Water, Sanitation, Hygiene and Climate Change Adaptation in Nigeria

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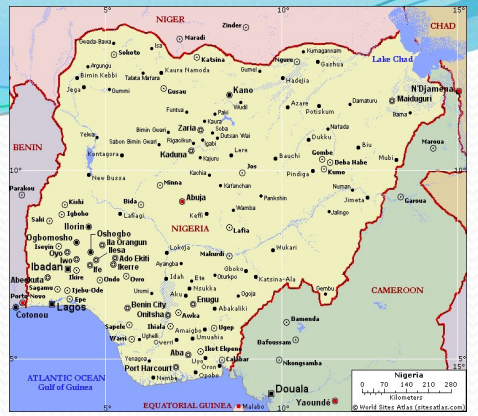
Paper presented at the "Urban Climate Change Adaptation: Access to Drinking water in Fast Growing Economies " workshop, December 13-14. 2012 Center for Development Research (ZEF), University of Bonn, Germany

Nigeria's WASH profile



- Nigeria is in the bottom 25 countries worldwide in terms of water and sanitation coverage- WHO/UNICEF JMP 2008
- "*On current trends Sub Saharan Africa will reach the Millennium Development Goals (MDG) water target in 2040 and the Sanitation target in 2076.*" UNDP HDI 2006
- All but four countries in Africa remain off track to meet the sanitation MDG. African Ministers Council on Water (AMCOW) 2011
- Not on track to meet MDG targets 7B and & 7C of halving, by 2015
- If Nigeria doesn't meet the MDG sanitation target, neither will Africa as a whole.

Nigeria's WASH profile

- Over 868,000 Nigerian children die each year, about a quarter of which are from water related and vaccine preventable diseases such as pneumonia, diarrhea, meningitis and measles. (Worldpneumoniaday.org
- Lack of access to basic sanitation facilities coupled with poor hygiene practices causes diarrhoea which is the 2nd largest direct cause of childhood mortality in Nigeria- WHO/UNICEF/JMP 2009
- Nigeria has a high infant mortality rate of 86 per 1, 000 live births, and an under-five mortality rate of 191 per 1, 000 live births. (UNICEF 2010).
- 130,000 Nigerian children under five die each year from diarrhoea. (WHO / UNICEF Joint Monitoring Programme (JMP) report 2010

Nigeria's WASH profile

- Economic impacts of inadequate sanitation- Nigeria losing around 455b ($3b)naira annually to inadequate sanitation - World Bank's Water and Sanitation Program (WSP) 2011
- '34 million Nigerians - are without toilets, and still practice "open defecation". Nigeria holds the fifth position behind India, Indonesia, Pakistan, and Ethiopia- WHO's GLAAS 2012 Report
- 70 million Nigerians use unsanitary or shared latrines.
- 32 million have no latrine at all and defecate in the open. (Sanitation fact sheet Nigeria- http://www.unicef.org/wash/files/NigIYSFact.pdf)

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

Access to Water and Sanitation in Nigeria

Sources:

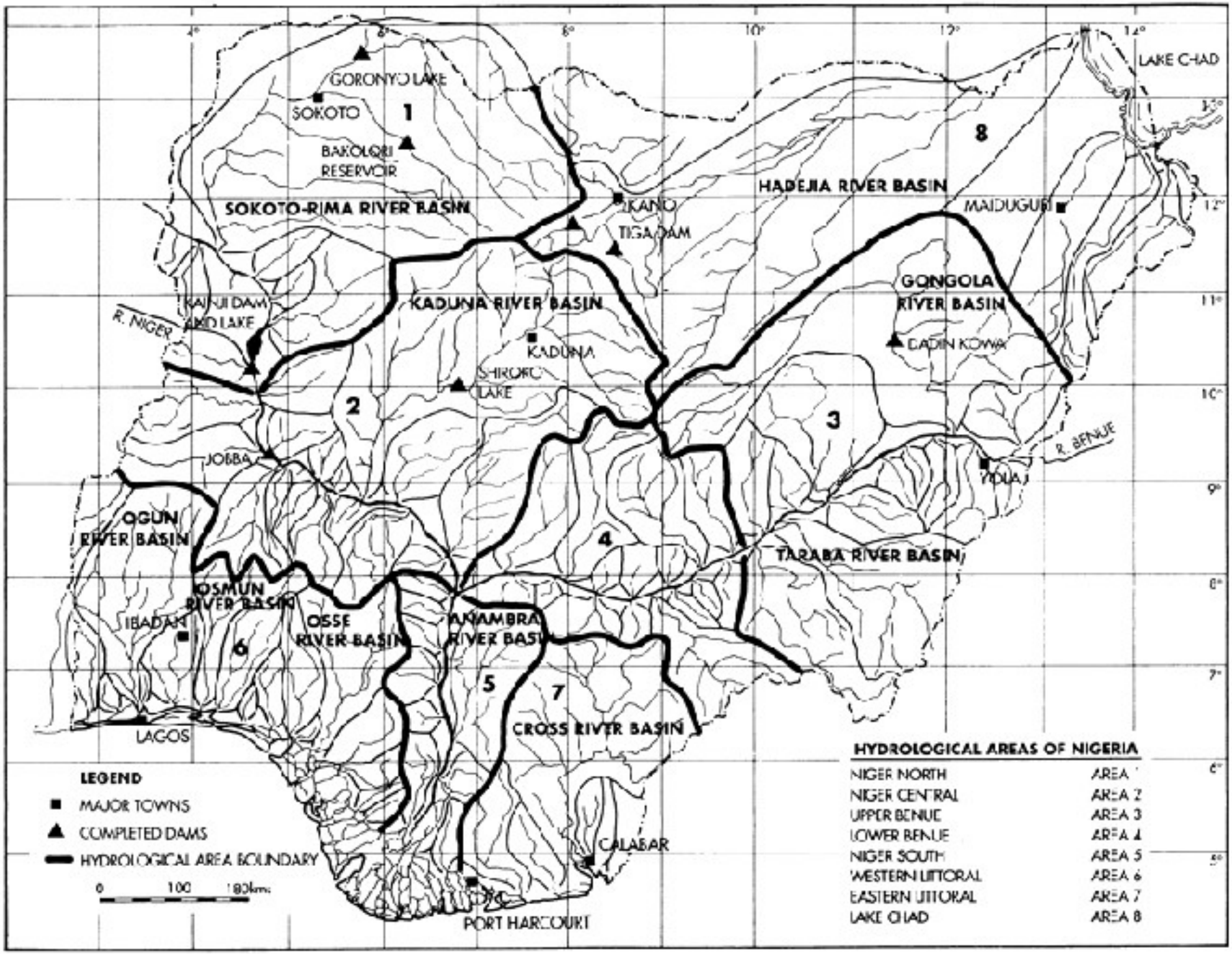
- The Nigeria Demographic & Health Survey (NDHS) by NPopC (supported by MACRO, UNFPA & USAID)
- National Census- by NPopC
- The UN Joint Monitoring Programme of 2004, 2006 & 2008
- Multiple Indicator Cluster Survey (MICS)-supported by UNICEF, UNDP, WHO and other Intl organizations
- Core Welfare Indicator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

Nigeria's Climate profile

- Nigeria -latitudes 4°N and 14°N and longitudes 2°2'E and 14°30'E
- Total area of 923,768 km^2.
- 13,000 km^2 of the land is covered by water (1.4%) and the remaining 98.6% -forest/desert
- Three broad ecological zones:Northern Sudan Savannah, Guinea Savannah zone or Middle Belt; and southern rainforest zone.
- Annual rainfall varies from 4,000 mm in the South – East to below 250 mm in the extreme North-East
- Nigeria's total annual renewable water resources -286.2 km^3. Annual internally produced resources -221 km^3, made up of 214 km^3 surface water and 87 km^3 groundwater
- Mean temperature is generally between 25 and 30 °C (77 and 86 °F),

Nigeria's Climate profile

- Surface water resources =estimated at 267.3 billion cubic metres ,groundwater potential is 51.9 billion metres. (NWRMP 1995).
- Four drainage basins-*River Niger basin, Lake Chad Inland, Atlantic drainage basin- West of Niger, Atlantic drainage basin- East of Niger*
- 13 River Basins Development Authorities
- Eight hydrological areas


LAKE CHAD
GORONYO LAKE
SOKOTO
1
BAKOLORI RESERVOIR
SOKOTO-RIMA RIVER BASIN
8
HADEJIA RIVER BASIN
KANO
TIGA DAM
MAIDUGURI
GONGOLA RIVER BASIN
KAINJI DAM AND LAKE
R. NIGER
KADUNA RIVER BASIN
KADUNA
SHIRORO LAKE
DADIN KOWA
2
3
JOBBA
YOLA
R. BENUE
OGUN RIVER BASIN
4
TARABA RIVER BASIN
OSMUN RIVER BASIN
IBADAN
OSSE RIVER BASIN
ANAMBRA RIVER BASIN
6
5
7
CROSS RIVER BASIN
LAGOS
CALABAR
PORT HARCOURT
LEGEND
MAJOR TOWNS
COMPLETED DAMS
HYDROLOGICAL AREA BOUNDARY
0 100 180km
HYDROLOGICAL AREAS OF NIGERIA
NIGER NORTH AREA 1
NIGER CENTRAL AREA 2
UPPER BENUE AREA 3
LOWER BENUE AREA 4
NIGER SOUTH AREA 5
WESTERN LITTORAL AREA 6
EASTERN LITTORAL AREA 7
LAKE CHAD AREA 8

