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WATER AND POVERTY SITUATION IN OYUN LOCAL GOVERNMENT AREA, NORTH-CENTRAL NIGERIA

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Abstract

This study looks into the water and poverty situation in Oyun Local Government Area, North-central Nigeria. A well-structured questionnaire is used to collect data at household level. Thirty

households were sampled at random in each of the 11 wards in the LGA, giving a total of 330 households. The data were analyzed using percentages, Kendall's correlation coefficient and WPI (Composite Index Method). The results revealed that Ojoku scored highest (62.4) while Igbonna scored lowest (52.0), which shows that it is the most water poor in the area. The result of the overall WPI (58.34) shows that the water and poverty situation in the whole of the LGA is slightly above average. The study concludes that the overall water and poverty situation in Oyun LGA is fair. It is therefore recommended that appropriate measure should be taken to improve the overall water accessibility and usage in the LGA by creating more water supply points in the community and renovating/upgrading the existing water works in the area for improved pipe borne water supply. Also, water use should be extended beyond domestic usage into other sectors that can increase productivity and hence, the overall poverty level in the area.

Key words: Water, Scarcity, Poverty, Access, Capacity, Resources, Uses, Environment

Introduction

Unlike wars and natural disasters, the global water crisis does not make media headlines and it is the poor people suffering the most from the water and sanitation crisis, especially poor women who often lack the political voice needed to assert their claims to water (Human Development Report, 2006).The studies of experts have established the linkages between water and poverty, by suggesting that improving access to water and sanitation, coupled with holistic water management approach is a gateway for eradicating poverty and sustaining economic growth (World Bank, 1996; Asian Development Bank, 2003; World Commission on Dams, 2000;Mlote et al., 2002, Lawrence, et al., 2003). Holistic water management involves appropriate use of water resources while taking into consideration

those factors relevant for human development. Such factors include, water for domestic, agriculture and industrial use as well as for ecological maintenance (Mlote et al., 2002).

It is high time we stopped seeing water as an infinite free gift of nature but as a resource that needs to be conserved and managed for optimal usage. This is because of the growing awareness of global water crisis that is imminent and the need for proper management of this resource to sustain human existence. According to the Food and Agriculture Organization (FAO) and UN Water, global water use has been growing at more than double the rate of population increase in the last 100 years (UN Water, 2011).World population is predicted to grow from 7 billion to 9.1 billion by the year 2050, putting a further stress on water resources to meet increased food, energy, and industrial demands (World Water Assessment programme, 2012). The importance of water can never be overemphasized because the modern society was build and sustained by water availability. At the global level, 70 percent of water withdrawals are for the agricultural sector, 11 percent are to meet municipal demands, and 19 percent are for industrial needs (FAO, 2011).

However, only 20% of the world population has access to running water and over 1 billion people do not have access to safe water (The World Water Organization, 2010).This incidence of inadequate water accessibility affects the health of the people worldwide and leads to diseases that claim thousands of lives across the globe. World Health Organization (2008) reported that about 3.575 million people die each year from water related diseases. Annual mortality rate in children under five years from water related diseases is estimated to be about 4 million in developing countries (Warner, 1998).Half of the population in developing countries is suffering from water-related diseases (The World Water Organization, 2010). In these developing countries, nearly 80% of diseases are linked to water, leading to 3 million early deaths (UN News Service, 2009).

Moreover, the preceding statistics is as a result of water scarcity experienced and looming in almost every part of the world. Water scarcity occurs even in region where there is abundance of rainfall or fresh water. The quality of water available, how it is used, distributed and conserved in communities can determine if there is enough to meet the demands of households, farms, industry and the environment (WHO, 2009). The incidence of water scarcity that can be attributed to a changing climate and population growth has been the focus of recent researches (Seckleret al., 1998; Vörösmarty et al., 2000). According to Chris (2012) Water scarcity, which can be described as the lack of access to adequate quantities of water for human and environmental uses, is becoming a serious concern in many countries of the world. Despite this growing concern on water scarcity, there is no rigid definition of water scarcity or how it can be measured.

However, water scarcity can be seen as physical scarcity and economic scarcity. Physical scarcity is when there is not enough water to meet demand; its implications include severe environmental degradation, declining aquifer, and unequal water distribution (FAO, 2012). Economic water scarcity on the other hand is when there is a lack of investment and proper management to meet the demand of people who do not have the financial capability to use existing water sources (FAO, 2012).According to WHO (2009) about 1.2 billion people (almost one fifth of the world) live in regions of physical water scarcity and another 500 million people approaching this scenario. About 1.6 billion (1/4 of the world population) faced economic water shortage (where countries lack the infrastructure to tap water from rivers and aquifers). It is also predicted by the International Water Management Institute in year 2000, that by 2025 about 1.8 billion people will live in countries or regions with absolute water scarcity and almost half of the world living in conditions of water stress, based on the vagaries of present climatic condition (IWMI, 2000).

