FACTORS INFLUENCING WOMEN'S ACCESS TO WATER IN OKE-OGUN REGION, NIGERIA

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Abstract
This paper examines community Water Access Index (WAI), investigates the determinants of women's access to water, and identifies windows of opportunities for improved water access in Oke-Ogun region in Nigeria. The study adopted triangulation methodology via household survey, focus group discussions and key-informant interviews for data collection. The result indicates that women's access to water depends on their socio-economic characteristics, physical availability and location of water resources. The water access index (WAI) of the study area is 36.3 indicating that more than two-third of women in Oke-Ogun region is without reasonable/acceptable water access.

Key Words: *Water access, Water resources, Women, Oke-Ogun.*

Introduction

Water is a necessity to all dimensions of human systems. The availability and sustainability of water resources is a crucial factor in human development index. Access to water conditions the progress that any country can achieve towards the targets of sustainable development and good governance (Bartram and Cairncross, 2010; Grey and Sadoff, 2007). It is also a key dimension to measure poverty alleviation because poor accessibility to water and sanitation is not a crisis of physical availability, but has been related to deprivation, inequalities as well as power and resources allocation (UN-Habitat, 2003; United Nations Development Programme, UNDP, 2006).

The importance of access to water to sustainable development has been in the global agenda over the years. For example, the General Assembly of the United Nations declared the period between 1981 and 1990 as the International Drinking Water Supply and Sanitation Decade (IDWSSD). The gender inclusion in the Demand-Side Management for good water governance was reinforced at Rio-de Jairo in 1992, the design of the Millennium Summit in year 2000, the target 10 of the Millennium Development Goals, and the Johannesburg World Water Conference in 2003. Access to water was also included in the human rights act in 2002, while sanitation issues were added in June, 2009 by the United Nations purposely to effectively monitor progress on water target in the Millennium Development Goals (MDGs). During the Rio+20 meeting in 2012, some of the conclusions towards achieving global sustainability goals in 2030 were related to water. The justification for this global agenda is clear: "Sustainable

access to safe drinking water often translate to improved health and saving considerable time and effort in water collection for women" (PBL Netherlands Environmental Assessment Agency, 2012).

Evidences from the literature show the importance of understanding and addressing gender dimension of access to water because, gender (sex, age, race, social class) significantly contributes to access to environmental assets (Neumayer and Plumper, 2007). Gender also often dictates who gains and who loses in environmental (water-related) risks and therefore contributes a major factor in assessment of policy intervention. It is also a fact that household water provision is still a female responsibility in most African societies, especially in local communities (UN-Habitat, 2003). Except for specific cultural ideology, women are primary water collectors. For instance, in the Hausa dominated communities in West Africa, where women are kept in Purdah (a religious rite that keeps women excluded from men and the public), and men are primary water collectors. Thus, culture plays an important role in influencing who are the principal water collectors.

Gender-specific disadvantage is also traced to health impacts of women head-load water which can be stressful and time consuming especially when water points are not readily close to their residences (UN-Habitat, 2003). The direct involvement of women in water collection means that, women have a special interest in having access to convenient, reliable and safe water resources close to the homestead as well as having access to improved sanitation system (United Nations Education Socio-Cultural Organization, UNESCO, 2004). It is also important to note that women's interests are not limited to the above but that women also have pressing needs for water to enable them to engage in economic production, whether in agriculture, in enterprise, or in other income-generating activities (Denton, 2004; UNDP, 2010). Women's access to water, in a way can be used to determine the linkages between households and the community livelihood capital, household's health and well being (Joint Monitoring Programme, JMP, 2010); community social status (Amnesty International, 2010) and national poverty index (UNDP, 2006; V¨or¨osmarty *et al.*, 2005).

Within the context of the MDGs and the United Nations Fresh Water Decade (2005-2015) - periods in which more people than ever are expected to gain access to water, specific quality indicators are provided to guide monitoring national progress towards achieving target on access to water. According to the World Health Organization (WHO, 1999); UNESCO, (2004) and the UN-Habitat, (2003), a person has access to safe water if he/she is provided with water within 200 metres of a dwelling through piped water or through standpipe"; and that the provision is ″adequate and improved″ if it is available at least 20 litres/person/day (LPD) from protected sources (deep wells, springs, boreholes). In rural areas and urban suburbs where there are no connection to pipes, and the available sources are not properly protected, it is imperative that indicators in measuring "improved access" should be more encompassing and contextualized.

