

An Appraisal of the Institutional Framework for Groundwater Exploitation and Utilisation in Akwa Ibom State, Nigeria

Uzoma Evan Ifeoma

**Department Of Geography and Natural Resources Management, University of Uyo,
Uyo. Akwa Ibom State, Nigeria.**

Introduction

Water is a finite resource that is very essential for human existence, agriculture and industry. Without doubt, inadequate quantity and quality of water supply have serious impact on water resources management and environmental sustainability (Chukwu, 2015). Problems of this nature have been increasing in scope, frequency, and severity because the demand for water continues to increase while supply of renewable water remains fixed (Okoye, 2015).

Understanding water risks in developing countries implies coming to terms with issues of unsafe drinking water and scarcity, which varies in time and space, water related threats, as well as quality and quantity issues (Akpabio and Ekanem, 2009). In most countries, there are increasingly various degrees of water uncertainties arising from over pumping of the aquifers, falling water tables and sharp deterioration of the aquatic ecosystems (Akpabio, 2003). These often lead to many consequences on the most vulnerable groups in the population especially those who do not have the power to influence and effect a change in behaviour. Against this background is the need for effective system of governance to regulate practices, protect the ecosystem and minimize uncertainties and risks (Europe, 2004). Unfortunately, governance issues in the water sector have been the major problems facing most developing countries in meeting the challenges of water related targets and development goals (Akpabio and Ekanem, 2009).

In Nigeria the primary responsibilities for water resources development are vested on government agencies including the Federal Ministry of Water Resources, State Water

Agencies and non government agencies such as UNICEF (Chukwu, 2015). Other government agencies not directly concerned with water resources development but carry out water resources developments include the Federal and State Ministries of Agriculture and Environment. These agencies and private individuals carry out water resources development projects in an uncoordinated manner with each not taking into considerations the activities of the other. In most cases quality control and assurances were downplayed with emphasis on number of communities covered rather than water supply system efficiency. Water Schemes sustainability involving ownership, operation and maintenance structure are not properly addressed in planning. Consequently water supply projects benefits are short lived. Despite billions of dollar invested in water projects, supply is falling behind the demand of a growing population and development of new sources of water is increasingly becoming capital intensive (Okoye, 2015).

Aim and objectives

This paper is aimed at analyzing the groundwater exploitation and utilisation in Akwa Ibom State, Nigeria. Specifically, the objectives of the paper are designed to

1. Appraise the institutional framework for groundwater exploitation and utilisation in the state.
2. Examine the appropriate strategies which should be directed to achieve truly sustainable supply management system in the area

The achievement of these objectives will enable us explore suitable recommendation to improve the situation.

Conceptual issues

The essence of a holistic approach to groundwater exploitation and utilisation adopted in this study is to ensure that all the relevant components and factors are considered in the totality of their effect on the whole process in order to achieve the sustenance goal of the system. The concept of water supply system is made up of three main components that are one-way directional and serially complementary in significance and criticality (Bhatia, 2009; Okoye, 2015). They are intrinsically linked through design, function, and performance. These are the source, treatment and transmission/distribution. 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 (Chukwu, 2015).
- 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 earth is rainfall. Groundwater contains high concentrations of dissolved chemicals. Nigeria has extensive groundwater resources, located in various hydrogeological areas together with local groundwater in shallow alluvial (Fadama) aquifers adjacent to major rivers (Okoye, 2015). Groundwater is generally preferred because it is safer and highly protected especially for urban dwellers (Akpabio and Ekanem, 2009). In Akwa Ibom state, there are three water tables (Akpabio, 2003) and they include; areas with shallow water depth in the Southern part of the state, here ground water can be struck at a depth of 10m or less (Akpabio, 2010); areas with high water depth found in the central part of the state, the depth of the water table is greater than 10m but less than 40m and

finally, areas with highest water depth found in Ini and the northern part of the state, the depth of the water table is about 40-55m and ground water can only be struck through deep wells and drillings to a depth of 40m and above.

