



Original Research Article

Perceived Effects of Domestic Water Access on Rural Households' Livelihood in Ogbomosho Agricultural Zone of Oyo State, Nigeria¹ADEBAYO O. O and ²ADEWUMI K. A*^{1,2}Department of Agricultural Extension and Rural Development, Ladoke Akintola University of Technology, Ogbomosho, Oyo state, NigeriaDOI: [10.5281/zenodo.8336348](https://doi.org/10.5281/zenodo.8336348)

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***Corresponding author:** ADEWUMI K. A

Department of Agricultural Extension and Rural Development, Ladoke Akintola University of Technology, Ogbomosho, Oyo state, Nigeria

Abstract

This study was conducted to examine the perceived effects of domestic water access on rural households' livelihood in Ogbomosho agricultural zone of Oyo state. A multistage sampling procedure was used to obtain a primary data from 162 respondents in the study area through a structured questionnaire and interview schedule. The data obtained were analyzed using descriptive instruments such as frequency and percentages while Pearson Product Moment Correlation (PPMC) was used as the inferential statistical tool to test the hypothesis of the study. The result findings revealed the mean age of the respondents to be 50.3 years, more than half (55.6%) of the respondents were males, majority (76.5%) were married, 46.9% Christians, 69.8% had their household size within 6-10 members, majority (83.3%) were formally educated but has low educational background with the average years spent in school being 8.4 years while majority (88.3%) of the respondents belongs to one social organization or the other. All (100%) the respondents claimed rain water was accessible water source available to them. They likewise claimed that Seasonality of Water Sources was the major factor responsible for how they access water (WMS = 1.7). Construction activities usage of water ranked highest with Grand Mean of 3.3 based on the respondents' perception on effects of domestic water access on their livelihoods. Majority (54.9%) of the respondents perceived the effects of domestic water access to be favorable on their livelihoods. The results obtained from Pearson Product Moment Correlation revealed that some of the selected variables, specifically, Age ($r = 0.751$, $p \leq 0.000$), Household size ($r = 0.639$, $p \leq 0.000$), Years of education ($r = -0.459$, $p \leq 0.000$) and Years of residence ($r = 0.751$, $p \leq 0.000$) had significant relationship with the perceived effects of domestic water access on rural households' livelihood. Based on the findings of the study, it was concluded that the major domestic water sources available for households' livelihood were rainfall and wells. Whereas, seasonality of water sources was the most notable physical factor responsible for how domestic water access in the study area. Therefore, the study recommended that; there is a need for influential people with the support of other members of the community under the guise of community participation to champion a self-help water project gestured towards the provision of modern water infrastructural facilities that is adequate, efficient and not season bound. Local community leadership should prohibit pollution of water sources with great penalty for defaulters.

Keywords: Domestic Water, Livelihoods, Rural Households, Safe water.**INTRODUCTION**

Water is a precious natural resource, vital for life, development and the environment. It can be a matter of life and death, depending on how it occurs and how it is managed. When it is too much or too little, it can bring destruction, misery or death. Irrespective of how it occurs, if properly managed, it can be an instrument for poverty alleviation, economic survival, growth and development. It can be an instrument for poverty alleviation, lifting people out of the degradation of having to live without access to safe water and sanitation, while at the same time bringing prosperity to all (United Nation, 2016). Although by 2015, over 90% of the world's population used improved drinking water sources,

those living in rural areas typically experience much lower levels of access to improved water (World Health Organization (WHO); United Nations Children's Funds (UNICEF), 2017). There are diverse sources of domestic water in rural areas including conventional communal sources (such as wells, rain water, ponds and streams) and self-supply sources like Borehole, private wells etc. a rural household is regarded as co-residence living together in the same house, pooling and sharing the incomes and resources, sharing the expenses and ultimately, existence of family or emotional ties occurring in the rural settings. Livelihoods conceptually means, activities, entitlements and assets by which people make a living.

However, Nigeria as a country has begun grappling with issues of poor water accessibility and scarcity across a number of her states causing infrastructure and long-term sustainability problem (Muta'ahellandendu 2012). Of which, Rural people in the country particularly still depend largely on unprotected water sources including; rivers, streams, ponds, and wells for their water needs either for domestic or economic purposes which in most cases their accessibility are non-functional. The limited access to water supplies by a significant proportion of the Nigerian rural population has been blamed on institutional and socio-economic factors (Ezenwaji et al., 2016). This has very serious implications on the economic development and social welfare of the rural people specifically and the country as a whole. According to Bauman, (2005) an estimated 35% of rural water accessibility in sub-Saharan Africa are non-functional, an indication that peoples' livelihoods are being jeopardized, livelihoods stated in terms of the various activities carried out by them either farming or non-farming activities alike. It is also said that an estimate of about 1.2 billion people lacks access to safe and affordable water for their domestic use (Grant et al. 2012). This has reduced several rural households into seeking mitigating measures that has resorted to high vulnerability of people dwelling in the rural area. The people trek long distances to fetch small quantity of water from the streams and springs (National Bureau of Statistics (NBS), 2008) which in most case are likewise characterized with low quality and for this reason, There is tremendous economic waste involved in people spending so much time and effort in search of water. There is, therefore, the need for thorough insight into the different dimensions of perceived effects of domestic water access on rural households' livelihood. It is against this background that this research was undertaken. While specifically, the study described the personal characteristics of the respondents in the study area, identified the domestic water sources available for household use in the study area, identified the various water-dependent livelihood activities carried out by each household in the study area and examined the physical factors responsible for water access in the study area.