In Nigeria, national aggregates on access to water are known. For instance, the JMP (2012) report indicated that between 1990 and 2010, additional 23% of the Nigeria's population gained access to water (Table 1). However, available national data on access to water could be too general and may be inadequate to plan for water provision in some local communities.

Table 1: Access to water in Nigeria (1990-2010)

Years	Population (* 1,000)	Urban Improved	unimproved	Rural Total improved	Unimproved	National Total improved	Unimproved
1990	97.552	77%	17%	30%	29%	47%	25%
2000	123.689	77%	19%	36%	33%	53%	27%
2010	158.422	74%	21%	43%	35%	49%	28%

Source: WHO/UNICEF, Joint Monitoring Programme (2012)

Aggregate data indicating progress on access to water in Nigeria such as the WHO/UNICEF JMP assessment is most likely to mask the reality because the spatial direction and the equity of progress in water access are not known. Also, specific needs of the disadvantaged communities are often hidden in national aggregates of water access. This paper therefore, determines the community water access index, investigates the determinants of women's access to water in Oke-Ogun region, and identifies windows of opportunities for improved access to water in such communities in Nigeria.

Materials and Methods
The Study Area
The Oke-Ogun area is a socio-economic region comprises 10 local government areas in the northern part of Oyo State, Nigeria. The study area is located between latitudes 7°39′ and 9°10′ N and longitudes 2°40′ and 4°20′ E and is bordered in the north by Kwara state, in the south by Ibadan region, in the east by Oyo and Ogbomosho regions and in the west by Republic of Benin (Figure 1).

Figure 1: The study area

Oke-Ogun Region is characterized by the wooded savannah of the southwest Nigeria, with distinct wet and dry seasonal periods lasting between April to October and November to March, respectively. The peak of precipitation is traditionally between August and September. Mean temperature during the wet season is 28°C and 35°C during the dry seasons; annual mean rainfall ranges between 1000 mm and 1600 mm. The area in its entirety is a hilly environment with elevations ranging between 150 to 650 metres above sea level. Prominent features that make up the relief of the area include series of isolated hills and intervening pediments and plains. Due to the nature of the topography, the Oke-Ogun area is well drained by the major tributaries of River Ogun, Ofiki and Oyan rivers which flow southwards into the Atlantic Ocean.

The study area is not connected with public water systems. Although; there are earth dams (mini water schemes) which were developed for public water system during the IDWSSD in four towns namely: Ofiki in Okeho/Iganna, Oge in Shaki, Ikere in Iseyin and Oyan in Ago-Amodu. Presently, Oge dam in Saki is the only functioning scheme with water supply serving less than 5% of the population.

Based on the 1991 national population census, projection with annual growth rate of 2.8% indicates an increase of 55.2% in 20 years (between 1991 and 2011), rising from 700,000 to about 1.6 million inhabitants in Oke-Ogun. Residents of Oke-Ogun engage in multiple livelihood activities dominated with rain fed agriculture and forest-based entrepreneur.

Data Collection

The triangulation method described in Kweku (2010) was adopted for the study. Using this method, gender dimension to water access and water politics in urban centres were analysed. The methodology also provided validation of data since observations from different data sources about access to water are similar and also to ascertain the participation of actors (women in the case study), not just their responses but how they respond, what they affirm and what are the tones of their affirmation.

Qualitative data: The field research that informs this paper was guided by a feminist ethnographic methodology, which gives careful attention to diverse experiences and looks for description and stories that are profoundly gendered and relevant to the context. During the field work, women's experiences at the water points were captured to showcase some of challenges of water collectors in the study communities.

Quantitative data: A detailed structured questionnaire was developed to interview a total of 397 women in three communities. The questionnaire captured socio-demographic profile, access to water, water use, women's participation in water management and water price.

Sampling Technique

Three local communities namely, Okeho, Iseyin and Saki (areas marked with ash colour in Figure 1) were selected for the study survey at the peak of the dry season of December 2008 to February 2009. A preliminary visit to the region was first done, during which a pilot survey was carried out in November 2008 during the onset of dry season. The choice of the period for the field work was informed by the fact that water stress in the study area is much more critical during the dry season because the region is not connected with public water system (tap water).