The scenarios of water scarcity presented above has led to the evolution of various approaches in calculating water scarcity or stress, to be able to come up with a solution that will improve the overall water use and management in human society. Some of these approaches include Falkenmark index; which measured water scarcity in terms of the amount of renewable freshwater that is available for each person each year (Falkenmarket al., 1989).Criticality ratio; which measured water scarcity in terms of the proportion of total annual water withdrawals relative to total available water resources in an environment (Raskin, et al., 1997).Demand management approach put forward by Seckler et al. (1998), which treated water scarcity as a function of a country's water balance against its projected needs and measuring the adaptive capacity of a country by assessing its potential for infrastructure development as well as efficiency improvements. From all these, a more holistic approaches to the determination of water scarcity which incorporate social, economic and political factors with physical measures of water scarcity is known as the Water Poverty Index (WPI). This approach takes into account the role of income and wealth in determining water scarcity by measuring:(a) the level of access to water; (b) water quantity, quality, and variability; (c) water used for domestic and productive purposes; (d) capacity for water management; and (e) environmental aspects (Sullivan, 2001a, 2001b, 2002; Lawrence, et al., 2003).

As reported by IRIN, United Nations Development Programme (UNDP) experts have emphasized that improving water supply and sanitation are key to reducing many aspects of poverty. Klaus Topfer (ex-UN Environment Programme chief) at the World Water Week Symposium in Stockholm, 2002 said “without adequate clean water, there can be no escape from poverty.” WHO also emphasized that improved water provision will instantly improves health, especially in poor communities, hours spent in fetching water could be invested in other activities that will lift people out of poverty (IRIN,

2006).Improved water provision in the entire facet of the society can only be achieved through a holistic water management approach. Hence, Water Poverty Index (WPI) is calculated using a composite index approach in this study to understand the water and poverty situation in Oyun Local Government Area of Kwara state, Nigeria.

The Research area

Oyun is located on latitude 8° 7' 0" North and longitude 4° 42' 0" East. The headquarters is at Ilemona and the whole Local Government Area covers a landmass of about 476km^2. It comprises two districts namely Odo-ogun and Oke-ogun, Odo-ogun comprises of the following wards; Erin-Ile North ward, Erin-Ile South ward, Ilemona ward, Ira ward, Aho/Inanja ward, Igbonna ward and Oke-Ogun comprises of the following; Ijagbo ward, Ipee ward, Igosun ward, Ikotun ward, Ojoku ward. The location of Oyun makes it to share a common political boundary with Oyo State in South, Asa local Government to the West and Irepodun local Government to the East and North.Oyun LGA is situated in the transition zone between the forest and savannah regions in Kwara state, North-central of Nigeria. Its climate is of the wet and dry tropical type with mean annual rainfall of about 1,318mm and mean monthly temperature of 32°C,the highest temperature is observed in March. The area receives rainfall from the south-westerly air masses, which invade the country from the gulf of guinea coast, i.e. the tropical Atlantic. The moist air stream is overhead by the Northeast trade wind which originated from above the Sahara and therefore bring dry and dust laden wind in the dry season (October-March). Temperature is high throughout the year round, mean monthly value at 26-28°C with mean daily sunshine hours as low as 5hours.

The geological form of the study areas are comprises of crystalline rock of the Precambrian age. The rock types include schist, quartzite, geniss and granite, among others. These rocks are sometimes faulted

and weakened in nature and they form low inselberg. Mean depth to water is sometimes at 3-4 meters depth. Oyun has a general undulating landscape with the surface shape like a bigger letter "W", while Oyun River flows through the valley. The main river which drains Oyun local government is the Oyun River with several tributaries which include River Agun, River Eleyoka, River Enji, River Omoleyin and others. Oyun River occupies a fairly wide valley and flows in south-north direction. The inhabitants of Oyun are predominantly farmers, growing both food and tree crops. The vast Savannah grassland that characterized the vegetation of the area is highly conducive for the production of food crops such as sweet potatoes, cassava, yam, plantation, banana, vegetables pepper among others. Tree crops that are grown here include palm trees, cashew, mangoes, and orange etc. Livestock rearing is also common in this area. The inhabitants also engage in various occupations such as pottery, cloth weaving, block making, smithery, poultry farm, bread bakery, Trading. There are salary earning opportunities in educational institutions, hospitals, banks and few available government establishments. The population of Oyun LGA was estimated to be 94,454, with the number of male given as 47,890 and female as 46,564(National Population Commission, 2006). See figure1 for the map of the study area.

