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Sustainability and Challenges of rainwater resource exploitation in the rural communities of Oyo State, Nigeria.

Sostenibilidad y desafíos de la explotación de los recursos de agua de lluvia en las comunidades rurales del estado de Oyo, Nigeria.

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ABSTRACT

Despite the fact that rainwater is in abundant supply in the humid tropics, this resource is still being underutilized for domestic purposes when compared with other sources of water. A study was thus conducted to assess the sustainability and challenges facing optimal exploitation of rain water. A survey was conducted in 125 rural communities with at least five rural communities selected from 25 rural Local Government Areas. The results showed that people's perception of rain water, inadequate storage facilities, availability at home during the rain incidence and seasonality of rainfall were the challenges of effective utilization of rainwater in the rural areas. The study further discovered that rain water is dependable as for domestic uses between the months of April and October while the dependence level of rain water from the months of November and March is about zero. A paired sample T-Test results showed that there is a significant difference between the average monthly water demand and the monthly storable water at 1% level of significance. This implies that stored rainwater is not sufficient to cater for the household water demand. Hence, it is suggested that exploitation of rain water should be encouraged by boosting the capacity of the rural dwellers so that they can acquire storage facilities that will enhance sufficient storage. Stakeholders can also support this campaign through economic empowerment of the inhabitants in the rural areas so that underground water can be protected for the purpose of rain water exploitation

Key Words: Rainfall; Rural areas; Sustainability; Resource conservation; Oyo State; Domestic water

RESUMEN

A pesar de que el agua de lluvia es abundante en los trópicos húmedos, este recurso aún se está subutilizando para fines domésticos en comparación con otras fuentes de agua. Por lo tanto, se llevó a cabo un estudio para evaluar la sostenibilidad y los desafíos que enfrenta la explotación óptima del agua de lluvia. Se realizó una encuesta en 125 comunidades rurales con al menos cinco comunidades rurales seleccionadas de 25 áreas rurales de gobierno local. Los resultados mostraron que la percepción de las personas sobre el agua de lluvia, las instalaciones de almacenamiento inadecuadas, la disponibilidad en el hogar durante la incidencia de lluvia y la estacionalidad de las lluvias fueron los desafíos de la utilización efectiva del agua de lluvia en las áreas rurales. El estudio descubrió además que el agua de lluvia es confiable para usos domésticos entre los meses de abril y octubre, mientras que el nivel de dependencia del agua de lluvia de los meses de noviembre y marzo es de cero. Los resultados de una prueba T de muestras pareadas mostraron que existe una diferencia significativa entre la demanda de agua mensual promedio y el agua almacenable mensual con un nivel de significancia del 1 %. Esto implica que el agua de lluvia almacenada no es suficiente para satisfacer la demanda de agua de los hogares. Por lo tanto, se sugiere que se fomente la explotación del agua de lluvia aumentando la capacidad de los habitantes rurales para que puedan adquirir instalaciones de almacenamiento que mejoren el almacenamiento suficiente. Las partes interesadas también pueden apoyar esta campaña a través del empoderamiento económico de los habitantes de las zonas rurales para que se pueda proteger el agua subterránea con el fin de aprovechar el agua de lluvia.

Palabras clave: lluvia; Zonas rurales; Sustentabilidad; Conservación de recursos; Estado de Oyo; Agua domestica

INTRODUCTION

In spite of the abundant endowment of rainwater in the humid tropics which spans through not less than eight months annually, this water resource is still being underutilized when compared with the exploitation of both surface and subsurface sources by man (Kumar et al., 2006; Lekwot et al., 2012; Singh, 2013; Tobin et al., 2013; Hajani and Rahman, 2014; Sridha et al., 2020). According to Lekwot et al (2012) and Ohiambe et al., (2018) the pertinence of water resource to the survival of life cannot be over emphasized, hence continuous investigations among professionals. Water is required in homes for various

purposes such as cooking, drinking, washing, washing, livestock care among others. This is apart from agricultural, industrial and aesthetic uses of water which are equally important to man. A sustainable supply of this resource has been the concern of scholars and researchers in various fields of discipline to ensure that its existence and status are not jeopardized (Worm and Hattum, 2006; Sule et al., 2010; Ifabiyi and Ashaolu, 2013; Kumar and Kumar, 2015 and Eshetu et al., 2016; Ogunbode, 2021).