2. Methodology

The study was carried out in Ogbomoso Agricultural Zone of Oyo State, Nigeria due to the abundance of rural households who utilizes domestic water in running their livelihood activities. The geographical location of Ogbomoso is on latitude 8°.08N and longitude 4°.29E The land area is about 3547.89 square meter which is bounded in the North by Irepodun L.G.A, in the West by Oyo L.G.A, in the South by Ejigbo L.G.A of Osun State and in the East by Asa L.G.A of Kwara State. It is regarded to be a derived Savannah vegetation zone and a low land Rainforest area. The estimated population of Ogbomoso during the 2006 population census was approximately 245,000 (NPC, 2006) and the projected population in the year 2023 is estimated at 628,682 (World Population Review (WPR), 2023). Ogbomoso is situated at the Northern part of Oyo State. The climatic and soil conditions of the study area favor the extensive production of arable crops like cassava, maize etc., horticultural crops and tree crops especially Mango and Cashew trees.

The target population of the study comprised of all rural household members in Ogbomoso Agricultural zone, Oyo State. A Multistage sampling method was adopted for this study. Ogbomoso Agricultural zone consists of 5 LGAs with each of them representing a Block. The first stage involved a purposive selection of three (3) blocks with abundant rural households in the study area. Therefore, Ogo-Oluwa, Oriire and Surulere Local Government Areas were selected due to their rurality. The second stage involved a random selection of forty percent (40%) Cells each from the selected blocks. Therefore, four (4) villages each were purposively picked from the selected blocks due to the abundance of rural households and this equaled to a total of twelve (12) villages selected. The third stage involved the identification of households present in the selected villages from which the sampling frame was generated for the study. The last stage involved a systematic random selection of 29% of identified rural households in each selected village. This implied that a total of one hundred and sixty-two (162) rural households constituted the sample size for this study.

The data for this study was obtained from primary source through the administration of a well-structured interview schedule. The schedule was divided into sections which are designed in line with the objectives of the study.

The dependent variable for this study was perceived effects of domestic water access on rural households' livelihood and this was measured based on the generated perception statements, structured in respect to the various water dependent livelihoods. Using a five-point likert scale indicating strongly agree (5), agree (4), undecided (3), disagree (2) and strongly disagree (1) for positive responses and reversed for negative responses. Responses generated was further categorized into Favorable and Unfavorable using Grand Mean (GM). The independent variables of this study included

the personal characteristics of the respondents, domestic water sources available for household use, various water-dependent livelihood activities carried out by each households and physical factors responsible for water access in the study area.

The data for this study was analyzed using both descriptive and inferential statistics tools. Data collected were analyzed with frequency distribution, percentages, mean values and ranking as the main descriptive statistics, Pearson Product Moment Correlation (PPMC) was used to determine the relationship between the variables (inferential statistics).

3. Results and discussion

Personal characteristics of the respondents

The age means the length of time a person has lived. The result indicated that 30.9% of the respondents were in the age range of 41-50 years, 24.1% were between the ages of 51-60 years, 22.8% were between the ages of 31-40 years while 19.8% and 2.5% of the respondents in the study area has the age of above 60 and ≤ 30 respectively. The mean age of the respondents was 50.3 years. This indicates that majority of the respondents in the study area are in their middle age, still productive and can still actively engage in accessing domestic water needed for their various livelihood activities. This finding corroborates the findings of Obisesan (2013) who reported that middle aged people are agile, active and more innovative than the older ones and possesses more energy to dissipate on productive efforts. This result also supports the findings of Aromolaran et al. (2019) that rural households' head are mostly youths and energetic, and as the head of the household they tend to actively provide the need of the household.

The sex (a concept describing the state of being either male or female) distribution of the respondents in the study area indicated that above average (55.6%) of the respondents were males while 44.4% were female. This is an indication that both genders engage in sourcing of water for domestic use in their various households, though with females having higher involvement. This implies that, even when men dominated the sampled population, women has higher influence on decisions relating to accessing, fetching and using water even though the males are regarded as the household head coupled with the fact that, the males are charged with other responsibility like engagement in farming and other economic activities in order to provide the needs of the households. This conforms to the findings of Ajibade et al (2013) which reported that, most rural farming household head are often males in developing world, decisions about household water use falls directly on women who are expected to simply get water by whichever means while their male counterpart have the required strength to carry out either farming or other economic activities for household livelihood.