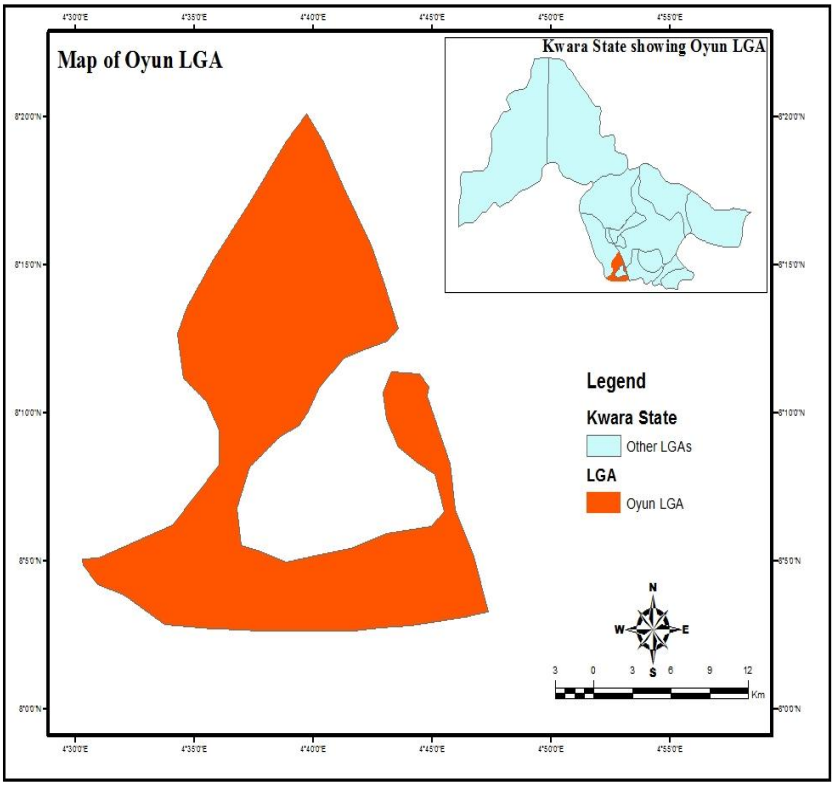

Figure 1: Map of the Study Area, Incest Map of Kwara State, North-central, Nigeria

Materials and method

The WPI was used to make an international comparison of water poverty across 147 countries (Lawrence, et al., 2002) and later modified for application at the community scale (Sullivan et al.,

2003). As a result of the findings at the community level, it has been suggested that the WPI is more appropriate for use at the community scale. However, there is no data base for the required data for this study at the community level. Therefore, a detailed questionnaire comprising 35 questions in total was designed to get the information required in calculating a water poverty index as well as added information on community water supply, health, general hygiene and sanitation. This questionnaire was administered at household level in the research area. A total of 330 copies of questionnaire were administered in the whole of the LGA, 30 copies in each ward of the LGA. The households were selected at random with each household providing a representative to speak on their behalf and provided the necessary information in the presence of every other member of the households.

The questionnaire is divided into two parts; the first part is on the general attribute of the households while the second part is on the WPI. The second part was divided into five parts to cater for the information on resources (R), access (A), capacity (C), uses (U) and environment (E). Each of these five components was subdivided into sub-components. The sub-components were similar to the ones employed by the original author but with little modification to suite the local community; see Table 1 for the sub-components used in this study. However, the people perceptions on water quality in the area were relied on because of the difficulties arising from getting water sample for laboratory analysis. Also, there is no weather station in the study area that would enable us to determine the rainfall trend in the area and the closest weather station is the one in Ilorin, the state capital which cannot give us the rainfall situation in the study area because of spatio-temporal variation in rainfall distribution. Therefore we relied on the people's perception on how rainfall has varied (increase or decrease) in the last 10 years in the area.

Table 1: Components and sub-components used

Components	Sub-components
Resources (R)	Major source of water supply, level of water availability from this source, Alternative source of water supply, Nature of the alternative source, Groundwater and surface water usage and water quality
Access (A)	Access to pipe borne water, conflict/fight over water access, cause of conflict, time spent in collecting water, type of toilet in the household and level of sanitation
Capacity (C)	Report of water borne disease in the household, under-five child death, educational status, income/pension and financial aid/assistance
Uses (U)	Daily domestic water consumption, domestic activities that consumed most water, industrial water use and volume, agricultural water use, livestock keeping and volume of water use
Environment (E)	Crop loss, level of land erosion, rainfall observed in the last 10 years, incidence of water pollution and causes

The method of data analysis technique employed in this work is descriptive statistics, percentages, Kendall's correlation coefficient (tau-B) which is more appropriate since the datasets analyzing is less than 50(Kinnear and Gray, 1999). This statistics is employed to be able to see the level of association between the components of the WPI. This will help to know that the result of the WPI arrived at is dependable if all the components were not highly correlated with each other because this can affect the final WPI scores. This will also help to know which of the components to modify in the future study in the area. However, the water poverty index is calculated using the composite index approach. The formula is given as:

Mathematical formula of the WPI

The WPI is calculated using a composite index approach. The five key components (Resources (R), Access (A), Capacity (C), Use (U), and Environment (E)) are combined using the general expression:

$$WPI = \frac{\sum_{i=1}^{N} wiXi}{\sum_{i=1}^{N} wi} \quad \text{..... (i)}$$

Where WPIis the Water Poverty Index value for Oyun LGA, *Xi* is component *i*of the WPI structure forOyun, and *wi*is the weight applied to that component.Each component is made up of a number of sub-components,and these are first combined using the same technique inorder to obtain the components. For the components mentionedabove, the equation can be re-written:

$$WPI = \frac{wrR + waA + wcC + wuU + weE}{wr + wa + wc + wu + we} \quad \text{..... (ii)}$$

This is the weighted average of the five components Resources (R), Access (A), Capacity (C), Use (U), and Environment (E). Each of the components is firststandardized so that it falls in the range 0 to 100; thus theresulting WPI value is also between 0 and 100.

Results

The results of the analysis on the data collected from the householders are presented in this section.

General attributes of the householders in Oyun LGA

Generally, 54.85% of the respondents are male, with Ijagbo having the highest number of male, 19 (63.33%), Igbona and Ikotun with the lowest male respondents of I6 (53.33%). Ilemonna has the highest

number of female respondents, 18 (60%) and Ijagbo with the lowest number of female respondents, 11(36.67%).In Oyun LGA, 72.42% of the population of the household interviewed is between age 31-60 and 76.97% are married. Most of the responded are civil servants and traders, 15.76% are farmer.However, larger percentage of those that are civil servants and traders still practices subsistence farming or gardening. In the area, the household with family size between 3-5 ranges is the highest (46.97%) and the households with 6-10 people are 31.21%. The attributes of the respondents/households in each ward of Oyun LGA is presented in Table 2.

