

# WOMEN'S INVOLVEMENT IN THE EVALUATION OF WATER-IMPROVEMENT VARIABLES TOWARDS THE ACHIEVEMENT OF SUSTAINABLE DEVELOPMENT GOALS: ASSESSMENT OF A SEMI-URBAN CITY IN SOUTH-WEST NIGERIA

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## ABSTRACT

Target 6 of the Sustainable Development Goals is aimed at the sustainable management of water using different levels of challenges and goals for different countries. The survey presented in this paper involves the distribution of 600 well-structured questionnaires to 340 mapped-out households, as well as personal interviews and group interactions to capture respondents' perceptions in line with the subject matter. The questions examined variables of analysis pertaining to the level of accessibility, cost perception, sources of water and proposed use of water gotten within Ado-Odo Ota, Ogun State, Nigeria. The outcome from the contributions of respondents was analyzed using the Multinomial Logit model. The Logit result obtained from the survey showed that the responsibility of accessing water within a household lies with the woman, as more women responded in affirmative to that aspect (61.2%). A thorough appraisal of the demographics showed that respondents depend on private sources, which seem expensive to get because the quality of other sources could not be relied on based on the judgment of some physical properties such as smell and colour. After evaluating all logical variables, the results further identified the shortcomings and complications of water service delivery that have caused respondents to lose confidence in government-provided water facilities. To positively improve the SDG metrics, the research highlights positive initiatives such as subsidy, cost recovery, and policy revisitation to improve water supply access within Ado-Odo Ota.

*Keywords: water access, SDG, women's participation, sustainability, water governance.*

## 1 INTRODUCTION

Water is one of the essential requirements for survival. It also plays a vital role in the societal formation and organizational ethics. The United Nations (UN) declared the 1980s as the International Drinking Water Supply and Sanitation decade, and yet, after 35 years and still counting, the world has seen about 748 million people without access to improved drinking water sources [1].

The health challenges to humanity and communities experienced in low- and medium-income countries reflect on the lack of access to safe water sources and inadequate sanitation [2], [3]. The reflection of water on health depends on the water-collection source, distance from home, time and labour invested in water collection and income [4], [5]. Understanding these factors inspired the Millennium Development Goals (MDGs) to focus on halving the number of people without access to sustainable water sources [6]. The target plan of the MDGs was meant to cater for water insecurity challenges, which have been defined by Hadley and Wutich [7] and the FAO [8] as "Inadequate and risky access to adequate water for an effective and productive living."



With the 2015 objective date for the MDGs met, there have been wavy conclusions in water and sanitation progress in sub-Saharan Africa where many countries have gone off track in actualizing the target [1]. The unsatisfactory achievement is being propagated in urban areas that experienced a decline in the number of household connections and not even having the provision of public taps, protected wells, hand pumps, etc. could cater for that [9]. Pending the expiration of the MDGs, the Sustainable Development Goals (SDGs) were established to handle sustainable water use amongst others [10], [11].

The effect of environmental development is not peculiar to a particular gender because women and girls partake in most domestic assignment globally [12]. An editorial in *The Lancet* [13] noted that disproportionate contributions to domestic duties make environmental transformation a women's affair. Therefore, the need to tackle the challenges encountered by women when accessing water needs urgent attention.

According to the WWAP [14] and Alonso-Almeida [15], women engage in the habitual responsibility in water management designated for domestic/household use in developing countries, while men are concerned with the overall decision guiding the development of water resources. In the same vein, women possess substantial knowledge concerning water resources, including its location, quality and different storage methods to be adopted. However, the contribution towards improving water resource management and expanding the access to safe and improved drinking water and sanitation has underestimated the role of women in water management.

