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Population Growth and Water Distribution for Sustainable Development in Birnin Kebbi Metropolis, Nigeria

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ABSTRACT
Water supply is the provision of water from different sources, such as public utilities, commercial organizations and community vendors usually via a system of pumps and pipes. Water is essential to life everywhere. Despite the necessity of water, the natural systems that allow water to be cleaned, maintained, and distributed are fragile and sensitive to changes. These natural systems are disrupted due to human activity and overuse. As the global population continues to grow the need for clean water increases. From a macro perspective, the paper looks at the nature and extent of population growth and water supply in Kebbi State, with a focus on Birnin Kebbi. At the micro level, an analysis of the water supply chain in Birnin Kebbi urban area, focusing on distribution, sources, quantity and quality received by the inhabitants. A descriptive method was employed in the analysis of data obtained from both primary and secondary sources. A total of 61 questionnaires were designed and administered to the sample respondents selected using Yamane's formula. The study participants include both male and female age 15-55 years. Tables, charts, frequencies and simple percentages were used to show the findings. The result indicates various sources and level of water supply in the study area. This includes sources of water, frequency of supply, and water needs of the people. The findings revealed that majority (72.1%) of the respondents obtained water from the tap, while only 8.2% procured water from community water vendors. In terms of water need and adequacy, the study discovered more half (50.8%) of the survey participants had sufficient water and 49.2% have not. The study therefore, concludes that there is adequate and uneven distribution of water within the study area, irrespective of the sources and availability of it. However, in other to ensure sustainable development, the study recommends that the government should take the advantage of the abundant sunlight resources of the area, to provide modern solar-powered boreholes to the underserved communities, this will carter for the increasing urbanization being experienced in the area.

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INTRODUCTION

Access to clean water is a basic human right crucial for health and well-being. Adequate water supply is a major requirement of any population for sustainable growth and development (Afolabi *et. al.* 2012). Yet, for many communities, this necessity remains out of reach. The impact of climate crisis and population growth alongside lack of progress towards Sustainable Development Goal 6: 'water and sanitation for all' shows global community have a long way to go to learn the true value of the world's most invaluable resources (Dixon, 2021). A staggering *2 billion* people worldwide, lack access to safe drinking water, with a significant portion living in rural areas. In many parts of the world, particularly underdeveloped nations, urban centers are rapidly expanding without a commensurate increase in water supply infrastructure. African continent is already a home to 319 million people without access to safe drinking water figure that continues to rise as cities grow and rural-urban migration amplifies (WaterAid, 2021). In order to meet water supply and sanitation provisions of the reviewed 1977 United Nations declaration that, "all people irrespective of their development, economic and social condition are entitled to have access to drinking water in good quality and quantities" (WHO, 2007). In line with this, the Federal Government of Nigeria directed and encouraged the establishment of State Water Supply Agency and State Rural Water Supply and Sanitation Agency in each state. Although, great strides have been made in meeting the challenges in terms of water supply provisions and services, the safety of many water supplies remains unknown and uncertain. Globally, hundreds of millions of people lack access to this basic need, and more than 2 billion people rely on water sources that are contaminated with human waste; the natural systems that provide us with drinking water, such as aquifers, are being depleted and threatened by pollution. Thus, it is estimated that in the next 10 years, half of the global population will rely on stressed sources of drinking water (Rios, 2019).

In Nigeria, State Governments are largely responsible for managing water supplies, while national and some international organizations also compliments the governments at all levels. Modern water supply infrastructures are built to pump, store, treat, divert, transport, and deliver adequate, safe and reliable drinking water to populations (Uttah *et. al.,* 2024). However, both the boreholes and pipe borne water supply facilities can deliver contaminated water, if adequate quality provisions are not effectively put in place. Destruction of water supply and/or sewage disposal infrastructures after major catastrophes (floods, crises, etc.) poses the immediate threat of severe epidemics of waterborne diseases, and several of which can be life-threatening.

According to the millennium development goal (MDGs) report 2012, 783 million people, or 11% of the global population, remain without access to an improved source of drinking water. Such sources include household connections, public standpipes, boreholes, protected dug wells, protected springs and rainwater collections. The world has met the MDGs drinking water target five years ahead of schedule but work is not yet completely done. The international drinking water supply and sustainable decade (1981-1990), all focused on this vital resource. The decade, in particular helped some 1.3 billion people in developing countries gain access to safe drinking water. In the general assembly of the human right to water and sanitation, the assembly established the right of every human being to have access to sufficient water for personal and domestic uses (between 50 and 100 liters of water per person per day), which must be safe acceptable and affordable (water cost should not exceed 3% of household income), and physically accessible (the water source should be within 100 meters' home and collection time should not exceed 30minutes). Water is life: adequate supply of water is central to life and civilization (Daniel, 1996).