Other broad divisions of water sources include;

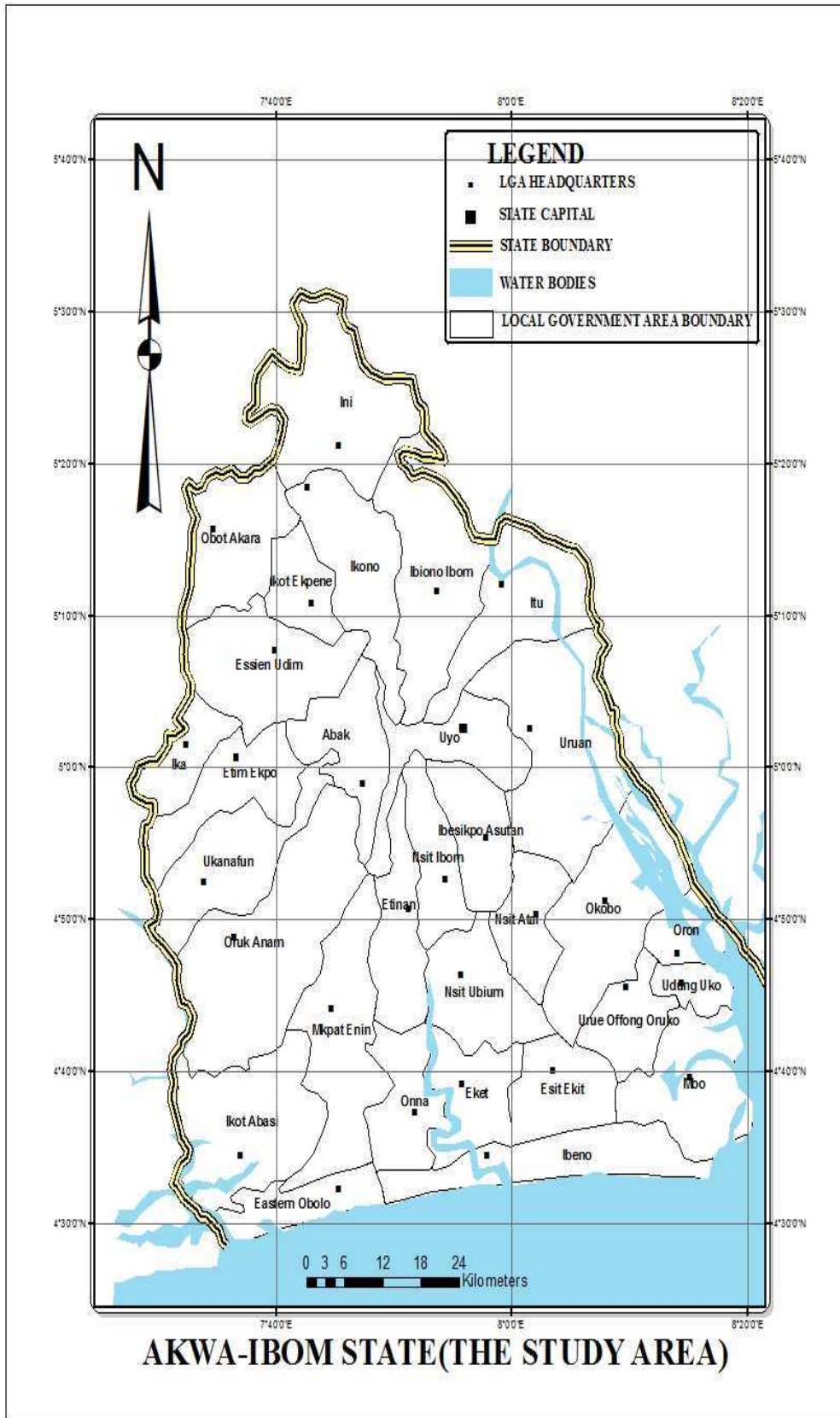
- a. Modern sources of water which includes boreholes, tap water, protected wells, stand pipes etc which could come from government, multi nationals, private or non governmental.
- b. Natural sources of water which include streams/rivers, hand-dug wells and rainwater, sea water etc (Akpabio, 2016).