Though man is endowed with both ground and surface sources of water for exploitation apart from rainfall which replenishes both sources, various challenges are reportedly facing these sources. Such challenges include incidence of water pollution, decrease or increase in rainfall incidence, population explosion with its attendant consequences on the facilities, management-related challenges most importantly in developing nations to mention a few. For instance, Ifabiyi and Ashaolu (2015), having discovered increased trend in rainfall in their investigation concluded that increase in rainfall poses water treatment challenges and so recommended that the capacity of treatment plants be increased so that the abundant resource available in their study area will be fully utilized. Akpor and Mucie (2011), Ajibade et al (2015), Abui et al (2016), Magombo et al. (2016), Chukwuma (2017) and Lade and Okunlola (2017) highlight other challenges facing water supply to include poor coordination and management, poor institutional structure, poor funding among others.

However, rainwater harvesting which has been described as a benign technology by Bachelor *et al*, 2002) and not capable of creating any undesirable consequences (Kumar *et al*, 2006) but unfortunately, has not been fully utilized (Liaw and Chiang, 2014; Worm and van Hattum, 2006; Isoken and Osahon, 2016; Sridhar et al., 2020). Rather, people in the rural areas especially, depend mostly on surface sources such as streams, rivers and brooks and or subsurface through digging of shallow wells and lately deep borehole/motorized wells. It has been noted that continuous and uncontrolled exploitation of groundwater could result into falling groundwater tables, saline intrusion, land subsidence (Foster *et al*., 2000; Salameh, 2008; Changming, 2010; Singh and Singh, 2010; Wada *et al*., 2010), rising levels of electrical conductivity (Pophare *et al*., (2014) and increased pumping and piezometric drop (Rodriguez-Estrella (2012). This is despite of enormous rainwater that caught across about eight months in a year. However, in view of the inherent dangers in uncontrolled exploitation of groundwater resources through drilling boreholes and dug-out wells, it is important that rainwater harvesting should be maximally exploited instead, especially in meeting domestic needs. Highlights of benefits of rainwater water harvesting have been given by several authors. For instance, Jackson (2001), Vohland na Barry (2009), Environmental Protection Agency (2013)

and Tabassum et al., (2013) gave reasons for the relevancy of adoption of using rainwater harvesting to overcome the increasing demand of water beside the global weather changes. Such benefits include: (1) Over half of the accessible freshwater runoff globally is already appropriated for human use; (2) more than one billion of people currently lack access to clean drinking water and almost three billion of people will grow faster than increases in the amount of accessible freshwater (per capita) availability of freshwater will decrease in the coming century; (4) climate change will cause a general intensification of the earth's global hydrological cycle in the next 100 years, with generally increased precipitation, evapotranspiration, occurrence of storms and significant changes in biogeochemical processes influencing water quality. Rainwater harvesting has a great potential possible solution to widespread of arsenic poisoning. Rainwater harvesting is a better option to provide arsenic-free, safe water in a cost effective and accessible manner, particularly for drinking and food preparation (Islam, et al., 2010). Qi et al., (2019) in seeking solution to arsenic contaminated groundwater, discovered that, though some treatment may be required, rainwater showed a promising solution to checkmate potable water shortage in Bangladesh, especially in areas where groundwater sources contain high concentration of toxic geogenic contaminants.

United Nations Initiative on Children Education, Fund (2009) revealed that average water need of rural homes per day is 117.01litres per person per capita per day, thus, given a monthly water need of 3510.3 litres per person per capita per month. However, this observation is at variance with the findings of Ogunbode and Ifabiyi (2017) that discovered that water supply per head is between 15litres and 31.7litres per day in the rural areas of Oyo State. It is also noted that not all rain that falls are readily available for collection since part of it joins the surface channel, part sinks to join antecedent water in the soil through infiltration, seepage and so on, part is also evaporated and or return back to the atmosphere through transpiration (Liaw and Chiang, 2014; Owusu, and Teye, 2015; Isoken and Osahon, 2016;). In spite of this, substantial amount of rainfall can still be trapped and collected for use in homes (Shadeed and Lange, 2010). However, in view of the abundant rainwater in the humid tropical regions, the following questions arise: (i) what is the volume of water required per head, both per day and month, for domestic purposes? (ii) What is the average daily/monthly water supply by rainfall? (iii) Is the latter sufficient to cater for the former sustainably? (iv) What are the implications of (iii)? It is of the opinion that if rainfall can sustainably supply domestic water need for the teeming population in the rural regions of the humid tropics, then exploitation of rainfall for the purpose is likely to encourage environmental resources preservation and conservation, which may be not be encouraged or associated with

