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EVALUATION OF THE IMPACTS OF WATER, SANITATION, AND HYGIENE (WASH) ON COVID-19 SPREAD IN NIGERIA

***J.I. Ubah[1], J.C. Chukwuneke[2], J.I. Awu[3], M.C. Ugochukwu[4], D.C. Anizoba [1], N.F. Onwurah[1] and J.I. Maduegbuna[1]**

[1]Department of Agricultural and Bioresources Engineering, Nnamdi Azikiwe University Awka
[2]Chukwuemeka Odumegwu Ojukwu University, Anambra State
[3]National Centre for Agricultural Mechanization, Ilorin, Kwara State
[4]FGN/IFAD Assisted Value Chain Development Programme (VCDP), Ministry of Agriculture Awka, Anambra State
**Corresponding Author's E-mail:* ji.ubah@unizik.edu.ng

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ABSTRACT

Corona viruses are a large family of viruses that cause illnesses ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV) (Hayk, 2020). Nigeria, with its large population and high urbanization rate, faces significant challenges in providing adequate water, sanitation and hygiene services to its citizens. Many Nigerians lack access to basic hand washing facilities with soap and water, which further increases the risk of disease transmission. The government's efforts in implementing WaSH programs have been hindered by factors such as weak governance, institutional frameworks, and infrastructure. The study focuses on the impact of Water, Sanitation, and Hygiene (WaSH) in curtailing the spread of the COVID-19 pandemic in Nigeria. It highlights the importance of access to clean water, basic sanitation facilities, and good hygiene practices, particularly hand washing, in preventing the transmission of diseases like COVID-19. The study emphasizes that without these essential components of WaSH, the risk of outbreaks and the spread of diseases is high. Hence, information from this study will provide insights and information to guide policymakers, government agencies, and non-governmental organizations in addressing the WaSH needs in Nigeria, with a specific focus on the fight against the COVID-19 pandemic. It emphasizes the crucial role of clean water, sanitation, and hygiene in preventing the spread of diseases and improving the overall health and well-being of the population.

Keywords: Hand Washing, Corona Virus, Water, COVID-19, WaSH

1.0 INTRODUCTION

According to the World Health Organization (WHO), Coronaviruses (COVID-19) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV) (Hayk, 2020). Coronavirus disease (COVID-19) is a new strain that was discovered in 2019 in Wuhan, China and has not been previously identified in humans. Coronaviruses are zoonotic, meaning they are transmitted between animals and humans. Detailed investigations found that SARS-CoV was transmitted from civet cats to humans and MERS-CoV from dromedary camels to humans. Several known coronaviruses are circulating in animals that have not yet infected humans (https://www.aljazeera.com/news/2020/01/coronavirus-symptoms-vaccines-risks). Common signs of COVID-19 infection include respiratory symptoms, fever, coughing, and shortness of breath and breathing difficulties. In more severe cases, the infection can cause pneumonia, severe acute respiratory syndrome, kidney failure, and even death (https://www.thesun.co.uk/news). Research has shown that the Basic protective measures to

prevent COVID-19 infection spread include regular hand washing, covering mouth and nose when coughing and sneezing, thoroughly cooking meat and eggs, avoid close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing (social distancing for at least 1 meter apart). In the World Health Organization (WHO) list of preventive measures, washing hands frequently tops in the list. The benefit and importance of hand washing as a veritable means of preventing the spread of COVID-19 cannot be overemphasized. It's a proven practice that washing hands with soap and clean water or using alcohol-based hand rub kills viruses that might be in the hands. Nigeria recorded the first case of the corona virus in sub-Saharan Africa on 27th February 2020 and since then the spread has continued in geometrical order. Recently, there has been evidence of community transmission of COVID-19 in Nigeria. Nigeria's government has set out measures such as stay at home among others measure set by WHO to check the spread of the COVID-19, believing a break along the chain of spreading would probably stop the virus spread. Hence, how effective will the stay home instruction be without an adequate measure of providing clean water for proper hygiene of Nigerian citizens' remains the focus of this study. Although, Nigeria was widely praised for its efforts to contain the Ebola outbreak in 2014 which killed more than 11,000 people in West Africa *(BBC News Services, 28th February 2020).* After the incident of Ebola and before the spread of COVID-19, Nigeria hasn't done enough in the area of WaSH and Governance to curtailing the spread of COVID-19 pandemic.

Across the globe, as of March 25th 2020, the WHO COVID-19 Situation reports show that Global statistics reveal that 332,930 cases were confirmed with 40,788 new cases confirmed in the last 24 hours. The global death was 14,510 with 1,727 reported in the last 24 hours. Mathematically, 12.25% and 11.90% are the percentages of confirmed and death cases in the last 24 hours. However, on March 27th, 2020, the WHO COVID-19 situation report shows that the confirmed cases have risen to 554,711 while death and recovered stands at 25,185 and 126,927 respectively. This figure represents 166.61% and 173.57% for an increase in confirmed and death cases within two days. The rate of increase both for confirmed and death cases as shown in this study is very sharp and perhaps has been rated very high by WHO. Although the African region still has a very low number of confirmed and death cases when compared with the United States of America, Italy and China, and others respectively. These do not signify that Africa is free, as the confirmed cases increase in the last 24 hours in Nigeria being the most populous country in Africa is been reported to be very high. The World Health Organization (WHO) Director-General, Dr. Tedros Adhanom Ghebreyesus in his opening remarks at the media briefing on Covid-19, as of 3rd March 2020, gave an estimate of 3.4% mortality rate to COVID-19. Figure 1 to 4 shows the descriptive graph of COVID-19 global and Nigeria confirmed cases on 24th March 2020, while Figure 5 shows the descriptive graph of the COVID-19 cases in Nigeria on 27th March 2020 (source: WHO, March 24th and 27th, 2020).