The study area

Akwa Ibom state is a part of South eastern Nigeria, located between latitudes $4^{\circ}30'$ and $5^{\circ}30'N$ and longitudes $7^{\circ}30'$ and $8^{\circ}20'E$. With a total land area of 8,412 km², the state falls within the sedimentary area of Nigeria. Approximately 75% of the state is located on coastal plain sands and alluvium which covers the whole of the southern, central and partially the northern parts while the sandstone of the Ameke formation and the underlying Imo shale cover the remaining 25% (AKS,1989).

Based on soils and land use surveys (AKS, 1989), Akwa Ibom state is divided into 3 hydro-geological areas based on the regional water table. They include (i) South (Ikot Abasi, Eket and Oron local government areas with water level accessible at less than 40m). The south happens to be an area dominated by onshore/offshore petroleum oil exploration with such major oil multinationals whose activities pose pollution problems to available sources of drinking water. It is also constantly washed by the southern Atlantic ocean (ii) the middle (Uyo, Etinan, Abak, Essien Udim, Oruk Anam, among others) with a water level values

ranging between 40 and 55 m. As a coastal plain sands, the lithology of the area is very favourable for the storage and extraction of groundwater. Consequently, private and commercial borehole engagement are very common in this region, especially taking advantage of high urban and consequent demographic growth (iii) and the North (Itu, Ini, Ikono, northern part of Ikot Ekpene local government areas with the water level values greater than 55m). The northern boundary of the aquifer is formed by the impervious clays and shale of the Ameke and Imo shale formations (AKS, 1989). This geological condition makes it difficult for ground water extraction and where such extraction is possible, there is the other problem of mineral-based water pollution. From these classifications, it is seen that water resources availability is highly variable across spatial areas (Akpabio, 2003).



Generally, there are enormous resources of surface and groundwater as a result of high rainfalls relative to low potential evaporation values as well as locational proximity to sea where most rivers from the inland parts of the country discharge their flows. These enormous resources of water have been estimated at over 12000 million cubic meters (AKS, 1989). The 2 largest rivers in southern Nigeria form both the eastern (Cross River) and western (Imo River) parts of the state. There are other several separate river systems in the state to include the Kwa Iboe River, Enyong creek, Ikpa River, the creeks draining the south-west corner into Ikot Abasi/Okpobo area and those draining the south-eastern corner of the state around Oron and Ebughu.

Climatically, Akwa Ibom state has a tropical rainy climate. Annual rainfall ranges from over 3000 mm along the coast to 2000 mm on the northern fringe. Temperatures are uniformly high throughout the year with slight variation between 26 and 28°C. In general, rainfall far exceeds the potential water losses all over the state. The effect of excess rainfall over evaporation is the availability of water for groundwater recharge and surface water flow over steep slopes and exposed land surface.

The State is divided into the rural (over 80%) and urban (less than 20%) population. The rural population is involved in the production of food and industrial crops, ornamental and medicinal plant, as well as keeping animals (Okoji, 2001). All these depend on constant water supplies from the natural sources. The urban dwellers, on the other hand, depend on groundwater for general domestic and other socio-economic activities. Groundwater is generally preferred because it is safer and highly protected especially for urban dwellers (NWRI, 1997).

Institutions and Policies in the Water Sector in Nigeria and Akwa Ibom State

Like all scarce resources which have regulations guiding their exploitation, ownership, preservation, and sustenance, water, the world over, is protected by a body of laws, policies, and regulations in order to prevent abuse (FGN, 2000).

In Nigeria the primary responsibilities for water resources development are vested on government agencies including the Federal Ministry of Water Resources, State Water Agencies and non government agencies such as UNICEF (Chukwu, 2015). There also policies and guidelines that govern groundwater exploitation and management. Other government agencies not directly concerned with water resources development but carry out water resources developments include the Federal and State Ministries of Agriculture and Environment. These agencies and private individuals carry out water resources development projects in an uncoordinated manner with each not taking into consideration the activities of the other

FEDERAL MINISTRY OF WATER RESOURCES

The Federal Ministry of Water Resources was first created in 1976 to formulate National Water Resources development policies and co-ordinate their development. It had only one operational Department called Federal Department of Water Resources with Sokoto/Rima Basin Development Authority (SRRBDA) and Chad Basin Development Authority (CBDA) as its parastatals.