the exploitation of groundwater, and also optimal utilization of rainfall in the region. This study is embarked upon to examine the sustainability of domestic water supply through rainwater harvesting and storage. Specific objectives are to determine the average daily or monthly water needs per head in the rural regions of Oyo State; and also, to assess the sustainability of rainfall to provide daily and or monthly water needs in the study area;

MATERIAL AND METHODS

Study Area: Oyo State, Nigeria is located between 8°00' N and 4°00' E. It shares its boundaries in the North with Kwara State, in the east with Osun State, in the South with Ogun State and in the West partly with Ogun State and partly with the Republic of Benin (Fig. 2). It has thirty-three (33) Local Goververnment Areas (LGAs). Some of the major urban centres include Ogbomoso, Oyo, Iseyin, Saki, Okeho among others.

Oyo State covers approximately an area of 28,454km^2 and is ranked fourteenth by size in the country. The landscape consists of old hard rocks and dome shaped hills, which rise gently from about 500metres in the southern part and reaching a height of about 1,219metres above sea level in the northern part. Some major rivers such as Ogun, Ofiki, Otin, Oba, Oyan, Sasa, Oni, Erinle and Osun rivers take their sources from this highland (Gbadegesin & Olorunfemi, 2007).

Climate: The climate of Oyo State exhibits the tropical climate of averagely high temperatures, high relative humidity and generally low rainfall maxima regimes during the rainfall period. The dry season lasts from November to March while the wet season starts from March and ends in October. Rainfall amount varies from an average of 1200mm around Igbeti in the northern part of the State and 1800mm in Igbo-Ora and Ibarapa zone in the southern part. According to Ayoade (1988), the rainfall pattern in the southwest is mostly influenced by the sea surface temperature of the Gulf of Guinea. However, wet season is usually characterised with large surface runoff with high humidity especially in the southern part of the State.

The high annual rainfall and high humidity encourage the growth and sustenance of the tall rich vegetation in this zone. These also encourage perennial tree cultivation including cocoa, kolanut and rubber. Presently, the major of water for domestic uses are both from surface and subsurface. Rainfall also form a source especially during the raining season (i.e.

March to October). However, the experience has revealed that most of the rural areas in the State depend on ground sources by drilling boreholes and hand-dug wells which could be motorised or manual ones despite abundant surface sources and rainfall.Most these water facilities are either provided by individuals, corporate organisations, religious institutions, philantropists and even the government at different levels. Most of these ground sources have been found to be deficient in catering for man's water need annually as most of them do not yield all-year round while some do for some months and later on dry up and some yield poorly to be reckoned with in providing water for human use in homes (see Ogunbode, 2015).

Method of Data Collection and Analysis: The data used in this study were both from primary and secondary sources. A multistage random sampling method was used to generate the samples chosen. Twenty five rural local government areas (LGAs) were selected from the thirty three LGAs in Oyo State while five villages were selected from each LGA and ten households were randomly selected from each of the villages, thus a total of one hundred twenty five villages were selected in all and questionnaire were administered across one thousand, two hundred and fifty households for the investigation. Some of the villages selected were shown in Fig. 1.

