Quality, public health and economic perspectives. *Afr. J. Sci. Technol. Innov. Dev.*, 7(1): 45-51.

- Omole, D.O., C.P. Emenike, I.T. Tenebe, A.O. Akinde and A.A. Badejo, 2015b. An assessment of water related diseases in a Nigerian community. *Res. J. Appl. Sci. Eng. Technol.*, 10(7): 776-781.
- Omole, D.O. and J.M. Ndambuki, 2015. Nigeria's Legal Instruments for Land and Water Use: Implications for National Development. In: Evans, O. (Ed.), *In-Country Determinants and Implications of Foreign Land Acquisitions*. IGI Global, Hershey, PA, pp: 430, ISBN: 1466674067.
- Palaniappan, M., P.H. Gleick, L. Allen, M.J. Cohen, J. Christian-Smith, C. Smith and N. Ross, 2010. *Clearing the Waters: A Focus on Water Quality Solutions*. UNEP, Nairobi, Kenya and Pacific Institute, Oakland, CA, USA, ISBN: 978-92-807-3074-6.
- RSC, 2010. *Africa's Water Quality: A Chemical Science Perspective*. A Report by the Pan Africa Chemistry Network. Retrieved from: [http://www.rsc.org/images/RSC\\_AWQ\\_PACN\\_Flyer\\_tcm18-176916.pdf](http://www.rsc.org/images/RSC_AWQ_PACN_Flyer_tcm18-176916.pdf). (Accessed on: July 30, 2014).
- Shah, T., J. Burke and K. Villholth, 2007. *Groundwater: A Global Assessment of Scale and Significance*. Retrieved from: <http://www.iwmi.cgiar.org/assessment/Water%20for%20Food%20Water%20for%20Life/Chapters/Chapter%2010%20Groundwater.pdf>.
- UN, 2012. *The Human Right to Water and Sanitation*. Retrieved from: [http://www.un.org/waterforlifedecade/pdf/human\\_right\\_to\\_water\\_and\\_sanitation\\_media\\_brief.pdf](http://www.un.org/waterforlifedecade/pdf/human_right_to_water_and_sanitation_media_brief.pdf). (Accessed on: July 24, 2015)
- UNDESA, 2013. *World Population Prospects: The 2012 Revision, Key Findings and Advance Tables*. Working Paper No. ESA/P/WP.227, United Nations, Department of Economic and Social Affairs, Population Division, NY.
- UNICEF/WHO, 2012. *Progress on Drinking Water and Sanitation: 2012 Update*. UNICEF and World Health Organization, New York, pp: 59, ISBN: 978-92-806-4632-0.