In 1977, the Federal Ministry of Water Resources was merged with Federal Ministry of Agriculture. The Federal Department of Water Resources remained intact under the new Ministry along with 11 RBDAs with their functions. Again in 1979, Federal Ministry of Water Resources was re-created. It still had the Federal Department of Water Resources as the only operational Department, the 11 RBDAs and the National Water Resources Institute

that was established in 1978 as a parastatal. In 1984, the Federal Ministry of Water Resources was for the second time merged with Federal Ministry of Agriculture, Water Resources and Rural Development. In the same year RBDAs were reorganised into 18 River Basin and Rural Development Authorities (RBRDAs) The Federal Department of Water Resources remained intact under the new Ministry along with 11 RBDAs with their functions. Each RBDAs had jurisdiction boundary for each State of the Federation except for Lagos State which was combined with Ogun State.

In another re-organisation in 1987, the 18 RBRDAs were reverted to their former 11 RBDAs structure as before 1984. The RBDAs were in addition reorganised to relieve them of some earlier responsibilities of direct agricultural activities including food production, forestry and livestock development.

In 1989, a Federal Ministry of Water Resources was created the third time. This time the Ministry had a tremendous boost and quickly expanded from one Department of Water Resources it inherited to eight new departments.

The most recent demerging from Federal Ministry of Agriculture and Water Resources to Federal Ministry of Water Resources and Federal Ministry of Agriculture and Rural Development was in April 2010.

Core Functions

The functions of the Federal Ministry of Water Resources are to:

1. Formulate National Water Resources policy towards ensuring adequate water supply for agricultural, industrial, recreational, domestic and other uses

2. Formulate and implement a Water Resources Master Plan for the development of dams, irrigation and drainage, water supply, soil erosion and flood control as well as hydrological and hydro-geological activities.
3. Develop and support irrigated agriculture and reduce the nation's dependence on rain-fed agriculture;
4. Promote and sustain national food security by minimizing unexpected and undesirable shortfalls in domestic food production and agro-based raw materials caused by the vagaries of weather;
5. Collect, store, analyze and disseminate hydro-meteorological and hydrological data;
6. Support, monitor and evaluate the programmes and performances of the River Basin Development Authorities (RBDA's) and National Water Resources Institute (NWRI);
7. Explore and develop underground water resources;
8. Formulate and review from time to time, the National Water Legislation;
9. Coordinate the development and utilization of water resources for irrigation and water supply;
10. Liaise with all relevant National and International Agencies on all matters relating to water resources development;
11. Support studies and research on the nation's underground and surface water resources potentials;
12. Undertake hydrological and hydro-geological investigations;
13. Formulate and implement a national irrigation policy that is consistent and complementary to the national agriculture policy;
14. Develop programmes and policies towards surface water storage schemes;
15. Develop guiding principles for dam construction nationwide

16. Formulate and support a national rural water supply programmes with a national on-farm storage programmes with emphasis on full initial involvement of local communities and local government performance to ensure sustained maintenance of built infrastructure
17. Identify and promote programmes that would enhance greater productive economic activities in the rural areas as well as help to improve the quality of life and standard of living of the rural people
18. Promote adequate training and manpower development in the water resources sector.

However, parts of the above functions are being carried by the four new Commissions/Agencies created from the Ministry namely:

1. Nigeria Institute of Water Resources;
2. Nigeria Integrated Water Resources Management Commission;
3. National Hydrological Services Agency; and
4. Gurara Dam Management Agency.

Constitution of the Federal Republic of Nigeria 1999

Section 20 Chapter 11 of the Constitution of the Federal Republic of Nigeria 1999

provides that “The state shall protect and improve the environment and safe guard the water, air, land, forest and wild life in Nigeria”.⁵ **Under the second schedule, part 1, item 64 of the same constitution**, the Federal Government of Nigeria has exclusive jurisdiction on primary water matters from sources affecting more than one state as maybe declared by the National Assembly. The same constitution grants exclusive legislative powers to the Federal Government of Nigeria such as fishing in rivers and lakes in item 29, maritime shipping and

navigation in item 36 all of part 1, second schedule of the 1999 Nigerian Constitution. Therefore, 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. Each federating state is permitted by the Constitution to legislate on water matters as it affects such state. 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 as water is a complex and multifarious compound.