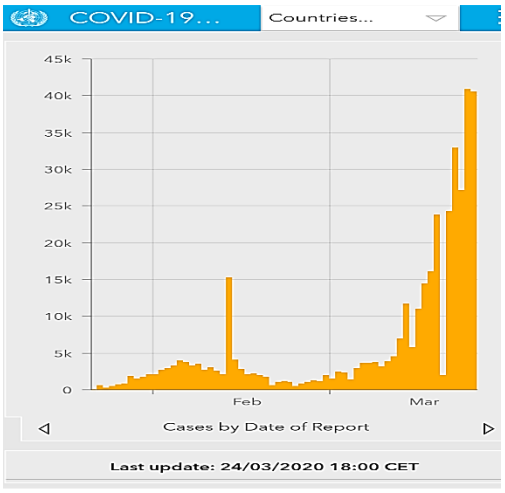

Figure 1: Global COVID-19 confirmed cases on 24/3/2020

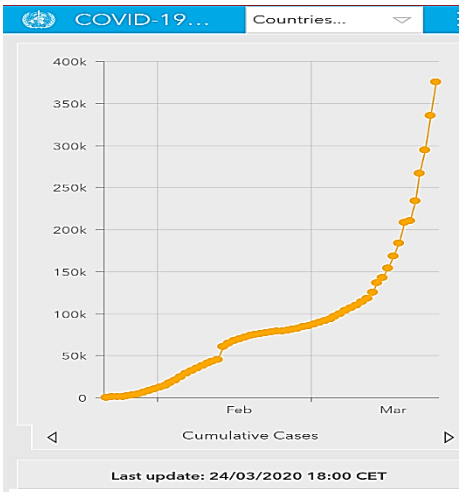

Figure 2: Global cumulative cases on 24/3/2020

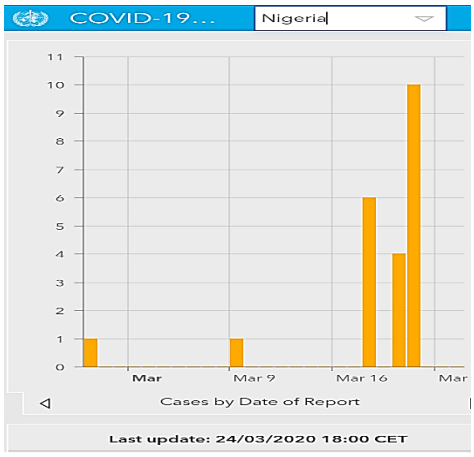

Figure 3: Nigeria COVID-19 confirm cases on 24/3/2020

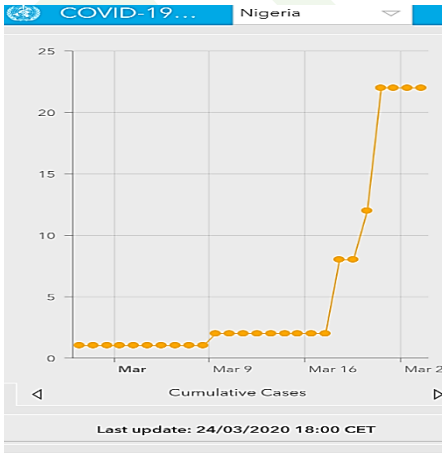

Figure 4: Nigeria COVID-19 cumulative cases on 24/3/2020



Figure 5: descriptive graph of COVID-19 confirmed

Hence, as of 12th August 2020, World Health Organization (WHO) has reported a total of 20,120,919 of global Confirmed cases; 736,766 of global Confirmed deaths across 216 Countries, areas or territories with Americas having the highest and western pacific having the lowest number of confirmed cases as shown in Figure 6 and 7.

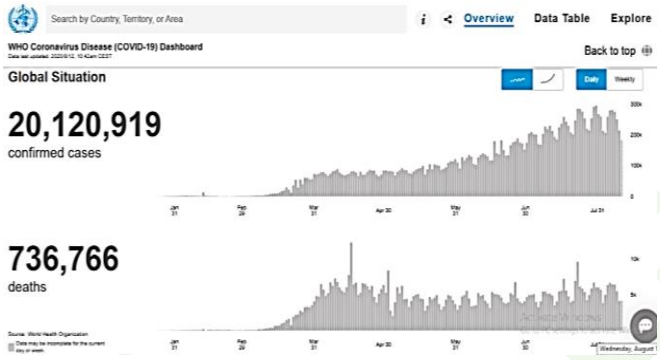

Figure 6: Global COVID-19 confirmed and deaths cases on 12th August, 2020.

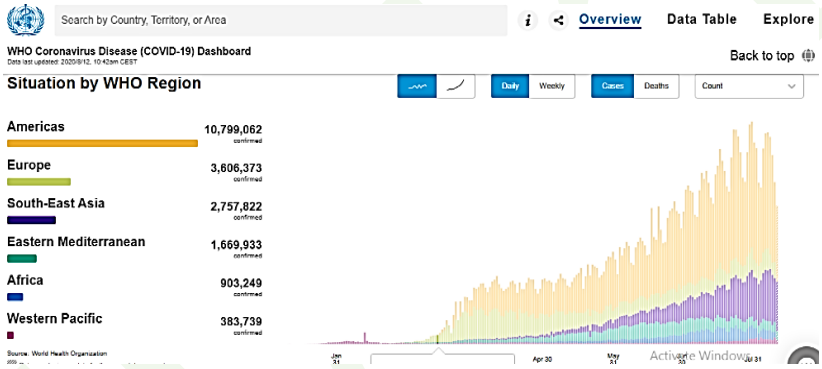

Figure 7: Regional COVID-19 confirmed cases on 12th August, 2020.
Source: World Health Organization (WHO)

Also, Nigeria Centre for Disease Control (NCDC) has reported a total of 49,290 confirmed cases with 33,609 discharged and 956 death on 11th August, 2020. On 4th August, 2020, Nigeria government considered reopening of schools for examination classes with so many schools displaying hand washing system. The question may be, for how long can these schools sustain the hand washing and hygiene as displayed in front of schools?

1.1 Water, Sanitation and Hygiene

WaSH is the collective term for Water, Sanitation, and Hygiene. Due to their interdependent nature, these three core issues are grouped together to represent a growing sector. While each a separate field of work, each is dependent on the presence of the other. The goal of the WaSH program is to contribute to an improvement in the number of people benefiting from improved water and sanitation facilities. This is aligned with the National Rural Water Sanitation Strategic Framework as approved by the National Water Council and Millennium Development Goal 7 on environmental sustainability, in particular the reduction by half of the proportion of people without

sustainable access to safe drinking water and basic sanitation. All three areas in WaSH support and strengthen one another. If one is missing, the others cannot progress for the well-being of a human. For example, without clean water, basic hygiene practices are not possible.