Table 2: Attributes of the respondents in Oyun LGA (%)

	Gender		Age				Marital Status				Occupation					Family Size			
Wards	Male	Female	18-30	31-45	46-60	Above 60	Single	Married	Divorced	Others	Civil servant	Trader	Farmer	Artisan	Others	1-2	3-5	6-10	Above 10
Aho/Inaja	56.67	43.33	13.33	53.33	33.33	N/A	6.67	90	3.33	N/A	36.67	36.67	16.67	6.66	3.33	N/A	50	36.67	13.33
Erinle North	46.67	53.33	23.33	40	36.67	N/A	23.33	76.67	N/A	N/A	70	16.67	3.33	N/A	10	16.67	60	20	3.33
Erinle South	57.67	43.33	33.33	56.67	10	N/A	20	80	N/A	N/A	40	33.33	13.33	N/A	13.33	6.67	46.67	40	6.66
Igbona	53.33	46.67	10	46.67	26.67	16.66	10	73.33	10	6.67	26.67	36.66	20	10	6.67	10	33.33	40	N/A
Igosun	60	40	23.33	33.33	30	13.33	23.33	63.33	10	3.33	40	26.67	23.33	10	N/A	10	30	53.33	6.67
Ijagbo	63.33	36.67	20	43.33	30	6.67	16.67	80	N/A	3.33	33.33	20	13.33	16.67	16.67	16.67	53.33	30	N/A
Ikotun	53.33	46.67	10	50	23.33	16.67	13.33	86.67	N/A	N/A	33.33	40	26.67	N/A	N/A	13.33	40	40	6.67
Ilemona	40	60	16.67	50	23.33	10	13.33	83.33	3.33	N/A	40	40	N/A	20	N/A	13.33	63.33	16.67	6.67
Ipe	60	40	20	36.67	40	3.33	23.33	70	6.67	N/A	40	33.33	13.33	6.67	6.67	20	46.67	20	13.33
Ira	56.67	43.33	16.67	40	26.67	16.66	16.67	63.33	13.33	6.67	30	33.33	30	6.67	N/A	16.67	43.33	26.67	13.33
Ojoku	56.67	43.33	16.67	40	26.66	16.67	16.67	80	N/A	3.33	43.33	33.33	13.33	N/A	10	10	50	20	20

Note: N/A= Not Available

Source: Field Survey, 2013

Resources

In the research area, 287 (86.97%) of the households have major source of water supply while 43 (13.03%) do not have major source of water supply. However, 39.70% and 29.39% of those that have major source of water supply claimed water availability from this major source are insufficient and very little respectively. It is only 17.88% that claimed the water availability from this major source is sufficient and a lot. About 88% of the households have an alternative source of water supply to the available major source of supply. The alternative source of water supply includes: borehole, hand-dug well, rainwater harvesting and stream water. About 34% use boreholes, 28.48% use hand-dug wells and about 21% use stream water as an alternative source of water supply in the area. In all the interviewed households, 224 (67.88%) use both ground and surface water while 106 (32.12%) use either surface or groundwater for their domestic needs. The quality of drinking water in the research area is described as fairly good by 34.24% of the household while 27.27% described it as good and 14.24% described it as bad.

Access

In the whole of the selected households in Oyun LGA, 187 (56.67%) have access to pipe borne water while 143 (43.33%) do not have access to pipe borne water. About 40% of the sampled households spent between 0-30 minutes in collecting water, 17.58% spent between 30-60 minutes, 22.42% spent between 1and 2 hours while 20% spent above 2 hours in collecting water. The level of conflict/fight experienced over water accessibility or use in the area is categorized as very high, high, moderate, low, very low and none. About 38.48% of the households described the conflict experienced over water use as moderate while 34.55% described it as low/very low and 24.25% described the conflict experienced as high/very high. Also, 48.18% of the households have access to water closet system (flush toilet), 32.72% have access to pit-latrine and 19.10% have no toilet at all. The level of accessibility to sanitation is moderate in 145

(43.93%) households, 110 (33.34%) households have low/very low access to sanitation while 75 (22.73%) households access to sanitation is high/very high.

Capacity

In Oyun LGA, 40.30% members of the sampled households have tertiary education while 46.06% have primary education. The monthly income of about 59% of the sampled households is below $100 (#16,000), 21.21% have monthly income that ranges from $201-$300 (#32,000-#48,000) while only 5.76% have above $300 (Above #48,000) as their monthly income. About 46% of the sampled households receive financial assistance from distant relatives, friends or government while 54% do not receive financial aids from any source. In the sampled households, 101 (30.61%) have recorded an incidence of water borne and water related diseases in the last five years. Also, 42 (12.73%) households have recorded under-five year child death that is water related in the last five years while 288 (87.27%) households have no report of such incidence..

