
Challenges of Urban Water Management in Nigeria: The Way Forward

Adah, P.D. and Abok G.

^{1&2}Department of Urban and Regional Planning,

¹The Federal Polytechnic, Idah-Kogi State

²Kaduna Polytechnic, Kaduna State.

E-mail: adahproject@gmail.com, abokgal66@yahoo.com

ABSTRACT

As the saying goes “Water is Life” one may however reframe it by rather saying “Adequate Safe Water is Life”. This is so because there could be water everywhere but not a single drop to drink or to use for domestic and other purposes due to the unsafe nature of such water. This phenomenon arises due to ineffective water management culture. The gap between water need and supply has widened steadily in Nigeria’s urban centre despite continuous efforts made to develop the nation’s vast surface and groundwater resources. Acute water shortages afflict the inhabitants of the towns and cities. The paper revealed that the challenges facing water management in the country include; Lack of effective compliance to policies, weak data base, fragmented responsibility, climate change, poor state of infrastructure, cost intensive, corruption, rapid urbanization, and low rate of costs recovery as the bulk of available water supply is unmetered and where metered, ridiculously low rates are charged. Thus; in order to ameliorate these challenges; recommendations were made as the way forward to achieving sustainable water management. There is need for total compliance to water management policies (both local and international), encourage stakeholder participation, Enforcement of existing laws and Regulatory responsibilities. There is also a great need for management policy that aims at financial viability and economic efficiency. More realistic water rates should be charged in order to raise the much-needed revenue to meet increasing production and distribution costs.

Key Words: Challenges, Urban Water Management and way forward.

INTRODUCTION

Adequate good water supply is central to life and human development, and of the five basic human needs (water, food, health, education, peace) water is a common factor to the other four. Water is a very important factor in settlement development and determines population growth as well as influences world health and living conditions. Nigeria is blessed with abundant water resources estimated at 226 billion m³ of surface water and about 40 billion m³ of ground water. However, FMWR (2004) noted that out of the 85 million people living in urban and peri-urban areas in Nigeria, less than half have reasonable water supply. It is worth noting that despite the fact Nigeria is one of the signatories to 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, and in spite of the efforts of various Governments at all levels, the water supply coverage in the country appears to be decreasing and deteriorating, (FGN, 2000). One of the reasons for this deterioration according to FGN, 2000 is the enormous socioeconomic rate of development which

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far outstrips the level of water supply development. Other reasons include low investment level in operation and maintenance which accounts for frequent breakdown of the production facilities, and lack of proper management of the nation's water resources.

In a bid to effectively manage water resource, there are challenges of poor state of infrastructure, climate change, and intensive cost on investment, rapid urbanization process, corrupt practices, and problem of inadequate measures for cost recovery and inability by state, local or community to adequately pay their counterpart funding. Meanwhile, the important role water play in the economic, social, recreational and human development and aquatic lives is the basis why emphasis should be laid on the management of this scarce natural resource. The paper therefore aims at assessing the challenges of urban water resources management in Nigeria with a view of making recommendations to improve the situation.

MATERIALS AND METHOD

In achieving the set target for this paper, secondary sources of data were used. These include the review of literature on urban water management policy documents and other theoretical works so as to understand the challenges of urban water management in the urban areas in Nigeria. Some of the relevant data were sourced from Federal Ministry of Agriculture and Water Resources (FMAWR), UN-Habitat publications, Water Aid, and other relevant paper presentations. The statistics from these sources formed core sources of statistical information.

CONCEPTUAL FRAMEWORK FOR THE STUDY

Sources of Water

There are two broad categories of water sources; surface and underground sources.

- a. **Surface Water:** This is water that is abstracted directly from streams, rivers and lakes. These sources generally contain larger quantities of turbidity and bacteria than groundwater and often the surface waters of rivers and lakes are polluted by the influx of sewage or industrial wastes. Jim (2008) in an article of Encyclopaedia of Earth identified four principal surface water basins in Nigeria thus;
 - The Niger Basin (covers an area of 584,193 km²)
 - The Lake Chad Basin (covers an area of 179,282 km²)
 - The south-western littoral basins (covers an area of 101,802 km²).
 - The south-eastern littoral basins, (covers an area of 58,493 km²)

- b. **Groundwater:** Groundwater is water obtained from wells and springs that feed streams, rivers, and lakes. In its course, groundwater dissolves soluble mineral matter. The ultimate source of all natural potable water on the earth is rain. Groundwater contains high concentrations of dissolved chemicals. Nigeria according to Jim (2008) has extensive groundwater resources, located in eight recognized hydrogeological areas together with local groundwater in shallow alluvial (Fadama) aquifers adjacent to major rivers thus;
 - The Sokoto Basin Zone (yield range from below 1.0 to 5.0 liters per second L/s).

