Water Supply in Nigeria: 1914-2014

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Abstract

This paper outlines initiatives by national and state governments as well as the external support bodies to develop Nigeria's water sector over the last century; in the process identifying factors have hindered national access to improved water supply.

Beyond lamenting that Nigeria is off track towards achieving the water target of the MDG goals, the paper makes key recommendations towards ensuring the newly proposed post 2015 target of universal coverage of improved water supply by 2030 is realized in Nigeria.

Keywords: Nigeria, drinking water, MDG, SDG, right to water

Introduction

Nigeria became a nation in 1914 with the amalgamation of the protectorates of the then Southern and Northern Nigeria by the British colonial power. Nigeria is located in the tropical zone of West Africa and has a land mass of approximately 923,768 square kilometers falling between latitudes 40 1' and 130 9' N and longitudes 20 2' and 140 30' E. It shares border with four countries: the Republic of Niger to the north, Republics of Chad and Cameroon to the east, and Republic of Benin to the west; and bordered on the south by the Atlantic Ocean with a coastline which measures about 800 kilometers. The country's north-south extent is about 1,050 km and its maximum east-west extent is about 1,150 km. (Kehinde Oshodi, 2005)

Conceptual framework

This paper is limited to discussing related to water supply in Nigeria in the last century, and water supply is defined as the collection, purification and distribution of water to household, industrial, commercial or other users; and excludes irrigation system operation for agricultural purposes; covered under water resources (National Bureau of Statistics, 2014)

Methodology

The methodology adopted for the preparation of this paper is the review of secondary data on water supply in Nigeria. These includes previous related papers published in journals, books, briefing notes, and presentations sourced online and in the office of Bread of Life Development Foundation, a Lagos based non-governmental organization.

Findings and Discussion

History of public water supply in Nigeria

The history of organized supply of pipe-borne water in Nigeria can be traced to the colonial era (1900 to 1960) when many small water supply schemes were established to provide water, essentially to the colonial government reserved (residential) areas. At that time, the responsibility for operation and maintenance of these facilities were in the hands of the Native Authority (and later Regional Government). Public works departments were established by Local Authorities in a few towns like Kano, Ibadan, Abeokuta, Ijebu Ode and Enugu; while those in Calabar and

Lagos were established by Native Administration. (Mohammed Iliyas, et al., 2000; M.A.K Abubakar, 2000).

The first water treatment plant with a capacity of 11,000m3/d (2.42 mgd) was installed in 1910 at Iju village, Ogun state, abstracting raw water from the spring trenches within the Iju river and supplying the residential reservation of the colonial administrators living in present day Ikoyi, Lagos, State, and the first cast iron trunk main "A" of nominal diameter 28" (700 mm) was laid to distribute thus supply. Subsequent expansion was made to the plant in 1943 by increasing its capacity to 27,000m3/d (6 mgd), accompanied by the laying of another cast iron trunk main "B" of nominal diameter 24" (600mm). The plant capacity was again increased in 1954 to 50,000m3/d (11mgd). Additional abstraction investments were developed at Akute, contiguous to the River Ogun, which is the most bountiful source of surface raw water available to the Lagos metropolis till today. (Lagos Water Corporation, 2014)

The first water corporation was formed in the Western region in 1966 with the staff of the Water Division of the Ministry of Works constituting the nucleus. (Kashim A. Ali, 2012). The 1970s, however, witnessed the creation of State Water Agencies (SWA) by several state agencies purely charged with the responsibility of providing water supply to urban, semi-urban and in some cases rural areas. At the Federal level, the Federal Ministry of Water Resources was established with only one department in 1975, and in the following year, nine River Basin Development Authorities (RBDAs) were established (as part of the 3rd National Development Plan) to provide bulk water, primarily for irrigation. (Kashim A. Ali, 2012)

Sources of Water

Water for drinking in Nigeria comes from three major sources, generally: atmospheric water in form of rain, and ultimately the source of drinking water in most rural areas; surface water classified as rivers, streams, lakes or reservoirs and ponds; and ground water obtained from boreholes sunk into water-bearing rocks or aquifers, or water that gushes out from rocks such as in springs (C. Ifeanyi, 2011).

Table 1: Estimated National Coverage for Urban and Rural water, 2014

URBAN WATER					
Estimated coverage 2014 update					
Year	Total improved	Piped onto premises	Other improved	Other unimproved	Surface water
1990	78%	33%	45%	16%	6%
1995	78%	27%	51%	16%	6%
2000	78%	20%	58%	17%	5%
2005	79%	14%	65%	16%	5%
2010	79%	8%	71%	17%	4%
2012	79%	6%	73%	17%	4%

RURAL WATER					
Estimated coverage 2014 update					
Year	Total improved	Piped onto premises	Other improved	Other unimproved	Surface water
1990	28%	3%	25%	23%	49%
1995	33%	3%	30%	24%	43%
2000	38%	2%	36%	26%	36%
2005	42%	2%	40%	28%	30%
2010	47%	2%	45%	29%	24%
2012	49%	1%	48%	30%	21%

TOTAL WATER					
Estimated coverage 2014 update					
Year	Total improved	Piped onto premises	Other improved	Other unimproved	Surface water
1990	46%	14%	32%	20%	34%
1995	50%	12%	38%	22%	28%
2000	55%	10%	45%	22%	23%
2005	59%	8%	51%	23%	18%
2010	63%	5%	58%	23%	14%
2012	64%	4%	60%	23%	13%

Source: WHO/UNICEF JMP, 2014

Surface Water

This is water that is abstracted directly from streams, rivers and lakes. Approximately 13,000 m^2 of the land is covered by water (1.4%) and the remaining 98.6% of the land cover ranges from thick mangrove forests and dense rain forests in the south to a near-desert condition in the northeastern corner of the country. Nigeria's total annual renewable water resources are estimated at 286.2 m^3. Annual internally produced resources amount to 221 m^3, made up of 214 km^3 surface water and 87 m^3 groundwater, while 80 m^3 of the latter is assumed to be overlap between surface water and groundwater. External water resources are estimated at 65.2 m^3/year,

being surface water coming from Niger, Cameroon and Benin. Exploitable surface water resources are estimated to be 80 percent of the natural flow, which is about 96 m^3/year. Annual extractable groundwater resources are about 59.51 m^3, distributed as follows: 10.27 m^3 in northern Nigeria; 25.48 m^3 in the Middle Belt; 23.76 m^3in the south. Dam capacity is estimated to be 45.6 km^3. (Kehinde Oshodi, 2005)