Majority (76.5%) of the respondents indicated that they were married, 13.6% are widowed while 4.3%, 3.1% and 2.5%, were divorced, singles and separated respectively. This implies that majority (96.9%) of the respondents had marital experience, this is expected to influence their household size (which could be seen as it reflected in the average household size of the respondents consisting 7 members), decision making processes in accessing water to be used in their household and also, their rate of water consumption which is mostly always high. This is in line with Aromolaran et al (2019) which opined that, more often, the quantity of water accessed and used is related to the household size, and hence the married households are likely to have larger household sizes and the more people in a household, the likelihood that more people will be available to obtain water required for the household.

Almost average (46.9%) of the respondents were practicing Christianity, 41.4% were practicing Islam while only few (11.7%) of the respondents were engaged in traditional religion. This result implies that none of the three identified belief systems in the study area are bias to domestic water access and usage for human livelihoods either domestically or economically.

About 69.8% of the respondents has their household size (number of individuals in each households) between the range of 6-10 members, 22.2% and 8.0% indicated the range of 1-5 members and above 10 individuals in their households respectively. Also, the result findings indicated the mean household size to be 7 individuals in the study area. This implies that each household in the study area has notable number of members that are readily available to access the domestic water sources present for their household livelihoods (the high number could be as a result of the marital status of the respondents being majorly married). This is in tandem with Otufale and Coster (2012) findings which reported that the average household size in Ogun state was 7 persons. Implying that more people in the household will be available to obtain water required for the household use.

About 58.6% of the respondents spent between the range of 7-13 years in school for formal education, 16.7% of the respondents spent between the range 1-6 years in school for formal education and also, no formal education at all while, only 8.0% of the respondents spent above 13 years in school for formal education. Likewise, the results indicated 8.4 years to be the average years spent in school by the respondents for formal education. This implies that majority of the respondents in this study area were formally educated but has low educational background level. Poor education as a setback could be a limiting factor in optimally accessing and managing the water sources available to them (especially if

the household head has low level or no education at all) and the amount of water they get both in quality and quantity for their household livelihood, a product of poor protection of the sources directly linked with poor health as a result of water borne diseases after consuming contaminated water. This finding conforms to Marks and Davis (2012) which opined that, when the water is inadequate, people are compelled to use contaminated water which may later create health problems, including the outbreak of diseases.

Almost average (45.7%) of the respondents has spent within the range of 21-40 years in the study area, 29.0% between the range of 41-60 years while 17.9% and 7.4% have been in the study area within the range 1-20 years and above 60 years respectively. The results also indicated the mean year of residency by the respondents to be 36.3 years. This implies that the respondents are well aware of the domestic water supply behavioral patterns in the study area and knows how and when to access the available water resources for their household livelihoods. This result findings agrees with Ezenwaji et al., (2016). Which opined that, the community dwellers are generally highly aware of water related issues in their communities. Over time, these people have been familiar with water supply and demand interactions and may also be able to establish changing trends in this interaction and the management of the situation.

It was further revealed the primary occupation of the respondents that, 48.8% of the respondents were farmers, 29% were traders, 9.9% of them were artisans and 7.4% were engaged in civil service while 3.1%, 1.2 and 0.6% were engaged in transport service, traditional health care services and hunting respectively. This implies that respondents in the study area has various other livelihoods they earn a living from aside from farming which is an indication that non-farm sector of rural household livelihood is growing although, majority of the respondents agreed they engaged in the latter as their major economic activities which on the long run may pose some stress on the major water sources such as rivers, springs and streams when irrigated farming is put into consideration. Also, their secondary occupation (other sources of livelihood) have it that, 63.6% were farmers, 30.2% were traders and 2.5% were artisan while 1.2% were engaged in hunting and traditional health care services transport service. Meanwhile, only 0.6% of the respondents were engaged in transport services and food selling as their secondary occupation. Hence, the study implied that farming related livelihoods still stands as the economic main stay in the study area even though there are other numerous sources of income available to the respondents. This result agrees with Orimafo (2012) which reported that, majority of his respondents engaged in diverse economic activities such as farming and trading as their occupations.

Majority (88.3%) of the respondents indicated that they were members of one social organization or the other while 11.7% of the respondents did not belong to any social organization. This implies that majority of the respondents in the study area are socially conscious, ready to take a collective effort in addressing issues related to water access in the study area. This result is in line with Adebayo el al., (2023), they reported that majority of rural household's members belonged to one social organization or the other even in most occasions multiple associations.

Domestic water sources available for household use

The result obtained from the table revealed that all (100%) respondents in the study area make use of rain as a domestic water source available for their households' livelihood, majority (98.1%) of the respondents' sourced water from wells. Also, above average (67.3%) of the respondents has their water sourced from rivers/streams while 58%, 53.7% and 46.9% of the respondents indicated their domestic water sources to be hand pumps, Water vendors and Spring water respectively. However, ponds (30.2%) and Boreholes (13%) were the least available domestic water sources for households use in the study area. This indicated that, rain water, wells and streams were the main domestic water sources available for respondents' access even though there are other available sources in the study area. As a result of the seasonal nature of the available sources incapable of all year-round provision of water coupled with other factors such as global warming, it has greatly tampered with climatic arrangements, this implies that, the water sources available for respondents access in the study area are unreliable in seasonality terms as a result, the capacity of surface water to supply water for the rural communities is degraded as rainfall reduces and ultimately surface water declines. This could take a toll on their social, domestic and economic welfare. This result findings corroborates Ayeni et al. (2015) which opined that the hydrologic impact of global warming contributes to the change in water balance parameters which increases or reduces water recharge and storage capacity. This result findings agrees with Adebayo el al. (2022) which opined that shallow wells were the most common source of water indicated to be available by the respondents in the rural area.