The five basic human needs namely air, water, food, light, and heat (Human Development Report 2006). Water is common factor to other four. It is therefore not an understatement to say water is life, because it forms an appreciable proportion of all living things including man. In fact, water is very critical to human life. Water constitutes about 80% of animal cells. The human body by weight consists of about 70% water and several body functions depends on water (Human Development Report 2006). Thus, drinking quality water ensures the safety of the people, environment, subsequent water supplies and the protection of public health. The establishment of Nigerian standard for drinking water quality (NSDWQ) ensure the protection of the consumers. It is expected that the NSDWQ will speed up the process of upgrading non-protected water systems and improving the management of all drinking water systems in the country.

The importance of Nigerian standard for drinking water quality contains mandatory limits concerning constituents and contaminants of water that are known to be hazardous to health and or give rise to complaints from consumers. The standards include a set of procedures and good practices required to meet the mandatory limits (Larry, 2000). In 2005, the National Council on Water Resources (NCWR) recognized the need to urgently establish acceptable Nigerian standard for drinking water quality because it was observed that the "Nigerian industrial standards for portable water" developed by standards organization of Nigeria (SON) and the "national guidelines and standard for water quality in Nigeria" developed by Federal Ministry of Environment did not receive a wide acceptance by all stakeholders in the country.

According to the popular Nigerian musician Fela Kuti who, in his song ŵater no get enemy ĩreiterated that all human

activities cling on water and that man will go to any length to search for water in times of scarcity which has proven the slogan ‟water is life ‟right (SON, 2007). The third world countries Nigeria inclusive, the problem of portable water supply has poised a lot of challenges with task of collecting water falling largely on women and children and their journey to collect water is long, tiring and often dangerous. It prevents millions of mothers from working and lifting their families out of poverty. It keeps millions of children out of school and from playing, depriving them of wellbeing and education necessary to become healthy adults. Where there are clean water sources, inadequate sanitation threatens and spreads disease such as diarrhea and cholera. People are forced to walk for water because government fails to priorities water sanitation for all (WHO, 2007). Therefore, this study intends to examine population growth and water infrastructure in Birnin Kebbi, with the view to examine the process of water treatment, ways of water distributing and challenges facing the water treatment and distribution in Birnin Kebbi.

Objectives of the study

This study aimed to examine the effect of rapid population growth on the current water supply system in Birnin Kebbi metropolis. Specifically, the study seeks to:

Analyze the effectiveness of the current water supply system in Birnin Kebbi Metropolis to meet the growing population.

Concept of Water as Urban Infrastructure

Water has been defined as transparent, tasteless, odorless, and nearly colorless chemical substance that is the main constituent of Earth's streams, lakes, and oceans, and the fluids of most living organisms (Gleick, 1993). He further said that its chemical formula is H_2O, meaning that each of its molecules contains one oxygen and two hydrogen atoms that are connected by covalent bonds. Strictly speaking, water refers to the liquid state of a substance that prevails at standard ambient temperature and pressure; but it often refers also to its solid state (ice) or its gaseous state (steam or water vapor). It also occurs in nature as snow, glaciers, ice packs and icebergs, clouds, fog, dew, aquifers, and atmospheric humidity. He further said that Water covers 71% of the Earth's surface. It is vital for all known forms of life. On Earth, 96.5% of the planet's crust water is found in seas and oceans, 1.7% in groundwater, 1.7% in glaciers and the ice caps of Antarctica and Greenland, a small fraction in other large water bodies, and 0.001% in the air as vapor, clouds (formed of ice and liquid water suspended in air), and precipitation. Only 2.5% of this water is fresh water, and 98.8% of that water is in ice (excepting ice in clouds) and groundwater. Less than 0.3% of all freshwater is in rivers, lakes, and the atmosphere, and an even smaller amount of the Earth's freshwater (0.003%) is contained within biological bodies and manufactured products. A greater quantity of water is found in the earth's interior.

Water on Earth moves continually through the water cycle of evaporation and transpiration (evapotranspiration), condensation, precipitation, and runoff, usually reaching the sea, evaporation and transpiration contribute to the precipitation over land. Large amounts of water are also chemically combined or adsorbed in hydrated minerals (Gleick 1993). He further asserted that safe drinking water is essential to humans and other life forms even though it provides no calories or organic nutrients. Access to safe drinking water has improved over the last decades in almost every part of the world, but approximately *one billion* people still lack access to safe water and over *2.5 billion* lack access to adequate sanitation. However, some observers have estimated that by 2025 more than half of the world population will be facing water-based vulnerability. A report, issued in November 2009, suggests that by 2030, in some developing regions of the world, water demand will exceed supply by 50%.