THE LAND USE ACT OF 1978

The Land Use Decree (now Land Use Act) was promulgated on 29th of March 1978 following the recommendations of a minority report of a panel appointed by the Federal Military Government of the time to advice on future land policy. With immediate effect, it vested all land in each state of the Federation in the Governor of that state (Fed. Rep. of Nigeria, 1978, Akwa Ibom State Government, 2000).

The Act vests all land comprised in the territory of each state (except land vested in the Federal Government for its agencies) solely in the hands of the Governors of the state who would hold such land in trust for the people. The promulgation of this Act was as a result of two main factors: Firstly, was the diversity of customary laws on land tenure and difficulty in applying the various customs of the different people. The second factor was the rampant practice in southern Nigeria with regards to fraudulent sales of land. The same land would be sold to different persons at the same time giving rise to so many litigations.

The Act distinguishes throughout between urban and non-urban (rural) land. In urban areas (to be so designated by the Governor of a state), land was to come under the control and management of the Governor. In rural areas it was to fall under the appropriate local government. “**Land Use and Allocation Committees**”, appointed for each state by the

Governor, were to advise on the administration of land in urban areas. **“Land Allocation Advisory Committees”** were to exercise equivalent functions with regard to rural land. The Act envisaged that **“rights of occupancy”**, which would appear to replace all previous system or rules of inheritance to land, would form the basis upon which land was to be held. These rights were of two kinds: statutory and customary.

1. **“Statutory rights of occupancy”** were to be granted by the Governor and related principally to urban areas.
2. **“Customary right of occupancy”**, according to the Act, means the right of a person or community lawfully using or occupying land in accordance with customary law and includes a customary right of occupancy granted by Local Government under this Act.

Local governments were empowered to grant customary rights of occupancy to any person or organisation for agricultural, residential and other purposes with the proviso that grants of land for agricultural or grazing purposes should not exceed 500 or 5000 hectares respectively without the consent of the State Governor. With the minor exception of land subject to Federal or State claims, the Act also empowered the local government to enter upon, use and occupy for public purposes any land within the area of its jurisdiction and to revoke any customary right of occupancy on any such land. The approval of the local government was to be required for the holder of a customary right of occupancy to alienate that right (Longe, 2010).

The right of occupancy gives individuals the licence to exploit resources on such land including water resources (groundwater) for private or commercial purposes (AKSG,2000). This indicates that once an individual or body obtains the rights of occupancy to a portion of

land, they can exploit any resource including groundwater resources. The Land Use Act constitutes one of the statutory basis for rights to water resource exploitation by individuals and organisations. The act has led to the increase in the presence of private and commercial boreholes and other ground water sources in Akwa Ibom State. Groundwater resources in aquifers, however, are yet to be quantified (Handidu, 1990). Anyone who can afford drilling costs simply goes ahead to tap groundwater sources without recourse to geophysical tests or the obtaining of necessary permits from regulatory bodies.

THE WATER RESOURCES DECREE (DECREE NO. 101) OF 1993

The decree was promulgated on the 23rd of August, 1993 vesting rights and control of water in the Federal Government. The rights include 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 as together with the bed and banks thereof, for the purpose of- promoting the optimum planning, development and use of the Nigeria's water resources; ensuring the co-ordination of such activities as are likely to influence the quality, quantity; distribution, use and management of water; ensuring the application of appropriate standards and techniques for the investigation, use, control, protection, management and administration of water resources; and facilitating technical assistance and rehabilitation for water supplies (Fed. Rep of Nigeria, 1993). It also states that any person - may take water without charge for his domestic purpose or for watering his livestock from any water course to which the public has free access; or may use water for the purpose of fishing or for navigation to the extent that such use is not inconsistent with any other law for the time being in force; or who, has a statutory or customary right of occupancy to any land, may take and use water from the underground water source or if abutting on the bank of any water course, from that water course, without charge for domestic purposes, for watering livestock and for personal irrigation schemes. The

decree also states that any person or any public authority may acquire a right to use or take water from any water-course or any groundwater described for any purpose in accordance with the provisions of this Decree and any regulations made pursuant thereto.

