

# Trend in Access to Safe Water Supply in Nigeria

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## Abstract

Access to safe water supply has remained an important issue in water resources development and management in Nigeria. Since access to safe water supply has is tied to the achievement of the Sustainable Development Goals, which Nigeria is treaty to, this paper takes a general look at availability, supply and funding of domestic water in Nigeria using data obtained from the Central Bank of Nigeria annual reports and the Nigerian National Bureau of Statistics. The paper found a decline in capital allocation for water supply, decline in access to public water supply and increased dependence on groundwater sources for domestic use in both urban and rural areas. The paper also observed high variability in urban-rural access to improved water supply. The paper concluded that there is a need to improve and increase investment/funding of water projects, especially in rural and poor urban communities to enable Nigeria to attain the Sustainable Development Goal of achieving universal and equitable access to safe and affordable drinking water for all by 2030.

**Keywords:** Water resources, Potable water, Groundwater, Urban/rural access.

## 1.0 Introduction

Water is essential to sustaining life and health (WHO, 2002). According to World Water Council (2006), the right to water is an element that cannot be dissociated from human dignity. The human right to safe drinking water and sanitation gained full political recognition in 2010 through resolutions by the Human Rights Council and the UN General Assembly. The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses (CESCR, 2002). Access to safe and sufficient water supply is a critical and necessary step towards a sustainable future. This is because progress in all dimensions of sustainable development is bound by the limits imposed by the finite and often vulnerable water resources (WWAP, 2015).

Nigeria has an estimated 267 billion cubic metres of surface water and 92 billion cubic metres of ground water per annum, with over 200 dams with a combined storage capacity of 34 billion cubic metres. However, despite the huge water potential, the country is still classified as 'water short' because of its inability to meet the challenge of supplying potable water to meet the domestic needs of the populace. Besides, the demand for potable water is set to increase with the rapid rate of population increase as well as urbanisation.

Only about 75 per cent (94 million) of the urban and 44 per cent (43 million) of the rural populations had access to improved drinking water sources, based on the population and water supply coverage of the country in the year 2008. The National Human Development Report for Nigeria (UNDP, 2009) put the percentage of Nigerians with access to improved source of drinking water at 49.1%, with over 70 million Nigerians not having access to improved domestic water supply. However, the 2013 official release from the Ministry of Water Resources put the percentage of Nigerians with access to safe drinking water at only 32 per cent, showing a drastic decrease in availability of safe drinking water. WaterAid (2017) estimated that 57 million Nigerians still lacked access to basic sanitation and clean water in 2016. According to WHO/UNICEF (2017), about 2.1 billion people worldwide gained access to improved sources of drinking water since 1990, thereby meeting the MDG target of halving the percentage of the global population without access to water in 2015. The report also showed that, Nigeria missed the MDG target, with 69 percent of Nigerians having access to improved water supply and less than 25 per cent of Nigerians using safely managed drinking water services.

The consequences of unavailability of potable water supply in rural and poor urban communities in Nigeria and other sub-Saharan countries have been quite grievous. The World Health Organization has estimated that about 361,900 people die yearly due to poor water and sanitation conditions in Nigeria. According to WaterAid (2017), 60,000 children under the age of five die from diarrhoea, a disease caused by poor sanitation and water. This study investigated safe water supply in Nigeria, by analysing trends in funding of the water sector as well as availability and disparities in water supply within the country.

## 2.0 Research Methodology

### 2.1: Study Area

Nigeria is located between latitude 4° and 14° North and longitudes 2°2'E and 14°30' East, with a landmass of about 923,770.00 sq. kilometres and a population of over 160 million. Elevation ranges from below 300 m along the coast and valley of main rivers, to over 1500m in the hinterland. Original vegetation consists of Mangrove Swamp Forest, Freshwater Swamp Forest, Rain Forest, Guinea Savanna, Sudan Savanna, Sahel Savanna and Montane Vegetation. Climate type is humid tropical, with maximum temperature between 32°C to 41°C;

minimum temperature is between 13°C and 21°C. Rainfall ranges from 2000 mm to over 4000 mm along the coastal areas, and between 400 mm to 600 mm in the extreme north-east (Sahel Savanna).