According to Chartres (2010), water plays an important role in the world economy. Approximately 70% of the freshwater used by humans goes to agriculture. Fishing in salt and fresh water bodies is a major source of food for many parts of the world. Much of long-distance trade of commodities (such as oil and natural gas) and manufactured products is transported by boats through seas, rivers, lakes, and canals. Large quantities of water, ice, and steam are used for cooling and heating, in industry and homes. Water is an excellent solvent for a wide variety of chemical substances; as such it is widely used in industrial processes, and in cooking and washing. Water is also central to many sports and other forms of entertainment, such as swimming, pleasure boating, boat racing, surfing, sport fishing, and diving. He further said that, water in its natural state is a liquid; it is ever changing, when heated it becomes steam (vapor) and when cooled it becomes ice (a solid). Water covers over 70% of the Earth's surface and is vital for the existence of all forms of life, yet less than 3% of water is in its consumable form and 98% of that is either ice or underground. About 96% of the planet's water is in the salty seas and oceans. Water is important to life, industry, food, recreation, and energy. It is considered the universal solvent. There is no man-made or natural obstacle that water cannot overcome through time, erosion, pressure, or change of state (Cotruvo, 1989).

Sources and Distribution of Urban Water Supply

Globally, there are only 3% of fresh water on the earth's surface (Ludovicus *et al.* 2012). Most of it is in icecaps and glaciers (69%) and groundwater (30%), similarly lakes, rivers and swamps combined only account for a small fraction (0.3%) of the Earth's total freshwater reserves. Water resources are natural resources of water that are potentially useful. Uses of water include agricultural,

industrial, household, recreational and environmental activities. All living things require water to grow and to reproduce. They further said that 97% of the water on the earth are salt water and only three percent (3%) is fresh water; slightly over two thirds of this is frozen in glaciers and polar ice caps. The remaining unfrozen fresh water is found mainly as groundwater, with only a small fraction present above ground or in the air.

Ahmad *et. al.* (2016), reported that on a daily basis, socioeconomic life of the people depends on clean and safe water and environmental benefits it provides. In order to continue to enjoy these benefits, we must construct a sustainable water infrastructure. Both boreholes and pipe borne water supply facilities used for drinking water supplies can deliver contaminated water, if adequate quality provisions are not effectively considered. Damage of water supply and/or sewage disposal infrastructures poses the immediate threat of severe epidemics of waterborne diseases, some of which can be life-threatening. Ahmad *et. al.* (2016) wet further to add that, water supply with consideration of quality requirements is important irrespective of the source type, so that the intended benefits of improved water supplies can be achieved. In order to meet water supply and sanitation provisions of the reviewed 1977 United Nations declaration that, "all people irrespective of their development, economic and social condition are entitled to have access to drinking water in good quality and quantities", the Federal Government of Nigeria directed and encouraged the establishment of State Water Board and also Rural Water Supply and Sanitation Agency (RUWASSA) in each State. A crucial body that provides and regulates access to safe water and sanitation for rural communities across different state. This agency (RUWASSA), collaborates with organizations like UNICEF and WaterAid to implement projects, respond to emergencies, and improve hygiene in rural areas.

Although, great stride has been made in meeting the challenges in terms of water supply provision services, the safety of many water supplies remains unknown and uncertain. Drinking water supplies is required to meet guidelines for microbial and chemical contamination. States in Nigeria are largely responsible for managing water supplies, while national and some international organizations provide recommendations and guidelines. An institution such as the National Water Resources Institute, Kaduna performs applied research, in all aspects of water resources development and management, in order to adequately advise government on policy formulation (Ahmad, *et. al.,* 2016). They further said that, Water-supply infrastructure consists of what is built to pump, divert, transport, store, treat, and deliver safe drinking water. Both the boreholes and pipe borne water supply facilities can deliver contaminated water, if adequate quality provisions are not effectively considered. Destruction of water supply and/or sewage disposal infrastructures after major catastrophes (floods, crises, etc.) poses the immediate threat of severe epidemics of waterborne diseases, and several of which can be life-threatening to the inhabitants.