Uses

The daily domestic water consumption rate is less than 20 litres/per capital/day in 150 (45.45%) households, 20-45 litres/per capital/day in 149 (45.15) and above 45 litres/per capital/day in 31 (9.39%). The domestic chore or activity that consumed the highest volume of water is cloth washing (23.33%) and cooking (26.97%) with both accounting for 50.26% of the total domestic water use in the area. The domestic activity that consumed least water is bathing which accounted for 13.03% of the total daily domestic water use. Industrial water use is low in the area, 113 (34.24%) households use water for industrial purpose with 53.97% using less than 65 litres daily. The number of households that use water for agricultural practices is 215 (65.15%), however, most of their practices is rain-fed agriculture. The number of households that keeps livestock is 220 (66.67%) and about

35.45% uses between 10-45 litres of water daily on their livestock while 30.45% uses less than 10 litres daily on their livestock.

Environment

Of the sampled 330 households, 215 (65.15%) practiced farming either on a part time (those with other occupations) or full time basis. Out of this 215 households, 110 (51.16%) have experienced crop loss in the last five years. The level of erosion on the lands owned by the households sampled is categorize descriptively as very high, high, moderate, low and very low. The level of erosion on the land of about 40% of the households can be described as moderate, 34.54% as low/very low and 25.15% as high/very high. Only 1% of the sampled households do not experienced soil erosion on their land. Since there is no weather station in the area, the rainfall received in the last 10 years is categorized descriptively as: increased a lot, increased a little, no change, decrease a little and decrease a lot. The rainfall changes observed in Oyun LGA was described as increase a little by 155 (46.97%) households; increase a lot by 114 (34.55%) no change by 35 (10.61%)in the last 10 years. The households selected were spread all over the research area but 146 (44.24%), experienced an incidence of water pollution in their area while 184 (55.76%) do no experienced any incidence of water pollution in their area.

Water poverty index (WPI)

In this section, descriptive statistics, Kendall correlation and composite index results of the WPI components used were presented. Also the pentagram diagram of the wards and the LGA as whole are presented.

Indicator scores used to calculate the WPI in Oyun LGA

Table 3 shows the mean, minimum and maximum scores for each indicator along with their respective standard deviation and range. Based on mean scores, Resources have the highest scores (68.21) and Use score the lowest (50.29). The standard deviation score by

Resources is the lowest compared to the remaining indicators. Capacity has the highest maximum scores (74.70) and Environment the lowest (58.20). Resources have the highest minimum score (58.50) and Use the lowest (40.80). The range score of the indicators are wide, with Use having the highest. The mean WPI for Oyun is 58.34 with a maximum score of 62.40 and minimum of 52.

Table 3: Indicator scores used to calculate the WPI in Oyun LGA

	Resources	Access	Capacity	Use	Environment	WPI
Mean	68.21	59.13	62.24	50.29	51.78	58.34
Std. Deviation	4.17	5.45	8.70	9.05	4.81	3.16
Range	14.30	19.40	22.40	33.60	14.80	10.40
Minimum	58.50	46.20	52.30	40.80	43.40	52.00
Maximum	72.80	65.60	74.70	74.40	58.20	62.40

Source: Author's Computation (2013)

Kendall's Tau-b correlation coefficients matrix

Given the small dataset in this study, Kendall's tau-b correlation coefficient was calculated to see the relationship between the indicators and the results are presented in Table 4.There is little correlation between the indicators, with the exception of Capacity and overall WPI (0.71). Resources present a mild positive relationship with WPI while Use also presents a mild negative relationship with Environment.

Table 4: Kendall's tau-b correlation coefficients matrix

	Resources	Access	Capacity	Use	Environment
Access	0.11				
Capacity	0.40	0.13			
Use	0.11	0.02	-0.27		
Environment	0.22	0.38	0.46	-0.53*	
WPI	0.55*	0.27	0.71**	0.02	0.46

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

WPI components and values for wards in Oyun LGA

Table 5, show that Aho/Inaja scores highest in terms of resources (72.8) while Igbonna scores lowest (58.5). In terms of Access, Igosun scores highest (65.7) while Erinle-south scores lowest (46.2). Erinle-north performs best in Capacity (74.4) while Igbonna scores lowest (52.3). Erinle-south recorded highest in terms of Use (74.4) whileErinle-north scores lowest (40.8). Ojoku scores highest in terms of Environment (58.2) while Erinle-south scores lowest (43.4). The highest overall WPI is recorded in Ojoku (62.4) while the lowest overall WPI is recorded in Igbonna.See figure 3.1 for the component bar chart of the WPI in each ward.

Table 5: WPI Components and Values for Wards in Oyun LGA

Wards	Resources	Access	Capacity	Use	Environment	WPI
Aho/Inaja	72.8	62.7	64.2	49.4	53.7	60.6
Erinle North	65.6	59.9	74.7	40.8	54.5	59.1
Erinle South	72.6	46.2	72.2	74.4	43.4	61.8
Igbonna	58.5	52.8	52.3	50.5	45.9	52.0
Igosun	66.8	65.6	56.3	54.0	49.9	58.5
Ijagbo	71.3	57.5	69.1	41.4	57.4	59.3
Ikotun	70.7	60.0	54.6	49.8	51.5	57.3
Ilemona	68.8	62.3	62.2	49.1	55.0	59.5
Ipe	66.6	61.9	53.5	52.2	53.4	57.5
Ira	65.9	58.7	53.2	43.8	46.7	53.7
Ojoku	70.7	62.8	72.3	47.8	58.2	62.4

Source: Author's Field Survey (2013)