Currently, the World Health Organization has declared a state of emergency on the COVID-19 pandemic. In an emergency, water and sanitation, along with food and shelter, are the most important human needs. For the purpose of this study, we shall be reviewing the components of WaSH, in the fight against COVID-19 in Nigeria. Without water, people will die or move on in search of it. At times of crisis, portable water supply becomes key to preventing illness and death from diseases that are often caused by a lack of sanitation, inadequate safe water, and poor hygiene. Without access to basic water and sanitation services, and without the practice of good hygiene, the danger of continuing outbreaks of diseases such as COVID-19 is high. It is essential that every human being should have access to safe water as being ensured by the United Nations Children's Fund (UNICEF). It is the responsibility of the government to ensure adequate clean water, basic toilets and to encourage basic hygiene practices for her citizens. However, due to some failure of the government in meeting the hygiene need of her citizens, UNICEF has been intervening and providing palliative measures. Last year alone, UNICEF emergency responses benefited 18 million people with clean water and 4 million people with improved sanitation. UNICEF among other of her responsibilities is the lead agency providing WaSH emergency needs today mostly in developing nations. Guided by its Core Commitments for Children in Humanitarian Action, UNICEF continues to respond directly to emergencies around the world and coordinates multi-agency WASH efforts as part of the "cluster approach". This work spans from emergency preparedness planning to post-emergency reconstruction (https://www.unicef.org/wash/3942_3952.html?p=printme).

Water is the first component of WaSH and is composed of the chemical elements hydrogen and oxygen and flows as a liquid in rivers, streams, and oceans; as solid as ice at the North and South Poles; and as gas (vapour) in the atmosphere. Water is one of the most plentiful and essential compounds found all over the earth (www.efbw.org). It is a tasteless and odorless liquid at room temperature, it has the important ability to dissolve many other substances thereby supporting live on one side and harboring disease on the other side (Awu *et al.*, 2015) Before use, water is purified either by **b**oiling, this is a reliable way to purify water: Use of Iodine solution, tablets or crystals, this is an effective and more convenient method; Use chlorine drops, this has the ability to kill bacteria in water; Use water filter, and Use Ultraviolet Light, respectively (www.bryceviewlodge.com). Likewise, hygiene refers to behaviours that can improve cleanliness and lead to good health, such as frequent hand washing, face washing, and bathing with soap and clean water (https://cleantheworldfoundation.org/why-wash/). In many areas of the world, practicing personal hygiene etiquette is difficult due to a lack of access to clean and potable water. Many diseases can be spread if the hands, face, or body are not washed appropriately at key times. It is estimated that washing hands with soap and water could reduce diarrhea disease-associated deaths by up to 50%. A large percentage of food-borne disease outbreaks are spread by contaminated

hands. Appropriate hand washing practices can reduce the risk of food-borne illness and other infections including COVID-19. Addressing water challenges requires that water managers apply an integrated and interdisciplinary approach, involving hydrological, biophysical, chemical, economic, institutional, legal, policymaking and planning aspects. Water Management and Governance programmes provide such an approach. This study is novel because it is the first article that has evaluated the impacts of sanitation, water and hygiene on the spread of covid-19 in Nigeria

1.2 Objective of the Study

The aim of this study is to present an overview of the impact of Water Sanitation and Hygiene (WaSH) in curtailing the spread of COVID-19 pandemic with emphasis on hand-washing in Nigeria.

1.3 Justification

Recent decades have witnessed an increasing rate of urbanization, particularly in developing regions and in countries in transition. About 80% of the world's mega-cities can be found in these regions. During the next two decades, the world's population is expected to double. The high concentration of people in urban areas will place enormous pressure on the local environment and on available resources. It will also generate ever-higher, sometimes conflicting demands on services such as water supply, sanitation, and hygiene (WaSH). At the same time, under decentralization policies, the responsibility for delivering such services will be increasingly delegated to lower levels of government that are often ill-equipped for this challenge in terms of financial and human resources. Therefore, the need to develop knowledge, insight, and skills required to design, implement and evaluate WaSH policies and strategies to achieve effective WaSH programmes becomes pertinent. Information from this study will serve as a guide to the public, governmental and non-governmental agencies on the level of Water, Sanitation and Hygiene (WaSH) programmes in Nigeria. Also information from this study will aid government on policy and decision making to curtailing spread of COVID-19 in Nigeria.

2.0 METHODOLOGY

2.1 Study Area

Nigeria is the focus of this review. Nigeria is located on the western coast of Africa (Figure 6). It has about 923,769 Km^2 landmasses of which 13,000 square kilometers is covered by water (Table 1) across 36 states from north to south (Merem *et al.*, 2017). With a population of over 200 million, the nation has substantial resources of water bodies. Nigeria has a diverse geography, with climates ranging from arid to humid equatorial. Nigeria is bordered to the north by Niger, to the east by Chad and Cameroon, to the south by the Gulf of Guinea of the Atlantic Ocean, and to the west by Benin. Nigeria is not only large in area, larger than the U.S. state of Texas but also Africa's most populous country. In general, the topography of Nigeria consists of plains in the north and south interrupted by plateaus and hills in the center of the country. Nigeria has a tropical climate with variable rainy and dry seasons, depending on location. It is hot and wet most of the year in the southeast but dry in the southwest and farther inland. A savanna climate, with marked wet and

dry seasons, prevails in the north and west, while a steppe climate with little precipitation is found in the far north.

Table 1: Potential Surface Water Resources of Nigeria

River system	Catchment's Area (KM^2)	Potential Surface Water (MCM)
River Niger	1,143,400	158,000
South West Region	100,500	35,400
South East Region	73,200	65,700
Lake Chad	188,000	8,200
Total	1,505,100	267,300
Source: Merem et al., (2017)		

In general, the length of the rainy season decreases from south to north. In the south, the rainy season lasts from March to November, whereas in the far north it lasts only from mid-May to September. A marked interruption in the rains occurs during August in the south, resulting in a short dry season often referred to as the "August break". Precipitation is heavier in the south, especially in the southeast, which receives more than 120 inches (3,000 mm) of rain a year, compared with about 70 inches (1,800 mm) in the southwest. Rainfall decreases progressively away from the coast; the far north receives no more than 20 inches (500 mm) a year. Temperature and humidity remain relatively constant throughout the year in the south, while the seasons vary considerably in the north; during the northern dry season, the daily temperature range becomes great as well. On the coast, the mean monthly maximum temperatures are steady throughout the year, remaining about 90 °F (32 °C) at Lagos and about 91 °F (33 °C) at Port Harcourt; the mean monthly minimum temperatures are approximately 72 °F (22 °C) for Lagos and 68 °F (20 °C) for Port Harcourt. In general, mean maximum temperatures are higher in the north, while mean minimum temperatures are lower (Encyclopædia Britannica, 2020).

A systematic synthesis methodology was adopted in this study. This was driven by selecting the rapidly increasing number of WaSH scientific publications, newspapers and web publications in the last decades in Nigeria. The selected publications were summarized from primary published studies and attempting to aggregate and reconcile the scientific results from the individual studies.