- 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).
- 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).
- The Benue Basin Zone (yields between 1.0 and 8.0 L/s).
- The South-western Zone comprises sedimentary rocks bounded in the south by the coastal Alluvium and in the north by the Basement Complex.
- The South-Central Zone (yields are from 3.0 to 7.0 L/s.)
- The South-eastern Zone comprises Cretaceous sediments in the Anambra and Cross River basins.
- The Basement Complex (yields between 1.0 and 2.0 L/s).

OVERVIEW OF URBAN WATER MANAGEMENT POLICIES IN NIGERIA

The Federal Ministry of Water Resources (FMWR) is the main national coordinating body in the water sector. Water resource management is a complex function which includes regulatory, support and operational activities. The responsibilities for water resources development in Nigeria are vested on government agencies including the Federal Ministry of Water Resources, State Water Agencies and non-governmental or donor agencies such as CBO, NGO, Water AID, EU, World Bank and UNICEF etc.; (Emoabino and Alayande, 2007). Other government agencies not directly concerned with water resource development but carry out water resource developments include the Federal and State Ministries of Agriculture and Environment. The policies include the following:

Water Policy Reform in Nigeria

The World Bank has been providing assistance to Nigeria in the water supply sector since 1979. The first generation of assistance was directed at investments and strengthening institutions at the state level, especially since urban water supply is constitutionally a responsibility under Nigeria's constitution. 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).

National Water Supply and Sanitation Policy of 2000

This policy spelt out the Institutional Framework for Water Supply and Development thus;

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The Federal Ministry of Water Resources: It is charged with the responsibilities of policy advice and formulation, data collection, monitoring and co-ordination of water resources development (of which water supply is a component) at the National level.

The River Basin Development Authorities (RBDAs): This came into existence following the promulgation of Decree 25 of 1976. The current law on RBDAs is the RBDA Act; cap 396 Laws of the Federation of Nigeria, 1990. The authorities are charged with the development, operation and management of reservoirs for the supply of bulk water for water supply amongst other uses in their areas of jurisdiction.

The National Water Resources Institute: It is be responsible for manpower training, research, development and studies under the National Water Supply Training Network in the water supply sector.

The State Water Agencies: These agencies are responsible mainly for urban, semi-urban and rural water supplies. In some States separate agencies exist for rural water supplies and urban and semi-urban water supplies.

The Local Government Authorities: Are responsible for the provision of potable water to rural communities.

The National Water Policy (NWP) Document of 2004

Water abstraction for public water supply is guided by the National Water Policy. In other to meet Nigeria's water supply demand, the following policy objectives had been drawn and the guiding principles for implementation. The formulation of the water resources policy was guided by; The Millennium Development Goals (MDGs), NEPAD Objectives and the resolutions of various conferences, conventions and meetings based on the International trends and agreements in water Policy. The International trends and agreements in water policy highlighted the fact that water management and development should be conducted on a participatory basis with decision making occurring at the lowest appropriate level.

THE CHALLENGES OF URBAN WATER MANAGEMENT IN NIGERIA

The challenges in urban water management are ample and are threatening the sustainability of the urban water system as a significant fraction of the urban population has no access to proper (good) water supply. Some of the challenges include the following;

- i. **Lack of Effective Compliance to Water Management Policies:** The inability for the stakeholders in water management to comply with the existing policies on water management and development constitute a great challenge in the system hence retards its efficiency.
- ii. **Weak Data Base:** Gold face – Irokalibe (2008) observed that water management cannot be done with poor data management. In the past ten years, no single pan Nigerian hydrological yearbook has been published. Without water assessment there cannot be decision support system (DSS) models necessary for understanding the impact of abstraction and groundwater aquifers. There is currently no effective water resources data

management system for the nation. Therefore, Nigeria does not only need to set up nationwide networks for these data collection but also an institute to use the data and make models.