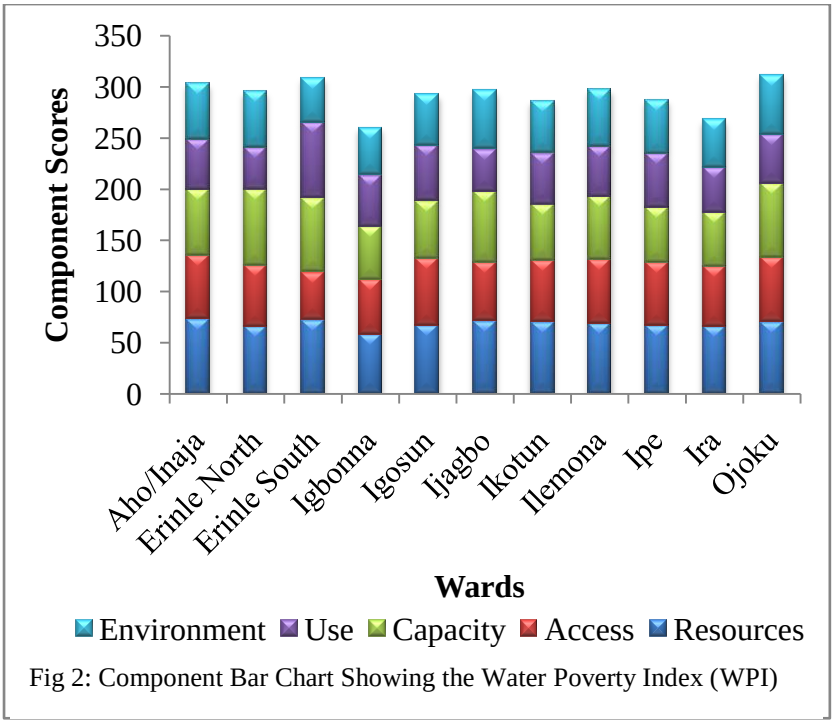

Fig 2: Component Bar Chart Showing the Water Poverty Index (WPI)

The pentagram diagram in Figures 2 and 3 helps visualize how the WPI can be used for making comparisons, that is, the components variation between each ward and the components difference in the whole of the LGA. For instance, in terms of resources Aho/Inaja scores highest while Igosun scores highest in terms of access and in trems of use Erinle-south is well ahead of other wards. However, Resources, Access and Capacity are strongly related to the overall WPI, while Environment and Use scored low compared to other three components.