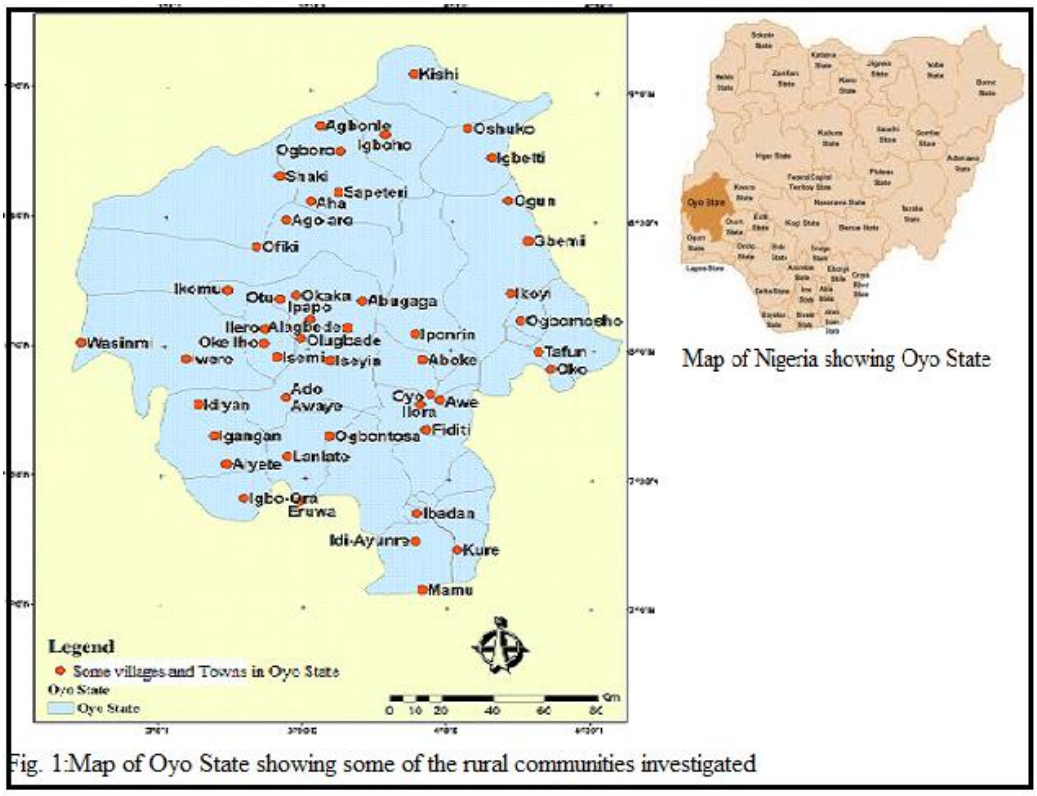

Fig. 1:Map of Oyo State showing some of the rural communities investigated

Also, ten-year monthly record of rainfall data between 2009 and 2021 were obtained from Federal Institute of Forestry, Ibadan for the purpose of this study. In addition to these, 10-year mean monthly number of rain days between 2009 and 2018 were accessed and downloaded from worldweatheronline.com/Ibadan-weather-averages/oyo/ng.aspx on 13th March, 2021. The analysis was done with the use of both descriptive such as the use of tabulation, mean and percentages and also inferential statistics.

RESULTS AND DISCUSSION

I. Characteristics of the Respondents

Table 1 shows some basic characteristics of the respondents in the study area.

Table I: Characteristics of the Respondents in the study area

Variable	Groups	Frequency	percent	Cumulative percent
1. Household Size	1. <5	271	22.0	22.0
	2. 6-10	689	56.0	78
	3. 11-15	234	19.0	97.1
	4. 16-20	29	2.4	99.4
	5. 20	7	0.6	100.0
2. Age of the respondents	1. <18 years	29	2.4	2.4
	2. 19-45 years	445	36.1	38.5
	3. 46-65 years	724	58.6	97.3
	4. >65 years	33	2.7	100.0
3. Level of Education	1. Primary education	286	23.2	23.2
	2. Secondary	87	7.1	30.3
	3. Tertiary	13	1.1	31.8
	4. No formal education	842	68.4	99.8
	5. Koranic	3	0.2	100.0
4. Gender Composition	1. Male	239	19.4	19.4
	2. Female	992	80.6	100.0
5. Monthly income	1. <N10,000	610	49.6	49.6
	2. N11000-N25,000	496	40.3	89.9
	3. N26,000-N40,000	115	9.3	99.3
	4. N41,000-N55,000	3	0.2	99.5
	5. >N55,000	6	0.5	100.0

Characteristics of the Respondents: Table I presents the characteristics of the respondents involved in the study. It shows that majority of the households are between 6 to 15 in size which is 75% of the total respondents. Also, 94.7% of the respondents are between 19 and 65 years in age. The reason for this proportion is to ensure that adults and household heads are involved in the survey majority of whom are female gender 80.6%, by virtue of their responsibilities for water provision in homes in Africa. The men were only involved when female head is not available. Also, 68.4% of the respondents are without formal education and 23.2% have primary education. This is the evidence of illiteracy level domicile in the rural settlements of developing countries of which Nigeria is one. In term of income, 89.9% of the respondents earn between 10,000.00 and 25,000.00 Naira monthly. This is another evidence of the poverty level of the rural dwellers in developing nations.