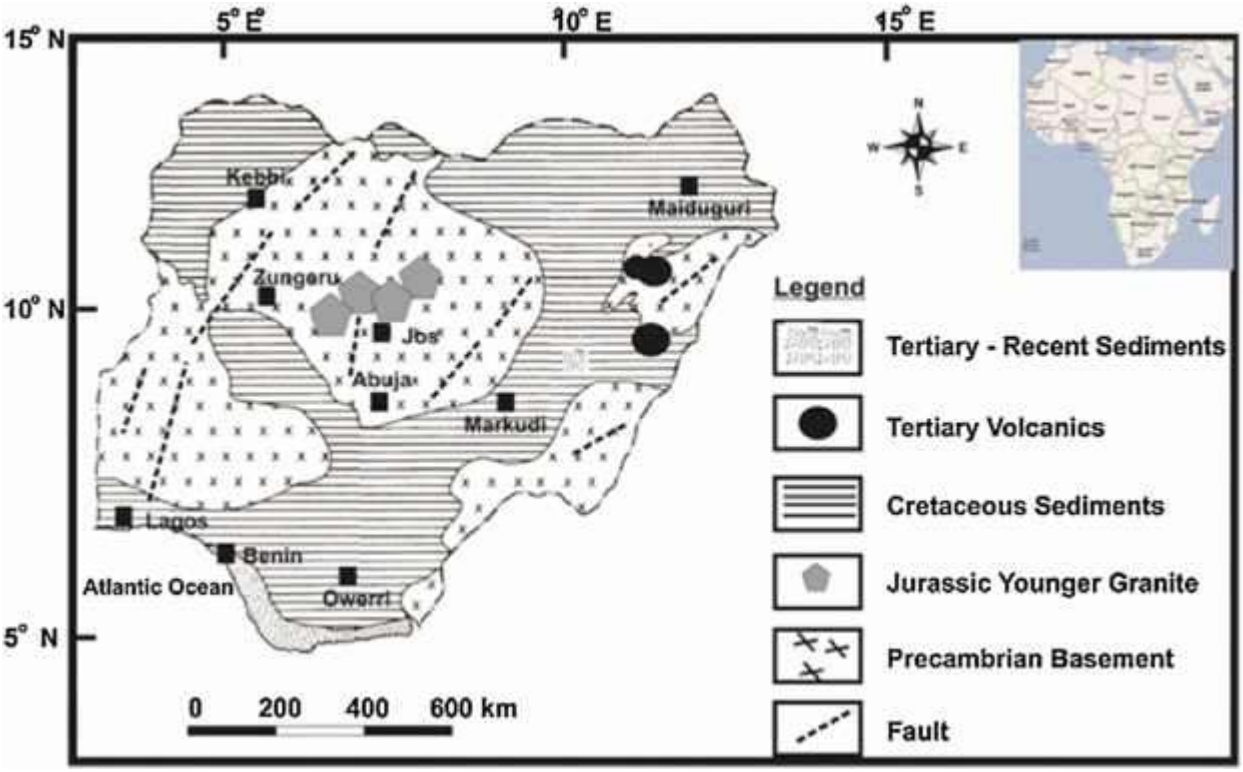
Groundwater

Well over 60 percent of Nigerians depend upon groundwater for their water supply for domestic, industrial or agricultural use. (Martin Eduvie, 2003, 2004). Groundwater has been described as the main source of potable water supply for domestic, industrial and agricultural uses in the southern part of Nigeria especially the Niger Delta, due to long retention time and natural filtration capacity of aquifers (Odukoya et al., 2002; Agbalagba et al., 2011; Ehirim and Ofor, 2011).

Nigeria has three main geological formations spread over which determine its groundwater resources.

a. *The basement complex comprises over 60 percent of the country's area and are poor aquifers contributing little to the groundwater supply (Ayoade, 1975). It consists of low permeability rocks and groundwater occurs in and fracture zones with yields of between 1.0 and 2.0 l/s. (Lekan Oyebande, 2006) States covered by this include Osun, parts of Ogun, Kwara, Ekiti, Kaduna, Kano, Bauchi, Plateau, Jigawa, Adamawa, and Taraba.*
b. *The sedimentary basin formations such as the Tertiary deposits of the Chad-Sokoto basins, the Cretaceous deposits of the Niger and Benue troughs, and the sedimentary formation of the Niger Delta, yield groundwater in varying quantities. States covered by this include Lagos, FCT, Sokoto, Niger, Borno, Anambra, Edo, Delta, Benue, Rivers, and Enugu. Igneous and volcanic rocks occur mainly on the Jos Plateau.*
c. *The tertiary volcanic found in some parts of Cross River, Adamawa and Taraba states.*

Figure 1: Nigeria's geological formations



Source: Journal of Geophysics and Engineering Volume 9 Number 4

Nigeria's groundwater resources are categorized into eight recognized hydrogeological areas (Jim 2008):

a. *The Sokoto Basin Zone (yield range from below 1.0 to 5.0 liters per second L/s).*
b. *The Chad Basin Zone (yields are about 1.2 to 1.6 L/s from the Upper unconfined aquifer and 1.5 to 2.1 L/s from the Middle aquifer).*
c. *The Middle Niger Basin Zone (yields between 0.7 and 5.0 L/s and in the Niger valley is between 7.5 and 37.0 L/s).*
d. *The Benue Basin Zone (yields between 1.0 and 8.0 L/s).*
e. *The South-western Zone comprises sedimentary rocks bounded in the south by the coastal Alluvium and in the north by the Basement Complex.*
f. *The South-Central Zone (yields are from 3.0 to 7.0 L/s.)*
g. *The South-eastern Zone comprises Cretaceous sediments in the Anambra and Cross River basins*
h. *The Basement Complex (yields between 1.0 and 2.0 L/s)*