	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	

Hydrological areas of Nigeria

Source: Lekan Oyebande, Water resources in Nigeria

WASH and Climate change

- "Water and its availability will be the main pressures on, and issues for, societies under climate change - **IPCC, 2008**
- Reductions in the availability and reliability of freshwater supplies caused by climate change are expected to increase the incidences of water borne, water based, water sourced, and water related diseases in Nigeria.

Climate change projections for Africa based on IPCC research

Source: Bryson Bates, et al, Climate Change and Water, IPCC Technical Paper VI, June 2008

Climate variable	Summary of projected change
Temperature	Warming in African continent is very likely to be 1.5 times higher than the global annual mean warming, in all seasons and over the entire continent. The IPCC predicts that average temperatures in Africa will increase by 3 to 4°C by 2090 based on 1990 levels.
Rainfall	Rainfall patterns will change with some regions seeing increasing rainfall (Eastern Africa and the Horn of Africa) and others decreasing rainfall (Southern Africa and African Mediterranean coast) although a high degree of uncertainty exists.
Sea level	Increase in mean sea levels of between 0.28 and 0.43 metres (best estimate) depending on emissions scenario, based on change from 1990 to 2100, this will be exacerbated by more intense storms in terms of coastal flood hazard.
Climate extremes	Storms, heavy rainfall and heat waves are likely to become more intense, as are tropical cyclones. Heavy rainfall events that occur at present 1 in 20 years are likely to occur 1 in 5 to 1 in 15 years by 2090 relative to the late 20th century. The 1 in 20 year hottest day is likely to occur every 2 years by the end of the 21st century

Climate hazard	Impact	Vulnerable system	Effects
Increase heavy precipitation	Flooding	Water supply (groundwater) Wastewater Water supply (reservoirs)	Equipment failure
			Flooding of Intake systems
			Risk of infiltration increase due to pressure reductions
			Flooding of pump stations
			Pollution of service reservoirs
			Flooding of taps and float valves increase risk of contamination
			Flooding of essential unit process
			Performance of utility adversely affected by poor raw water quality
			Increased demand for emergency supplies from areas adjacent to flooding
			Solids deposited in Inundated surface water sewers
			Foul water, Overflow of Sewers, floodwaters contaminated

Climate hazard	Impact	Vulnerable system	Effects
Increase heavy precipitation	Enhanced zooplankton blooms	Hygiene//Human health	Water related diseases such as Gastroenteritis, Hepatitis, and Respiratory and intestinal influenza.
			Transport of viruses from faecal and wastewater sources
			Gastroenteritis, Stomach & duodenal ulcer, Pneumonia, Cholera
			Wound infections, otitis and lethal septicemia, gastroenteritis, respiratory dysfunctions, allergic reactions
			Increase protozoa: Gastroenteritis Meningoencephalitis, Keratitis, blindness

Climate hazard	Impact	Vulnerable system	Effects
Increase heavy precipitation	Flooding	Water supply (groundwater) Wastewater Water supply (reservoirs)	Equipment failure
Decreased precipitation	Water scarcity	Hygiene//Human health	Malnutrition and increase in waterborne diseases
			Falling groundwater levels low flows in surface waters
			Deterioration of water quality.
			Low availability causes problems for hygiene and cleaning.
			Salinity of groundwater affects water supplies.
			Sewage in rivers becomes less diluted causing contamination issues.
			Increase algal growth.
			Insufficient water makes flush sanitation system redundant.
			Colonization of resource waters by opportunistic invader species

Climate hazard	Impact	Vulnerable system	Effects
Sea level rise	Saltwater intrusion	Wastewater	
Higher temperatures	Reduced water oxygen concentrations	Water supply (lakes/reservoirs)	Reduced water quality for example through algal blooms, increase in treatment requirements
Higher temperatures	Increase in bacterial and fungal content of water	Water supply infrastructure	Increase in treatment requirements to remove odour and taste

Impacts on Climate Change on WASH in Nigeria

In April 2012 by the Africa Adaptation Programme (AAP), Nigeria office; with the support of Federal Ministry of Environment, United Nations Development Programme (UNDP), and Government of Japan.