Various water-dependent livelihood carried out by each household

majority (80.2%) of the respondents in the study area carried out irrigated vegetable farming as a water dependent livelihood activity while above average (68.5% and 58%) of the respondents uses water for irrigated kitchen garden use and nursery practices respectively. Implying that, vegetable farming is achievable in the study area with irrigation as farmers are less dependent on rainfall and for vegetable production in the study area as a result, aiding their economic welfare.

The table likewise revealed that majority (73.5%) of the respondents uses water in watering small ruminants, 42% of the respondents uses water for intensive pig farming while, only 24.7% of the respondent engages in fishery as a water dependent livelihood. This implies that water gotten from domestic sources are also to some extent used for livestock farming and for that reason broadening the livelihoods of the rural households in the study area.

Furthermore, the table shows the result distribution of crop processing activities as a water dependent livelihood. It was observed that, majority (95.7% and 75.3%) of the respondents used water for maize processing to Ogi and yam/cassava processing to flour respectively. Above average (56.2%) engages in garri production, below average (32.1%, 25.3% and 24.7%) of the respondents carries out cassava processing to fufu, beske production and palm oil production respectively. While the least (8%) water dependent livelihood carried out by the respondents in the study area was locust bean processing. This implies that water is an important input for crop processing activities and in a broader sense, an entity that cannot be ruled out if there is an intention to boost both domestic and economic welfare of the respondents in the study area.

However, all (100%) respondents in the study area subjected water to their domestic household uses which are; drinking/cooking, bathing, washing and sanitation. This implies that, each household in the study area needs water to function optimally as it has direct influence on their entire socioeconomic welfare.

Lastly, sequel to construction purposes as a water dependent livelihood, the table revealed that, majority (89.5% and 72.2) of the respondents engages in residential house and animal pen construction while the least activity, above average (61.7%) carried out by them was processing facilities construction. This implies that adequate water access is a very necessary for development through structural expansion in the study area.

Generally, the result findings implies that water is majorly subjected to domestic household use among other purposes in the study area. Food production as far as irrigation practices and livestock farming are concerned, as well as structural development strongly depends on how accessible the respondents are to the available water sources. However, being accessible to or dependency on highly seasonal water sources including rain and streams could truncate food production, good health and community development. This finding agrees with Thompson et al. (2012) which opined that productive use of water which includes crop processing (brewing included), animal watering, construction and small-scale horticulture may be critical among the poor in sustaining livelihoods and avoiding poverty and therefore has a considerable indirect influence on human health. Fan et al., (2013) examined that the dominant behaviors in the villages with access to improved water supply including; domestic water consumption, Hygiene habits and vegetable gardening.

Physical factors responsible for water access

Above average (68.5%) of the respondents claimed Seasonality of Water Sources to be the major factor responsible for how they access water and for this reason, it was ranked first with the Weighted Mean Score (WMS) of 1.7, non-protection of Water Sources, Availability status of Water Infrastructure and Distance to water sources were ranked second (WMS=1.6), Quality of water from the available sources was ranked fifth (WMS =1.4), while, Number of available water sources, Water availability and quick dryness of water sources, household size and insufficient rainfall were ranked sixth (WMS = 1.3).

Furthermore, the table likewise revealed that, water facility maintenance frequency, Geographical location of water sources, long waiting queues at the water collection points and Communal Population size and growth occupied the tenth position with WMS of 1.2.

Lastly, based on the findings of the study, the table revealed that, social unrest/conflict and Household demography were ranked fourteenth with a WMS of 1.0 While, Aging Water Infrastructure was ranked lowest at sixteenth position (WMS=0.8) as a factor responsible for water access by the respondents in the study area. This implies that, Seasonality of the available water Sources was a major concern that determines how each households in the study area access water used for their livelihoods. This is as a result of their dependency majorly on highly seasonal water sources such as rainfall, wells and streams which have been proven to be unsustainable in ensuring adequate water access security of each households. Meanwhile, aging water infrastructure was ranked lowest due to water infrastructural facility absence to begin with. The result finding conforms to Obeta and Nwankwo (2015) concluded that, absence of water infrastructures, Seasonality of Water Sources, Non-protection of Stream/Spring Water sources, long distance to these water Sources, Misappropriation of water supply project funds by political leaders, poor management and politicizing of water projects was observed as the factors perceived by the respondents to be responsible for water access and supply in the rural area. This finding also conforms to Jiménez et al., (2014) who indicated that, Water availability and accessibility are the most significant factors for water access in crop production.