3.0 WATER, SANITATION AND HYGIENE IN NIGERIA

Nigeria's population is about 206,139,589, with an annual growth rate of 2.58% (www.worldometers.info). However, 150 million Nigerian lack access to basic hand washing facilities with soap and water. The lack of water, sanitation, and hygiene services exacerbated by accelerated urbanization, poor cost recovery, and weak governance and institutional frameworks adversely affects Nigerian citizens' health, as well as their access to educational and economic opportunities and their work efficiency and labor productivity (www.rti.org). Nigeria is comprised of 36 states and the federal capital territory, each of which operates with different institutional structures, power dynamics, and little or no regulatory oversight, aging infrastructure, inadequate or ineffective operations and maintenance, weak institutional capacity, and little accountability to consumers. These h\ave made the WaSH

governance difficult in Nigeria. In 2018, the United States Agency for International Development (USAID) launched the programme Effective Water, Sanitation and Hygiene Services (E- WaSH) to improve the availability of clean water and sanitation in Nigeria's poorest urban neighborhoods. With the expectation of improving water delivery to 500,000 households by boosting the productivity and efficiency of State Water Boards. How and at what pace this programme has touched Nigerians are still at a low ebb when compared to her current population. Likewise, Foundation for Partnership Initiative in the Niger Delta (PIND) in their findings reported that the severity of the WaSH needs in Nigeria's Niger Delta cuts across communities and institutions in urban, peri-urban and rural settings, with largely dysfunctional and non-existent WaSH facilities and services, such as: safe sanitary disposal of human waste, hand Washing and water supply facilities, etc. Facilities for WaSH are either grossly inadequate or simply not safe to use for maintaining good hygiene in communities and institutions like schools (https://pindfoundation.org/project/water-sanitation-and-hygiene-wash/). Lack of access to good water facilities contributes to a very high WaSH related disease burden with its attendant health and economic impacts (Olukanni, 2013). Olukanni (2013) in his study reported that most public schools in Nigeria are short of the basic water and sanitation facilities, and hygiene education programmes are often inadequate.

Literature has shown that one of the biggest challenges in the water and sanitation sector in developing countries such as Nigeria is the significant gap between policy-making and implementation. Even if the policy is good, without implementation, the programme is still a failed one. Although, Nigerian government through the former Minister of Water Resources, Engr. Suleiman Adamu agreed and restated that access to adequate water, sanitation, and hygiene (WaSH) services is a critical factor in the socio-economic development of any nation as it contributes to human capital outcomes such as early childhood survival, health and educational attainment. The President of Nigeria, Muhammadu Buhari through his water resources minister has promised of lifting 100 million Nigerians out of poverty in the next ten years, also, in the areas of Water, Sanitation and Hygiene (WaSH). Suleiman Adamu in his speech at the First Quarter Lunch Time Forum (February, 2021) on ending Open Defecation in Nigeria with Executive Directors restated Nigeria's commitment in collaboration with Organized Private Sector in Water, Sanitation and Hygiene (OPS – WASH). The Private Sector and Development Partners can leverage on more collaborative efforts that will provide for funding critical investments in water and sanitation infrastructure/programmes across the country; this is in the realization that job creation is everyone's responsibility. Nigeria government is believing that maintaining partnership, collaboration and good advocacy, all stakeholders are required to ensure that Nigeria attains Open Defecation Free status (ODF) by the target year of 2025 and achieve Sustainable Development Goal (SDGs) Goal 6.1 and 6.2 for WaSH with the theme 'leaving no one behind' by the year 2030.

Olukanni, 2013 through his study revealed that out of the 12 public secondary schools visited, only 3 (20%) had drinking water points (boreholes) and 40% of the schools do not have separate latrines

for boys and girls. The ratio of toilets to students in the schools visited ranges from 1:70 to 1:320. Only 1 (10%) of the schools had handwashing points but without soap. It was revealed that Information, Education and Communication (IEC) materials are not provided in any of the public schools and there are no facilities and in the schools for promoting safety, privacy and security of older girls. He concluded that the present WaSH facilities and practices in Nigeria are not satisfactory. Akpabio (2012) in his study reported that Nigerian water and sanitation policy is characterized by: too many short-lived policies without corresponding action; excessive and opportunistic use of some international policy instruments; very many agencies with none effectively in charge; unrealistic assumptions of situations and; poor implementation practices. Although this trend of observation seems a general problem in developing countries, he further argued that the Nigerian case looks exceptional, to a large extent, given the peculiarities of ethnic politics, long years of military rule which undermined the evolution and development of necessary institutions in the water and sanitation sector, official corruption, among several other factors. These factors and others contribute to making public water supply and sanitation services inaccessible to the poor in Nigeria. Merem *et al*., (2017) in their study reported that water stress, limiting access, and degradation compounded by an incoherent policy in water management in the country despite vast hydrological endowments. Notwithstanding policy efforts and provisions supporting proper management under various jurisdictions, water access remains a big issue in Nigeria where it is yet to be accorded priority. Seeing the various guidelines designed to safeguard aquatic ecosystems, the regulatory framework has been ineffective in containing the widespread discharge of toxins into surface water environments. The fact that current lapses in water management threaten the environment and public health in Nigeria, no effort has been made to assess the trends from a mix-scale perspective (Merem *et al*., 2017).

4.0 NIGERIA REGIONAL WATER BALANCE

The basic province of Nigeria's water circumstance contains an entire scope of extra difficulties including changes in regional water balance projected for the year 2020 over multiple regions locales starting with the north, central and southern geopolitical zones. Among the regions, the Northeast and the Northwest have a projected water demand (Table 2) of about 1,650 and 2,896 while the Central west 1 and 2 share a projected water demand level of 3,128 and 2,419, respectively (Okeola, 2014). During the same period in the south, the Southwest and Southeast see projected water demand levels of 8,472 and 4,707. With the actual water supply capacity volumes estimated mostly in the hundreds for all regions with exception of the Southwest with 1,012. Among the other regions, mostly, the North West, North East, the Central areas and Southeast, the volume of water supply capacity will be 275, 378, 534, 182 and 396, respectively. Additionally, the very high water deficit capacity of 7,460 and 4,310 projected in the South West and Southeast as shown in Table 2 will surpass the levels for the Central West 1, Central West 2, North West and North East at 2,597, 2,236, 1,386 and 2,525, respectively. Also, the differences between the total projected volumes for water demand at 23,272 to the actual capacity of 2,777 and a deficit capacity of 20,515 for all the regions in 2020. Even though the deficit capacity for 2020 appeared lower, rising deficits will be relatively common across the various ecological regions regardless of

climatic variability (Table 2). Such a projected level of regional water balance and pattern of stress known for its wide-ranging impacts will not only raise the susceptibility levels of many Nigerians to different epidemics, it will ravage agriculture with potential damage to livestock and food production.