The Federal Ministry of Water Resources and Rural Development iterated that sustainability and water adequacy can be achieved when there is effective control of the relative abundant water resource present in the country – Nigeria [10]. As part of the control measure, women should not be seen as water consumers or water beneficiaries but also as decision stakeholders and water managers. The water information carried by women are often disregarded; their valuable experience has been overlooked and their knowledge and participation in water-supply management is under-utilized. Therefore, this study evaluates the contributions of women in the improvement and achievement of the SDG target towards the level of access to water so as to establish positive benefits for the community since their valuable input in natural resource management can improve the quality of life.

## 2 METHODS AND MATERIALS

### 2.1 Study area

Ado-Odo Ota, Ogun State, Nigeria is known as one of the most industrialized heartlands in the country, with a population growth rate of 3.5% annually and an estimated population of 669,668 [16]. Some 450 towns, villages and communities, such as Atan, Sango-Ota, Agbara, Owode, amongst others, are enlisted within Ado-Ota. The study covers communities located within Ado-Odo Ota and they include Alapoti, Ijoko, Igbesa and Owode.

### 2.2 Field method and data collection

The protocol adopted in this study involved the direct dissipation of information about the purpose, procedures and potential benefits to the respondents so as to harness their voluntary participation. The survey encompassed four communities picked at random where participants were selected from 340 households among cases. The sampling framework used in the study was geared towards population-based assessment, and it encouraged teens and adults (<15 years of age) of both gender in each household. The study involved a team of



experienced enumerators that administered 600 revised baseline questionnaires within the communities. Interviews and group interactions were conducted to harvest the social trends and difficulties experienced when water is needed to the time the need is satisfied. The questionnaires captured respondents' preferences in line with water assessment. The survey encountered full participation from respondents with a questionnaire return rate of 87%. All data were analyzed statistically using SPSS 23 (IBM® SPSS® Statistics, Licensed 2015). Cross-tabulation was utilized in the assessment of water accessibility, cost perception, sources and the proposed use of water.

### 2.3 Multinomial logit regression

To analyze the research response, a multinomial logit regression is required to show if the independent variable(s) properly predict the dependent variables, which has two or more categorical levels. For the purpose of this survey, the independent variables will be categorized differently. The importance of the multinomial logit model will be determined, using the collective influence of the independent variable(s), represented by the  $\chi^2$  coefficient. The influence of the independent predictor variable on the variability of the dependent variable can be accounted for using the the Nagelkerke  $R^2$  value. Also, the Wald coefficient will be used to assess individual predictors. Meanwhile, Exp ( $B$ ) will be used to explain the predicted probability of a particular event occurring. For an adequate prediction to occur, the value of Exp ( $B$ ) greater than 1 shows that a unit increase in the independent variable will cause an independent variable to increase by (1-Exp ( $B$ )) percent.

## 3 RESULTS AND DISCUSSION

### 3.1 Survey demographics

The gender participation quota, literacy level and estimated income of respondents gathered from 340 households are described in Fig. 1.

The characteristics of participants displayed 61.2% of females responding to the subject matter and 70.69% of the entire respondents being married. The indication could be translated to the willingness of females to contribute to water resource management. The females handle the concerns of domestic water use in the household and the response harvested from them can be used to exemplify the extent of complications experienced when collecting domestic water. Therefore, owing to the high percentage of female response, women can be regarded as important decision-makers in water-related issues.

The level of literacy is a vital pointer to the degree of understanding and contributing power displayed by the respondents. Some 63.98% of females can be categorized as "Learned" while 21.84% of the males are given the same attribute. This shows that larger fractions of the entire respondents understand the subject matter and are willing to make a positive contribution to improving the water-related issues experienced within the study area. This attribute promotes the research as it significantly reveals, largely, the respondents' understanding of the benefits of safe and improved water sources while considering the health impact.