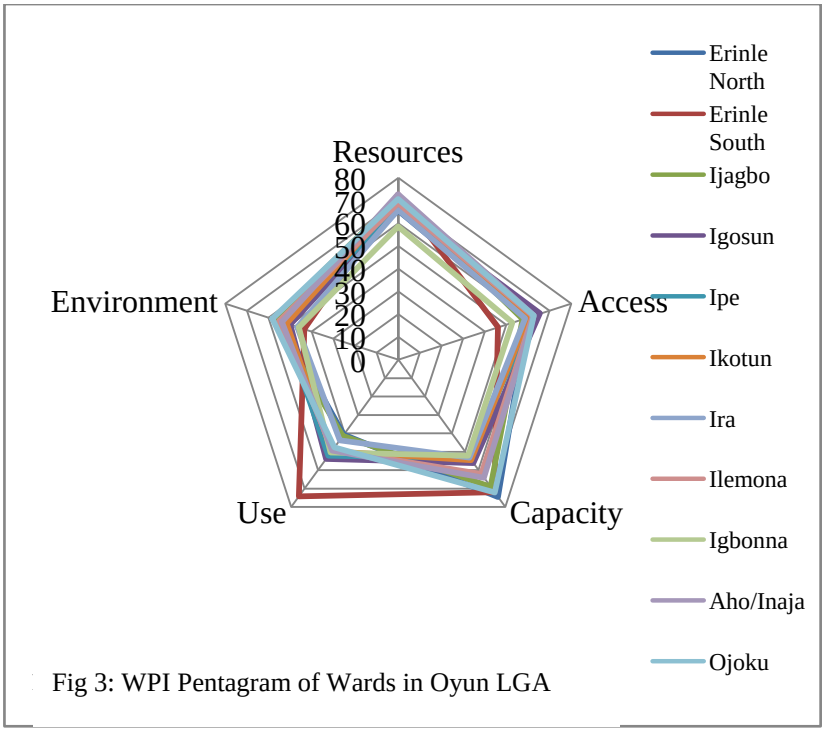

Fig 3: WPI Pentagram of Wards in Oyun LGA

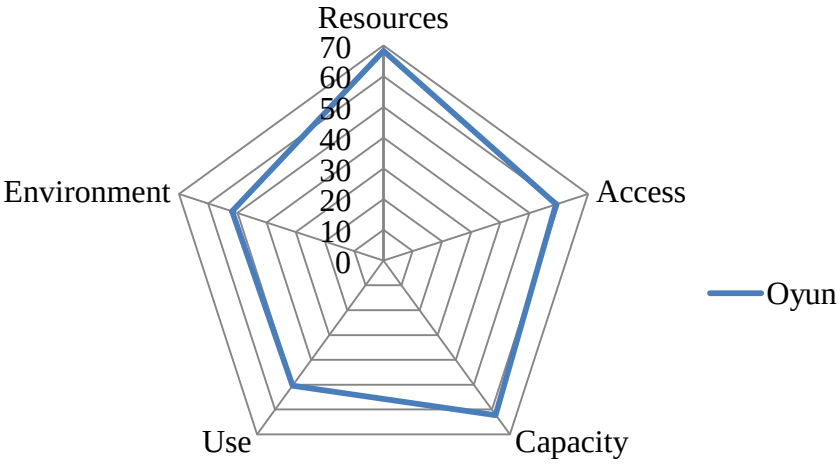

Fig 3.3. WPI Pentagram for Oyun LGA, Kwara State, Nigeria

Discussion

In the research area about 87% of the householders have a major source of water supply but the level of water availability from these major sources is of great concern. The level of water availability from these major sources is insufficient or very little. This is an indication that availability of major source of water alone is not sufficient to describe the level of supply but the level of water availability from the source. The insufficient level of water availability from these sources,

made about 88% of the householders to seek an alternative of source of water supply. The alternative sources of water supply in Oyun LGA include hand-pump boreholes, hand-dug wells, stream and rainwater harvesting. About 62% use both boreholes and hand-dug wells as an alternative source of water supply because they believe the quality of water from these two sources are fairly good compared to the stream water.

About 57% households in Oyun LGA have access to pipe borne water. The number of households with access to pipe borne is affected by the distribution coverage and the status of the pipe borne water provider (water works) in the area. There are about eight water works in the area. The source of supply for these water works are weir (3), boreholes (3) and dams (2). With the number of water works in the area, it is expected that the pipe borne water coverage in the area should be more than 57%. However, three out of the eight water works are not functioning while the performances of the remaining five are not optimal. This can be attributed to the inadequate maintenance and old equipment in the water works. About 40% of the sampled households spent between 0-30 minutes in collecting water daily. It is important to note that those households that spent this time are those with the privilege of owing private wells. Also, 22.42% and 20% of the householders spent between 1-2 hours and above 2 hours respectively in collecting water daily. These are households that does not own private wells but have to resort to collecting water from the few public boreholes provided by the government or from the stream.

As reported by some of the households in the area, "some of us spent most of our days at the public boreholes as if it is our second home, trying to collect enough water for our households". This is because the water is rationed most of the time as a result of the stiffness of the hand driven boreholes which make people to spend more than necessary time at point. The study revealed that households with private wells experienced little or no conflict over water accessibility. Conflicts over water accessibility in the area are experienced mainly at

the public boreholes and streams. Insufficient level of water availability is the cause of conflicts in the whole area. Most of the people do not always respect the arrangement of rationing the water at the public boreholes. They always want to collect water into all the containers brought to the borehole as against the lay down rules of rationing, which often leads to fight outbreaks.

Also, the fight experienced during the dry season is usually high because the water table would have dropped considerably and the seasonal streams in the area would have reduced in size or completely dried up. As narrated by one of the householders, fight over water accessibility in the dry season is terribly high. It usually resulted into "free for all" fight where people sustained injuries. He stressed further, that on some few occasions, it requires police intervention to check the outbreak of the fight. A respondent recalled "I have been standing on the queue for over 2 hours waiting to collect water, tired and stressed out, someone mistakenly stepped on me and it resulted into serious fight where lots of water containers were broken." This revealed the psychological effect spending longer time in getting water can have on people.

The study revealed that only 48.18% of the sampled households have access to flush toilet while 32.72% have access to pit latrine and 19.10% have no toilet at all. The type of toilet used will determine the volume of water used for cleaning up and flushing. This has serious implication on the sanitation and health of the people. The level of access to sanitation is considerably low in 33.34% of the sampled households, while 43.93% have moderate accessibility to sanitation and 22.78% have high access to sanitation. Those households with poor sanitation access are those with no toilets, poorly designed pit toilet and have no private well. The time spent in getting water determines how it is used. There are scenarios where households with pit latrine of flush toilets decided to use open spaces for defecation because there is no enough water for cleaning up and flushing the toilet after usage. Households with private wells have high and

moderate sanitation; hence, water availability improves the level of sanitation. However, there are households with private wells with fair level of sanitation. This shows that water availability alone is not enough to improve sanitation but the level of information and habit/attitude of the people towards sanitation.

The level of sanitation in the area can be attributed to the percentage of households (30.61%) that have recorded an incidence of water borne and water related diseases in the last five years. Also, 12.3% of the households have recorded under-five year child death that is water related in the last five years. The level of sanitation, water borne diseases and under-five year child death recorded in some households can be attributed to the level of income of the householders. The monthly income of about 59% of the sampled households is below $100 (#16000), 21.21% monthly income ranges from $201-$300 (#32,000 - #48,000). This is an indication that the larger percentage of the Oyun LGA residents is low income earners. This also reflects in the small percentage of the households that have the capability of owing a private well. Despite all this, the level of education in the area is quite interesting. From the 330 sampled households, 40.30% of the members have tertiary education while 46.06% have secondary education. The level of education attained is believed to have direct relationship on the level of income, which supposed to influence the ability and capability to access a better water supply. However, the level accessibility to water supply in the whole area can only be described as been fair. This scenario in Oyun LGA reflects what is obtainable in Nigeria as a whole.