Nigeria's total renewable water resource is estimated at 286.2 km<sup>3</sup>. Annual internally produced resources amount to 221 km<sup>3</sup>, made up of 214 km<sup>3</sup> of surface water and 87 km<sup>3</sup> of groundwater. Exploitable surface water resources are estimated to be 80 per cent of the natural flow, which is about 96 km<sup>3</sup>/year. Annual extractable groundwater resources are about 59.51 km<sup>3</sup>.

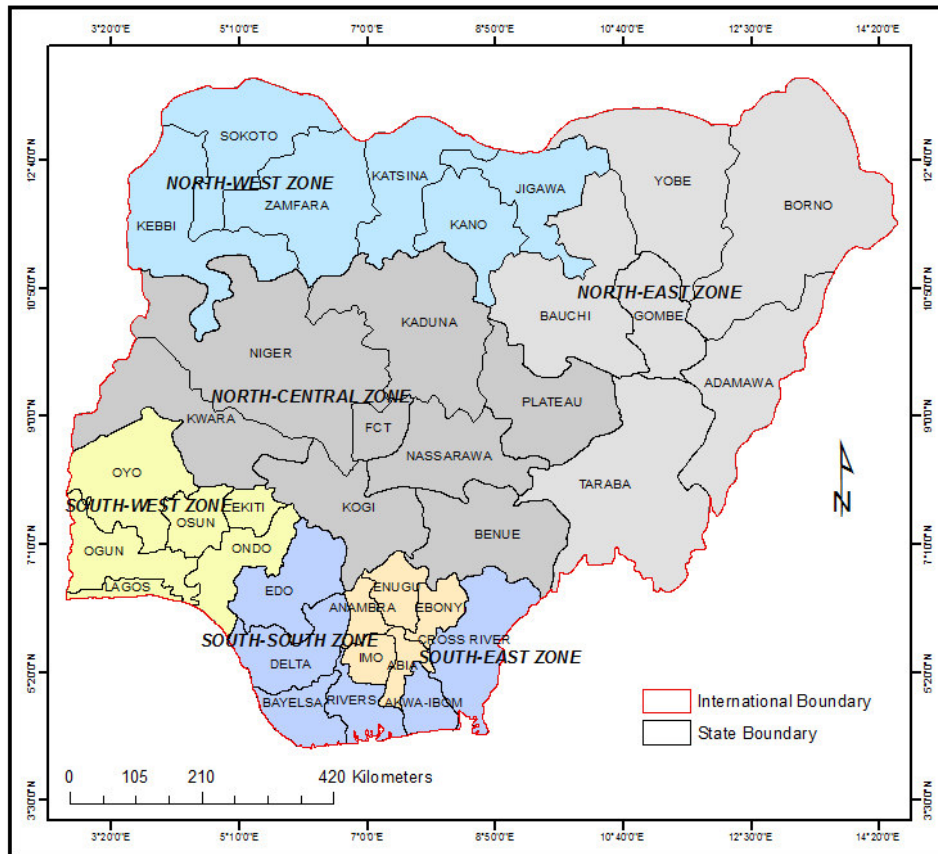


Figure 1: The Study Area.

## 2.2: Methods of Data Collection and Analysis

Data for the study were from secondary sources. Data on federal allocation to water resources was obtained from the budgets of the Federal Government from the Central Bank of Nigeria Annual Report (1977-2015) and Financial Statements for 2008. Data for household access to water supply for the thirty-six states and the Federal Capital Territory were obtained from the Household Demographic Surveys of the Nigeria Demographic and Health Survey (2008) of the National Population Commission and the Annual Abstract of Statistics between 2003 and 2012.

The budgeted capital expenditure by the Federal Government for the years 1977 to 2015 were collected and the percentage expenditure for water resources for the period was obtained. Summary statistics, including means and percentages, were used to show access to domestic water supply; while results were also shown as graphs and maps with the aid of excel and Arc GIS.

## 3.0 Results and Discussion

### 3.1: The water sector in Nigeria

Three levels of government - federal, state, and local – share the statutory responsibility for the provision of water supply and sanitation services in Nigeria. The 2000 National Water and Sanitation Policy defined clear roles for the various levels of government. The Federal Ministry of Water Resources is responsible for policy formulation, data collation, resources and demand surveys, monitoring, evaluation and the coordination of water supply development and management, research and development, national funding and technical support, and the creation of an enabling environment for meaningful private sector participation among others (WaterAid, 2006). The state water supply agencies are responsible for the establishment and operation of urban and semi-urban water supply systems. Local governments are responsible for the establishment, operation and

maintenance of rural water supply schemes, in conjunction with the benefiting communities.