Table 2: Hydrological areas of Nigeria

	Name	Sub basins	% of Total area
1.	Niger North	**15**	**13.6**
2.	Niger Central	**23**	**16.9**
3.	Upper Benue	**17**	**16.9**
4.	Lower Benue	**16**	**8**
5.	Niger South	**12**	**5.9**
6.	Western Littoral	**16**	**11.1**
7.	Eastern Littoral	**17**	**6.5**
8.	Lake Chad	**21**	**21.1**
		153	

Source: Lekan Oyebande, Water resources in Nigeria

About 60% of the country is underlain by crystalline rocks, 20% by consolidated sedimentary materials, and 20% by unconsolidated sedimentary materials. Static water level in water wells ranges between zeros in parts of the coastal alluvium to 200 metres in some sedimentary areas. Well yield are unpredictable in the crystalline rocks found in many part of the North; where sufficient depth of weathering exists, the area may be suitable for operation of hand pump (minimum of 10 liters per minute), but only at specific localities where deep weathering and underlying fracture coincide are yields likely to be sufficient for motorized schemes. Groundwater quality in the country is good. Only in some areas are iron, nitrate or fluoride concentrations above recommended WHO levels.

Table 3: Typical borehole yield in selected locations in Nigeria

Geological formation	Location of borehole	State	Depth of borehole (ft)	Static water level (ft)	Yield (gal/h)
Abeokuta	Otta	Ogun	174	31	5 000
Coastal Plain sands	Agbor	Edo	210	60	9 000
Coastal Plain sands	Epe 1	Lagos	238	8	7 025
Alluvium	Epe 11	Lagos	238	52	12 100
Basement Complex	Ilorin	Kwara	95	13	3 580
Basement Complex	Dambanki-Gumel	Kano	250	120	740
Basement Complex	Maigamoka	Kano	255	122	7008

Source: *J.O Ayoade, Water Resources and their Development in Nigeria, 1975*

Policy framework

The National Water Supply and Sanitation policy, was developed in 2000 with the aim of ensuring the provision of sufficient potable water and adequate sanitation to all Nigerians in an affordable and sustainable way through participatory investment by the three tiers of government, the private sector and the beneficiary.

Before the development of the 2000 National Water and Sanitation Policy, the Federal Ministry of Water Resources in 1984 initiated the preparation of a National Water Resources Master Plan with FAO assistance to ensure optimum management of water resources. The master plan was completed in 1995 by Japan International Cooperation Agency (JICA). (K. Okoye et al., 2007). Other strategic policy documents and proclamations that earlier guided sectoral development include the United Nations International Drinking Water Supply and Sanitation Decade whose objective was to supply water to all citizens of the country between 1981 and 1990., (FGN, 2000), and the Rural Water Supply and Sanitation Sector Strategy and Action Plan, developed in 1992 as a framework of the National Rural Water Supply and Sanitation Programme (Nwankwoala, 2009).

The Federal Government introduced the National Economic Empowerment and Development Strategy (NEEDS) in May 2004 to address the country's key development challenges, including increasing access to safe drinking water for at least 60 per cent of the population. (National Planning Commission, NEEDS, 2004)

The "*Presidential Water Initiative"* (PWI): Water for People, Water for Life was launched in 2003 to increase access to WSS services to 100 percent in state capitals, 75 percent WSS access in other urban and peri-urban areas, and 66 percent WSS access in rural areas. The Good luck Jonathan administration launched the 'Transformation Agenda' in 2011, and in pursuit of this development paradigm the *'Presidential Summit on Water'* was convened February 2013 to discuss 'Innovative ways of funding the water sector in Nigeria' and it came up with several resolutions, on how private financing could be leveraged to develop the sector. Unfortunately, all these policies and programmes are yet to yield the desired result, as access to improved water supplies is still low in the country.

Nigeria

Table 4: National Drinking Water Coverage (*Source: WHO/UNICEF JMP, 2014*)

Source	Code	Year	URBAN						RURAL						TOTAL					
			Piped onto premises		Total improved		Surface water		Piped onto premises		Total improved		Surface water		Piped onto premises		Total improved		Surface water	
			Used in ests.	Not used	Used in ests.	Not used	Used in ests.	Not used	Used in ests.	Not used	Used in ests.	Not used	Used in ests.	Not used	Used in ests.	Not used	Used in ests.	Not used	Used in ests.	Not used
Demographic and Health Survey	DHS90	1990	31.1		78.4		4.9		3.3		33.3		51.9		13.1		49.2		35.3	
Multiple Indicator Cluster Survey	MICS95	1995																		
Census	CEN96	1996		33.6		81.8		5.3		3.9		40.2		36.3		15.6		56.7		24.0
Multiple Indicator Cluster Survey	MICS99	1999		21.1		70.5		6.4		1.9		48.0		32.0		9.9		57.4		21.3
Demographic and Health Survey	DHS99	1999	24.0		79.7		4.1		3.7		35.5		34.1		12.2		53.9		21.6	
Child Labour Survey	CLS00	2000	20.5		80.9			0.0	1.8		34.2			0.0	9.7		54.0			0.0
Core Welfare Indicator Survey 2002 conducted in six States only	CWIQ02	2002																		
Demographic and Health Survey	DHS03	2003	15.5		73.8		7.6		2.5		37.8		29.6		8.3		53.8		19.8	
Nigerian Living Standard Survey 2003-2004	NLSS04	2004	19.8		83.0		3.7		2.5		42.2		28.3		10.3		60.6		17.2	
Core Welfare Indicator Questionnaire	CWIQ06	2006	12.5		77.2		5.3		1.3		42.2		27.4		6.5		58.4		17.1	
General Household Survey	GHS06	2006	11.0		75.6		9.0		1.0		39.4		34.9		5.6		56.2		22.9	
Multiple Cluster Indicator Survey	MICS07	2007	12.6		75.7		3.6		1.1		37.4		28.6		6.5		55.4		16.9	
Nigeria Water Supply and Sanitation Baseline Survey	BLS08	2008	12.7		70.8		4.2		2.3		50.1		23.8		7.3		60.0		14.4	
Demographic and Health Survey	DHS08	2008	7.9		79.7		4.8		1.5		43.8		25.2		4.6		60.9		15.5	
Nigeria Living Standards Survey	LSS09	2009	9.6		81.9		6.1		2.8		44.8		27.8		6.1		62.7		17.3	
MEASURE DHS - Malaria Indicators Survey (MIS)	MIS10	2010	7.0		78.4		2.8		1.3		49.5		21.6		4.1		63.6		12.4	
Living Standards Measurement Study (LSMS)	LSMS11	2011	5.5			70.4		12.8	1.6		51.9		27.4		3.5					
Multiple Indicator Cluster Survey 2011	MICS11	2011	9.2		85.9		1.6		2.0		53.3		19.4		5.6		69.5		10.6	

Legal framework

The first set of legislations regulating the sector include the Waterworks Act of 1915, the Waterworks Act, 1915; the Minerals Act 1917 Cap 226 LFN; and the Public Health Act, 1917.