METHODOLOGY

Two sources of data were employed in this study which includes the primary and secondary sources. In terms of 'primary data' questionnaire was use, interviewing some of the respondent as well as the general observation when visiting the study area. The secondary source, were data from journals, text books, as well as the documents obtained at the water boards. The questionnaire was designed to collect information from the respondents which involved male and female age 15-55 years, in addition, to physical observation. A total of 268,620 houses were included in the study and a sample size of 61 respondents was arrived at using Yamane's formula. Since there was no actual population figure for the study area at the time of this study, however, the 2006 census figures were sought for from the National Population Commission office in Birnin Kebbi and was used. The data obtained from the field were analyzed using SPSS version 23. The processed data are presented using descriptive statistics such as tables, frequency, among others.

The Study Area

Birnin Kebbi is the capital of Kebbi State located in the north-western part of Nigeria. It lies between latitudes 12º 151 N to 12º 351 N; and Longitudes 4º 011 E to 4º 381 E. It is bounded to the north east by Argungu LGA, to the south by Kalgo LGA, to the east by Gwandu LGA, to the west by Arewa, Dandi LGA. (Figure 1). Relief in the state is generally gently rolling to undulating. Further northwest of the study area, there are however, outcrops and steep cliffs of limestone, reaching 15m in height in the town and up to 30m just outside. In general, elevations throughout the state are mostly less than 300m (Birnin Kebbi Master Plan1980-2000). The landscape of Birnin Kebbi is dominated by extensive flood plains. The Rima and the Shella rivers are located in the north and south east of the town respectively. Both rivers have broad flood plains. The Rima river system has major tributaries like Gawon, Zamfara and Gubinka. These tributaries rise in the Basement Complex region of Sokoto State and flow westward to join the Rima (Birnin Kebbi Master Plan1980-2000).

Population and Ethnic Groups

Population growth trends in the study area are typical characteristics of developing nations. For instance, it has increased from 47,682 in 1984 to 63,147 in 1991 to 74,027 in 1996, and 268,620 in 2006 (NPC, 2009). The major ethnic groups are Hausa, Fulanis, Kabawas, Dakarkaris,

Zabarmawas, which largely inhabit the Birnin Kebbi urban area. However, the diversity of the ethnic composition within the metropolis has greatly multiplied, especially with the present status as a state capital. Such ethnic diversities in the capital include the Dakarkaris, Kambaris, Gungawas, Dandawas, and more recently Yorubas, Igbos, Nupes, Urhobos, among others.