II. Storage Facilities and their respective mean capacities and Possession

Table 2 reveals the storage facilities and their respective capacities with the possession rate among the respondents.

Table 2: Storage Facilities and their respective mean capacities and Possession Percentage in the Study Area

S/No	Storage Item	% of Possession	Mean Capacity (Litres)
1.	Clay Pot	45	30
2.	Jericans/Kegs	35	25
3.	Steel Drums	13	200
4.	Underground Tank	0	NA
5.	Others	65	8

Storage facilities in the rural communities: Table 2 shows that rural areas in Oyo State are deficient in modern storage facilities which could take quite enough water for their domestic use. The results showed that of all the households, 45% possess clay pots which could has the capacity of an average of 35 litres, 35% of the respondents have jericans and kegs which could take average of 25litres of water, 13% has steel drums which has the

capacity of about 200litres while none of the rural dwellers has underground tank which could take more of rainwater. The other category includes bowls, buckets and the likes which has the highest possession of 65%. All these storage facilities have an average capacity of 8% and mostly unprotected for most of these storage items do not have any cover, thus reducing their usea for drinking and cooking as a result of their susceptibility to contaminants. It was observed that some of these storage facilities are multipurpose. For instance, the steel drums are important in the local oil mill and fermentation of cassava flour while clay pots and the drums are both made use of in the process of yam flour, thus, rendering all these containers irrelevant when it is rainy for the purpose of water storage. The deficiency in the storage facilities noted in this study corroborates the finding of Kwari *et al*., (2017) which attributed the insufficiency of harvested rainwater for domestic uses to insufficient storage facilities in Jos, Nigeria.

III. Daily/Monthly storable volume in the study area

Table 3 shows the selected LGAs and their respective mean daily domestic daily and monthly water demand.

Table 3: The Selected LGAs and their respective mean domestic daily and monthly water demand

S/N	Name of LGA	Average Daily water demand/capita head (Litres)	Average monthly water demand/head (Litres)	Monthly Storable Volume (Litres)
1.	Afijio	29.51	885.3	230.5
2.	Akinyele	24.38	731.4	234.3
3.	Atisbo	17.63	528.9	345.2
4.	Egbeda	17.07	512.1	356.1
5.	Ibarapa Central	26.90	807.0	321.6
6.	Ibarapa East	20.88	626.4	226.2
7.	Ibarapa North	27.90	837.0	325.3
8.	Ido	20.99	629.7	226.9
9.	Irepo	24.01	720.3	220.1
10.	Iseyin	21.89	656.7	315.3
11.	Itesiwaju	17.43	522.9	233.2
12.	Iwajowa	16.77	503.1	321.1
13.	Kajola	19.43	582.9	314.3
14.	Lagelu	23.97	719.1	334.5

15.	Ogo-Oluwa	25.51	765.3	223.3
16.	Olorunsogo	23.42	702.6	320.7
17.	Oluyole	18.64	559.2	328.5
18.	Ona-Ara	21.18	635.4	321.2
19.	Oorelope	19.45	583.5	319.6
20.	Oriire	30.17	905.1	216.4
21.	Oyo East	25.82	774.6	326.0
22.	Oyo West	23.31	699.3	322.9
23.	Shaki East	14.79	443.7	319.9
24.	Shaki West	17.20	516.0	321.3
25.	Surulere	26.15	784.5	317.3

Table 3 revealed that the storable water per month varies over the year. This discovery is attributed to the pattern of annual rainfall. The storability of rainwater in the study area as shown in the Table is determined by several factors. These are the depth of rainfall, availability of harvesters at the time of the rain, availability of storage facilities and their respective capacities. However, it is expected that the rainwater storable in a given month will vary with the seasons. It is expected that little or no rainwater may be available in the months of dry season (November to February) while the volume of harvestable rainwater improves as rainy season resumes from March through October. It should also be noted that the severity of the rainstorm could affect the rainwater harvestable- An incidence of rainfall that is accompanied with heavy and turbulent storm may hinder the collection of rainwater by the storage facilities available in the rural communities of Oyo State, which are mostly open and moveable types (see also Mechell et al., 2009).