Although the institutional framework in Nigeria is very elaborate, it is not effectively coordinated and harmonised and the link between the sector institutions is very weak, leading to inefficiency and duplication of efforts. Most of the investment for water provision in Nigeria is by the Federal Government which make about 50 per cent of investment, which is mainly for the supply of bulk water, through building of dams and reservoirs to supply bulk water to the states. The bulk water provided by the Federal Government is not only for domestic use, but also for industrial and irrigation purposes. The states provide about 25 per cent of capital investment to water supply, which is for the treatment and distribution of water for domestic use in urban centres. The local government's investment to water supply is mainly in rural and semi-urban areas, while communities only make investments within the rural areas, as shown in Table 1.

Table 1: Cost sharing formula for water provision (percentage) in Nigeria

Level	Rural		Semi-Urban		Urban	
	Capital	Operation & Maintenance	Capital	Operation & Maintenance	Capital	Operation & Maintenance
Federal	50	-	50	-	30	-
State	25	10	30	-	60	100
Local	20	20	15	-	10	-
Communities	5	70	5	100	-	-
Total	100	100	100	100	100	100

Source: National Water Policy (2000); WaterAid (2006)

Investment in the water sector in Nigeria has been poor. Figure 2 shows the percentage of federal budgetary allocation for capital projects that is used for water resources development purposes. Although budgetary allocation to the water resources sector has increased over time, as a percentage of the total budget, it has been reducing over time. Figure 2 reveals a decrease in budgetary allocation for water resources as a percentage of capital allocation over the period 1977 to 2014, with the lowest in 2009.

Extending and sustaining water programmes and infrastructure requires adequate funding and effective financial management. According to WWAP (2015), water service remains rather low on the scale of policy priorities in most countries, despite well-documented contribution to human and economic development. The Nigeria MDG Office estimated that US\$1.7 billion was required annually to meet the water supply and sanitation targets for the country between 2007 and 2015, with rural water supply needing US\$604 million per year and urban water supply US\$1.1 billion per year. However, national funding is insufficient for the programme needs and remains a major obstacle to progress. The commitment of government to funding water supply in the country is doubtful, as funding continues to reduce as a percentage of the annual budget despite increasing population.

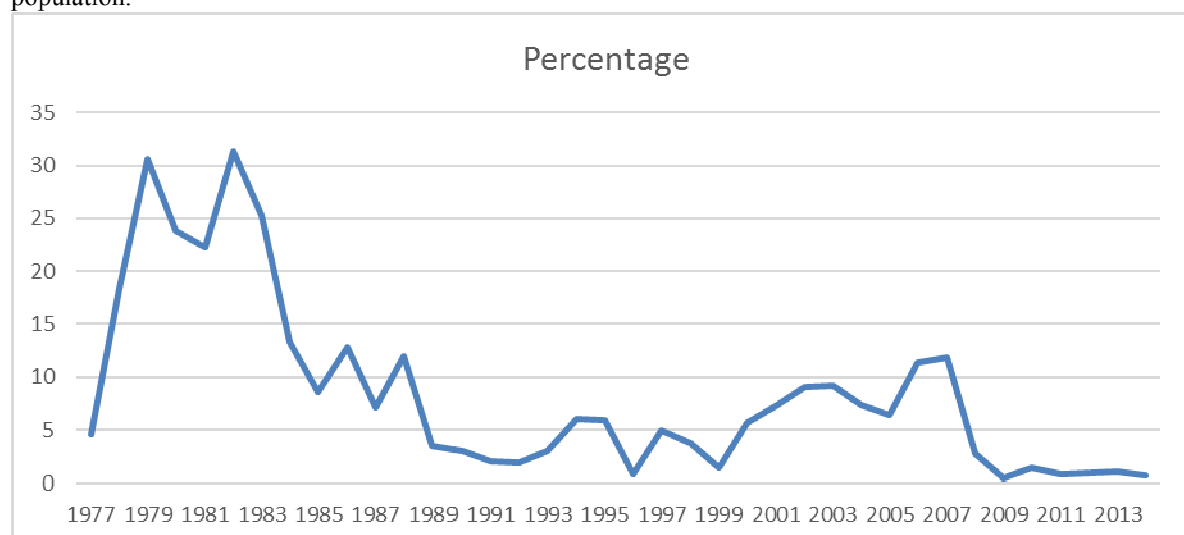


Figure 2: Percentage of Federal Capital Allocation for Water Resources.