- iii. **Fragmented Responsibility:** Fragmented sectoral practices according to Gold face – Irokalibe (2008) have also led to disjointed development and have critically led to a situation where there is presently nothing in place to significantly ensure the quality of water. There are no clear responsibilities, no mandated water quality standards, no effective water monitoring, no enforcement, no sanctions for polluters, and no remediation.
- iv. **Climate Change Mitigation:** In circle of blue.org news (2010), it was reported that climate change and water scarcity go hand-in-hand to cause some of the biggest contemporary challenges to the human race. These issues have a reciprocal relationship, identified by the Intergovernmental Panel on Climate Change (IPCC), in which, “water management policies and measures can have an influence on greenhouse gas (GHG) emissions.” As renewable energy options are pursued, the water consumption of these mitigation tactics must be considered in producing alternatives ranging from bio-energy crops to hydropower and solar power plants.
- v. **Poor State of Infrastructure (Inadequate supply of energy for water works and service stations):** The poor state of power supply from the Power Holding Company of Nigeria, Plc. (PHCN), limited distribution system that was put at 40%, ageing plants, vehicles, machineries and limited service coverage due to limited reticulation pose a serious problem to many water supply projects in the Country.
- vi. **Cost Intensive (High production and maintenance cost):** Producing potable water for the public involves finance in the purchase of materials/equipment and paying of bills-(chemicals, power, maintenance and overhead costs).
- vii. **Corruption:** The situation where projects are not adequately monitored by coordinating agencies is detrimental to economic progress and against social benefits for the government to carry out such projects. Huge capital investment without corresponding financial discipline and accountability for performance, along with political interference in decisions about allocations and pricing are reflected in the inefficient operations, inadequate maintenance, financial losses and unreliable service delivery as witnessed.
- viii. **Challenges of Cost Recovery:** The sustainability of a project is tied to continuous maintenance which involves continuous flow of funds. Cost recovery measures are not adequately put in place in our water management approach because water supply has always been considered as a social good. There is no appropriate metering system, and where they do exist utility officer do not make use of them for proper pricing system.
- ix. **Urbanization Challenge:** The accelerating growth in urban population could see a supply-demand gap in water resources. Currently, due to urbanization

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process more than one billion people don't have access to clean water on the global scale, (Jeff 2010). This is a great challenge to the water management sector of the economy. More strategic and proactive approach need to be adopted to handle this situation.

RESULT OF THE FINDINGS

Kaduna urban area like most urban areas in Nigeria is faced with numerous water management challenges. These include among others the following:

- a. **Poor State of Infrastructure:** Apart from decaying infrastructures, the major challenge of water management in Kaduna Metropolitan area has been that of inefficient power supply. Without power supply, water supply can never be effective.
- b. **Challenges of Cost Recovery:** Cost recovery for water has been a major challenge in water management in Kaduna Metropolis. Bulk of available water supply is unmetered while ridiculous rates are charged for the unmetered users. For instance about N400 is charged for a compound or tenement house while about N600 is charged for a flat. However besides the meagre charges, the rates are hardly paid by most users.
- c. **Lack of Community Participation:** Community participation in water management in Kaduna Metropolis is barely absent except in the areas of the provision of private alternative sources such as wells and boreholes.
- d. **Rapid Rate of Urbanization:** Kaduna Metropolis is among the most populated cities in the Country with its present estimated population put at 1,652,844 (Wikipedia, the free encyclopaedia, 2010).
- e. **Lack of Maintenance Culture:** It not uncommon to see broken water pipes without any efforts made by the residents or the authority concern; to repair or replaces such pipes. This phenomenon leads to water wastage as well as water contamination hence detrimental to health and economy as well.

DISCUSSION ON WAY FORWARD FOR SUSTAINABLE URBAN WATER MANAGEMENT

Having understood that urban water management in Nigeria is facing serious challenges due numerous factors, it is therefore crucial to develop good approaches, so that policy development and planning are directed towards addressing these global change pressures, and to achieving truly sustainable urban water systems. The following are therefore some of the strategies considered to achieve this.

- i. **Current International Approaches in Water Management should be Adopted:** The 'Dublin Statement' (International Conference on Water and the Environment, 1992) and the 'Agenda 21' (UN Department for Sustainable Development, 1992) unfold a vision about how water resources are best managed, to serve the people, without damaging the environment. The 'Dublin Statement' principle addresses the issue of water management from a river basin perspective. The principles of the 'Dublin Statement' are: Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment. Management of water resources requires linking social

and economic development with environmental protection, within the river basin or catchment area. Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels. Decisions are taken at the lowest appropriate level, with full public consultation and involvement of users in planning and implementation. Institutional arrangements should reflect the role of women in water provision and protection.