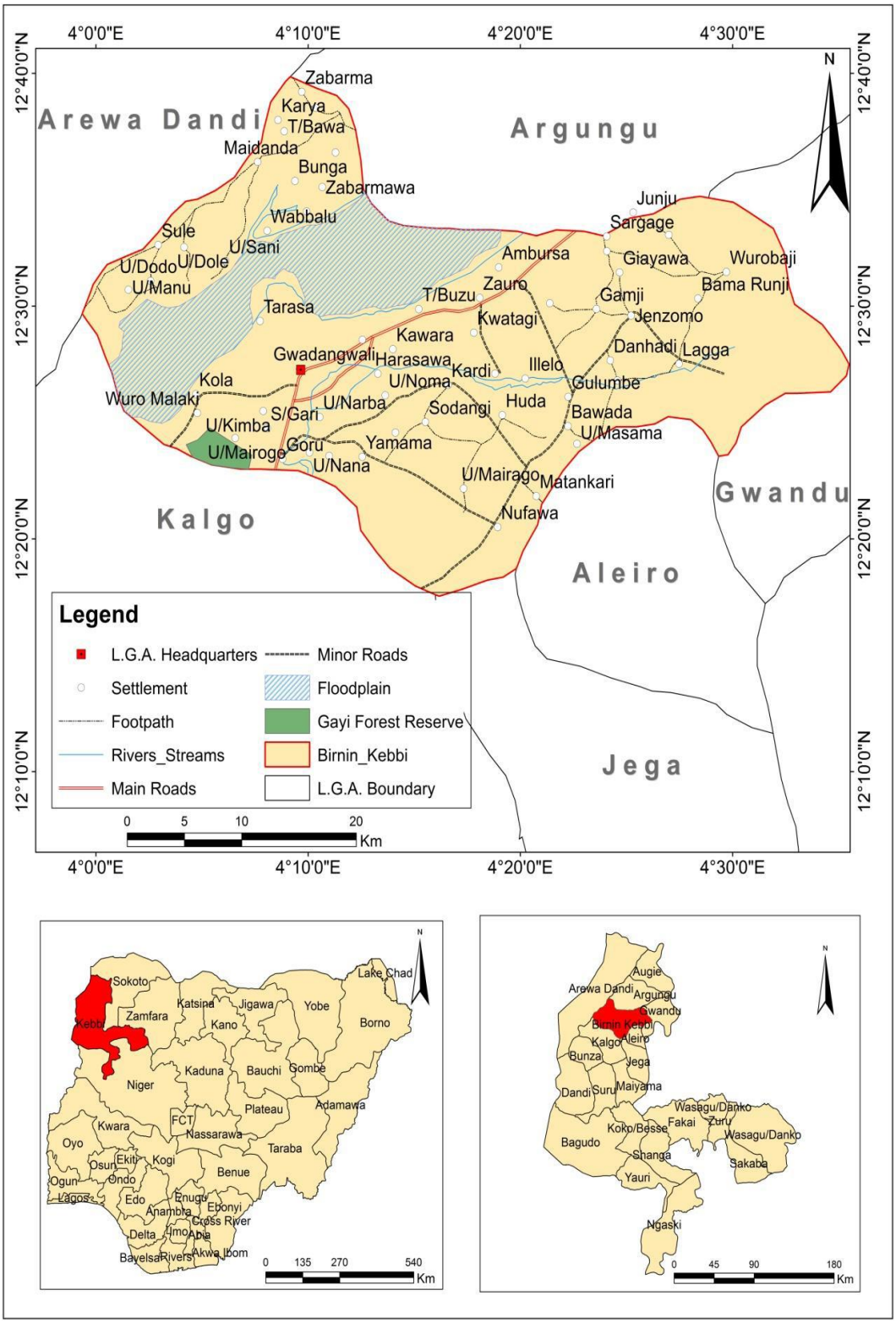

Figure 1: The Study Area
Source: GIS-LAB Sokoto State University, Sokoto

LITERATURE REVIEW

Globally, over 87 million people mostly from developing countries of Africa rely on unimproved sources of water supply (Domingue Torres, 2012 in Cobbinah *et. al.,* 2016). As a consequence, urban water supply has become an important factor in socioeconomic development and public health in Africa and other developing countries (Fuest Haffner, 2007; Stoler et al., 2012; UNICEF and WHO, 2012 in Cobbinah *et. al.,* 2016).

Human population is a vital component of development. Its growth and demand on available resources generate tangible concern to the global community (Uttah, 2018). As the global population approaches 9 billion, the demand for water for domestic, agricultural, and industrial purposes has surged. According to the United Nations World Water Development Report (2023), water demand has grown at approximately 1% per year due to population growth and economic development. This increase in demand places significant stress on existing water resources, particularly in urban areas. A study by Gleick, Cooley, and Wolff (2020), emphasized that urban centers in developing countries face acute water shortages as populations expand beyond the capacity of infrastructure. In Dhaka, Bangladesh, population growth has led to excessive extraction of groundwater, causing a drop in the water table by over 3 meters annually. Population growth has exacerbated water scarcity in many regions. A study by Mekonnen and Hoekstra (2016), revealed that 4 billion people experience severe water scarcity for at least one month per year. This issue is most pronounced in arid and semi-arid regions, where population growth outpaces the replenishment rate of water resources.

Modern water supply systems are designed to deliver adequate, safe, and reliable water to populations. However, with rapid population growth, many systems struggle to maintain efficiency. According to the International Water Association (2022), non-revenue water lost through leaks, theft, or meter inaccuracies accounts for an average of 35% of the total water supply in developing countries, significantly reducing efficiency.

In Sub-Saharan Africa, rapid population increase has strained water supply systems, reducing access to clean water. For example, Nyenje *et. al.* (2021), reported that over 60% of urban residents in Kampala, Uganda, rely on unsafe water sources due to insufficient public water infrastructure.

Several studies have examined the relationship between population expansion and water supply. Ibe (2019), highlighted that Nigeria's water infrastructure, much of which was constructed during the colonial era, has not been significantly upgraded to meet the needs of a rapidly growing population. This failure to modernize has led to frequent water shortages in many of the country's urban centers (Uttah *et. al.,* 2024). According to Adewumi and Uche (2020), many Nigerian cities operate with water supply systems that serve only a fraction of their populations. In addition to infrastructural inadequacies, mismanagement of water resources and fragmented governance structures are also major contributors to Nigeria's water supply crisis.

Sokhem and Sonada (2008), points out that, population size and its composition have important implications for pressures on natural resources. Increase populations require more food, which typically requires land and water. The increase of human consumption rates of natural resources is the reason behind all environmental problems that the world has witnessed since the second half of the last century (Abughleleshal and Lateh, 2013). The water management challenges in Birnin Kebbi are as a result lack of commitment by successive governments and of investment in modern water infrastructure. For instance, a study by WASH-NORM II (2019) report, reveals that only about 22% of the average population in Kebbi State has access to an improved water supply. In fact, Kebbi State has the third-highest percentage of people who have access to unimproved water supplies in Nigeria, trailing only Zamfara and Sokoto States. However, a recent Satisfaction Survey Analysis (SSA) conducted by the Kebbi State Government has shown an improvement in the status of water supply and sanitation compared to the 2019 WASH-NORM report.