Source: Central Bank of Nigeria, annual reports and statement of accounts (various years).

According to the UN-Water (2012), Global Analysis and Assessment of Sanitation and Drinking Water Report, high-level political commitment underpins all efforts to accelerate and sustain improvements in access to adequate and safe drinking-water, sanitation and hygiene services. Although Nigeria as part of the 2010 Sanitation and Water for All (SWA) high-level meeting, committed to increasing budgetary allocation to water

and sanitation, this is not reflected in budgetary allocation, which has been on the decrease.

### 3.2: Access to safe water supply in Nigeria

The main sources of domestic water supply within the study area include pipe-borne water (mainly from municipal water supply schemes), boreholes (solar, machine and hand-pump, both public and private), wells (hand dug shallow wells, mainly private) and streams (including water collected directly from rivers, lakes, ponds, irrigation channels and other surface sources). Water supply from vendors using tankers, trucks and carts and also rainwater is becoming important. Table 3 reveals that pipe-borne water was the main source of water in Nigeria in 1995, but by 2010, this source of water accounted for only 8.8 per cent of domestic water supply to households. The table also reveals an increase in the use of wells and boreholes, as percentage of households depending on these sources of water supply increased from 1 per cent in 1995 to 28.4 per cent in 2010 (borehole) and from 8.5 per cent to 35 per cent (wells). The table further indicates that, within the study area, the percentage of households depending on streams and ponds for domestic water supply reduced marginally from 28.9 per cent in 1995 to 13.9 per cent in 2010.

Table 3: Percentage Distribution of Dwelling Units by Type of Water Supply

Type of Water	1995/96	1997/1998	1999/2000	2006	2007	2008	2010
Pipe-borne Water	61.60	56.57	54.10	11.37	10.4	8.8	9.5
Borehole	1.00	1.07	0.40	13.61	26.8	28.4	21.5
Well	8.50	13.41	15.80	35.77	33.3	31.5	35.0
Streams/Ponds	28.90	28.97	29.70	21.45	24.4	27.1	13.9
Tanker/Truck/Van	-	-	-	5.88	4.1	3.2	2.0
Rain	-	-	-	8.65	0.6	0.5	27.1
Others	-	-	-	3.26	0.3	-	1.0
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Sources: National Bureau of Statistics (2000; 2011)

Within the study area, 61 per cent of households had access to improved water supply (defined by WHO/UNICEF (2012) as water from piped water into dwelling; piped water into yard/plot; public tap/standpipes; tubewell/boreholes; protected dug wells; protected springs and rainwater). There were also variations in percentage of households that had access to improved water supply over the study period. In 1990, 49 per cent of households had access to improved water supply, this decreased to 45 per cent in 2000. Household access to improved water supply increased to 53.6 per cent in 2007 and further increased to 67 per cent in 2010 and 69 per cent in 2015. This improvement could be related to the increased use of rainwater and water from covered wells as sources of domestic water supply. Within the study area, mainly pipe-borne water was developed by government and its agencies and access reduced from 61.6 per cent in 1995 to 9.5 per cent in 2010.