The Water Act gives the Minister for Water Resources very wide powers on water regulation such as to issue licences of water, storage, pumping or use of commercial scale or construction, maintenance, operation, repair of any borehole or hydraulic works etc. The Minister may also define places from which water may be taken or used, fix times of actual anticipated shortage of water, amount of water which may be taken to by any person, prohibit temporarily or permanently, taking or use of water that is hazardous to health, revoke the right to use water where such right overrides public interest, require to be examined or license any drilling operations, regulate, place, depth, manner of construction of borehole or well. The Minister in the discharge of his duties is to make provision for adequate supply of suitable water for animals, irrigation, agriculture, domestic and non domestic use, generation of hydro electrical energy, navigation and recreation, drainage, safe disposal of sewage, prevention from pollution, prevention from flooding, soil erosion, reclamation of land, protection of the environment etc.

Even though the law gives people the right to exploit and utilise groundwater resources anywhere, ownership of groundwater is linked to land ownership (Akpabio, 2010) which although is subject to governmental control, is difficult to control legally especially in urban areas of the country. So groundwater is exploited and utilised based on the ownership of land and this system is detrimental especially to the poor who have little or no access to land because of their low economic power. It is also detrimental because ownership of land which gives the right to exploit groundwater resources have led to indiscriminate exploitation of ground water which has its implications on the health of the utilisers of water.

The National Water Resource Institute Act

This Act provides for the establishment of the water resources training institute for the promotion, development of training programme and courses in water resources and advise Government on water resources training needs etc. The institute is currently located in Kaduna, Nigeria.

CUSTOMARY WATER LAWS AND PRACTICES

Customary Water Rights

a. **Nature of Customary Law:** Water is used in traditional settings mainly for domestic purposes, fishing, farming and irrigation and livestock raising. Because customary rights in water resources are based on customary law it, it is useful to precede the description of customary water rights in this section with a general overview of customary law which is recognized as a major source of law in modern Nigeria along with Islamic law and laws passed by the legislature (Kuruk, 2005).

Customary law consists of the customs accepted by members of indigenous groups in Nigeria as binding upon them. For the most part, the rules are unwritten and their devolution can be traced to the social organization of Nigerian societies which is based on a strong pattern of kinship groups. The lineage, as the basic unit, forms the foundation of a wide social group called the clan. A system of interclan linkages in turn constitutes the tribe made up of people belonging to different lineages but speaking the same language with the same traditions. Group relations are normative, and give rise to a series of well-defined rights and obligations, belonging to and owing to members of the group. Kinship rights and obligations are specific when the individual is interacting with members of his lineage, but they become more general as the degree of kinship widens. Observance of all traditional norms, is secured

through a system of sanctions that may vary according to the degree of kinship ranging from censure, to fines, to ostracism or even expulsion from the group.

b. Customary Water Rights

(i) **Land Rights:** To the extent water resources are found on land, access to such resources would be affected to a large degree by rules governing possession of land like the Land Use Act of 1978. Therefore, for a better understanding of the nature of customary water law rights, it is necessary to provide a brief description of the basic customary land tenure rules in Nigeria. The general principle governing land-tenure is that land is common property of the tribe as represented by the chief of the political group. Thus, village land would be held in trust and apportioned by the chief. Such administrative control of the land by the chief is referred to by the people as “ownership” a term also used to refer to the direct utilization and control of land by a family head or individual. When the land is owned communally, there is communal exploitation and utilisation of ground water resources. This could lead to indiscriminate use of ground water resources especially for personal gains. Customary laws on land acquisition, beliefs, norms and values also affects exploitation of water resources and its utilisation.