Table 5: Major Water related legislations in Nigeria- 1915-2012

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

Compiled by Emmauel Akpabio (2012)

More recent legislations include the Oil in Navigable Water Act Cap 337, 1968, which prohibits the discharge of contaminated oil unto prohibited sea greens; the Petroleum Act; 1969 give which amongst other provisions seeks to prevent the pollution of watercourses and the atmospheres; the Harmful Waste (Special Criminal Provisions, etc.) Act 1988 prescribes Criminal Prosecution for dumping of harmful wastes in Nigerian Territorial Waters or its Inland Waterways; the Nigeria Ports Authority Decree 1991 empowers the Nigerian Ports Authority to supply water to shipping vessels and control pollution arising from oil or any other substance from ships using the port limits or their approaches; he River Basins Development Authorities Act 1986 establishes and regulates all River Basin Authorities in Nigeria; and the Niger Delta Development Commission (Establishment) Act, 2000 empowers the Niger Delta (Joint) Development Commission to conceive, plan and implement development projects for waterways and water supply in the Niger Delta.

The primary federal law regulating water is the **"**Water Resources Act 101 of 1993" which in section 1 vests the Federal Government with *'the right to the use and control of all surface and groundwater and of all water in any water-course affecting more than one State".* Notwithstanding this provision, the Law in Section 2(i) granted Individuals the right to *"take water without charge for his domestic purpose or for watering his livestock from any water course to which the public has free access".*

A new National Water Resources Bill that is expected to repeal and replace the Water Resources Decree 101 of 1993 is presently being debated by Nigeria's Federal law makers.

The 1999 Constitution of the Federal Republic of Nigeria, and in fact all other laws, gave the Federal Government jurisdiction over shared water resources, la r g e d a m s , f o r m u l a t i o n a n implementation of policies for overall water resources management.. However, the sourcing, production, supply and distribution of water other than those stated above falls under the Concurrent Legislative list under Part 11 of the 1999 Constitution. Also each federating state is permitted by the Constitution to legislate on water matters as it affects such state.

The Fourth schedule of the Constitution also grants the 774 Local Government Council in the country the power to make laws and administer programmes related to provision and maintenance of public conveniences, sewage and refuse disposal. Besides the Constitution of the Federal Republic of Nigeria, there are several federal and state laws that regulate the supply and usage on water in Nigeria.

Institutional framework

The Federal Ministry of Water Resources (FMWR) was created in 1976 and charged with the responsibility for formulating and coordinating national water policies, management of water resources, , and approving development projects.

The National Water Resources Council (NCWR) was established in 1980 as the highest water resources policy making body in Nigeria, chaired by the Honourable Minister of Water Resources. Its membership includes representatives from the Federal Ministry of Environment and all State Government Commissioners responsible for Water Resources matters (including the Chairman of the Federal Capital Territory Water Board). Under the NCWR resides the National Technical Committee on Water Resources (NTCWR), chaired by the Permanent Secretary of the Federal Ministry of Water Resources. (Adah, P.D. et al., 2013)

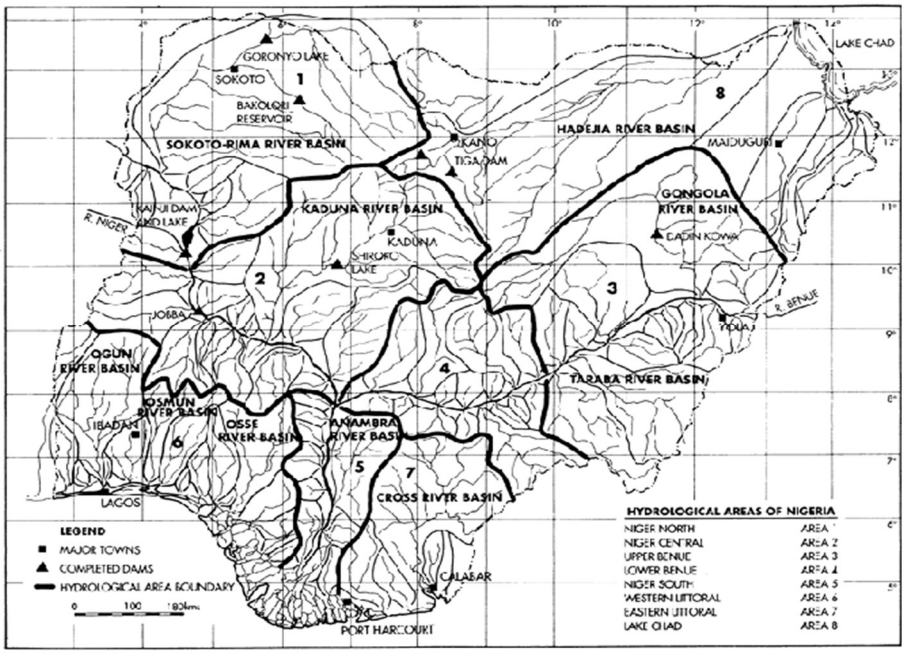
The National Water Resources Institute (NWRI) was legally established in 1985 and is responsible to FMWR for engineering research functions related to major water resources projects and training sector professionals and technicians.