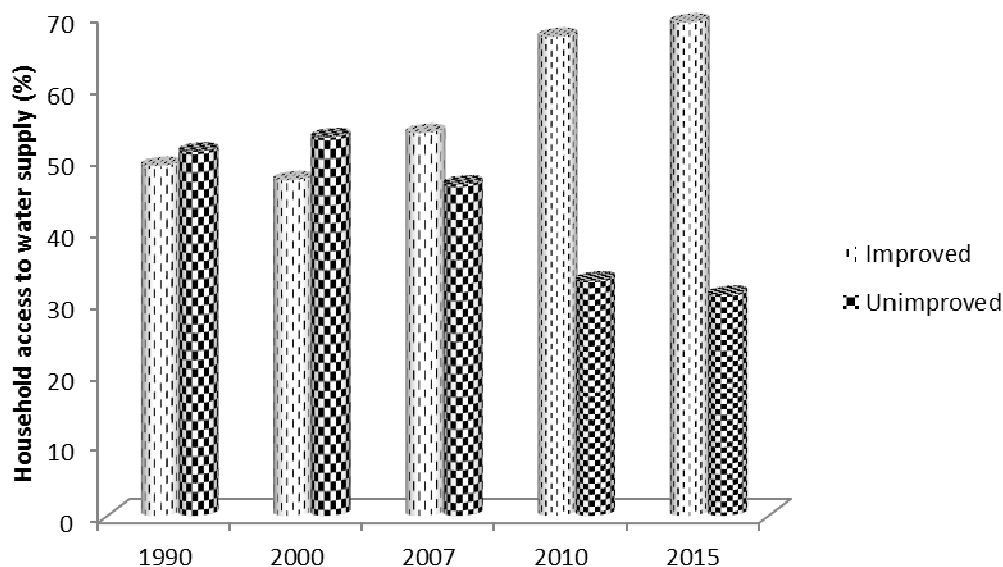


Figure 3: Percentage of household using improved sources in Nigeria  
 (Data source for chart: WHO/UNICEF, 2010; 2017; NBS, 2011)

There were significant zonal disparities in the proportion of people using improved water sources in Nigeria, as shown in Figure 4. Improved water coverage in the geo-political zones ranged from 36.5 per cent to 61.5 per

cent, in 2003: 34.1 per cent to 67.7 per cent, in 2007; and 50 per cent to 80 per cent, in 2010. The south-west geopolitical zone had the highest access between 2003 and 2007, while the south-west and south-east zones had the highest access in 2010 (see Figure 4). The figure also revealed the consistent increase in the use of improved sources of water supply in the south-east geopolitical region. Within this region, only 30-40 per cent of households had access to improved water supply in 2003. This increased to about 51-60 per cent in 2007 and further rose to 71-80 per cent in 2010. The north-east region had the lowest access of 50% in 2010. The National Human Development Report for Nigeria (2015) showed that this region also had the least access to improved water sources in 2014 (50.2%).

There was generally an increase in access to improved water coverage in all the zones in Nigeria. Increase in access to improved water in Nigeria may be the result of increased use of rainwater as a source of improved water for domestic purpose. An issue here is whether this source of water supply (when used untreated) can actually be termed as 'improved'. The use of rainwater as a source of water supply involves the collection, storage and handling of water. The type and age of roofing materials as well as the storage types and handling may lead to contamination of water supply (see Saheed et al., 2013; 2014).

Differences in percentage of households with access to the different water supply sources in different states within the country are also shown in Figure 4. Lagos and Kaduna States had the highest numbers of households with access to pipe-borne water in 2003, at 51 and 59 per cent, while Taraba and Ebonyi States had the lowest access to pipe-borne water at 0.6 and 0.9 per cent respectively. By 2010, however, no state in the country had up to 60 per cent access to pipe-borne water. The figure also revealed that Bayelsa and Benue States had the highest number of households still depending on streams as their source of domestic water supply.