This would come at the expense of ordinary Nigerians coupled with unrestrained dumping of domestic and industrial wastewater with the degradation of water quality through elevated levels of organic materials in both surface and groundwater. That will increase the occurrences and spread of epidemics of water-borne diseases such as cholera, hepatitis, typhoid and malaria (BNRCC, 2008).

Table 2: Nigeria Regional Water Balance in 2020

Water Supply	Projected Demand, m^3	Actual Supply Capacity, m^3	Deficit Capacity, m^3
North West	1,650	275	1,386
North East	2,896	378	2,525
Central West 1	3,128	534	2,597
Central West 2	2,419	182	2,236
South West	8,472	1,012	7,460
South East	4,707	396	4310
Total	23,272	2,777	20515

(Source: Okeola, 2014)

5.0 NIGERIANS ACCESS TO SAFE WATER FROM 2000 -2015

Merem *et al*., (2017) in their study on Nigerians access to safe water compared with sub-Sahara Africa reported that the percentage of Nigeria population with improved water access over the years from 2000 to 2015 as shown in Figure 7, indicates that the country's access to safe water never exceeded 59% from the year 2000 to 2006. From 2007 to 2015, they were improved access to water among the citizens by 61 to 68.5% at levels identical to the rest of sub-Saharan African countries. Also, the figure reveals that at the beginning of the first four years of the 21st century, the year 2000, 2001, 2002 and 2003, the percentage of Nigerians with improved access to water rose to the medium levels of 51.8%, 53%, 54.2% and 56.6%, respectively. In the following years of 2005 to 2006, the percentage jumped slightly from 57.8% to 59% while from 2007 to 2011, the percentage of Nigeria population with access to safe water rose from 60% to 64.5%, however, from 2012 to 2015, the percentage enhanced by 65.5% from 68.5%. This to some degree reflects the patterns evidenced all through the same time frame among the other countries in the Sub-Saharan Africa region. Similarly, the percentages of Nigeria population among the states with access to drinking water in the year 2001 as shown in Figure 8, indicate that 78% and 59% of the population in Lagos and Kwara had more access to drinking water compared to Enugu and Ogun with 55% and 51%, respectively. Apart from Lagos, Kwara and Ogun States which has about 50% and above of her citizens' access to drinking water while other states of the federation fall below 50%. Hence, Kebbi, Bauchi, Benue and Taraba States have the least percentage of her citizens ranging from 18% to 10% with access to drinking water. The four states with 50% and above access to drinking water represents 11.11% of the total states of the federation.

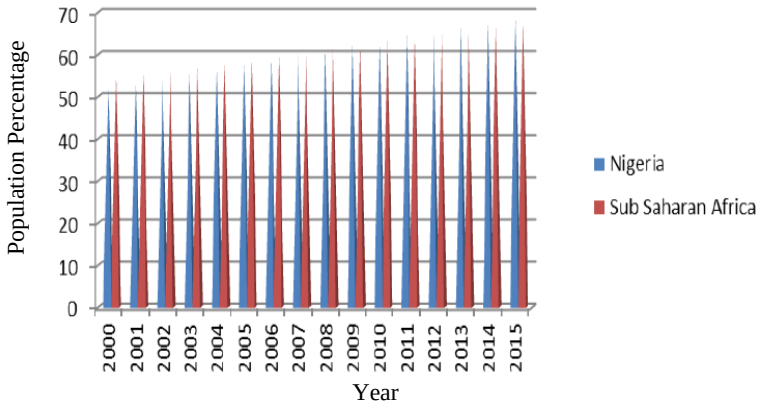

Figure 7: Percentage of Nigeria and Sub-Sahara Population with access to safe water from 2000 to 2015 (Source: World Bank)

The progress in percentages of the population with access to safe water with respect to the year could have been possible because of huge investment in the sector over the years as shown in Table 3. Although, the rapid rate of socio-economic and demographic expansion in Nigeria over the years is not matched by public investments in the water and sanitation sectors. Financial commitment to water and sanitation from relevant governments has not been very regular and clear. Available statistics from the year 2001 to 2008 shows a lack of consistency in public financial commitment to water and sanitation at various levels (Table 3).

Table 3: Expenditure on Water, Sanitation and Hygiene (WASH) (in millions of US$)

Year	FGN	State	LGA	Consolidated	% growth rate of Wash Consolidated	% Consolidated WaSH to total Consolidated Expenditure	Required for WaSH MDG achievement	Shortfall to MDG WaSH projection
2001	76.04	16.05	3.59	95.59		5.97	-	-
2002	80.02	19.42	4.23	103.68	8.46	6.53	-	-
2003	52.54	19.27	11.3	83.11	19.84	4.28	-	
2004	46.47	29.92	11.65	88.04	5.93	3.89	-	-
2005	71.01	33.71	14.87	119.6	35.85	4.26	-	-
2006	70.08	40.19	18.89	129.23	8.05	1.96	189.87	60.64
2007	76.27	46.3	21.91	144.48	19.54	1.03	191.82	47.32
2008	57.86	42.7	21.02	121.58	-14.82	1.29	173.82	52.17

Source: CBN Annual Reports (undated) and NBS Sources

However, with a greater number of Nigerians not having access to drinking water as shown in Figure 8 as reported by Merem et al. (2017) also evident with the proliferation of waterborne disease epidemic across the northern part of the country with more scarcity to safe and clean drinking water as shown in Table 4. Of the 13,000 cases in a reported outbreak of cholera on September 28, 2010, about 1,250 of the victims died mostly as a result of a lack of access to potable water in rural areas. Being mostly in the northern part of the country, Kastina topped the list with 781 out of the 3,310 reported cases while Adamawa and Borno followed up with 118 and 162

casualties. Both states of Gombe and Zamfara recorded 80 and 13 deaths. This shows the significance of access to safe water can help to curtail pandemic diseases.