Perceived effects of domestic water access on rural households' livelihood activities

About 69.1% of the respondents strongly agree with the fact that, Adequate water access Increases vegetable production and productivity and this was ranked first with a Weighted Mean Score (WMS) of 4.7 as regards to irrigated farming, water availability determine the kind of crops cultivated and farming system practiced in my area occupied the second position with a WMS of 4.4, Water availability ensures food security in my area as a result of kitchen garden irrigation was ranked third (WMS=4.3) while, Poor water access limits optimal nursery practice in my community and Unstable water supply to my vegetable plot fosters income rate fluctuation were both ranked fourth (WMS=2.0). Also, the table further showed that, inadequate water access limit vegetable production was ranked lowest at the sixth position with WMS of 1.5. This implies that, irrigated farming system is a common practice among the respondents but mostly limited to vegetable productions. The findings of this study agree with Crow et al., (2012) which opined that, Adequate access to water supply can help lift many rural households out of food insecurity and poverty because water is crucial to agriculture especially in dry seasons for irrigation, crops and animals need water for their growth, Insufficient water for agriculture could arrest the food security of an area leading to poor nutrition and illness in the long run.

In respect to livestock farming, the result findings revealed the perception of the respondent that, improved portable water access enhances farm animals' health and Poor water access reduces rate of livestock production occupied the first position with a WMS of 4.5 each. Likewise, Adequate water access fosters easy handling of farm animal was ranked second (WMS=4.3), Adequate water supply improves the rate of sanitation and hygiene of the livestock farm was ranked third (WMS= 4.2). Also, Long distance to water source affects the general turnout rate of farm animals were ranked fourth (WMS=2.0) while, inadequate water supply aids disease development due to poor sanitation and poor water access reduces rate of livestock production were both ranked fifth with WMS of 1.6. This implies that, improved access to portable water enhances livestock farming as an enterprise in the study area. The findings of this study conform to Crow et al., (2012) which opined that, animals need adequate access to water for their growth, Insufficient water for agriculture could arrest the food security of an area leading to poor nutrition and illness in the long run.

However, it was further revealed by the table that, Water availability enhances clean livelihood centers (processing facilities) in my area was ranked first with WMS of 4.3 in respect to crop processing activities, adequate water access in my area ensures increased income level was ranked second with WMS of 4.0 while, Water availability ascertains Employment rate increment in my community and Long waiting queue for water collection affects my livelihoods performance were ranked third (WMS=3.1) and fourth (2.8) respectively. Also, insufficient water resources in both quality and quantity enhances Communal clash and Poor operation and maintenance of water facilities affects the amount of water provided for processing activities were both ranked fifth with WMS of 2.1. This implies that, water is the primary determinant of clean livelihood centers and also, majority of the livelihood options in the study area (especially crop processing activities) are based on water availability, a feature which made water resources a cogent aspect required in achieving sustainable development. The findings of the study agrees with Houweling et al., (2012) that, the shortage in water supply and access could have both direct and indirect impact in the area. Efficient water supply is very vital to achieving sustainable development in the area because water supply has link with rural livelihood system.

Furthermore, as regards to domestic household use of water, the result findings in the table reveals that majority (68.5%) of the respondents agreed with the fact that, Adequate safe water access enhances good health of household members and was ranked first with WMS of 4.7 while, adequate water access enhances improved school attendance for children in my area was ranked second (WMS=4.1) Meanwhile, the table likewise showed both Distance to water sources adversely affects both the amount of water collected for household use as well as my livelihood performance and Unprotected water sources amplifies water borne diseases were ranked third (WMS=1.8) and fourth (WMS=1.6) respectively. This implies that, to achieve sound health in the study area by the respondents, adequate access to safe water is highly significant. This agrees with Basu et al., (2015) who opined that, inadequate Water access and supply can directly affect some domestic activities such as bathing, cooking, washing, basic sanitation and waste disposal. Insufficient water for these activities can result to poor hygiene which spreads water-related diseases such as diarrhea, cholera, malaria, dysentery etc. Consequently, households will have huge part of their income spent on health care leaving them with insufficient money for education, nutrition, better shelter etc. (Pearson et al., 2015).

Lastly, based on use of water for construction purposes, it was revealed that, 74.7% of the respondents agreed that, adequate access to water resources enhances livelihoods growth through structural expansion and this was ranked first with a WMS of 4.0, Water availability fosters change in land use through construction of processing facilities and animal houses was ranked second with a WMS of 3.9 while, Long distance to water source hinders structural expansion of livelihood centers and Inadequate water supply and poor water policies aids inequality among water facility users especially for construction in my community were ranked third (WMS=2.9) and fourth (WMS=2.2) respectively. This implies that, economic growth is possible in all fronts if there is adequate access to water resources through structural expansion. Adequate water access is important to achieving sustainable development in the study area. The findings of the study agrees with Houweling et al., (2012) that, the shortage in water supply and access could have both direct

and indirect impact in the area. Efficient water supply is very vital to achieving sustainable development in the area because water supply has link with rural livelihood system.