- ii. **Private Sector Participation (PSP) in Urban Water Management:** The private sector (operators, commercial banks, and consultants), communities, as well as NGOs have a critical role to play in the planning, design, financing, implementation and operation of water management system. Their potential for additional finance and technical expertise should be tapped. Other benefits inherent in participation are greater transparency, efficiency, accountability to the consumer, and self-sufficiency. This is also in line with good governance principles that decision-making should involve participation of all stakeholders, especially the consumers and providers of services. Furthermore the local community needs to fully participate; this is because conventional wisdom is that without community participation; there is little likelihood of sustainability being realized. This is in part a pragmatic recognition of Governments' inability to deliver services, but in part an ideological proposition which values concepts such as 'empowerment', and 'capacity building' for their own sake. Even from a strictly practical approach, a number of the issues mentioned earlier illustrate the need for capacity building at the community level as well as at the level of Government or NGO. (Narayan, 1995; Oyesiku, 1998 in Ademiluyi, and Odugbesan, 2009).
- iii. **Optimization of Water Resource:** The use of the storage, transport and treatment capacity of existing urban infrastructure for water resource management can be optimized in many cases. Optimization of urban water systems aims at finding the technical, environmental and financial best solution, considering and balancing measures in the sewage system, the wastewater treatment plant and the surface water system at the same time.
- iv. **Economic /End Use Efficiency:** Economic efficiency is a key objective of water demand management and needs to be viewed from the broader perspectives of the society. End use efficiency means doing more in economic terms with less water. Water saving strategies and technologies can be adopted in all economic sectors to achieve end use efficiency. A lot more water can be saved through end use efficiency through application of smart technologies and metering.
- v. **Environmental Sustainability and Improvement of Catchment Area:** The sustainability of the nation's water resources is threatened both in terms of quantity and quality. Rivers are the major transporters of domestic and industrial wastes generated which are discharged into them untreated. Such wastes are increasingly accumulated in reservoirs created downstream for water supply. Improving the water catchment systems is essential for areas with no other reliable water sources. This is already been practiced in

Pakistan and India; two countries that contend with some of the worst effects of climate change are overhauling rainwater harvesting systems.

- vi. **Holistically Managed Ecosystems:** Simply put, holistic management applies to a practical, common-sense approach to overseeing natural resources that take into account economic, cultural, and ecological goals. In essence, the whole is greater than the sum of its parts, and each facet is related to and influences the others.
- vii. **Enforcement of Existing Laws and Regulatory Responsibilities:** The conservative capability of existing end-use technologies for water services does not conform to the principles of best practices. Prepaid water meters should be a precondition for prequalification for water service to consumers and punitive measures should be in place to deal with illegal water connections and vandalism of water installations. The regulatory framework will require the regulator to apply a wide variety of tools and employ a degree of selectivity in jurisdiction and responsibilities. How the regulator meets the above responsibilities is through the application of various tools, best illustrated as regulatory inputs and outputs as in figure 1.