The economic gains to safe water access can be linked to the standard of living of residents. From Fig. 1, we can see that 55% lived below the income threshold of \$200 per month, and it can be concluded that the vicinity can be categorized as rural since the majority



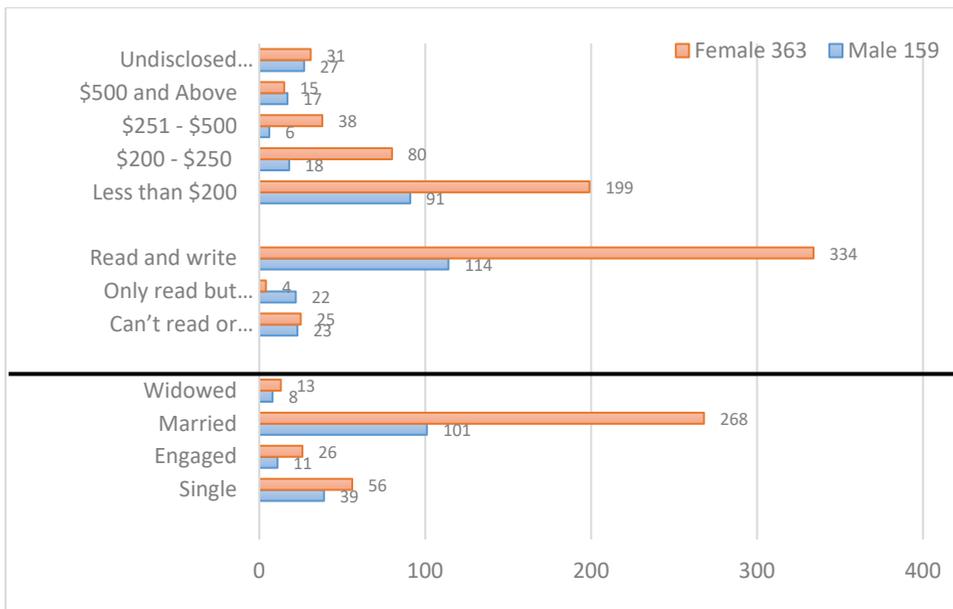


Figure 1: Demographics of the data collected.

have a low income. Low incomes are social magnifiers of limited accessibility to basic environmental amenities, thereby exposing residents to water challenges. The report supports the idea stated by Francis et al. [17] which explains that household income determines the level of access to water and sanitation.

### 3.2 Descriptive analysis of predictive parameters

The contributions of women towards the subject matter were accessed using the question “Describe the level of water access within your region.” The parameters considered are water cost, water use, water supply source, persons to fetch water and closeness to the source (Table 1).

From Table 1, it can be seen that the contributions of the females are more evident when it comes to accessing water within a household. From the multinomial logit model (Table 2), the absence of a female in a household will cause water access to be reduced 7.256 times, which is statistically significant at 1% ( $p = 0.005$ ). However, this value is greater when compared to the absence of a male in the household, which will result in a reduction in water access by 2.221 times and is statistically significant at 5% ( $p = 0.012$ ). The cost analysis using the multinomial logit model signifies that when the cost of water is expensive, water access will be irregular by 2.818 times and this is significant by 5% ( $p = 0.011$ ). Evaluating the water usage based on Table 1, an irregular access to water will cause drinking water to be reduced by 5.658 times which is statistically significant at 5% ( $p = 0.019$ ). This calls for attention as the availability of drinking water promotes survival within the study area. Also, from Table 1, the absence of a private borehole results in a reduction in water access by 1.530 times (53%). The proximity to a water source is one important factor to water access. From Table 1, the multinomial logit model suggests that irregular access to water will increase by 314% ( $4.145 - 1$ ) when the water source is very far.

Table 1: Multinomial regression of the predictive analysis.

