

Water Consumption Determinants in Rimin Kebe area, Ungogo Local Government, Kano State, Nigeria

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Abstract: The research conducted investigates the major determinants of water consumption in Rimin Kebe, Ungogo Local Government area, Kano State. The questionnaire was used in data collection from the respondent in the study area. The research was able to identify major determinant of water consumption as level of education, family size, income level and time travel to water sources. The resident of the study area has large family size with average of 32% have more than fifteen people in their houses. More than 34% trekked more than one hour from their destination to water sources. About 70% of the respondents have little or no western education in the study area. The research concluded that resident consumes less water due to the reasons, this affect their sanitation and personal hygiene drastically as such several health and environmental problems emanate in the study area.

Keywords: Water consumption, Determinants, Rimin Kebe, Ungogo Local Government

I. INTRODUCTION

Human survival and well-being in space and time is partly dependent on the access to and the utilization of potable water. Water is required in homes for different purposes including bathing, drinking, cooking, and laundry and cleaning among others. Thus, the United Nations had recommended that an adult man should have access to an average of 115 litres per day (United Nation, 2009).

Water is an essential environmental resource; its most important role lies in human sustenance. Human being utilizes water directly for many purpose; municipal water supply, sanitation, irrigation, transportation, industrial water supply, energy generation (hydroelectric) and recreation (Whittington, 2009). Water plays a necessary and irreplaceable role in many ecosystem services, such as habitat creation, nutrient cycling, the hydrological cycle and climate regulation (Arbues, 2003). Water has many unique characteristics that makes it difficult to trade on regular markets; Exclusive property right cannot be assigned because of its physical attribute its highly fluid nature and role in the hydrological cycle. Secondly, water can be utilized as a non-rival good, where one's use does not preclude another use of that resource. Thirdly, due to the large amount of interdependency with uses of water such as hydroelectricity generation impacting recreation, externalities can be associated with (Whittington, 2009).

When externalities exist, the full cost of an activity may not be visible or considered by the producer or consumer. Lastly, economies of the scale in the supply of water lead to imperfect competition, where limited competition and monopoly supplier can significantly influence the pricing of good (Arbues, 2003). As a result, many disclaimers suggest that water is a social good and should be affordable to the poor (Whittington, 2009). Water economies are understood to deal with how best to meet all human wants making the right choice about the most sustained uses of water in broad social context, therefore, considering water as an economic good is about making integrated choices not about determining the right price of water (Hikma, 2012).

The determinants of water demand and consumption are very complicated. Unlike many other economic goods, living things need some minimum amount of water for their survival regardless of its scarcity (Whittington, 2006). According to Arouna and Dabbert (2009), water consumption patterns are very complex processes as they are affected by many factors which may include seasonal variability and water availability. In buttressing this view, Fan et al., (2013) and Zhang, Dong, Liu and Qiao (2016) observed that a clear understanding of water consumption patterns and the factors that influence water consumption is explicative or central to the effective management of water supply and effective design of water-related public policies. The findings of several scholars on domestic water utilization have, however, established these views because different factors determine domestic water utilization in space and time (Zhang, Dong, Liu and Qiao, 2016). For instance, Keshavarzi et al., (2006) found that water consumption significantly correlated with household size and age of household head. Similarly, Ogunbode and Ifabiye (2014) noted that water use for bathing and dish washing, age range of water suppliers, quantity of water supplied, and household size influence the utilisation of water in Kano, Nigeria. Some people in developing countries are sourcing water from rivers and nearby by stream which is most of the cases are contaminated due to industrial and domestic discharges as in the case of river Kaduna, Nigeria (Hamza, et al, 2017)

The inconsistency in government policies and political instability is the major setback in water supply in Kano

metropolitan. In the sense that when a government promulgate a policy, when another government comes in its will disregard such policies and bring a new policy of its own in regard resources this is seriously dragging the water supply agency backward in achieving its goal (Nura, et al, 2014).

According to Douglas (2008), there are so many factors that influence household demand for water; some factors are within the control of the water utilities like prices, water restrictions, rebate programs etc. while weather and demographic characteristics are not. There are several factors that affect the demand and consumption for residential water of the households. Some of these factors are income of the households, price of water, household size, level of education, age and sex composition of the family members and weather variables like temperature and precipitation (Arbues, 2003).