Using Grand Mean (GM), summarily this result revealed that, construction activities usage of water was ranked first with GM of 3.3, irrigation activities usage of water was ranked second (GM=3.2) while, domestic household use of water and crop processing activities usage of water were both ranked third (GM=3.1). Also, livestock farming activities usage of water was ranked last at the fourth position with GM of 3.0. This result affirms that there is a corresponding perceived effects of water access across all water depended livelihoods. Meanwhile it was observed that construction use of water was ranked highest and this could be as a result of the fact that, high volume is required during construction efforts.

Categorization of responses to perception on effects of domestic water access on rural households' livelihood

The table reveals that above half (54.9%) of the respondents claimed that domestic water access for households' livelihood was favorable to them while 45.1% of them agreed that domestic water access for households' livelihood was unfavorable to them. Generally, this result implies that domestic water accessibility by the respondents has favorable effects on their household livelihoods despite some unwanted constraint encountered while accessing the available domestic water sources in the study area.

Test of hypothesis

The hypothesis of the study was stated in a null form as follows; there is no significant Relationship between some selected personal characteristics of the respondents and perceived effects of domestic water access on rural households' livelihood. For this hypothesis, PPMC analysis was employed and the result revealed that some selected variables including; Age ($r = 0.751, p \leq 0.000$), Household size ($r = 0.639, p \leq 0.000$), Years of education ($r = -0.459, p \leq 0.000$) and Years of residence ($r = 0.751, p \leq 0.000$) had influence on the perception of effects domestic water access has on rural households' livelihood. This implies that the respondents felt that the more active they are in terms of age, the higher the number of their household members, number of years spent in school for formal education and years of residency, the greater their perception of effects accessibility to domestic water has on their livelihood activities.

4. Conclusion and Recommendation

Based on the findings of the study, it was concluded that a sizeable number of the respondents were men, middle aged and still active. Majority of the respondents were either married or have marital experience with very few singles observed. a situation that has a direct influence on their household size which has a mean size of seven (7) individuals. It was discovered that majority of the respondents are educated but has low educational background. They are likewise engaged majorly in farming as their sources of living but they are equally in to other economic activities. Majority of the sampled respondents further indicated they belong to one social organization or the other. The major domestic water sources for household livelihoods were rainfall and wells. Majority of the respondent claimed that irrigated vegetable farming was the most practiced irrigation activities as a water dependent livelihood, Majority of the respondent likewise signified that, watering small ruminants, maize processing to Ogi and residential houses construction were the most practiced livestock farming activity, crop processing activity and construction purposes respectively. Also, all the respondents claimed they utilizes water for domestic purposes in their household which included; drinking/cooking, bathing, washing and sanitation. Moreover, based on the result findings, seasonality of water sources was ranked the most apparent physical factor responsible for how domestic water is being accessed by the respondents for rural household's livelihood in the study area.

However, the study shown that, adequate water access Increases vegetable production and productivity and was the most ranked perception statement as regards to irrigated farming while, improved portable water access enhances farm animals health, Water availability enhances clean livelihood centers, Adequate safe water access enhances good health of household members and adequate access to water resources enhances livelihoods growth through structural expansion were the most ranked perception statement in respect to livestock farming, crop processing activities, domestic household use and construction purposes respectively. Of which, majority of the respondents perceived the effects of domestic water access for rural households' livelihood to be favorable.

Hence, as a result, it is recommended that, The rural community leadership should launch a safe water campaign in the rural areas of the country in order to create and reinforce rural people's awareness on roles of water in health management and rural development, the community leadership should invite personnel from water, sanitation and hygiene (WASH) to train them on how to effectively and optimally protect and manage the available water sources in their community, the local community leadership should protect the water sources through prohibition of water sources pollution with great penalty for defaulters. Likewise, Policies that gives all rural people equal chance to access provided water facilities across all social classes should be enforced.

Table 1: Personal characteristics of the respondents

Personal characteristics	Frequency	Percentage	Mean
Age(years)			
≤30	4	2.5	
30 - 40	37	22.8	50.3
41 - 50	50	30.9	
51 - 60	39	24.1	
> 60	32	19.8	
Gender			
Male	90	55.6	
Female	72	44.4	
Marital status			
Single	5	3.1	
Married	124	76.5	
Separated	4	2.5	
Divorced	7	4.3	
Widowed	22	13.6	
Religion			
Christianity	76	46.9	
Islam	67	41.4	
Traditionalist	19	11.7	
Household size			
1 – 5	36	22.2	
6 – 10	113	69.8	7
Above 10	13	8.0	
Years of formal education (years)			
No formal education	27	16.7	
1 – 6	27	16.7	
7 – 13	95	58.6	8.4
Above 13	13	8.0	
Years of residency(years)			
≤20	29	17.9	
21 – 40	74	45.7	
41 – 60	47	29.0	36.3
>60	12	7.4	
Primary occupation			
Farming	79	48.8	
Trading	47	29	
Civil service	12	7.4	
Artisan	16	9.9	
Hunting	1	0.6	
Transport worker	5	3.1	
Traditional healer	2	1.2	
Secondary occupation			
Farming	103	63.6	
Trading	49	30.2	
Artisan	4	2.5	
Hunting	2	1.2	
Transport service	1	0.6	
Food seller	1	0.6	
Traditional healer	2	1.2	
Membership of an association			
Member	143	88.3	
Not a member	19	11.7	

Source: Field survey, 2023.