(ii) **Domestic Uses:** The principal domestic uses of water include drinking, washing and bathing. Water for domestic use may be obtained from surface water (dams, rivers, streams, wells) or groundwater (bore-holes, wells etc). In general, there are no customary restrictions to access water from large bodies of water. However, with respect to smaller bodies of water, particularly in private ownership, non-family members would need permission to access resources owned by family groups.

Basically in this area, water is seen as belonging to all. In essence, customary (traditional) rights, as instituted in customary laws, are backed up by, but subjected to, the Federal laws. The local knowledge of water exploitation and utilisation in the area is nested in beliefs, myths and superstitions (Akpabio, 2012). Cultural orientations influence the behavioural attitude of people to water. For example, as long as water is clean to the eyes, it is deemed fit for drinking. Disputes in the exploitation and utilisation of groundwater resources relating to the customs of the people is settled by the customary court.

NATIONAL WATER RESOURCES POLICY (2004)

The guiding principle of the National Water Resources Policy is subject to and consistent with the Constitution in all matters including the determination of the public interest and the rights and obligations of all parties, public and private, with regards to water (Fed Rep of Nig, 2004).

It states that all water, wherever it occurs in the water cycle, is a national asset and resource common to all, the use of which shall be subject to national control. Also, all water shall have a consistent status in law, irrespective of where it occurs. The objective of managing the quantity, quality and reliability of the nation's water resources is to achieve optimum, long term, environmentally sustainable social and economic benefit for society from their use.

The policy stipulates that there shall be no ownership of water but only a right (for environmental and basic human needs) or an authorisation for its use. Any authorisation to use water in terms of the water law shall not be in perpetuity. The planning and management of Nigeria's water resources shall take place within a framework which facilitates awareness and participation among all users at all levels. Water resources shall be assessed, developed, apportioned and managed in such a manner as to enable all users to have equitable access taking into account the sustainability of the resource. Water quality and quantity are interdependent and shall be managed in an integrated manner, which is consistent with broader environmental management approaches. Water quality management options shall include the use of economic incentives and penalties to reduce pollution; and the

possibility of irretrievable environmental degradation as a result of pollution shall be prevented. The management of water resources shall seek to harmonize human and environmental requirements, so that the human use of water does not individually or cumulatively compromise the long term sustainability of aquatic and associated ecosystems. The operational management of water resources and services shall be decentralized to the lowest practicable level in accordance with the established 8 hydrological areas (HA) as the basic units of water resources management in Nigeria. International water resources, specifically shared river systems, shall be managed in a manner that optimises the benefits for all parties in a spirit of mutual co-operation. Allocations agreed for downstream countries shall be respected. Water quality management options shall include the use of economic incentives and penalties to reduce pollution so that beneficiaries of the water services shall contribute to the cost of its establishment and maintenance on an equitable basis. The resource base shall be protected against any kind of pollution. The protection measures shall be based on both regulatory and market-based approaches to waste management, applying the “polluter pays” principle. For the purpose of improving water related environmental conditions, abstraction fees for raw water shall be charged for the commercial use of it.

Factors that have led to the low level of water exploitation and utilization include; non planning of the water sector, absence or poor level of investments in water infrastructure/sector, politically motivated distribution of available water infrastructure, household economy, quality of water/sources, attitudes, values and environment amongst others.

RIVER BASINS DEVELOPMENT AUTHORITIES ACT (1976, 1986, 2004)

This Act establishes and regulates all river basin authorities in Nigeria. The Act lists their functions as agriculture, irrigation, fisheries, forestry and veterinary institute. The Act also establishes the 12 river basin authorities as: Anambra- Imo River Basin Authority, Benin-Owena River Basin Authority, Chad River Basin Authority, Cross-River River Basin Authority, Hadejia-Jamaare River Basin Authority, Lower Benue River Basin Authority,

Upper Benue, Upper Niger River Basin Authority, Lower Niger River Basin Authority, Niger-Delta River Basin Authority, Ogun-Oshun River Basin Authority, Sokoto-Rima River Basin Authority. These twelve River basin authorities are under the Federal Ministry of Agriculture.