Household and daily per capita consumption of water is affected by various factors, the effects of which vary widely from place and from community. Many writers have tried to identify the factors influencing the amount of household and daily per capital water consumption, although, the most frequent variables in all studies are house hold size, income, education, expenditure of a household, age and sex of the respondents and distance of water source (Arbues, 2003). Analysis and evaluation of these factors will help to identify factors, which either positively or negatively associates with the rate of per capita household water consumption. A study carried out by Teschome (2007), revealed that there is a positive relationship between monthly income and per capital daily water consumption. This result confirms with economic theory which states that an individual demand for a certain commodity depends on his/her income and quantity demanded are positively related, except in the case of inferior goods. The result of the survey shows that higher income groups have higher per capital daily water consumption than lower income group. According to Dessalegn (2012), monthly expenditure of a household was found to have a positive relation with the per capita daily water consumption of household because family members of better household are more likely to have frequent bath, showering, frequent washing of cloth and more water for cooking as compared with worse off households, taking into consideration the households life style and sanitation preference of better- off household. Douglas et al., (2008) in their study of residential water demand management found that residential water demand is a function of several factors, some are within the control of the water utilities like prices, water restrictions, rebate programs etc. while others like weather and demographic characteristics are not. Their findings indicate that pricing and other outdoor water restrictions policies interact with each other to ensure that total water savings is a collection of both policies. This study also shows that pricing and restriction policies varies among different classes of customers (low, middle and high-volume users), and between pre-drought and drought periods. A study done by Mesert (2010) in Simde district in Ethiopia suggest that the per capita water use is negative and significantly

determined by the distance of water source from the households (i.e. keeping other factors constant), as the distance of water source from a household increases, the per capita water use significantly decreases. This implies that water facilities should be accessible to all segments of the population to better satisfy daily water requirement of residents. It also shows that convenience of location of water source is a significant determinant of water use at household level. This means that households located nearer to water source are likely to use water more than those located farther away. As indicated by Teshome (2007), the educational level of a house head is positively related with the per capita daily water consumption. Households with less educated head consume less water than a household whose head is more educated. This is because the higher the educational level of the head of the family, the higher the awareness about the benefits that could be gained from water. Arbues (2003) found that water use is less than proportionate to the increase in household size or population because of economies of scale in discretionary and nondiscretionary water usage, including cooking, cleaning, car washing and gardening as there is an optimum household size beyond which these economies of scale diminishes. Families with children could be expected to use more water as children require frequent sanitations. Outdoor uses by children and teenagers might be higher, youngsters might use water less carefully, have more showers and demand more frequent laundering, while retired people might have saving and disciplined water use behaviours. But, Lyman (1992) found that retired people tend to spend more time at home and do more gardening, which is associated with more water use. However, water demand in most cases is perceived as inelastic in its nature as water has no perfect substitutes for its basic uses. In addition, consumers do exhibit a low level of perception of the rate structure since water bills typically represent a small proportion of income. A study conducted by Scott and Dodley (1998), simulate the potential of water markets using dynamic optimization to derive short run demand functions for reservoir water, and marginal opportunity cost for a variety of decisions to derive optimal short run allocations. Their result shows that demand for water is responsive to price changes. The research conducted in the on water supply challenges in Rimin Kebe area shows that there is an acute shortage of water in the entire study area, almost throughout the year with exception of rainy/wet season where rains fall in less than five month. This clearly, indicate the persistent water shortage can only be solved when the all stakeholders on water supply (government, philanthropist, community leaders and residents) put hand on deck to salvage the area (Abdulkadir, et al, 2019). There are serious of water crisis in the developing countries particularly in African countries, that is why resident devices a coping strategy to do away with period of acute shortages of water like water harvesting, storage of water in big containers and minimized water consumption (Nura, et al, 2018)

The aim of the research is to examine water consumption determinant in Rimin Kebe area of Ungoga local government,

Kano state. It can be achieved through the following objectives

1. Examine the level of income generated by resident in the study area
2. Examine the family size of the respondents
3. Investigate the educational status of the respondent
4. Examine the proximity to the source of water

II. METHODS

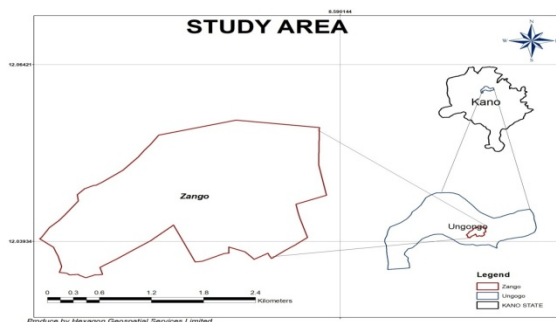
Sample Size and Sampling Procedure

The stratified random sampling technique employed in selecting 200 respondents within eight neighbourhoods in the study area. The study involved 200 respondents consisting of 130 males and 70 females) spread over eight neighbourhoods includes: Bulbula estates, Layin Ali Babur estate, Dorawa estate, Layin ‘yan committee estate, Layin Tsamiyar Tazarce estate, Galula estate, Karshen Kwalta estate, and Fakko estate in Rimin Kebe area of Ungogo Local Government. Household heads were selected because they are in the better position to give more adequate information on how they perceived the inadequate water supply nature in their neighbourhoods in general.