The River Basin Development Authorities (RBDAs) were created 1986 and saddled with the responsibility for planning and developing water resources, irrigation work and the collection of hydrological, hydro-geological and meteorological data. Nigeria has thirteen River Basin Development Authorities:

a. Anambra River Basin Development
b. Benin-Owena River Basin Development Authority
c. Chad Basin Development Authority
d. Cross-River Basin Development Authority
e. Hadejia-Jama'are River Basin Development

f. Lower Benue River Basin Development Authority
g. Niger Delta Basin Development Authority
h. Ogun-Osun River Basin
i. Development Authority
j. Sokoto-Rima River Development Authority
k. Upper Benue River Basin Development Authority
l. Lower Niger River Basin
m. Development Authority
n. Upper Niger River Basin
o. Imo River *Basin Development Authority*

Figure 2: Nigeria's River Basins



Source: http://www.fao.org/docrep/005/T1230E/T1230E02.htm

Nigeria is also member of two regional authorities dealing with the management of shared water resources:

a. The Niger Basin Authority (NBA) was formed in 1964 and is made up of the nine countries that share the Niger Basin (Guinea, Côte d'Ivoire, Mali, Burkina Faso, Algeria, Benin, Niger, Chad, and Cameroon). The principal aim of the authority is to ensure the integrated development of the basin.
b. The Lake Chad Basin Commission (LCBC) comprises representatives of Cameroon, Central African Republic, Chad, Niger and Nigeria. Its objective is to ensure a rational

and equitable development of natural resources, including water, of the Lake Chad Region.

Table 6: River Basins Development Authorities in Nigeria

S/N	*Name of Authority*	*Area of Operation*	*Headquarter*
1	Anambra River Basin Development	The whole of Anambra, Enugu and Ebonyi States	Enugu
2	Benin-Owena River Basin Development Authority	The whole of Edo, Ekiti, Ondo States and area of Delta State drained by the Benin, Escravos, Forcados and Ramos Rivers Creek' Systems.	Benin.
3	Chad Basin Development Authority	The whole of Borno and Yobe States and area of Adamawa State drained by the Yedseram and Goma River Systems	Maiduguri
4	Cross-River Basin Development Authority	The whole of Akwa Ibom and Cross River States	Calabar
5	Hadejia-Jama'are River Basin Development	The whole of Jigawa, and Kana States, and the area of Bauchi State drained by the Misau and Jama' are River System	Kano
6	Lower Benue River Basin Development Authority	The whole of Benue, Nasarawa and Plateau States	Makurdi
7	Niger Delta Basin Development Authority	The whole of Rivers, Bayelsa and part of Delta States	Port -Harcourt
8	Ogun-Osun River Basin Development Authority	The whole of Lagos, Ogun, Osun, and Oyo States	Abeokuta
9	Sokoto-Rima River Development Authority	The whole of Katsina, Kebbi, Sokotoand Zamfara States	Sokoto
10	Upper Benue River Basin Development Authority	The whole of Gombe and Taraba States and the area of Bauchi State drained by the Gongola River system and the whole of Adamawa excluding the area	Yola

		drained by the Yedseram River system	
11	Lower Niger River Basin Development Authority	The whole of Kwara and Kogi States	lIorin
12	Upper Niger River Basin Development Authority	The whole of Niger, Kaduna states and the Federal Capital Territory	Minna
13	Imo River Basin Development Authority	The whole of Abia and Imo States	Owerri

The Federal Ministries of Environment and Health also have sector-related mandates in Nigeria. The mandate of the Federal Ministry of Health includes standards formulation and regulation of drinking water quality, as well as policy development and control and prevention programmes for water- and sanitation-related diseases through its Public Health department. Other Federal ministries with some involvement in the sector include Education, Women Affairs, Intergovernmental Affairs, Youth Development, Special Duties, and the National Orientation Agency.

The National Task Group on Sanitation is a multi-sectoral group formed in 2007, with FMWR as the lead agency. It coordinates water sanitation and hygiene programming as well as policy implementation at Federal level.

At State Government Level in Nigeria, responsibility for potable water supply was traditionally entrusted to departments of the state governments (36 in number). As the importance of drinking water supply grew during the 1970s, most water departments were gradually transformed into State Water Agencies, Boards, or Corporations to provide urban, semi-urban and, in some cases, rural water supply. Each SWA has, in general, been established under an edict to develop and manage water supply facilities within its respective state and to meet sound financial objectives. SWAs are responsible to their state governments, generally through a State Ministry of Water Resources (SMWR), though in some cases under alternative arrangements. In some states, responsibilities for rural water supply remain with or have been transferred back to a state government department; additionally, in several states, state rural water and sanitation agencies

have been set up largely to implement the FGN/UNICEF RWSS program. Known as Rural Water Supply and Sanitation Agencies (RUWASSAs), they monitor and coordinate all activities in the rural sub-sector, carry out training and support capacity building activities at LGA and community level, and to implement the provision of safe water supply.

Table 6: Estimated trends of drinking water coverage

Nigeria	Drinking water coverage estimates					
	Urban (%)		Rural (%)		Total (%)	
	1990	2012	1990	2012	1990	2012
Piped onto premises	33	6	3	1	14	4
Other improved source	45	73	25	48	32	60
Other unimproved	16	17	23	30	20	23
Surface water	6	4	49	21	34	13

Source: WHO/UNICEF JMP, 2014

At Local Government level, all the 774 Local Government Areas (LGAs) are responsible for providing rural water supply and sanitation facilities in their areas, although only a few have adequate resources and relevant skills to address the problems. They are also responsible for the establishment, operation, and maintenance of rural water supply schemes and sanitation facilities; and for establishing local water, sanitation and hygiene (WASH) departments, that oversee the delivery of water and sanitation services, and provide support to communities in the facilities' management, sanitation promotion, and hygiene education.

Several development partners such as UNICEF, UNDP, World Bank, DFID, JICA, CIDA, EU, Global 2000 WaterAid, Concern Universal, and Tulsi Chanrai Foundation are supporting government agencies and civil society organizations to implement WASH programmmes, with some intervening directly in service delivery.

Non state actors also implement sectoral programmes, but most of their activities is donor driven.