Description of water supply access	B	Std. error	Wald	Sig.	Exp(B)
Not regular					
<b>Water cost</b>					
Expensive	1.036	0.004	0.506	0.011	2.818
Free	-1.004	0.037	0.138	0.034	0.366
Cheap	-1.178	0.246	0.332	0.005	0.308
Moderate	0 <sup>b</sup>	.	.	.	.
<b>Water use</b>					
Drinking	1.733	0.410	1.510	0.219	5.658
Cleaning	0.299	0.191	1.063	0.802	1.349
Cooking	1.445	0.447	0.997	0.318	4.242
Washing	0.505	0.191	0.180	0.671	1.657
<b>Water supply source</b>					
Rainwater	-3.355	0.941	0.165	0.347	0.035
Stream water	-4.036	0.313	0.304	0.532	0.018
Unprotected well water	-0.532	0.868	2.523	0.052	0.587
Piped public tap	-0.332	0.000	.	0.024	0.717
Private borehole/tap	0.425	0.652	2.060		1.530
<b>Person to fetch water</b>					
Adult male	0.798	0.050	0.577	0.012	2.221
Adult female	1.983	0.392	0.498	0.005	7.256
<b>Closeness to source</b>					
Very close	-0.172	0.110	0.339	0.024	0.842
Close	-0.015	0.974	1.019	0.013	0.985
Far	1.395	0.150	0.226	0.032	4.035
Very far	1.422	0.267	0.348	0.048	4.145

Table 2: Source and respondents' characteristics.

Source of water supply						
Sources	R/S	RWH	UW	PT (Gov't owned)	PRT	Total
<b>No. of respondents</b>	47	13	93	51	318	522

R/S: river/stream; RWH: rain water harvesting; UW: unprotected wells; PT: public taps; PRT: private taps.

### 3.3 Sources of available water

The questions concerning the access to sources of water available have alternatives that include various sources such as private taps, public taps (piped), unprotected wells and river/streams. Nevertheless, respondents reported that they have access to the water sources mentioned earlier but further explained that private taps are the most patronized (Table 2). Some 8.9% gave more light to their opinion, saying that water from public taps is free to access, but the availability is not regular. Therefore, its availability springs up a rush when it flows, and often the water appears to be decolorized. Some 57.1% made use of taps owing to the fact that they are perceived as clean and reliable, regardless of the distance embarked upon. Hence, water gotten from private taps is used for drinking and cooking purposes



without prior treatment. Rainwater harvesting (RWH) received minimum attention (2.5%). Unprotected well users recorded the second highest and the reason for its attention were gathered from personal interviews with dominating comments like “*The water is free and fairly clean, so we use it for washing, cleaning, drinking and cooking*”. The exact use of water sources, differentiated by activities, is summarized in Fig. 2.

The question concerning the consumption of unprotected well water arose, and participants stated that they are left with no alternative than to drink the open water bodies because accessing piped water seems stressful due to the long-distance walk required.

Without a doubt, the respondents (mostly female) apply subjective conclusions to qualify the quality of water located around them. Various factors such as colour and taste influences the selection of water source for the specified use.

### 3.4 Cost perception

The willingness to pay for improved water is regarded as one of the keys to evaluating social improvement. One of the important indicators that promote access to water is cost. Respondents expressed their challenges relating to the cost of water within the study area, as shown in Fig. 3.

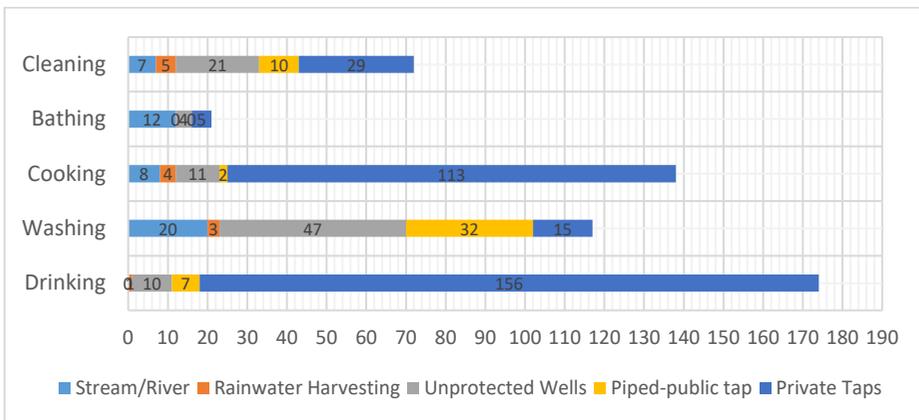


Figure 2: Water activities according to their sources.