The study investigated the correlates between climate change, and sustainable delivery of water supply and sanitation services in Nigeria, exploring the real and potential effects of climate variability on access to safe WSS by Nigerians, as well as how climate change affects the capacity of service providers to guarantee this access.

Case Studies- Summary

- Case study 1: Salinisation in Lagos state
- Case study 2: Water scarcity and water related diseases in Maiduguri
- Case study 3: Groundwater reduction in Osun state
- Case study 4: Water scarcity and water related diseases in Jos
- Case study 5: Water shortages in Oyo state
- Case study 6: Infrastructural damage in Anambra state
- Case study 7: Pollution of the Niger Basin
- Case study 8: Shrinking of dams in Osun state
- Case study 9: Water shortages in the Komadugu-Yobe River Basin
- Case study 10: The shrinking of Lake Chad
- Case study 11: Erosion and Water pollution in Imo state
- Case study 12: Onchocerciasis in Dadin Kowa Dam and Upper Imo River Basin
- Case study 13: Collapse of Gorokyo dam, Sokoto state
- Case study 14: Over flooding of Kanji dam 1998
- Case study 15: Collapse of Gusau dam, Zamfara state, 2006
- Case study 16: Evaporation of Zobe and Tiga dams
- Case study 17: Salininization in Bakolori dam
- Case study 18: Siltation in Kano City Water Supply
- Case study 19: Over flooding of Lagdo dam and River Benue drainage basin
- Case study 20: Over flooding of Kanji dam

Case studies

- In Jos, North Central Nigeria, the state ministry of health have confirmed that there is a noticeable increase in the incidence of water related diseases such as scabies during dry season and diarrhoea during the rainy season. The incidence of malaria has been on the increase. Residents of the Jos, the capital town of Plateau state said the town was almost free of mosquitoes in the past, but at present, the presence of mosquitoes could be felt everywhere in the state. (Akpodiogaga-A & Odjugo, 2010; Spore 2008; IPCC, 2007)

- The over flooding of several communities in Nigeria 2012, due to the opening of the Lagdo dam in neigbouring Cameroon expectedly lead to widespread contamination of surface and groundwater, water scarcity, and increased prevalence of water borne, water based, and water related related diseases including River Blindness exarcebated by fast flowing water.

Case studies

- The over flooding of Kanji Dam in 1998 triggered an outbreak of river blindness chronic shortage of clean water as children and women suffered most and trekked several kilometers to fetch potable water.

- Maiduguri a town in Northern Nigeria, have been experiencing high water deficit; and increased incidence of malaria between 1976-2005 except for the period 2000 and 2004 where an inverse relationship holds.(Akpodiogaga-A & Odjugo, 2010; Spore 2008; IPCC, 2007)

- A survey of 91.8% of the population in 2005 in two neighbouring high altitude communities of Umuowaibu 1 and Ndiorji, in Okigwe Local Government area of Imo State, South South Nigeria shows that 37% of those examined were positive for Onchocerca volvulus microfilariae (39.2% of males and 34.9% of females). The area are part of the upper Imo River Basin traversed by rivers and several streams, and conditions are favourable for transmission of onchocerciasis. (F..C. Okorie, et al)

Key findings

- *Nigeria WSS sector lacks appropriate policy framework to response to climate change impacts as existing Federal and State water and sanitation policies and strategy papers examined are not climate change sensitive.*
- *While an WSS specific institutional structure exists at the national level for climate change adaptation in the WSS sector, most states are yet to set up governance structures for climate change adaptation to the WSS.*

Key findings

- *Most WSS agencies have not started responding to climate change. Sixty seven (67%) per cent of the WSS sector agencies surveyed have not set up a desk office on climate change; and seven three per cent (73%) are yet to research into climate resilient water supply and sanitation technologies and systems as part of a climate change adaptation programme.*

- *Though there is a general awareness of climate change issues, in house staff are not technically competent to articulate a climate change adaptation strategy. A high seven six per cent (76%) of WSS utilities said they have never conducted in house training for relevant staff on climate change; sixty one per cent (61%) said their staff have never attended seminars/workshops/conferences on climate change and seventy four per cent (74%) said they have never conducted studies/researches on climate change as it affects their agency.*

Key findings

- *There is a near absence of data and baseline information to effectively study climate change as it affects the water supply and sanitation sector as weather changes and its effects on stream flow, wastewater, infrastructural damage etc , though observes is not well documented and accurately recorded.*
- *WSS utilities, though viable, lack adequate resources to shoulder on climate change adaptation programmes. Only twenty six per cent (26%) of the utilities surveyed said they are financial solvent.*