The study adopted a multi-staged sampling technique. First, the three oldest of the ten Local Government Areas (LGAs) in the Oke-Ogun region were purposefully selected. These are: Saki North (from the Old Ifedapo), Kajola and Iseyin LGAs. Other

criterion for the selection was based on localities that already have water project such as earth dam. Second, a selection of the three LGAs headquarters was done. Third, a random selection of two neighbourhoods sites comprise of the old compound houses ("agbo ile") and the new layout areas ("daleko") in order to examine spatial differences within the same town in relation to access to water. The final stage was a random selection of a 1% sample size of households in the three communities, based on the projected 1991 census data. Participants were initially drawn from elected community groups and leaders. A total of 397 women participated in the survey, consisting of 72 in Okeho; 150 in Iseyin and 175 in Shaki.

Data Analysis

Responses from household survey's questionnaire were coded and entered into a Statistical Package for Social Sciences (SPSS 16th edition) for analysis. Simple descriptive analysis provided the frequencies and percentages of socio-economic variables and indicators for water access. The study variables were generated based on the benchmark on from indicators for access to water which were designed to measure progress towards the achievement of the MDGs (UN-Habitat, 2003). Initial frequency results of the analysis were transformed into binary format in order to accommodate the benchmarks of "acceptable" and the "unacceptable" value labels of such variables.

The recoding exercise provided the opportunity for inferential statistic in order to determine what factor contributes to women's water access. Explanatory variables include: Neighbourhood type (nhood), educational status (edu), Income (income), time spent for water collection (duration), reliability of water sources (reliab), and quality of water supply while quantity of water in terms of litre per person per day (LPD) is the dependent variable. In order to determine the contribution of the explanatory variables to the prediction, a binary regression analysis was done based on the acceptable and non acceptable values. To fit the model, "enter" procedure was used; and to determine the likehoodness of occurrence, the Wald χ^2 values were computed. Positive values of the parameter estimate indicate that larger values of the explanatory variable will increase the likelihood of the occurrence of the event. The null hypothesis for the study is stated thus: Households socio-economic characteristics do not significantly influence women's access to water.

Result and Discussion
Socio-economic characteristics of the respondents

Literacy levels of the participating women are generally high, with only 7.1% of participating households having no formal education. Households with fewer persons are common especially in the old compounds. Regarding occupations of participants, 40% were in farming and trading, followed by artisans and trading (20.7%) and 11.6% worked in the civil service (Table 2). Women in Oke-Ogun rely on combination of multiple income generating activities, multi dimension of livelihood activities, but with low economic return. High proportion of the women (59.5%) earns less than ₦15,000 naira per month (less than USD100). This has implication on livelihoods, development and poverty dimension in Oke-Ogun region.

Table 2: Socio-demographic profile of the respondents

Variables	Value labels	Frequencies (N_{pop} = 397)	Percentages
Education status	Primary	14	3.6
	Secondary	56	14.2
	Post secondary /vocational trainings	275	69.8
	Adult education	21	5.3
	No formal education	28	7.1
Occupational structure	Civil service	82	40.1
	Trading	20	20.7
	Farming	159	5.0
	Artisan	46	11.6
	Professional service	28	7.1
	Retired/ unemployed	62	15.7
Monthly income (NGN)	Below 7,500	123	31.1
	7,500 – 15,000	112	28.4
	15,001 – 30,000	109	27.6
	30,001 – 50,000	36	9.1
	Above 50,000	15	2.8
Household size	1-2	246	62.6
	3- 5	99	25.2
	6 -8	31	7.9
	Above 8	17	4.3
Type of neighbourhood	Old compounds houses	172	43.3
	New layout areas	225	56.7

Women's Access to water in Oke-Ogun

In Oke-Ogun region, the main water sources available for household use include: wells (64.6%), hand pump, deep wells/ boreholes (13.8%) and ponds and rivers (10.9%). Locations of many wells are farther away from residences. For instance, 42.5% of the participating households are served by wells located at the neighbourhood centre. Majority of these wells are sited within the sub-surface of 3-8 metres. Wells are protected with concrete apron and wooden or metal cover. The shortness of most well aprons accommodates children for water collection but with the challenges of domestic animals such as goats who take naps on the wells covers.