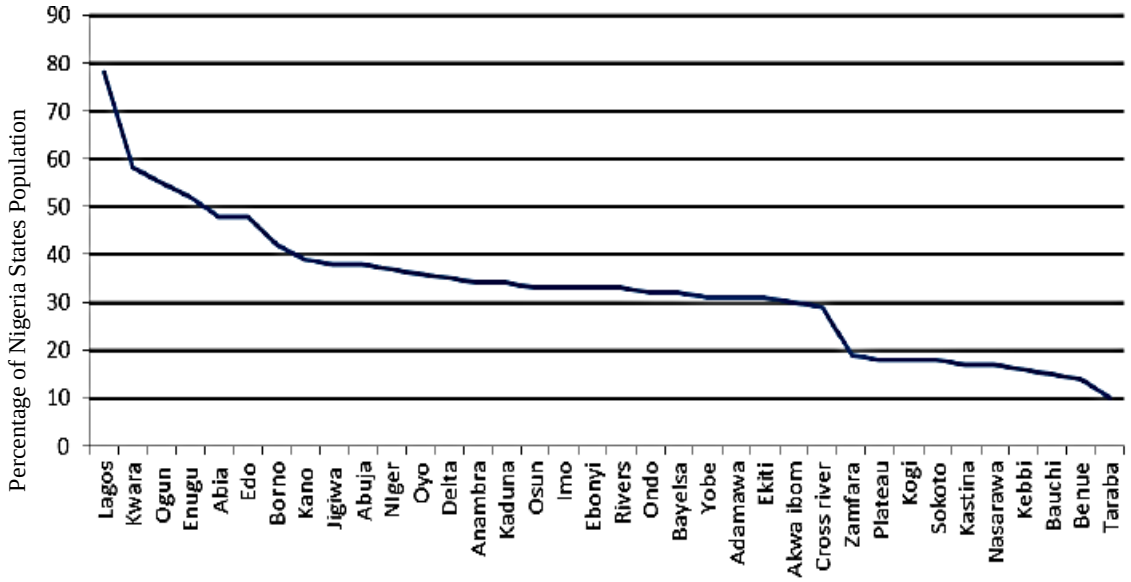

Figure 8: Percentage of Nigeria States Population with access to clean water in 2011
(Source: Merem et al., 2017)

Table 4. Cholera Cases 28/09/2010 (Waterborne Diseases) in Nigeria

S/N	Cases of Cholera infection	Death	States Recorded
1	13,000	1,250	Nigeria
2	3,310	781	Katsina
3	1,469	118	Adamawa
4	2,651	162	Borno
5	2,293	94	Bauchi
6	1,381	80	Gombe
7	118	13	Zamfara
Total	11,222	1,248	

Source: Federal Government of Nigeria (FGN)

6.0 THE NIGERIA'S INSTITUTIONAL PERSPECTIVE OF WATER SUPPLY AND SANITATION SERVICES

The institutional rationale for water supplies and sanitation services in Nigeria arises from the following needs: to protect available sources of water; to ensure wider urban and rural water supply and sanitation coverage; to respond to and fit in with wider global initiatives and goals; as an emergency response to the water and health needs of the population; to regulate activities in the sector, among several others. The need to protect available sources of water guided by various colonial and post-colonial policies and regulations in the water sector. Consequently, what could be regarded as water and sanitation policies were subsumed under wide-ranging regulatory instruments scattered in various documents as summarized in Table 5.

Table 5: Relevant Colonial and Post-colonial Regulatory Instruments in the Water and Sanitation Sector

S/N	Relevant Statutes	Main provisions
1	The Waterworks Act of 1915	Specifically to keep water from being polluted by obnoxious or harmful matters
2	The Minerals Act of 1917	The law vests the Head of State of Nigeria with the power to make regulations for the prevention of pollution of any watercourse
3	The Public Health Act of 1917	It prohibits the fouling of water and vitiation of the atmosphere by harmful human activities
4	The oil in Navigable Waters Act, 1968	It prohibits water pollution by oil spillage
5	The Petroleum Act, 1969	It covers prevention of pollution by inland waters, rivers, lakes and watercourses
6	The Land use Act of 1978	Ownership of Land linked to ownership of groundwater resources
7	The River Basin Development (RBDA) decree/Act of 1976, 1987 & 2004	To ensure a Pan-Nigerian programme for comprehensive and integrated water resources development
8	The Environmental Impact Assessment (EIA) decree/Act 1992 & 2004	The law seeks to protect the physical and aquatic environment
9	Water Resources decree/Act of 1993 & 2004	Nigeria's water resources now exclusively in the control of the Federal Government of Nigeria
10	The 1999 Constitution	Guarantees the Right of access of every citizen to water
11	National Policy on Environment 1989	Protection of the environment
12	National Guidelines and standards for Environmental pollution control (1991)	Pollution control in watercourses as part of the environment
13	National Effluent Limitation Regulation 1991	Control of discharge of industrial waste and sewage into watercourses
14	Pollution Abatement in Industries and Facilities Generating wastes Regulation 1991	Control of industrial pollution
15	Waste Management Regulation, 1991	Waste Management
16	Nigerian Industrial Standards for potable Water and Natural Mineral Water, 1992	For the public health protection
17	National Environmental Standards and Regulations Enforcement Agency Act, 2007	Captures a wide range of environmental protection, coordination and enforcement functions
18	Nigerian Standard for Drinking Water Quality, 2007	For the public health protection

Source: Akpabio (2012)

Such protective regulatory instruments revolved around the 'right of ownership' legislation and measures to integrate and regulate standard practices. The Land Use Act of 1978 and the Water Resources decree of 1993 (updated as Water resources Act of 2004) in such context could best qualify as a right-based approach for protecting available water resources. Realizing that the Land use Act (which linked the ownership of land resources to water resources) could not help achieve the aim of protecting water resources especially from powerful interest groups of resource users and Corporation, the Federal Government of Nigeria came up with the Water Resources Management decree of 1993 and Water Resources Act of 2004. The law vested in the federal government the right to use and control available surface and groundwater and all water in any water-course affecting more than one state, for the purpose of promoting the planning, development, and regulation in the water resources sector. The Water Resources Act becomes only enforceable where a conflict of interests over the right of water resources poses a manifest threat to a particular water resource and large-scale developmental and infrastructural needs are

envisaged for the wider and larger interest of the citizens and the State. In Nigeria, inter-state and inter-community conflicts over shared water resources are common and often threaten the effective utilization of such resources. Resolving this is important in a multi-ethnic country such as Nigeria. Establishing and clarifying rights of ownership was an important first and primary step (though lately realized) in evolving management, legislative instruments and regulatory policies in the water sector. The second and the secondary step was the emergence of national-level legislation such as the Water Works Act (1915), the Minerals Act (1917), the Oil in Navigable Water Act (1968), National Guideline and Standard for Environmental Pollution (1991), the Environmental Impact Assessment (1991), among several other legislations to protect water sources from the pollution of any form as well as other activities that will be seen to be inimical to public health. In essence, it is here argued that the first-generation regulatory instruments (1915-1969) were more interested in protecting sources of available water resources. Such regulatory instruments were mostly colonial based public health protection plans arising from the awareness of the rising human impact on available sources of drinking water supplies. Nwaka (1990) argued that the British colonial rule neither anticipated nor approved of the growth of large African urban populations possibly to avoid political subversion and social disorganization. However, spontaneous growth of population and the rise of urbanization presented a new challenge of environmental health which probably accounted for the emergence of related public health regulations basically targeted at protecting the small colonial population residents in the cities.