The instrument used in this study for obtaining data from local residents was through field observation and a questionnaire titled “Questionnaire on the public perception on the inadequate water supply in Rimin Kebe Area of Ungogo Local Government Area. It consists of three sections with section A covering issues on personal background information of respondents such as age, sex, occupation, marital status, educational background and family size. Section B covers issues bordering on the nature of problems affecting the distribution of public water supply in Rimin Kebe while section C dwells on the public perception on the problems affecting the distribution of public water supply in the study area. Before administration on respondents, the instrument was tested, for reliability.

A total of 200 households was selected for administration of questionnaire across eight neighbourhoods in Zango, Rimin Kebe Area of Ungogo Local Government chosen from stratified random sampling. Data was analysed using descriptive statistic, and the results were presented in the form of table, charts and figures.

Fig 1. Map of the Study Area



III. RESULTS AND DISCUSSION

Table 1: Monthly income of the respondents

MONTHLY INCOME	Frequency	Percent (%)
<50,000	119	59.50
51,000-100,000	58	29.0
101,000-150,000	18	9.0
151,000->	05	2.50
Total	200	100.0

Sources: 2017

From the above table 1, it shows that majority of the respondents earn less than 50,000 on monthly basis, about 59% this clearly indicate lower incomes resident are the dominant, follows by those earn 51-100 monthly which is about 29%. It is only about 11% earn more than 100, 000. Therefore, the research shows that majority consumes less water since they don’t have enough to buy water from vendors and they cannot afford to construct boreholes, which clearly indicate income level determine personnel hygiene and environmental sanitation. Very few among resident afford to buy sufficient water for their domestic chores.

Table 2. Households Size in the study area

HOUSEHOLDS SIZES	Frequency	Percent
1-5	54	27.0
6-10	48	24.0
11- 15	34	17.0
15- above	64	32.0
Total	200	100.0

Source, 2017

Household’s size is another major determinant factor of water consumption. Table 2 shows that about 32% of the respondents are having family of more than fifteen and about 41% composed family of 6-15. The families with 1-5 are only 27%. It can deduce that the study area has large family size as such they can consumes more water for their domestic’s chores and sanitation even though they have low income, they can source water from neighbours and nearly public water utility.

Table 3. Educational Status of the respondents

EDUCATIONAL STATUS	Frequency	Percent
Islamiyya	80	40.0
Primary	24	12.0
Secondary	36	18.0
Tertiary	60	30.0
Total	200	100.0

Source, 2017

Table 3, shows the level of education among the respondents in the study area. About 40% of the respondents do not attend any kind of formal education, and only 30% have tertiary education, which is the determinant of sanitation and personal hygiene. Primary and secondary education covers only 30%. The research shows that the level of western education is not appreciable. Therefore, the level of personal and environmental hygiene is low as such the water consumption is less in the study.

Table 4. TIME TRAVEL TO THE WATER SOURCES

TIME TRAVEL	Frequency	Percent
30 minutes	72	36.0
30-1 hrs	68	34.0
1 hour & above	60	34.0
Total	200	100.0

Source: 2017

The table 4 above vividly shows that about 36% of the respondents travel for at least 30 minutes, 30% trekked for 30-1 hours, while about 34% covered more than one hour to the source of water. The distance and time travel determine water consumption, as such majority trekked longer distance to the water sources as such residents minimised their water usages due to fatigue and difficulties involved in accessing water.

IV. CONCLUSION

Several factors determine the level of water consumption in every given society. From the findings of the research, it is concluded that distance is one of the major determinants for water consumption with high consumption of water from those living near the source of water. Other determinants include income earning, size of the households, education level among the others. This clearly show serious water shortages in the area, because of the failure of public water utility to meet the water demand of the populace in Kano state as identified by (Bello and Tuna, 2014). These problems of could be solve through public campaign and benightment as well as provision piped borne water and incorporating water vendors in water services delivery in the area.

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