IV. Challenges of storing rainwater in the study area

Table 4 shows factors that determine the utilization of rainwater in the study area

Table 4: Determinants of Rainwater Utilization in the Study Area

S/No	Determinants of Rainwater Utilization	% Respondents
1.	Pattern/Consistency of rainfall	100
2.	Available Storage facilities and their capacities	95
3.	People’s belief and attitude	65
4.	Respondents availability at the time of rain incidence	78

Table 4 reveals the response of the respondents on the challenges they normally face in the utilization of rainwater resource in their various locations. The result shows that the utilization of rainwater is bedeviled by various factors including storage facilities, pattern of rainfall incidence, people's belief and attitude to the use of rainwater, people's availability in the time of rain incidence among others. All respondents believed that the pattern of rainfall or its incidence consistency determine the harvest of rainwater for their home use. Thus, the demand for rainwater during dry periods or when it seizes remains zero during that period. Also, 95% of the respondents stated that the storage facility in their respective homes is a strong predicament to the utilization of rainwater in the study area. Even, when rainwater is in abundant supply, the storage facilities available and their capacities determine the volume of rainwater that could be harvested. This study also discovered that the belief and attitude of some people poses a challenge to the optimal use of rainwater. About 55% of the respondents revealed that even when there is rainwater, they have less interest to its harvest because of their belief about the water. For instance, some of the respondents stated that they do not bath or wash with rainwater because it foams a lot while some are of the view that rainwater can only be utilized for scrubbing and nothing more than that. Last but not the least is about 78% of the respondents that belief that their availability could also pose a challenge to the effective and optimal use of rainwater. It was revealed that since most of the respondents are farmers and traders that may not be available in their homes during the day until in the evening. Thus any incidence of rain while they are away from home may not allow them to optimal utilize rainwater except the little that may be harvested through the rainwater collector attached to the house roofs. It is evident that rainwater utilization in the tropics is determined by such factors despite its abundance. The findings of Campisano et al., (2017) and Qi et al., (2019) corroborated the findings here that rainwater harvesting is determined by certain variables as discussed.

V. Temporal accessibility of rainwater

Table 5 presents 10-year monthly total and mean monthly total rainfall and mean number of rain days in the study area.

Table 5: Ten- year monthly total, mean monthly total and mean rain days in Oyo State

S/No	10-year Monthly total rainfall (mm)	10-year Mean Monthly total rainfall (mm)	*Mean Number of Rain Days/month
January.	121.2	12.1	7
February	368.6	36.9	13
March	937.1	93.7	24
April	1268.1	126.8	27
May	1808.4	180.8	27
June	1775.6	177.6	27
July	1945.8	194.6	29
August	1264.6	126.5	29
September	1965.5	196.6	29
October	2233.2	223.3	29
November	581.5	58.2	21
December	40.8	4.1	7

VI. Source: Author's compilation; *worldweatheronline.com (Accessible on 25th May, 2021)

VII.

This study further investigated what could influence the sustainable utilization of rainwater in the tropics apart from the factors noted above. Table 5 revealed the total monthly rainfall across the 12 calendar months over a period of 10 years (2009-2018) and the mean rain days for the same period interval. The result shows that apart from the months of December and January, the AMWD/Head could be realized from rainfall if all the conditions for the fetchability of rainwater are met. The months of December and January fall within the dry period when rainfall seizes. AMWD ranges between 885.3mm and 443.7mm in Afijio and Shaki East LGAs while the Total Rainfall over the study period has a range of between 337.7mm in December and 6957.3mm in the month of September. The implication of this result is that if rainfall could fall uniformly across the study area, then every household will have sufficient rainwater to fetch for their respective household use. Considering the months between April and October, the rainfall is enormous that the available rainwater is extremely in excess of AMWD per head. However, the investigation revealed that the number of rain days vary from month to month. Table 2 further revealed that if the number of rain days is anything to reckon with as shown in the table then, it was observed that rain water could optimally be depended upon for home use especially between the months of April and October which falls with the