Key findings

- *Water supply and sanitation agencies see climate change s a threat more that an opportunity as it is negatively affecting service delivery. Eighty four per cent (84%) of the 32 agencies surveyed have observed drastic changes in stream flows, seventy eight (78%) have observed contamination of groundwater due to weather changes, ninety per cent 90% are experiencing leakages in distribution system due to infrastructural damage caused by extreme flooding*
- *Eighty six per cent 86% of WSS utilities have experienced increase cost of raw water treatment caused by increased contamination of water bodies.*

Key findings

- *Consumers of water supply and sanitation services are also being negatively impacted. Our findings indicate that the most profound way consumers have felt the impact of climate change is through decrease in groundwater supplies noticeable in hand dug wells and boreholes; and increase in incidence of water borne diseases.*
- *Eighty one per cent (81%) of users surveyed said they have observed a decrease in groundwater supplies (borehole, hand dug wells etc) in recent years; fifty one per cent (51%) have observed increase in contamination (turbidity levels, pollutants) in water sources in recent years due to flooding, and another fifty three (53%) of those surveyed said that they have experienced increase cases of faecal pollution, water borne diseases or water related diseases such as malnutrition, cholera, dysentery, malaria, and depression .*

Recommendations for Adaptation

- *The Federal Government should commission a study to assess the safety of dams in Nigeria and their vulnerability to weather extremes.*
- *State governments should support the creation of a state level integrated water resources management committee to drive climate change adaptation by water resources users.*
- *Local governments should introduce water supply and sanitation reform at the local level to include institutional reform, policy, and legal reform to enable it cope with climate variability.*
- *Federal and State Ministries of Environment should promote and facilitate coordination among various MDAs working on climate change.*
- *Federal and State Ministries of Health should carry out research on the ecology and epidemiology of infectious diseases that will probably be affected by climate change.*
- *Federal and State Ministries of Water Resources should lead development and implementation of a national/state programme for Integrated Water Resource Management (IWRM)*
- *River Basins Development Authorities should evaluate the design, safety criteria, and current status of river basins infrastructure.*

Recommendations for Adaptation

- *Hydrological/Metrological agencies should ensure the availability and reliability of baseline data and historical data on water resources (e.g. water quality, river flow rates, precipitation data) to facilitate modelling of long-term climate risk and related factors. Including data on the adequacy, safety, affordability and continuity or regularity of water supply, and the safety, affordability and cultural acceptability of sanitation facilities.*
- *Water supply agencies should undertake vulnerability studies of existing water supply and sanitation system and ensuring that new systems are built to reduce vulnerability.*
- *Sanitation agencies should explore on site unconventional or modified climate resilient sanitation technologies which offer alternatives to water-borne sanitation, particularly in rocky areas or areas where there is too little water for waterborne sanitation systems*
- *Wastewater management agencies should evaluate the design, safety criteria and current status of current infrastructure.*
- *Private sector should partner with government to promote climate change adaptation and mitigation programmes.*
- *Consumers and users of WSS service should promote environmental greening and reduce pavement of the neighbourhood in order to encourage natural groundwater recharge.*

Recommendations for Adaptation

- *Development partners should ensure adequate and flexible financing mechanisms to speed up investment in climate change adaptation in water and sanitation sector, with a particular focus on the most vulnerable communities.*
- *The UNDP should organise stakeholders workshop to robustly debate the findings of this study; disseminate the findings of this report locally and internationally; facilitate capacity building training workshops for key officials of state water supply and sanitation agencies on climate change issues; support the creation of governance structures for climate change adaptation in pilot LGAs in Nigeria; and support further research and investigation into critical issues raised in this study such as:*

- Safety of dams in Nigeria Vis a vis extreme weather events.
- Seawater intrusion and salinisaiton of groundwater in Nigeria's coastal towns.
- Development of implementation strategy for Nigeria's IWRM plan.
- Ecology and epidemiology of infectious diseases that will probably be affected by climate change.
- Climate change adaptation by Nigeria's River Basin Development Authorities.

Post Script-**WASH and climate change adaptation: Training of trainers workshop Nigeria November 2012**

- UNICEF organised a Train the Trainers workshop for managers of Rural WASH agencies in Nigeria on Adaptation WASH to Climate change, November 2012

Objectives

- Support participants with some of the latest resources available to support WASH and climate change adaptation training
- Equipped them to use the available resources with exercises and examples to design and deliver effective training courses
- Give feedback on the draft training module to support its finalisation
- Generate ideas and commitments for future capacity building activities over the next two years

http://www.irc.nl/page/75446

End