The subsequent generation of regulatory instruments (1978-date) was more pan-Nigerian, at least on paper, as they took a more holistic look at the protection of available sources of water. Important highlight about that period was the establishment and clear definition of ownership interest in the water resources sector as a measure to ensure effective control and management. Policies and programmes that subsequently emerged within the context of 'right of ownership' over water resources were although basically designed to help attain agricultural productivity. For a country that was aiming at guaranteeing food security to its rapid population, giving priority to the productive uses of water was an important first step in the development process. With rising population growth and socio-economic activities as well as the emergence of urban centers, the interest of government and public agencies to guarantee adequate water supplies and ensure efficient management and disposal of human and related waste materials became another urgent challenge. In the colonial period, such a challenge was responsible for the emergence of segregative public water supply services to serve few towns including Lagos, Calabar, Kano, Ibadan, Abeokuta, Ijebu Ode and Enugu with substantial British population. The schemes were maintained with revenue from water rate collection with virtually no operational subvention from the government. With the creation of regional governments in the early 1950s the water supply undertakings continued to maintain the schemes but the financial and technical responsibilities for developing new water schemes were taken over by the regional governments who also assigned supervisory high-level manpower (Water Engineers and Superintendents) to the water supply undertakings. For the period of the assignment, all the allowances and part of the salaries of these

officers were from revenue generated from their water rate, while they still retained their employment and seniority in the regional service (FGN, 2000). With rising demands and increasing costs, there was a necessity for external loans as well as further decentralization of management arrangements. Consequently, the regions were requested to set up independent bodies such as Water Corporations/Boards to develop, operate and manage the water supply undertakings. This led to the formation of the first Water Corporation in 1966 by the then western region with all the public water supply undertakings in the region, including their staff, assets and liabilities were taken over by the Water Corporation. At the moment, all the thirty-six (36) States of the federation and the Federal Capital Territory have Water Boards/Corporations or Public Utilities Boards managing their public water supply undertakings.

These efforts are supplemented by Local Governments authorities who supply water to small villages in their areas of jurisdiction. The Federal Government is also involved in water supply through the Federal Ministry of Water Resources and the River Basin Development Authorities (RBDAs). Although the colonial water and sanitation policies have been criticized for their discriminatory and segregative contents and practices (Nwaka, 1990), studies have equally shown that the post-colonial policies on water and sanitation did not significantly differ from their colonial counterparts given that available regulatory instruments and practices with service priorities focused on the rich over the poor and urban over the rural areas (Udom, 2011; Dung-Gwon, 2004 & Gabriel and Abraham, 2009). Given that access to water is a universal and constitutionally guaranteed right, providing adequate water supplies and sanitation services has always been at the core of public duty and responsibility to the population. Consequently, numerous versions of public water supply and sanitation policies by the Nigeria government over the years (Table 6).

Table 6: Relevant Water and Sanitation Policies

S/N	Policy Title	Key Provision
1	National Policy on Environment, 1989	Focuses on water quality regulation and standard as well as pollution control
2	National Rural Water Supply and Sanitation Policy, 2000	Focuses specifically on rural water and sanitation through community participation. The programme targets were to increase water coverage from 43% to 80% by 2010 and 100% by 2015. The sanitation coverage was to be increased from 32% to 60% by 2010 and 90% by 2015
3	National Water Resources Management Policy, 2003	This recognizes water as an economic good, opted for integrated and demand-driven services
4	National Water and Sanitation Policy, 2004	This operated strictly in line with the demand-driven approach of the National Water Resources Policy
5	National Environmental Sanitation Policy NESP), 2005	A bit comprehensive as it touched on a range of issues including solid waste, medical waste, excreta waste, sewage management, food sanitation and hygiene, sanitation at public places, adequate potable water supply, urban drainage management and hygiene education etc.
6	National Economic Empowerment and Development Strategy-NEEDS (2003-2007)	This attempted to address water and sanitation issues in clearly defined spatial units namely, urban areas, small towns, rural areas. NEEDS placed high priority on the development of safe and

		adequate water supply and sanitation services as a key instrument for fighting poverty and accelerating socio-economic development
7	National Development Plan (NDP), 2007	As one of the seven point development agenda of the Late Yar a dua's administration, targeted subsidies on water and sanitation facilities were planned for the poor

Source: Akpabio (2012)

At the Federal level, water supply and sanitation provisions fall within the responsibility of the Federal Ministry of Water Resources. Other federal agencies with related responsibilities include the Federal Ministries of Environment and the Federal Ministry of Health. While the Federal Ministry of Environment has responsibilities in the area of environmental quality, the Federal Ministry of Health is involved in responding to challenges in sanitation related diseases such as controlling vector-borne diseases, malaria, guinea worm, schistosomiasis, promotion of sound food hygiene, building capacity through awareness creation and training environmental health practitioners. Other sector ministries with some direct or indirect responsibilities include the Federal Ministries of Education, Science and Technology, Women Affairs, Inter-governmental Affairs, Youth Development and Special Duties. These sector ministries by their various program, are involved directly or indirectly in promoting sustainable development of water supply and sanitation services in Nigeria. For instance, the Federal Ministry of Science and Technology becomes an important advisory and procurement ministry when technological solutions to water supply and sanitation provisions are emphasized. The above ministries are, to a large extent, duplicated at the State level structure with responsibilities of regulation, legislation, policies, development, management, etc. at the respective State domain. In most cases, Water Boards or Water Corporations are used at the State level for urban water services while rural water supply and sanitation (RWSS) is used for rural water supply and sanitation. All the 774 local government authorities are further involved in the provision and management of rural water supply and sanitation within their respective domains, mostly through various community organizations including water and sanitation committees (WASCOMS). Private sector participation in the Rural Water and Sanitation (RWSS) sub-sector has been in the form of consultants, suppliers, manufacturers, artisans etc. Non-Governmental Organizations (NGOs) are even becoming equally relevant and more interested in the RWSS through collaboration with relevant authorities, communities and donor organizations.