Generally, female members of household are responsible for domestic roles including water collection (Figure 2). Water collection is done mostly in the morning by majority

(79%) of the participating households (Table 3), which implies lost of productive hours for women and school time for some children in a search for water. Water collection during the dry season is particularly severe for women whose water points (mostly well) are located farther away from households. It also increases the burden for household members in charge of water collection in terms of travelling longer distance and more time been spent for collection by the residents of the study area. The amount of time spent for collecting water is important in determining the adequacy of water sources. In the study region, the survey shows that 67.9% of participating households travel long distances of 1.5 km or more on a daily basis. For the participating women, time spent for daily water collection ranges between 30 minutes (11.2%) and 120 minutes which account for 13.1% (Table 3).
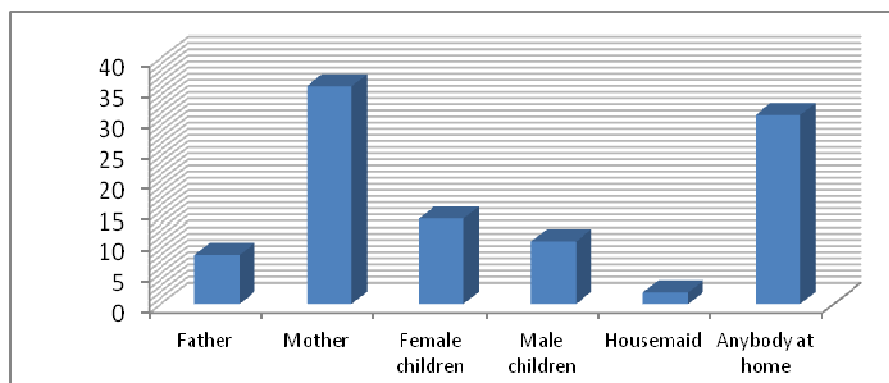
Figure 2: Women as main water collector in Oke-Ogun

Table 3: Women's water access index in Oke-Ogun

Variables	Value labels	Freq. (N_{pop} = 397)	Percentages	% within the acceptable index
Condition of well water	Protected with cover	348	87.7	87.7
	Not protected with cover	49	12.3	
Availability of improved large water storage facility	Yes	51	21.9	21.9
	No	182	78.1	
Reliability of water supply sources	Yes	61	31.3	31.3
	No	134	68.7	
Average time spent for water collection (daily)	At most 30 minutes	51	13.6	49.4
	30 – 45 minutes	134	35.8	
	45 60 minutes	44	11.8	
	More than 60 minutes	145	38.8	
Location of water sources to residence	Within the compound	55	13.9	43.9
	In the next compound	119	30.0	
	Neighbourhood centre	172	43.3	
	Another neighbourhood	51	12.8	
Distance covered for water collection (km /daily)	Less than 0.5	11	2.9	18.2
	0.5 – 1.0	57	15.3	
	1.01 – 1.5	52	13.9	
	More than 1.5	253	67.8	
Period of the day when water collection is done	Morning	286	79.0	1.9
	Afternoon	28	7.7	
	Evening	41	11.3	
	Any time of the day	7	1.9	
Weighted Average				36.3

Water quantity and quality for households is also impacted during supply shortage (as a result of low precipitation, higher demands and population increase). Supplies during the dry season are muddy while some water points have contaminated colour and odour

during the wet season. The calculated weighted average of water access index of the study area (36.3) indicates that only 36% of the participating women have access to 20 LPD and are within the acceptable improved/reasonable access. This result also indicates that two-third of the participating households are far below the "acceptable or reasonable" access to water. The implication of this is that poor water access could impacts other aspects of development and

livelihoods of women both at household and community levels.

Preconditions to women's access to water in Oke-Ogun

Factoring all the independent variables together, the Exp (β) indicates that 56.4% of the parameters contribute to the occurrence of the predictor (access to water), (Table 4).The significance level of the Wald χ^2 value of 11.924 is less than 0.05, then the explanatory variables have significant impact on the model.

Table 4: Summary of the binary regression model

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 0	Constant	-.572	.166	11.924	1	.001**	.564

** significant at 0.05 significant level

The parameter estimates (ExpB) summarizes the effect of each explanatory in the model. The result indicates that reliability of water supply sources alone has a contribution value of 95%. Parameters with Wald χ^2 values that are significant to the contributions include: Neighbourhood type, time spent for water collection and reliability of water source (Table 5).