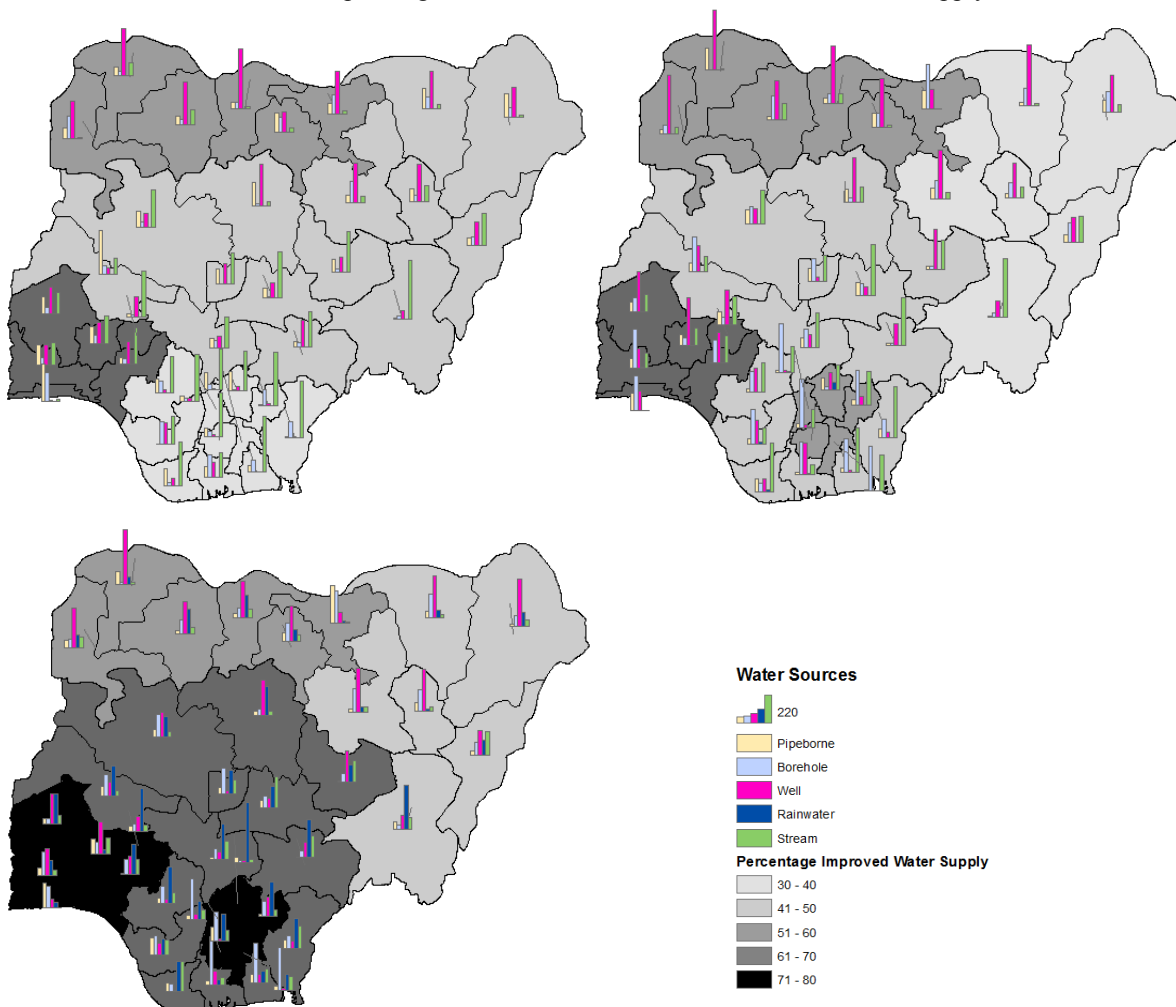


Figure 4: Household water supply sources in states (bar graphs) and percentage of households with access to improved water supply within regions (graduated colours). From top left 2003, 2007 and 2010

As societies develop, their water usage pattern changes; global trends in the use of different water sources demonstrate a shift towards piped water on premises, especially in the urban areas. In most cities in Nigeria, this form of water supply can only be obtained in old areas, as newly developed areas have not been integrated into the water supply chain. Over 1 billion people worldwide gained access to piped supplies between 2000 and 2015



(WHO/UNICEF, 2017), but as shown by this study, the percentage of people who enjoy piped water on their premises in Nigeria has been decreasing. The percentage of households which had access to pipe-borne water decreased from 61.1 per cent in 1996 to 9.5 per cent in 2010. This same trend is seen in the rest of sub-Saharan Africa, where percentage decreased from 42 per cent to 34 per cent between 2000 and 2012 (WHO/UNICEF, 2014). Pipe-borne water is mainly provided by the government, and this supply has been dwindling, with supply not being constant. In Lagos State (which has one of the highest rates of supply of pipe-borne water), the water company's capacity is 210 million gallons a day (excluding problems of power supply and pipe leakages) compared with the 540 million gallons needed. Most households in the Ibadan metropolis do not have access to this form of water supply. Only areas like Old Bodija, Eleyele, Agodi-Gate and Beere have such access. But even in these areas, water supply is not constant as the taps flow about once or twice a week, for a few hours. This scenario plays out in most of the cities of Nigeria, including Benin City, Warri, Kaduna, Markurdi and Calabar. According to WHO/UNICEF (2017), 71 per cent of the global population (5.2 billion people) used a safely managed drinking water service; that is, water from an improved source, located on premises, available when needed and free from contamination. Less than 25 per cent of the Nigerian population had access to this form of water supply in 2015.