The increasing population has outpaced the city's water supply infrastructure, which has not been significantly upgraded since the colonial era. This has led to frequent water shortages and a heavy reliance on alternative water sources such as private boreholes, wells, and water vendors (Uche, 2020, Uttah *et. al.,* 2024). Gleick *et al.* (2019); Eze and Onyebuchi (2020), acknowledged that rapid growing population exacerbate cities water crisis, with governance issues and a lack of investment in infrastructure further straining the water distribution system. Also, researchers such as Eze and Onyebuchi (2020), maintained that existing studies have underestimated the combined effects of population growth and poor infrastructure on water supply systems in African cities. They highlight the need for more targeted interventions that account for regional disparities in water access and consumption patterns.

The increase in world population is quickly becoming urbanized as people migrate to the cities (Uttah *et. al.,* 2022). Birnin Kebbi metropolis, being the state capital, which make it one of the major urban centers in Northwestern Nigeria, has experienced substantial population growth over the past few decades, driven by rural-urban migration, natural population increase, and economic opportunities. According to the National Population Commission (NPC, 2006), Birnin Kebbi recorded a population of 268,620 in the 2006 census, with an estimated annual growth rate of 3.96%. This growth rate has pushed the city's population above four hundred

thousand (445, 671) in 2025, causing significant urban expansion and heightened pressure on the city's infrastructure (United Nations, 2025). The rapid urbanization, spurred by Birnin Kebbi's role as a political and educational hub, has further contributed to the demographic surge, resulting in a growing demand for essential services, including water supply (Adewumi and Uche, 2020 in Uttah *et. al.,* 2024).

This literature review has identified key gaps in knowledge, particularly, in the area of population expansion and their direct impact on water infrastructure in Birnin Kebbi. While studies such as Uche, 2020, Eze and Onyebuchi, 2020, Gleick et. al. 2019, Sokhem and Sonada (2008), among others, have documented how rapid population expansion has increased demand for water, there is a need for more detailed analyses that examine how population growth is stretching the city's water supply systems beyond their capacity. This paper further examines how the soar in population has directly strained the existing water infrastructure and make the system ineffective.

RESULTS AND DISCUSSION

Major Findings

The demographic characteristics of respondents for this study include age, sex, religion, among others. Table 1 shows the age cohorts of the respondents who participated in this study. The age of the respondents revealed that majority 22(36.1%) of the respondents sampled for this study were between the ages of 26-35 years, follows by those between the age of 15-25 with 19(31.1%), those between the age of 36-45 years with 17(27.9%) and very few 3(4.9%) of the respondents sampled were between the age of 46-55 years.

Table 1: Age Distribution of the Respondents

Age	Frequency	Percentage %
15-25 years	19	31.1
26-35 years	22	36.1
36-45 years	17	27.9
46-55 years	3	4.9
Total	61	100.0

Source: Field Work, 2025

Figure 2 shows the gender of the respondents; whereby the bulk (44(72.1%) of the respondents are male while 17(27.9%) were females. This clearly shows that the study had more male respondents than their female counterpart in this study. This may be due to the nature of the environment that regulates female interaction especially, opposite gender that they are unfamiliar with.