Table 2: Distribution of respondents by sources of domestic water available for household use

Source of information on tractor hiring	*Frequency	Percentage
Well	159	98.1
Rain water	162	100
boreholes	21	13.0
River/stream	109	67.3
Spring	76	46.9
Hand pumps	94	58.0
Ponds	49	30.2
Water vendors	87	53.7

Source: Field survey, 2023

*Multiple responses.

Table 3: Distribution of respondents by various water-dependent livelihood activities carried out by each household in the study area.

Water-dependent livelihoods	*Frequency	Percentage
Irrigated vegetable farming	130	80.2
Irrigated Kitchen-garden use	111	68.5
Nursery practice	94	58.0
Intensive pig farming	68	42.0
Fishery	40	24.7
Watering of small ruminants	119	73.5
Cassava processing to Garri	91	56.2
Yam and Cassava processing to flour (Elubo)	122	75.3
Cassava processing to fufu	52	32.1
Maize processing to Ogi (pap)	155	95.7
Palm oil production	40	24.7
Locust beans processing	13	8.0
Soya beans processing to Wara/Beske	41	25.3
Drinking and cooking	162	100
Bathing	162	100
Washing	162	100
Sanitation	162	100
House construction	145	89.5
Pen construction for animal	117	72.2
Livelihood centers construction (processing facilities)	100	61.7

Source: Field survey, 2023

*Multiple responses.

Table 4: Distribution of respondents by Physical factors responsible for water access in the study area.

Factors	Major factor f(%)	Minor factor f(%)	Not a factor f(%)	Score	WMS	Rank
Seasonality of Water Sources	111(68.5)	47(29.0)	4(2.5)	269	1.7	1 st
Non-protection of Water Sources (Stream/Spring)	115(71)	35(21.6)	12(7.4)	265	1.6	2 nd
Availability status of Water Infrastructure	100(61.7)	56(34.6)	6(3.7)	256	1.6	2 nd
Distance to water source	95(58.6)	66(40.7)	1(0.6)	256	1.6	2 nd
Quality of water from the available sources	79(48.8)	77(45.1)	10(6.2)	235	1.4	5 th
Number of available water sources	68(42.0)	87(53.7)	7(4.3)	223	1.3	6 th
Water availability and quick dryness of water sources	53(32.7)	105(64.8)	4(2.5)	211	1.3	6 th
Household size	48(29.6)	112(69.1)	2(1.2)	208	1.3	6 th
Insufficient rainfall	53(32.7)	97(59.9)	12(7.4)	203	1.3	6 th
Water facility maintenance frequency	49(30.2)	103(63.6)	10(6.2)	201	1.2	10 th

Long waiting queues in the water collection sources	44(27.2)	111(68.5)	7(4.3)	199	1.2	10 th
Geographical location of water sources	44(27.2)	109(67.3)	9(5.6)	197	1.2	10 th
Communal Population size and growth	33(20.4)	123(75.9)	6(3.7)	189	1.2	10 th
Social unrest/conflicts	20(12.3)	128(79.0)	14(8.6)	168	1.0	14 th
Household demography	26(16.0)	107(66.0)	29(17.6)	159	1.0	14 th
Aging Water Infrastructure	19(11.7)	86(53.1)	57(35.2)	124	0.8	16 th

Source: Field survey, 2023

WMS: Weighted Mean Score.

Table 5: Distribution of respondents by Perceived effects of domestic water access on rural households' livelihood

Perception statements	Strongly agree f(%)	Agree f(%)	Undecided f(%)	Disagree f(%)	Strongly disagree f(%)	Score	WMS	Rank	Grand Mean	Rank
Irrigation										
(+) Adequate water access increases vegetable production and productivity.	112(69.1)	50(30.9)	0(0.0)	0(0.0)	0(0.0)	760	4.7	1 st		
(+) Water availability determine the kind of crops cultivated and farming system practiced in my area	73(45.1)	86(53.1)	3(1.9)	0(0.0)	0(0.0)	718	4.4	2 nd		
(+) Water availability ensures food security in my area as a result of kitchen garden irrigation	54(33.3)	102(63.0)	6(3.7)	0(0.0)	0(0.0)	696	4.3	3 rd	3.2	2 nd
(-) Poor water access limits optimal nursery practice in my community	29(17.9)	116(71.6)	10(6.2)	5(3.1)	2(1.2)	321	2.0	4 th		
(-) Unstable water supply to my vegetable plot fosters income rate fluctuation.	53(32.7)	84(51.9)	10(6.2)	10(6.2)	5(3.1)	316	2.0	4 th		
(-) Inadequate water access limit vegetable production	90(55.6)	68(42.0)	4(2.5)	0(0.0)	0(0.0)	238	1.5	6 th		
Livestock Farming										
(+) Improved water access and quality enhances farm animals health	79(48.8)	79(48.8)	3(1.9)	0(0.0)	1(0.6)	721	4.5	1 st		
(+) Adequate	53(32.7)	101(62.0)	6(3.7)	2(1.2)	0(0.0)	691	4.3	2 nd		