rainy season. This observation is in view of the number of rain days which ranges between 27 and 29 for each of the months mentioned. Shittu et al., (2015) corroborated this observation by concluding that rainwater is viable and reliable water resource for both rural and urban homes. Similarly, Balogun et al., (2016) also noted that rainwater resource has the potential to cater for up to 54% of the non-potable and between 74.34% and 156.38% of potable water demand of a 6-member household. However, the months of March and November have a mean rain day of 24 and 21 which marks the beginning and end of the rainy season respectively. The rainwater in March may not be dependable because rain is just commencing and may be erratic for a reliable use for domestic activities. Similarly, that of November also marks the beginning of dry season and transition from wet to dry period, and so any probable rainfall in the month may not be relied on as reliable source of water for domestic use. The months of December, January and February are typically of dry month and so level of dependence of rainwater within those months are significantly zero.

VI. Comparing Average monthly water demand and the monthly storable water using t-Test Results

Result of a paired sample T-Test: A paired sample T-Test results showed that there is a significant difference between the average monthly water demand and the monthly storable water at 1% level of significance. The implication of this is that storable rainwater is not sufficient to take care of the households' monthly water demand. This means that despite the availability of rainwater spreading over about eight months yearly, there is no enough storage facilities to conserve water and so could not meet the household water demands. This finding corroborates the findings of Aladenola and Adeboye (2010) and Hufman-Caris et al., (2019). Hufman-Caris et al., concluded that the harvested rainwater in the city district in The Netherlands can only meet 50% of water demand and concluded that rainwater harvesting for home use is not economically feasible. The findings of Urban (2008), Awawdeh et al. (2012) and, Pradhan and Sahoo (2019) led them to also suggest that drastic efforts are required to develop rainwater harvesting which supplements other sources of potable water. The recommendation was in view of the global water crisis which is being culminated with the scenarios of climate change, high water demands, population growth, increased urbanization and industrialization. Netherlands Water Partnership, in 2007 recommended that erecting brick cement tank as used in Nicaragua and Ghana is cheaper and easier in construction than rooftop tanks. It was however revealed that physical inspection and repairing cracks as part of maintenance practices are required to ensure its sustainable use. In addition, periodic water quality test and microbiological assessments may be required to ensure that the harvested

rainwater complies with the required drinking standards.it is expected that capacity building and economic empowerment of the local communities are required in most developing countries if these recommendations will be actualized as the level of poverty in this region is high (Mehrotra, 2000; International Peace Institute, 2009; Mansi et al., 2020.

In conclusion, study of the sustainability of rainwater as a source of water for domestic activities in the rural areas of Oyo State, Nigeria was carried out. The study revealed that there is sufficient supply of rainwater in the area spreading over eight months (March to October). However, the seasonality of the rain hindered the all-time availability of rainwater in a year period. Other bedeviling factors include inadequate storage facilities as revealed in the paired t-test analysis. Also rural dwellers are incapacitated to construct underground reservoir by virtue of their economic weakness. The orientation of the rural dwellers towards the utilization of rainwater could be influenced if encouraged by the government and other water supply development stakeholders. People's attitude and their perception on rainwater need to be worked on so that they could embrace optimal utilization of rainwater for their domestic activities. This could be achieved through sponsoring construction of underground water reservoirs, granting credit facilities towards acquisition of surface storage facilities to enhance rainwater conservation for home use. The mean rain days per month indicate that April to October have sufficient number of rain days which could be relied upon for home water supply while dry period is not. It is suggested that relevant stakeholders should intensify campaign on the exploitation of rainwater for its optimal use for domestic purposes. Surface water source is bedeviled with indiscriminate pollutions while ground water exploitation may not be environmentally friendly among other challenges. Most of the rural areas are not connected to pipe-borne water network which is acclaimed to be the safest for human and also environmentally friendly. The only alternative left is rain water which is in abundant supply in the humid region of which the study area is part.

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