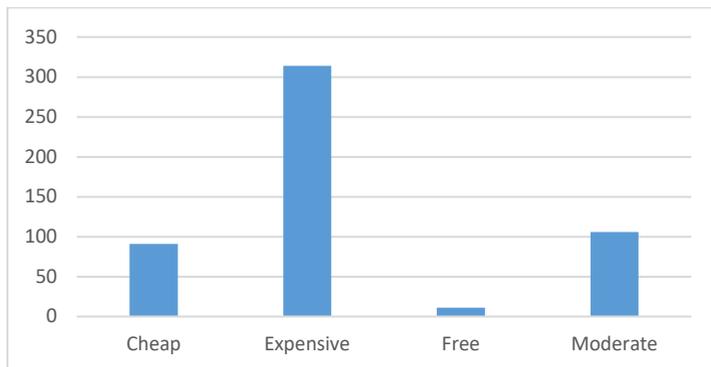


Figure 3: Water cost response.

Some 60.2% indicated that the cost of water is high while 20.3% stated that it is moderate. The participants that showed the willingness to pay gave the statement, “*We the end users prefer to pay exorbitant water rates rather than walking longer distances to cheap of free water sources*”. The proximity to water sources is shown in Table 3.

It is evident from Table 3 that 31.0% of the respondents walk as far as 500–700 m to access water. It is paramount to note that the amount of time invested in completing household tasks such as water collection and other domestic chores is serially related to the distance covered which in turn disrupts other domestic activities.

#### 4 CONCLUSION

To improve the condition of water-related issues, effective policies should be implemented. The SDGs matrix can be improved when women’s participation in water projects is encouraged. The weights and benefits of policies that support women’s empowerment outweigh the cost since accessing water can be improved with their individual and collective information. This study tends to promote women’s involvement in community-based water governance since they are active decision-makers, even at household levels. Barriers can be overcome when sustainable agenda are developed. Therefore, policies that support women’s solidarity, institutional support and a conducive atmosphere should be revisited so that their collective understanding can be harnessed properly. The cycle of water service delivery can be improved when the sustainable approach to solving a wide range of documented failures are implemented. Without discerning a proper decision, there will be a continuous infringement of human rights to safe drinking water, even for those who seem to have access to water. Investing funds into water projects is not enough; there is an adequate oversight into what is required, and this is where women’s empowerment is needed.

To combat the cost of obtaining water, the authors suggest a rural tariff plan, defined by women to cater for the maintenance and operations of water facilities. This serves as an efficient way of harmonizing the cost implication of obtaining water between the poor and the rich, as well as driving towards sustainability. Also, water sustainability can be attained when there is the adequate utilization of the available water resource, and RWH has been seen as a productive solution [10], [18]. Aladenola and Adeboye [19] stated that water stress could be reduced when proper rainwater collection and storage is implemented. Collecting rainwater in storage tanks can cater for domestic chores involving the use of water thereby reducing the dependence on piped sources. Therefore, this study suggests that RWH should be inculcated into community-based integrated water management schemes.

Acknowledging the importance of decision implementation is key towards the full realization of the SDG Target 6 which will, in turn, maximize the available water resource and also ensure that water rights can be preserved, not only for the present but also the future generations.

Table 3: Showing the distance covered with respect to water collection.

Sources	Near	Very near	Far	Very far
Stream/river	5	6	20	16
Rainwater harvesting	4	9	0	0
Unprotected wells	27	31	24	11
Public tap	8	9	15	19
Private taps	54	81	103	80
<b>Total</b>	<b>98</b>	<b>136</b>	<b>162</b>	<b>126</b>



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