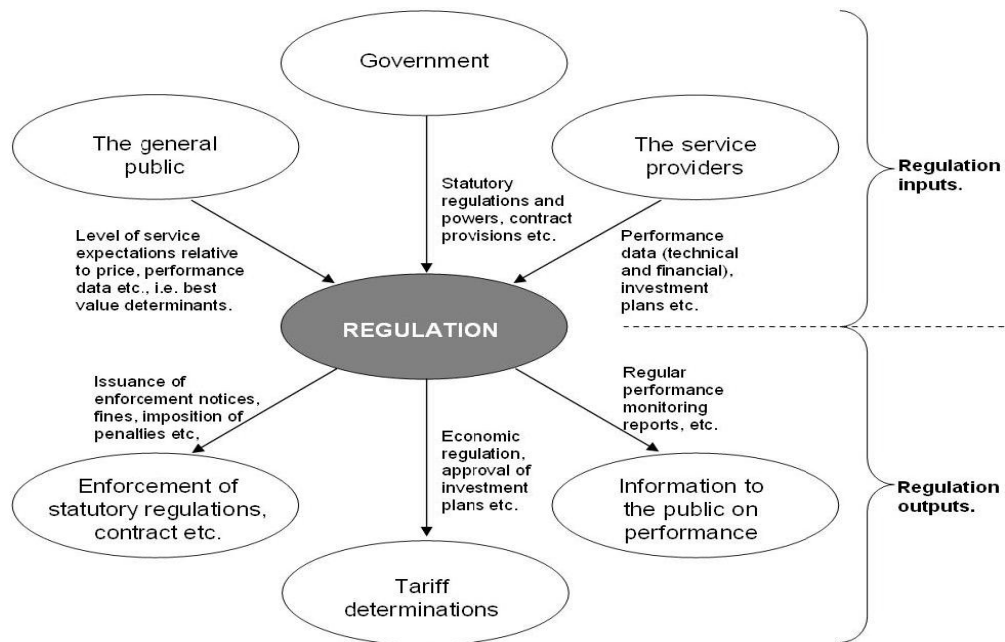


Fig. 1 Regulation inputs and outputs

Source: Adapted from FGN, FMWR National Urban Water Sector Reform Project (2006)

- viii. **Urban Water Project Finance and Cost Sharing/Recovering Measures:** Water services can be delivered through public, private or community based institutions. Water pricing for these services is a substantial aspect

underpinning the understanding of water as an economic good. Cost recovery of these services is necessary to ensure their long-term utilization. All consumers should be appropriately metered for effective cost recovery starting with Industrial and commercial consumers to communal outlets down to domestic consumers. However a careful application of cross-subsidies among users and cost-sharing between users and government shall be applied to protect the poor. It is, however, of imperative importance to know the total costs of each service in order to allow the application of these tools and to find out the most cost-effective investments.

- ix. **Effective Data and Information Management:** The collection and analysis of data and the circulation of information is needed for different kinds of assessment, preparation of plans, construction and operation of projects. In addition, data are required for decision making and for taking appropriate interventional measures regarding management, allocation and development of water resources. An effective integrated water resource management system must be able to provide timely and correct information on the quantity, quality and resource use.
- x. **Manpower Development and Capacity Building:** Water resource management will only be successful if the personnel are developed not only on federal institutional level but in all relevant organizations and agencies, at all levels. Thus for integrated water resources management to be successful and to implement sustainable and participatory water management strategies, capacity will have to be built in user groups as well as at a technical level. Women and youths should also be well represented in professional and managerial positions.
- xi. **Institutional Arrangement:** The institutional arrangement adopted to respond to Nigeria's vision of equal distribution of the water resources between users without compromising the environmental requirements and those of future generations. The institutions have to meet natural, technical and social considerations, respecting existing rules and regulations and able to adopt a flexible approach to water management. There is need to develop a co-operative governance approach whereby as many governmental functions are undertaken on national, state or local levels, there must be a commitment to co-operate between each level and with the population.
- xii. **Legal Regulatory Framework:** The Water Decree 101 of 1993 is the principal legislation governing the utilization and pollution control of the water resources. This legislation does not adequately meet present and emerging water resources management challenges and the requirement emerging from this water policy. A central issue is definition of access to water resources through permits, the establishment of water protection zones and the fees related to raw water abstraction and fines for water misuse and pollution. This is to respect the "user-pays" principle. Access and the application of royalties for water abstraction will not be applied in a general manner but limited to the commercial use of water resources only.

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- xiii. **Monitoring and Evaluation of Water Projects:** Monitoring is necessary for the protection of the quality of raw water sources as well as the output conformity with drinking water quality standards. Improvement of water service delivery requires that activities are continuously monitored and evaluated to guarantee a timely execution of projects and to ensure their sustainability. Also Continuous monitoring and testing of the water before it reaches the tap is required. This is to improve on the envisaged impact of the project. Where feasible; participatory monitoring and evaluation will be carried out with support from the government levels, NGOs, and the Private Sector.
- xiv. **Improvement of Management and Maintenance Practices:** Financial management, operation and maintenance, abstraction and treatment techniques and control of water sources pollution should be taken seriously.

CONCLUSION

The importance of water and its effective management cannot be overemphasized. Well-designed and operated urban water systems are critically important for maintaining public health as well as for controlling the quality of the water into which urban runoff are discharged. In order to effectively harness and manage water, there is need to adopt sustainable measures and one of these measures is cost recovery. FRN (2000) observed that Universal and sustainable provision of water supply services is possible only if water is recognized as an economic good, subject to the relation of supply and demand. Thus people's demand for water is a function of the price of water. Their willingness to pay for water is influenced by the level of service they desire and the quality of the service they receive (people will pay if services are good). As the price of water depends on the cost of systems, appropriate technologies that conform to consumers' demands and willingness to pay should be adopted. Treating water as an economic good enhances financial viability, by ensuring that tariffs cover the costs of investments and operation and maintenance.

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