At the community level are Water Consumer Associations and Water supply, Sanitation, and Hygiene Committees (WASHCOMs) for management and maintenance of water supply facilities in small towns and rural communities respectively. Lastly, but not the least is the Private sector involved in project implementation, service delivery, and infrastructural financing (FGN, 2000).

Coverage and Access

Table 7: Access to Water and Sanitation in Nigeria

Survey	Year	Access to improved drinking water source			Access to improved sanitation		
		Total	Urban	Rural	Total	Urban	Rural
NDHS*	1990	45.0	78.0	33.0	37.0	50.0	33.3
JMP****	1990	50.0	80.0	34.0	26.0	33.0	22.0
MICS1*	1995	51.0	80.0	39.0	57.0	82.0	48.0
NDHS**	1999	53.1	80.2	41.4	41.0	53.0	36.0
MICS2**	1999	54.2	70.6	48.2	56.0	75.4	44.0
NDHS**	2003	42.3	64.6	29.8	41.4	53.0	35.0
JMP****	2006	47.0	65.0	30.0	30.0	35.0	25.0
CWIQS***	2006	51.4	73.4	40.0	57.6	77.0	47.6

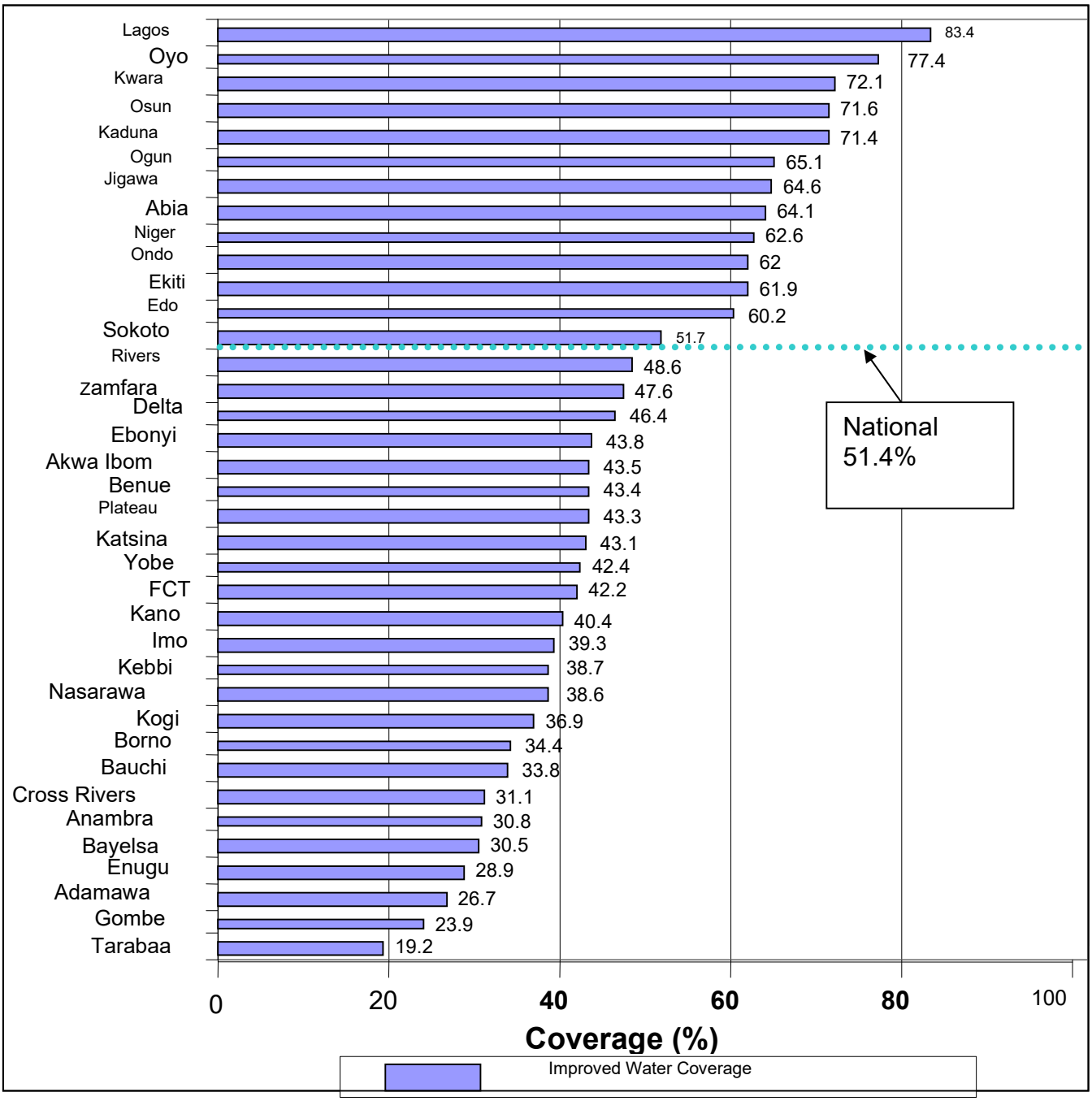
Sources:

- The Nigeria Demographic & Health Survey (NDHS) by NPopC (supported by MACRO, UNFPA & USAID)
- National Census- by NPopC
- The UN Joint Monitoring Programme of 2004, 2006 & 2008
- Multiple Indicator Cluster Survey (MICS)-supported by UNICEF, UNDP, WHO and other Intl organizations
- Core Welfare Indicator Questionnaire Survey (CWIQS) by NBS

The Federal Ministry of Water Resources Roadmap for Nigeria Water Sector (2011) estimates the water resources potential of the country as 267 and 92 billion m3 of surface and ground water respectively. It also estimates the water supply and sanitation service coverage as 58% (87million) and 32% (54million) respectively. Unfortunately, Nigeria is one of several African countries off-track from the Millennium Development Goal (MDG) target for accelerating efforts towards improved access to water supply and sanitation services. The provision of drinking water and sanitation has not kept pace with the rapid growth of population, which increased by nearly five times from 30 million in 1951 to 140 million in 2006. As the UNDP 2006 Human Development report states, the water supply target may not be achieved in Nigeria until 2046 and sanitation may have to wait until 2076. Also according to the 2008 report

of the WHO/UNICEF Joint Monitoring Programme (JMP), Nigeria is in the bottom 25 countries worldwide in terms of water and sanitation coverage. If the present pattern of water coverage continues only 74.8 m out of the estimated 170m will be using water from improved sources in 2015. This figure represents 52.7m people short of the MDG target.