Table 5: Parameters' estimates in the logistic regression model

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Nhood	-.797	.354	5.059	1	.024**	.451
	Edu	-.587	.459	1.637	1	.201	.556
	Income	-.097	.356	.075	1	.784	.907
	duration	.542	.171	10.074	1	.002**	.719
	Reliab	-.050	.457	.012	1	.013**	.951
	Quality	-.138	.365	.144	1	.705	.871
	Constant	.190	.892	.045	1	.832	1.209

Variable(s) entered on step 1: nhood, edu, income, duration, reliab, quality.
** significant at 0.05 significant level

The result of the significant Wald values implies that:
The types of neighbourhood a woman lives contribute to her access to water. This is quite logical because, types and locations of residences dictate the socio-economic status (in relation to educational and income levels) of the residents. Poor women are located within poor and blight neighbourhoods while

the affluent people with improved socio-economic status and livelihood assets live in planned, choice and physically favourable locations. Generally adaptive capacity of women to water supply shortages in Oke-Oke-Ogun is influenced by their access to economic, social and institutional assets

The time a women spent for water collection (duration) explains the degree of

access to water she is enjoying. Time spent is often a function of the proximity of (travel distance) the waiting period at water point. Women that have to travel longer distance would spend more time for water collections and are definitely exhibit inadequate access to water. A similar result was obtained in a study on mapping water poverty in Akoko-Ekiti in Nigeria which shows that access to water is influenced by location and distance covered (including waiting time) for water collection (Ayeni and Soneye, 2011).

The reliability of the supply which relates to the ability of the source to supply quality and quantity required by the population per time is a good prediction to determine women's access to water. It is evident from this study that over dependence of women on sub surface well water which cannot supply adequate water all year round is a major factor influencing poor water access. This could impair the access because the sources are not reliable during rainfall variability. This result is similar to Kweku (2010) who found that availability of public water system is more reliable and could result to improved water access to women in Ghana.

Conclusion and Recommendations

This paper has shown that water access in Oke-Ogun region, Nigeria is highly influenced by households' economic power to explore alternative water supply sources (such as boreholes in particular) and that most of the water sources are impacted by the seasonal rainfall variability during dry season. The study has also shown that women's access to water is determined by other livelihood assets such as housing location and the availability and reliability of water resource.

It is clear that the study communities are yet to have improved access to water in the context of the MDG in Nigeria. But beyond the timelines of the MDGs, it is important to appropriate the framework of the African Water Vision of 2025 by localising the agenda. With the establishment of Water and Sanitation Unit (WATSAN) in each LGA, the National Water Policy of the Federal Government of Nigeria could be implemented at the community level. In doing this, available water resources in the study communities (such as earth dams) should be redeveloped for water supply system in Oke-Ogun area.

Exploration of underground water provides opportunity for improved water access. Situating Oke-Ogun which has a total annual rainfall of 1600 mm within the context of ground breaking research work by Macdonald *et al*. (2012) with mapping of groundwater availability in Africa to combat water crises would implies that development of deep wells and borehole from groundwater in aquifers could well buffered the study region against short term variations in climate. To achieve this, institutional responsive action on data capturing is inevitable. Location specifications data (demographic, needs, use and demand, hydrology) across the country will provide enabling action plan for mini water schemes not just to be implemented by the government, but individual households, private enterprises and communities can pool social and economic capitals to actualize improved water access.

While a strong institutional interventions mentioned above is still in the pipeline, rain harvest could provide rescue ticket for improved access to water in Oke-Ogun. Proper harnessing of the abundant rainfall (annual mean of 1300 mm) could be more beneficial to the study communities if such could be harvested and stored instead of the common wastage during the wet season. In doing this, a simple technology of roof gutter and adequate storage tanks which are already in use in some countries such as India, Kenya and Ghana could be adopted towards improved water access for women in Nigerian local communities.

Key developmental issue that must be acknowledged is that improved access to water by women in local communities has the potential to facilitate progress of other MDG goals apart from the goal seven (7). For example, improved access to water (Goal 7) will facilitate the achievement of goal 3, 4 and 6 which are directly related to women's welfare. It is therefore advocated that women's empowerment programmes should entail provision of life's basic services that may improve population's socio-economic status, thereby facilitating their capacity to secure improved water access at household level. Whenever the households water needs are adequately met, not just the women group that benefits but the provision would also take care of the future generation (children) who may also feel the hurt of water supply crisis.

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