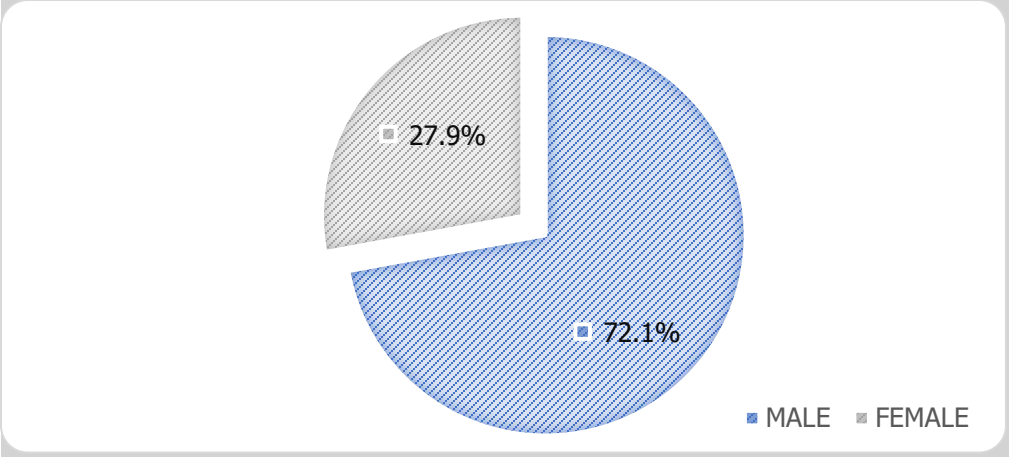

Figure 2: Gender of the Respondents
Source: Field Work, 2025

Figure 3 shows the source of water supply in Birnin Kebbi, majority of the respondents 44(72.1%) obtain their water from the tap, whereby few of the respondents 12(19.7%) get their water from bore hole and very few 5(8.2%) of the respondent get water from the water vendors.

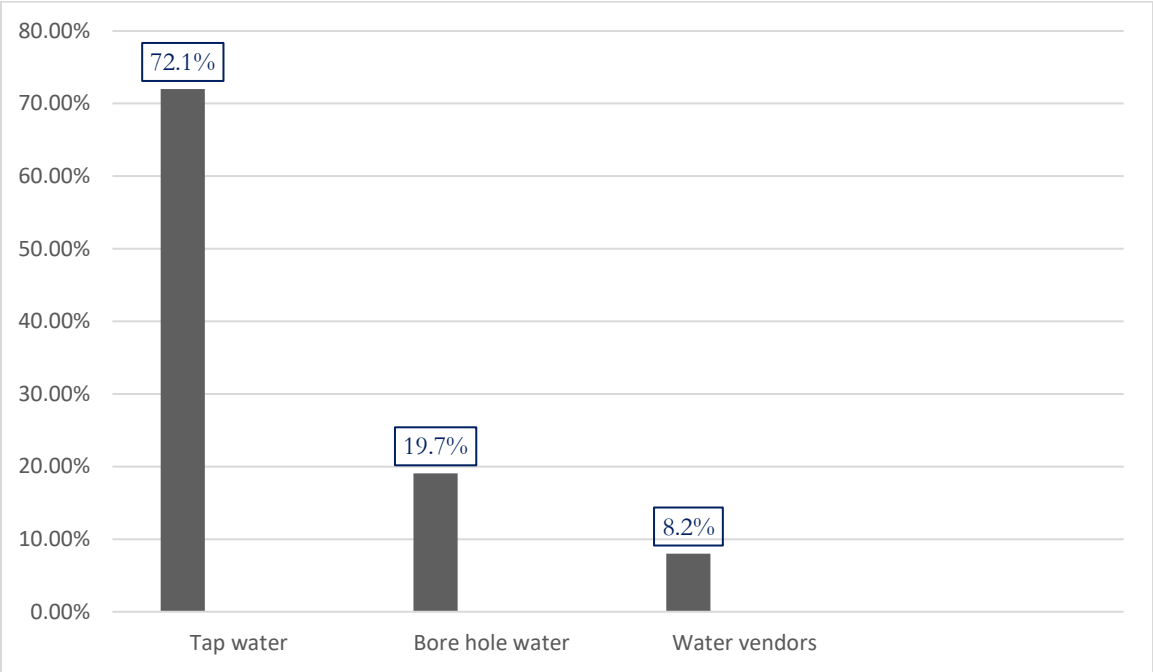

Figure 3: Source of Water Supply in Birnin Kebbi
Source: Field Work, 2025

Table 2 shows the frequency of water received in Birnin Kebbi; the result indicates that majority of the respondent 28(45.9%) received water once in a day, 17(27.9%) of the respondents received water in other way apart from the one's mentioned, few respondents 9(14.8%) received water once in two days and very few 7(11.5%) among the respondent received the water throughout the day.

Table 2: Duration of Water Received in Birnin Kebbi

Availability of Water Received	Frequency	Percentage
24hours	7	11.5
Once a day	28	45.9
Once in two days	9	14.8
Other	17	27.9
Total	61	100.0

Source: Field Work, 2025

Table 3 shows the adequacy and water need in Birnin Kebbi, in terms of adequate water supply, respondents were asked whether the water they received is sufficient or not. Majority 31(50.8%) of the respondents said the frequency is sufficient for their need, and 30 which represent 49.2% of the respondents disavowed that the quantity received is not sufficient for their need. In addition, respondents were further engaged to find out the how often they wish to be supply with water, majority 34(55.7%) of the respondents said they like to received water more than once in a day and 27(44.3%) of the respondent like to received water in other frequencies.