Table 8: Disparity in National Water Supply Coverage



Source: Water and Sanitation Monitoring Platform

Service Providers

a. The State Water Corporations or Boards are primarily responsible for delivery water supply service to urban areas, though several of them also deliver services to semi urban areas and in fact rural areas.
b. The Federal Ministry of Water Resources complements the work of state water agencies by directly funding the construction or rehabilitation of state water infrastructure or direct service provision through the River Basins Development Authorities. Past initiatives include the National Borehole Programme, DFRRI/RUWATSAN Programme, UNDP-World Bank Projects, Department for International Development (DFID) Water and Sanitation Projects, National Water Rehabilitation Programme, Petroleum Trust Fund (PTF) Multi state Water Supply and Sanitation Projects, FGN/UNICEF Water and Environmental Sanitation (WES) Programme, Water Supply Projects of the Agricultural Development Programmes, 1st, 2nd, and 3rd, National Urban Water Supply and Sanitation Project all aimed and improving National access to water supply and sanitation.

   Many other agencies and organizations are also involved at various levels in addressing issues bordering on water supply and sanitation including but not limited to the following (see Nwankwoala, 2011, Babalobi, 2013):

c. European Union (EU) is implementing the Water Supply and Sanitation Sector Reform Programmes (WSSSRP) in 13 States- Anambra, Cross-River, Jigawa, Kano, Osun, Yobe, Bayelsa, Delta, Edo and Rivers, Adamawa, Ekiti and Plateau under the 10th European Development Fund which kicked off in 2012 The Water Supply and Sanitation Sector Reform Project, Phase II (WSSSRP II) is a successor project of the 9th EDF Water Supply and Sanitation Reform Programme (WSSSRP) I. It aims at consolidating the achievements of the predecessor project with a view to addressing the remaining fundamental weakness of the Nigerian water and sanitation sector.

   The WSSSRP II will over a period of 4 years provide support for the finalization of policy and institutional reforms at the federal government level, particularly within the

FMWR and its agencies, and in the six EU focal States where the 9th EDF WSSSRP was implemented.

It intends to sustain the improvements on water governance made by WSSSRP at the federal level and in the EU focal States through the provision of technical assistance and capacity development to ministries and agencies responsible for water resources, water and sanitation service delivery at the federal level and in the focal States. A component of the project, to be implemented by UNICEF, will support capacity building of state and local governments' agencies responsible for rural water and sanitation and provision of water supply and sanitation facilities in rural communities.

Under the earlier 9th European Development Fund (EDF) 2003-2008, the European Union supported the implementation of Water Supply and Sanitation Sector Reform Programme (WSSSRP) in the Federal Ministry of Water Resources (FMWR) and in six EU focal States, namely, Anambra, Cross River, Jigawa, Kano, Osun and Yobe..

WSSSRP II will be built on the successes of WSSSRP I in six States – Anambra, Cross-River, Jigawa, Kano, Osun and Yobe States; it will also be used to finance the water component of Niger Delta Support Programme (NDSP) in four States – Bayelsa, Delta, Edo and Rivers; while the sum of 40m euros out of 176m Euros will be spent to implement WSSSRP III will be implemented in three other states – Adamawa, Ekiti and Plateau. The overall objective of the Programme is to contribute to poverty reduction, sustainable development and to the achievement of the water and sanitation related MDGs.

d. Japanese International Cooperation Agency (JICA) provides grants for rural water supply and sanitation in the rural areas of Oyo, Bauchi, Enugu, Katsina and Kano and Yobe. Currently, JICA's typical intervention consists of the two components in Nigeria: designing and facilitating Implementation of grant aid project (provision of equipment and materials) funded by the Government of Japan; and conducting in-country training programme in the target state. Its operations intervention includes:

e. **WaterAid** Nigeria works with Federal and State institutions as well as Local Government Partners in each of our six focal States, WaterAid in Nigeria currently operates in over 100 communities in 6 focal states – Bauchi, Benue, Ekiti, Enugu, Jigawa and Plateau. It also works with various Civil Society and Non-Governmental Organisations. WaterAid Nigeria's primary focus is supporting initiatives that help poor and marginalised people at household and community levels to address their basic and immediate needs in the areas of water, sanitation and hygiene, by constructing facilities and promoting hygiene and sanitation education services.

f. U**NICEF's** goal on WASH is to contribute to an improvement in the number of people benefiting from improved water and sanitation facilities. UNICEF has supported rural water supply, sanitation and hygiene in communities and schools across the country since 2002. Its interventions have been financed by DFID and the European Commission.

g. **World Bank** has been providing assistance to Nigeria in the water supply sector since 1979. Amengo-Etego And Grusky (2005) (in Emoabino and Alayande 2007) pointed out that the States that benefited from the World Bank Water projects are Kaduna (in 1979), Anambra (in 1980), and Bornu (in 1985) and Lagos (in 1989). The second generation of assistance was in the form of a loan of US$256 million for the National Water Rehabilitation Project (1991-2001), which targeted the entire country. Concurrently also, the World Bank supported the First Multi-State Water Supply Project (1992- 2000) with a loan of US$101 million, which was targeted at Kaduna and Katsina States. The third generation of assistance (2000-2004) was the provision of US$5 Million under the Small Towns Water and Sanitation Pilot Project aimed at satisfying the needs of 16 towns. However it is sad to note that the Independent Evaluation Group (IEG) of the World Bank considers its intervention between 1979-2005 to have failed because the seven selected case studies were 'rated as unsatisfactory' with unlikely sustainability and with negligible or modest institutional development impact' (World Bank 2006:vii).Adah, P.D. and Abok G. (2013).