water access fosters easy handling of farm animal		3)								
(+) Adequate water supply improves the rate of sanitation and hygiene of the livelihood centers(livestock farm)	57(35.2)	92(56.8)	2(1.2)	2(1.2)	9(5.6)	672	4.2	3 rd		
(-) Long distance to water source affects the general turnout rate of the livelihood (livestock farming)	57(35.2)	67(41.4)	20(12.3)	18(11.1)	0(0.0)	323	2.0	4 th	3.0	4 th
(-) Inadequate water supply aids disease development due to poor sanitation	86(53.1)	65(40.1)	7(4.3)	4(2.5)	0(0.0)	253	1.6	5 th		
(-) Poor water access reduces rate of livestock production	79(48.8)	78(48.1)	4(2.5)	1(0.6)	0(0.0)	251	1.6	5 th		
Crop processing activities										
(+) Water availability enhances clean livelihood centers(processing facilities) in my area	51(31.5)	109(67.3)	2(1.2)	0(0.0)	0(0.0)	697	4.3	1 st		
(+) Adequate water access in my area ensures increased income level.	56(34.6)	67(41.4)	23(14.2)	15(9.3)	1(0.6)	648	4.0	2 nd		
(+) Water availability ascertains Employment rate increment in my community	18(11.1)	28(17.3)	72(44.4)	36(22.2)	8(4.9)	498	3.1	3 rd		
(-) Long waiting queue for water collection affects my livelihoods performance	26(16.0)	55(34.0)	10(6.2)	69(42.6)	2(1.2)	452	2.8	4 th	3.1	3 rd

(-) Insufficient water resources in both quality and quantity enhances Communal clash and conflicts	23(14.2)	118(72.8)	10(6.2)	1(0.6)	10(6.2)	343	2.1	5 th		
(-) Poor operation and maintenance of water facilities affects the amount of water supplied for household livelihoods (processing activities)	21(13.0)	121(74.7)	10(6.2)	3(1.9)	7(4.3)	342	2.1	5 th		
Domestic household use										
(+) Adequate safe water access enhances good health of household members in my area	111(68.5)	49(30.2)	0(0.0)	2(1.2)	0(0.0)	755	4.7	1 st		
(+) Adequate safe water access enhances improved school attendance for children in my area	85(52.5)	29(17.9)	33(20.4)	7(4.3)	8(4.9)	662	4.1	2 nd		
(-) Distance to water sources adversely affects both the amount of water collected for household use as well as my livelihood performance.	65(40.1)	77(47.5)	7(4.3)	13(8.0)	0(0.0)	292	1.8	3 rd	3.1	3 rd
(-) Unprotected water sources amplifies water borne diseases in my area	104(64.2)	44(27.2)	4(2.5)	2(1.2)	8(4.9)	252	1.6	4 th		
Construction										
(+) Adequate access to water enhances livelihoods growth through structural expansion	24(14.8)	121(74.7)	7(4.3)	8(4.9)	2(1.2)	643	4.0	1 st		
(+) Water	25(15.4)	112(69.7)	12(7.4)	11(6.8)	2(1.2)	633	3.9	2 nd		

availability fosters change in land use through construction of processing facilities and animal houses	35(21.6)	37(22.8)	16(9.9)	64(39.5)	10(6.2)	463	2.9	3 rd	3.3	1 st
(-) Long distance to water source hinders structural expansion of livelihood centers	25(15.4)	86(53.1)	45(27.8)	4(2.5)	2(1.2)	358	2.2	4 th		
(-) Inadequate water supply and poor water policies aids inequality among water facility users especially for construction in my community										

Source: Field survey, 2023.

WMS: Weighted Mean Score.

Strongly agree = 5, Agree = 4, Undecided = 3, Disagree = 2, Strongly disagree = 1

Table 6: Categorization based on Level of perceived effects from domestic water access for households' livelihood by the respondents

Level of perceived effect	Score	Frequency	Percentage
Favorable	≥ 80.2	89	54.9
Unfavorable	< 80.2	73	45.1

Source: Field survey, 2023

Grand Mean = 80.2

Standard deviation = 4.13

Table 7 Summary of correlation analysis showing relationship between some selected personal characteristics of the respondents and perceived effects of domestic water access on rural households' livelihood.

personal characteristics	Correlation coefficient(r)	p-value	Remark	Decision
Age	0.751**	0.000	S	Reject H ₀
Household size	0.639**	0.000	S	Reject H ₀
Years of education	-0.459**	0.000	S	Reject H ₀
Years of residence	0.751**	0.000	S	Reject H ₀

Source: Computed data, 2023

** Correlation is Significant at 0.01 level (2-tailed).

S= Significant

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