The use of surface water by households reduced from 28.9 per cent in 1995 to 13.9 per cent in 2010. This source is very important in Taraba, Benue, Kogi and Bayelsa States. About 3 per cent of the global population, and over 10 per cent of the population of sub-Saharan Africa use this source of unimproved water for domestic purposes. The use of stream water as a source for domestic supply in Nigeria is risky. In a lot of communities (both urban and rural) wastewater and human waste are discharged into local streams. It is usually the poor that depend on these polluted streams as their only sources of water for domestic use. According to WHO/UNICEF (2017), 159 million people still collected drinking water directly from surface water sources, of which 147 million lived in rural areas and 58 per cent lived in sub-Saharan Africa. In Nigeria, surface water use was prevalent in rural areas but, recently, the use has spread widely to urban centres. For example, in Markurdi, the capital of Benue State, it is common to see people with buckets and basins collecting water from the highly polluted River Benue for domestic purposes.

Water supply from groundwater sources (wells and boreholes) is becoming very important in Nigeria. Water use from this source increased from 9.5 per cent in 1995 to 56.5 per cent in 2010. Groundwater reportedly provides drinking water to at least 50 per cent of the global population and accounts for 43 per cent of all water used for irrigation (Groundwater Governance, n.d.). In most places in Nigeria, the inability of government to provide water for its citizens has led to the proliferation of boreholes and wells, affecting the surface and underground water resources. Most citizens in middle to upper income groups sink private boreholes, while those in lower income groups dig private hand-dug wells within their compounds for domestic water supply.

The use of tankers, trucks, vans and carts for domestic purposes reduced from 5.88 per cent of households in 2006 to 2 per cent in 2010. The use of tankers trucks and carts becomes highly important during the dry season in most parts of the country when water from wells dries up and there is no public supply. Water from this source is of dubious quality and very expensive. One of the most important forms of informal water supply in Nigeria is the use of carts (*mairuwa*) for water supply. The purchase of water from carts (*mairuwa*) is a common scene in most urban centres in Nigeria. Purchase from tankers is also important. This goes for between ₦7,000 to ₦10,000 for a tanker load. Where this cost is too prohibitive, a number of families may come together and contribute to buy a tanker load of water.

Differences are observed in access to domestic water supply between the urban and rural areas in Nigeria. Table 3 shows that access to treated pipe-borne water is mainly within the urban areas. For example, in 2010, the percentage of people with access to treated pipe-borne water in urban areas was 15.9 per cent while it was 4.2 per cent for rural areas. The use of rainwater and boreholes as sources of potable water supply is high for both rural and urban centres, especially during the rainy season.

Table 3: Urban-rural Differences in Sources of Domestic Water Supply

	Sector	Pipe-borne Treated	Pipe-borne Untreated	Borehole	Well/spring Protected	Well/Spring Unprotected	Rainwater	Stream	Tanker
2007	Urban	18.6	3.6	34.4	22.4	6.5	-	6.2	7.8
	Rural	3.3	1.8	21.9	16.3	20.1	0.8	33.4	2.2
2010	Urban	15.9	2.3	26.8	16.6	5.3	22.8	2.6	4.8
	Rural	4.2	2.7	19.9	10.0	15.9	28.3	17.3	1.1

Source: NBC (2011)