In the 2000s, first National Urban Water Sector Reform Project was implemented in **three** states in Nigeria including Enugu, Kaduna and Ogun; while the Second National Urban Water Supply Reform Projects were implemented in the three states and additional two states of Lagos, and Cross River states. The third National Urban Water Sector has recently be approved for implementation in primarily in Rivers and Bauchi states, and in other states. (International *Journal of Current Research, 2011).*

The Federal Government of Nigeria, in collaboration with the World Bank, is coordinating the implementation of the Urban Water Sector Reform Project in five States of the Federation. The Project States include Kaduna, Ogun and Enugu under the 1st National Urban Water Sector Reform Project and Lagos and Cross River States for the 2nd National Urban Water Sector Reform Project.The First Urban Water Reform Project (US$120 million) targets 13 towns in the states of Kaduna, Ogun and Enugu. The project also aims to establish state water policies, and to foster the engagement with the private sector. The second Urban Water Reform Project worth US$200 million, supports the extension of the piped network in Calabar, and the rehabilitation of water treatment plants and distribution systems in Lagos as well as another three towns in Cross River State. Under a Privatization Project, the Federal Capital Territory (FCT) Water Board is being assisted with US$25 million. In 2012 the World Bank approved additional US$ 400 million National Urban Water Sector Reform Project for Lagos, Kaduna, Ogun, Enugu and Cross River State.

h. **USAID** supports rural water supply, sanitation and hygiene education in Northern Nigeria, in 46 communities in Bauchi, Kano and Sokoto States. The WASH project builds on a previous Global Development Alliance with Coca Cola. The Water and Development Alliance (WADA) partnered with USAID to provide boreholes, water supply and sanitation facilities in schools and clinics in Kano and Enugu States promoting hygiene and sanitation practices in communities and among school children; training farmers, especially women in the use of sustainable agriculture and irrigation techniques.

USAID is also partnering with Nigerian non-governmental agency Women Farmers Advancement Network (WOFAN), through the Access to Water Sanitation and Hygiene program (WASH), to increase access for poor Nigerians to safe water, sanitation and hygiene education in 46 communities in Bauchi, Kano and Sokoto States.

USAID is also financing the implementation of the Sustainable Water and Sanitation in Africa (SUWASA) a two year reform project to improve the delivery of water and sanitation services to the urban areas of Ebonyi state, Bauchi, and Rivers State in Nigeria

Sector challenges

Practitioners in the sector (Kashim Ali, 2012; Abubakar, Babatope Babalobi, 2014) have identified several factors as being responsible for low access to safe drinking water in Nigeria. These include the following:

Operational challenges

- *Old, dilapidated, and in some cases nonexistent water supply infrastructure*
- *Poor technical capacity of communities to maintain water supply facilities*
- *Erratic and inadequate power supply;*
- *Limited network coverage*

Financial Challenges

- *Inadequate sectoral financing*
- *Low cost recovery in all states*
- *Poor power supply in all states*
- *High Non-Revenue Water and Inadequate Asset Management strategies*
- *Inadequate tariff structure*
- *Inadequate performance accountability and incentive instruments*
- *Government institutions (Federal and State) refusal to pay water bills*
- *Lack of political will to set appropriate tariff for cost recovery*

Policy challenges

- *Lack of clear definitions of the functions and relationship of sector institutions;*
- *Dearth of data for planning and projections;*
- *Lack of or delayed approval or non-implementation of water policy and law*

Institutional challenges

- *Lack of appropriate regulatory framework on potable water supply*
- *Poor sectoral Governance Gaps: Poor corporate governance of the utilities, absence of Board of Directors in most utilities.*
- *Lack of dedicated line ministers such as Ministry of Water Resources*
- *Lack of regulating mechanism especially*
- *Lack of autonomy of water supply agencies*
- *Gaps in data integrity and reliability*
- *Lack of accountability (Pervasive corruption).*
- *Lack of technical & financial capacity to efficiently monitor distribution systems*
- *Shortage of qualified, honest & transparent manpower;*
- *Inadequate Management Information System in all the states*

Conclusion

As stated earlier, Nigeria is off track towards achieving the water target of the MDG goals, and the new target of universal coverage by 2030 being proposed as part of the post 2-15 Sustainable Development Goals, may be a mirage unless the following issues outlined below are not addressed by National and State governments in Nigeria:

First, the biggest operational challenge of the water utilities is the unreliable and epileptic public power supply. Efforts should therefore be intensified to develop alternative power sources including small scale hydro power projects.

Second, practitioners and sector has to be demonstrably committed towards increasing water integrity and promote accountability, transparency and accountability both in the disbursement of funds by duty bearers.

Third, state and local governments should institute good water governance by implementing water sector reform encompassing Institutional, Policy, Regulatory and Legal reforms. Utilities should also implement reform measures enabling them to perform like quasi commercial organizations with increased financial autonomy and organizational effectiveness.

Fourth, the Federal Government should fulfilled its commitments made under the auspices of the Sanitation and Water for All (SWA) partnerships to increase financing of the sector. Innovative financing should also be sourced through the private sector and consumer groups.

Fifth, National and State Governments need to demonstrate political commitment to the sector by declare access to safe water a human right and promoting efforts to ensure its progressive realization.

Sixth, in rural areas, Household water treatment should be encouraged and popularized to ensure point of use water treatment. Low costs Technologies for Household water treatment that can be promoted include filtration and boiling. Launch a National Campaign for Household water treatment to prevent future preventable deaths through water borne diseases- guinea worn, cholera etc. Facilitate High profile Hand Washing campaigns. Make policy statements that all Government and private offices, all schools and public places should construct toilet facilities that also meets the needs of the disabled. Work with paramilitary organizations to enforce this.

Seventh, Communities should set up Water Supply and Sanitation Committees (WASHCOMs), and all Small Towns in Nigeria to establish Water Consumer Associations (WCAs) as platforms for improved water governance as well as mobilize communities to part finance water and sanitation projects.

Seventh, National and State Governments should create National awareness of Rain Water Harvesting and its techniques- this will ensure all year round availability of water where there is scarcity and seasonal variability of rainfall.

Lastly, professionals, not politicians should be appointed to manage the sector. The Federal Ministry of Water Resources had to be reorganized to weed off dead woods and bring in competent hands. The National Water Resources Institute in Kaduna must be empowered to train more professionals in the sector- to degree level. At the state level, the Board of the Water Utilities must be managed by professionals not politicians.

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