Water is use mostly for domestic purpose and for livestock keeping because most of the residents of this area keep livestock. WHO/UNICEF (2000) give an estimate of 20 l/c/das the volume of water required for basic domestic health and hygiene needs. In Oyun, 45.45% of the sampled households use less than 20 l/c/d. This percentage also reflected in the level of access to sanitation in the whole area. Cloth washing and cooking accounted for about 50.26%

of the domestic water use while bathing (13.03%) consumed the least. Industrial and agricultural water use in Oyun is very low compared to domestic water usage. This can be attributed to the fact that it is rain-fed agriculture that is practiced in the area. Also, the minimal water is used for industrial purpose because there is no heavy industry in this area. The few light industries that use water are block making and bread making industries.

Farming is practiced either on full time or part time by 65.15% of the sampled households. Out of this 65.15%, 51.16% have experienced crop loss in the last five years. It is only 25.15% of the households that have experienced high/very high erosion rate on their land. Rainfall received in the area in described to be on the increase in the last 10 years. Though the description is subjective but one can be certain that rainfall received in the area is on the increase because 81.51% of the sampled households in the area described the rainfall received as increase a little/increase a lot. Since rain-fed agriculture is been practiced in this area, increase in rainfall, other things being equal can increase crop yield. Hence, increase in income of the farmers, thereby reducing the level of poverty in the area. The results of the survey revealed that 44.24% of the sampled households experienced incidence of water pollution, such as dumping of feaces and refuse into streams, defecating around the major sources of water. The incidence of water pollution is however common in hand-dug wells. They are sometimes polluted by septic tanks or during the process of evacuating the soak-away.

The results of the overall scores for each component in the area show that Resources (68.21%) score highest, followed by Capacity (62.24%), Access (59.13%), Environment (51.78) and Use (50.29%) which is the lowest of all scores. As you can see in Table 3.4, the WPI range from a low of 52.0 to a high of 62.4 among the wards, while the overall WPI for Oyun is 58.34%.The results of the Kendall's correlation show that there is a mild negative correlation (r= -0.53) between the Use and Environment. This show that the Use which is

not optimized in the area can be ascribed to water quality and stress, the level at which water and the environment generally are given importance in the LGA's strategic and regulatory framework. The resources and the capacity of the people in the area has a mild positive relationship (r= 0.55) and strong positive relationship (r= 0.71) with the overall WPI. However, there is no relationship between the Capacity and Access to water resources in the area. This is an indication that the capacity of the people in the area count for nothing in the accessibility to the available water resources which is somewhat ironic.

Aho/Inaja ward scores the highest in terms of Resources (72.8), this can be attributed to the large surface reservoir and the number of water supply points in relation to the population in the area. Also, majority of the households have alternative source of supply and uses both ground and surface water to meet their daily domestic need. Igbonna scored lowest on Resources (58.5), this can be attributed to the insufficient supply from the major sources of water supply and the quality of the water in particular. Igosun scored highest in terms of Access (65.6), this is because about 87% of the population have access to pipe borne water, 80% have access to toilet (flush and pit toilet) and more than 50% have good sanitation practices. Erinle-south scored least on Access (52.8), more than half of the population does not have access to pipe borne water supply. Erinle-north ranked highest on Capacity (74.7), this can be attributed to the level of education, income and minor cases of water related diseases or death recorded in the area. Igbonna scored least on Capacity (52.3), this is also attributed to the level of income, the number of water related diseases recorded in the area in the last five years. Erinle-south ranked highest on Use (74.4), this is attributed to the high volume of domestic water use, the water use by the bakery and block making industries as well as water use in gardening. Erin-north scored lowest on Use (40.8), which is attributed to low water use by the few light industries in the area and on gardening. Ojoku scored highest on environment

(58.2), which can be attributed to the minute incidence of crop loss recorded in the last five years and few cases of water pollution incidence. Erinle-south scored least on Environment (43.3), this is as result of the high crop loss rate the nature of erosion recorded in the area. Ojoku ward scored highest WPI (62.4),this can be attributed to the availability of water resources, the high level of accessibility and capacity in the area. While Igbonna scored lowest WPI (52.0), which can be attributed to the low level of accessibility, capability and the general sanitation of the area. However, the overall WPI for the whole LGA is 58.34, which is an indication that the overall water and poverty situation in Oyun LGA is fair.

Conclusion

In conclusion, WPI provide a better understanding of the relationship between the extent of water availability, the ease of abstraction or accessibility and the level of community welfare. This study presented the situation of water and poverty in Oyun LGA of Kwara state, Nigeria. The results of the analysis show that water resource is high in the study area but the level of accessibility is low compared to the available water resources. This was attributed to the fact that majority of the households in this area are low income earner as revealed by the study. The study further revealed that the usage is also low because water is used mostly for domestic consumption while industrial usage is limited to the few light industries such as block and bread making industries available in the area. Also, available water Resources, Capacity and access were better than Use and Environment in relation to the overall water poverty situation in the area. The study concluded that the overall water and poverty situation in Oyun LGA is fair. It is therefore recommended that appropriate measure should be taken to improve the overall water accessibility and usage in the LGA by creating more water supply points in the community and renovating/upgrading the existing water works in the area for improved pipe borne water supply. Also, water use should be extended beyond domestic usage into other sectors that can increase

productivity and hence, the overall poverty level in the area. The local authority should put in place functioning health inspecting and waste management bodies to improve the general sanitation and hygiene of the residents of the area. If the aforementioned recommendations are put into place, it is hoped that the overall water and poverty situation in Oyun would improve significantly.

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