While urban areas have enjoyed a fairly long policy and administrative attention in water supply and sanitation services, its rural counterparts came to the picture in relatively recent times (from the late 1970s). Beyond the River Basin Development Authorities (RBDAs) which came with the aim of ensuring comprehensive pan-Nigerian water resources development, serious efforts at addressing rural water supply and sanitation concerns emerged as a response to the standard of universal coverage of water and sanitation set by the International Drinking Water Supply and Sanitation Decade (IDWSSD, 1981 to 1990) as well as the recommendation of the World Summit for Children (1990) which equally set targets of universal access to safe water and sanitation (Nwankwoala, 2011). Since then, there have been many international declarations and agenda on

public health issues including the Millennium Development Goals (MDG). Such international declarations and directives probably contributed to engendering policy and program interventions in the water and sanitation sector in Nigeria. However, some of the initiatives that emerged were more general in orientation for which water supply and sanitation services were subsumed. One of such initiatives was the Directorate for Food, Roads and Rural Infrastructure (DFRRI) which was initiated in 1985 for the purpose of providing rural infrastructures, for which rural water and sanitation (RUWATSAN) program emerged. Beyond mere declarations and directives, regional and international agencies and organizations have been actively involved at various scales and levels in water and sanitation programs in Nigeria. For instance, the African Development Bank Group had been around in the sector for over 40 years in Nigeria (since in 1971). Many other agencies and organizations are also involved at various levels in addressing issues bordering on rural water supply and sanitation including but not limited to the following (Nwankwoala, 2011): UNICEF assisted State Water and Sanitation Projects (1981-2010), Japanese International Cooperation Agency's (JICA) rural water supply projects (1992-1994, United Nations Development Project (UNDP)-Rural Water supply (1988-1993), European Union (EU) water and sanitation program (2002-2009), Department for International Development's (DFID) water and sanitation pilot project (2002-2008), Water Aid's rural water supply and sanitation program (1996-2010), United State Agency for International Development, World Health Organization, World Bank, Among several others.

Involvements of these bodies have been restricted to financing, infrastructural provisions of boreholes, hand-dug wells, latrines of different types in urban, rural areas and public spaces such as markets, worship places, schools, health clinics etc.; as well as capacity building on public health through education and awareness creation. Current reforms in the water and sanitation sector beginning from 1999 to date have been premised mostly on the conditional loans or its expectation from multilateral financial institutional (mostly the World Bank, International Monetary Fund, African Development Bank, etc.) as well as foreign direct investments. The review in this study shows that an average of about half of the Nigerian population has access to improved drinking water, the sanitation sector remains poorly covered (Onabolu et.al, 2011; Nyong and Kanaroglou, 1999; Sanusi, 2010; WHO, 2007; NBS, 2007; Adekunle et.al, 2004; Nwankwoala, 2011). Most efforts at addressing the sanitation challenges are fragmentary and ad hoc mostly dictated by emergencies and pressures from water-borne, waterwashed, water-based and water-related problems and catastrophes. Such responses are coordinated sectorially or completely independent of any specialized ministries or relevant government agencies. Many of such intervention programs adorn public governance spaces including the Nigerian Guinea Worm Eradication Program (NIGEP) supported by many international and local partners and institutions; National Committee on Certification for Guinea Worm Diseases Eradication; as well as some intervention programs on diarrhea, dysenteries, cholera and malaria, among several others. The inability of the numerous programmes and related ones to deliver the targeted results of comprehensively addressing the problems arising from the water supply and sanitation may

probably have been responsible for the emergence of such focused reforms and initiatives such as the National Rural Water and Sanitation Policy (launched in 2000); the Presidential water initiative (water for people, water for life) launched in 2003; the urban water sector reform programme (2000); the National Environmental Sanitation Policy (2005); and the national water and sanitation policy (2004). These policies and programmes not only set a clear time frame and number of citizens to be covered for specific periods, they were clearly framed to address urban and rural water and sanitation needs. Some of these policies carried the prospect of engaging the private sector as partners in the water supply and sanitation provision agenda. The National Rural Water and Sanitation policy placed much emphasis on rural water supply over sanitation. Its programme targets were to increase water coverage from 43% to 80% by 2010 and 100% by 2015 while the sanitation coverage was to be increased from 32% to 60% by 2010 and 90% by 2015. Placing high priority on rural water supply coverage over sanitation was understandable given the role of water as the first entry point for addressing the challenges of sanitation. By using the rural areas as the target, the National Rural Water Supply and Sanitation policy set out to address the long-standing infrastructural neglects that Nigeria's rural areas have historically been subjected to. Despite the lofty goals of the policy, progress in delivering its ambitious targets could not be tracked. Its oblivion probably led to the emergence of the National Water and Sanitation policy in 2004 and the National Environmental Sanitation Policy in 2005. While the National Water and Sanitation Policy introduced the demand-driven approach into water and sanitation services, the National Environmental Sanitation policy focused more on public environmental cleanliness and waste management. For instance, the national environmental sanitation policy (developed by the Federal Ministry of Environment, 2005) has as its goal to ensure a clean and healthy environment by adopting efficient, sustainable and cost-effective strategies, to safeguard public health and wellbeing in line with national development. The Presidential Water Initiative (PWI) aimed to increase access to water and sanitation services to 100 percent in State Capitals; 75 percent in other urban areas; and 66 percent in rural areas. The National Urban Water Sector Reform Project (introduced in 2000 and re-launched in 2005 in its second phase) aimed at increasing access to piped-water networks in urban areas. It has four main components namely, system rehabilitation and expansion, public-private partnership, capacity building and project management; and policy reform and institutional development.

Although, Nigeria seems to have progressed with inconsistent investment in WaSH, thereby leaving a greater number of her population without safe water, sanitation and hygiene. The findings of this study were affirmed by the stakeholder's roundtable on Sustainable Access to Water and Sanitation by the Nigerian Economic Summit Group (NESG) held on 12th March 2020 and upheld that about 150 million Nigerians lack basic handwashing facilities with soap and water. Basic hygiene practices for Nigerian citizens remain the focal objective of the Federal Ministry of Environment and Federal Ministry of Health which has been left dormant (DFID, 2005; Ademiluyi and Odugbesan, 2008; Nwankwoala, 2011). The World Water day held on 22nd March 2020, emphasis on the essential role of hand washing as one of the most important contributions we can make to slowing down the transmission of COVID-19 and keeping ourselves and our communities

safe. This study, therefore, overviewed the impact of WaSH in Nigeria as a measure of curtailing the spread of COVID-19.

The study, therefore, concludes that the facilities for WaSH remain poorly covered, grossly inadequate and simply not safe to use for maintaining good hygiene in communities and institutions like schools. These are caused by the significant gap between policy-making and implementation. Information from this study will serve as a guide to the public, governmental and non-governmental agencies on the level of Water, Sanitation and Hygiene (WaSH) programmes in Nigeria. Also information from this study will aid government on policy and decision making to curtailing spread of COVID-19 in Nigeria.

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