Table 3: Adequacy and Water Need in Birnin Kebbi

Description	Response	Frequency	Percentage
Sufficient of Water Need	Yes	31	50.8
	No	30	49.2
Water Need	More than once a day	34	55.7
	Other	27	44.3
	Total	61	100.0

Source: Field Work, 2025

Figure 4 shows those who are responsible for the provision of water in Birnin Kebbi. Majority 43(70.5%) of the respondents indicate that it is the duty of the government to provide quality and sufficient water to their houses, while few of the respondent 11(18.0%) were of the opinion that it should be community effort and some very few 7(11.5%) of the respondents are of the view it should be provided by individual households.

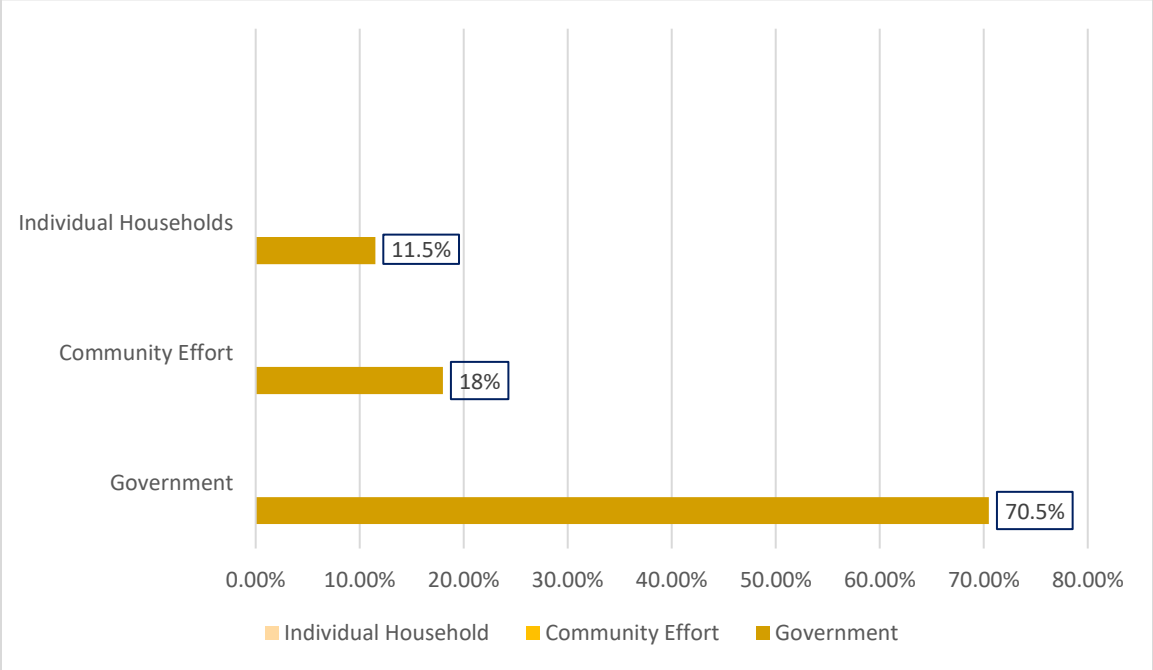

Figure 4: Water Provision Responsibility
Source: Field Work, 2025

Table 4 shows the quality and reasons that make some of the water not to be hygiene, in terms of quality supply, majority of the respondents which are 40 and represent 71.6% affirmed that the water supply is in good hygiene, while very few of the respondents 14(28.4%) claimed the water is not hygiene for usage. Furthermore, respondent that responded otherwise, were asked to state their reasons. Where bulk of the respondents 9(63.7%) were of view it is the activities of man/animals, for instance, contamination from human and animal waste, industrial discharge, agricultural runoff, among others. However, some 5(36.3%) of the respondents are of the opinion, it is as a result of inadequate treatment and distribution systems.

Table 4: Water Supplied Quality

		Respondents	Percentage
Quality of Water Supplied	Yes	40	71.6
	No	14	28.4
	Total	54	100.0
Reasons for Unhygienic	Human/Animal Activities	9	63.7
	Inadequate Treatment	5	36.3
	Total	14	100

Source: Field Work, 2025

CONCLUSION

This study aimed to examining the water infrastructure within Birnin Kebbi urban area, the research infers that, there is an adequate and uneven distribution of water within the study area, and most of the people received the water from the tap which was distributed to them by the government. Also, the water board used almost a single method in water treatment which is the use of chemical and machine, and also applied the pumping method while distributing the water. The study therefore, recommends that there should be uniform and sufficient supply of safe water to all the nooks and crannies of the study setting and State Water Board should also apply multiple modern water treatment methods.

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