In the rural areas, there is a high dependence on all forms of natural sources of water supply (streams, ponds, rain and hand-dug wells). Surface water is the most important source of water supply for most rural areas in Nigeria. Table 3 reveals that rural areas had the highest percentage use of stream water, which although reduced from 33.4 per cent in 2007 to 17.3 per cent in 2010 is on the high side since this is an unimproved source of

domestic water supply. Studies have shown that 19 per cent of rural dwellers in sub-Saharan Africa and 39 per cent of rural residents in Oceania rely on surface water for drinking and cooking (WHO/UNICEF, 2012). As shown in Figure 5, there remains a great disparity in access to improved sources of water supply between the urban and rural areas in Nigeria. This needs to be addressed because sustainable development and human rights perspectives both call for reduction in inequalities and tackling disparities in access to services (UNGA, 2013). Water should be seen as essential to life and its supply and accessibility can be linked to achieving all the Sustainable Development Goals (SDGs). WHO/UNICEF Joint Monitoring Programme (JMP) for Water and Sanitation Report (2014) showed that, between 1990 and 2010, there was only an 11 per cent increase in access to improved water supply in Nigeria. In January 2011, the Federal Government launched the water road map, a blueprint that described the government's objectives in developing the nation's water resources between 2011 and 2025. The plan included the promises that 75 per cent of Nigerians will have access to potable water by 2015, and 90 per cent by 2020. None of the short-term targets have been met, though a number of projects are in progress. According to the Water Sanitation and Hygiene (WASH) 2013 report, at the nation's current rate of progress, the water target of 75% coverage will be achieved in 2033, 18 years after MDG target of 2015.

### 3.3: Water supply issues

One known feature of the water resources sector in Nigeria is the litany of abandoned projects, which mainly stems from government's insincerity in the award of contracts. Most of the water project contracts are awarded to politicians who often sub-contract them to professionals after removing more than the profits in the contracts. The projects suffer delays or abandonment; where such projects are completed they are often sub-standard. Both the executive and legislature (through their constituency projects) construct boreholes and mini water works that often break down a few days after inauguration.

There is also hardly any maintenance structure to sustain water projects in Nigeria. Numerous hand pumps, motorized boreholes, surface water schemes with water treatment plants, and even dam projects are not functioning as a result of maintenance issues. Most water supply pipes in the country were laid in the 1970's. There has been little replacement or construction of new pipelines. This has occasioned the problem of burst pipes, leading to huge wastage of the already scarce resource.

The absence of financial discipline and accountability is another problem confronting water resources development in Nigeria. According to a World Bank study in 2012, it costs the government ₦150 on average to produce a litre of clean drinking water. This is in contrast to private water packaging companies who are able to sell (with a high profit margin) a litre of bottled water at less than ₦100. This high cost of production of water by government parastatals means the government has to provide a huge subsidy for consumers. There also exists a weak rate collection structure. According to Akpe (2012), it is estimated that at least 90 per cent of the country lacks a clear framework for the metering, billing or collection of water payments. This has led to water bill payment defaults of over ₦1bn, making revenue generation almost impossible in the water sector.

The nation's water sources are under serious threat from widespread pollution, including the indiscriminate disposal of refuse including hazardous substances. High levels of pollution and contamination of both surface and groundwater has been reported from different parts of the country. Arsenic contamination has been reported in Kaduna State (Garba et al., 2012); and in Ibadan, Oyo State (Egbinola and Amanambu, 2014). Large-scale pollution of water from both shallow and deep aquifers have been reported in Lagos State. Salt water intrusion into groundwater has also been reported in coastal areas (Oteri, 1990). This makes water from wells and boreholes in some of these areas unsuitable for most domestic purposes.

Epileptic power supply is also a major hindrance to water supply efforts within the country. Often, state waterworks are unable to treat and supply water owing to epileptic power supply. In most places where boreholes have been provided (both public and private), the taps are often dry because of lack of power supply, and the high cost of fuel (when available) to power them.

### 4.0 Conclusion

The study revealed an improvement in access to improved water supply between 1990 and 2015, which increased from 48 per cent to 69 per cent. But this increase in coverage of improved water supply was mainly linked to the increased usage of rain and well water as sources of domestic supply. Use of these sources increased from negligible and 8.5 percent in 1995 to 27.1 and 35.5 percent in 2010, respectively. The study also revealed that access to pipe-borne water reduced from 61.6 percent in 1995 to 9.5 percent in 2010. The study further revealed a disparity in rural/urban access to safe water supply. Poor financing and management are seen as the main problems of improved water supply. Thus the government must stop paying lip service to improving access to improved water development and supply. This is indeed pertinent for Nigeria to meet the Sustainable Development Goal of achieving universal and equitable access to safe and affordable drinking water (specifically safely managed drinking water services) for all by 2030.

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