Akwa Ibom state is covered by the Cross River Basin Development Authority (CRBDA) which is mandated to provide and manage water resources in the basin which covers Akwa Ibom state and Cross River state. River Basin Development Authorities act as an **inter-agency** contact point for the Ministry of water resources and the Ministry of Agriculture since it covers both areas.

THE VARIOUS STATE WATER BOARD ACTS

All states in Nigeria has State Water Board Acts which establishes a state water board in each state to manage, supervise, control the use, consumption, maintenance of water and its ancillaries. State Water Boards report directly to the Governors of each state.

EIA DECREE 86 OF 1992

The Nigerian EIA legislation was promulgated into Federal legislation in 1992 under EIA **Act Decree No.86**. It demands from the public or private sectors of the economy not to undertake or embark on any public projects or activities without prior consideration of their environmental effects at the early stages if the projects. It introduced environmental considerations into development project planning and execution, prescribes guidelines for EIA Studies and spells out the project areas and sizes of projects requiring EIA It also ensures that consultations with the Regulators and locales residing where the development is to take place are being consulted.

EIA AT THE STATE GOVERNMENT LEVEL

Each of the 36 States of the Federation can make laws on environmental protection and may also set up environmental protection agencies. In Akwa Ibom State, the Akwa Ibom State Environmental Protection and Waste Management Agency Act (EPWMA) empowers the Agency to conduct pre and post EIAs of projects and make recommendations for corrective measures.

3.4 The Objectives of EIA

This is to ensure that the environmental implications of major developments are identified.

- S.1 of the Decree states the objectives of any EIA before making an application as follows:
 - a. to determine if the proposed development is likely to significantly affect the environment and this would be carried out by the Government of the Federation, State or Local Government
 - b. to implement the appropriate policies in all areas where the proposed development is to take place and these must also be consistent with the State and LGA laws and decision processes
 - c. to develop procedures for information exchange, notification and consultation when proposed developments are likely to have significant environment effects on bordering towns and villages.
 - d. to consider the extent, nature or location of a proposed project or activity is such that is likely to significantly affect the environment.
- S. 2(2) states that “Where the extent, nature or location of a proposed project or activity is such that is likely to significantly affect the environment, its environmental impact assessment shall be undertaken in accordance with the provisions of this Decree.”
- S.4 of the Decree describes the constituents of an EIA with at least the following minimal matters as follows:

1. a description of the proposed activities;
2. a description of the potential affected environment including specific information necessary to identify and assess the environmental effects of the proposed activities;
3. a description of the practical activities, as appropriate;
4. an assessment of the likely or potential environmental impacts on the proposed activity and the alternatives, including the direct or indirect cumulative, short-term and long-term effects;
5. an identification and description of measures available to mitigate adverse environmental impacts of proposed activity and assessment of those measures;
6. an indication of gaps in knowledge and uncertainty which may be encountered in computing the required information;
7. an indication of whether the environment of any other State, Local Government Area or areas outside Nigeria is likely to be affected by the proposed activity or its alternatives;
8. a brief and non-technical summary of the information provided that have been provided above.

MANDATORY PROJECTS FOR EIA UNDER DECREE 86 OF 1992

This section, based on the EIA Decree provides a list of projects that will require an EIA and include: oil refineries, large waste and waste water disposal and treatment facilities, large extensive agricultural units and industrial facilities, transportation and power generation.

- a. **Agriculture** - Land development schemes covering an area of 500 hectares or more
- b. **Airport** - Construction of airports (having an airstrip of 2,500 meters or more)

c. **Drainage and Irrigation** – Drainage of wetland, wild-life habitat or of virgin forest covering an area of 100 hectares or more, Irrigation schemes covering an area of 5,000 hectares or more.

d. **Land Reclamation**-Coastal reclamation involving an area of 50 hectares or more.

e. **Fisheries** –land based aquaculture covering an area of 50 hectares or more.

f. **Forestry** - Conversion of hill forest land to other land use covering an area of 50 hectares or more; Logging covering an area of 500 hectares or more; Conversion of mangrove swamps for industrial, housing or agricultural use covering an area of 50 hectares or more.

g. **Housing**

h. **Industry** - Chemical- Where production capacity of each product or of combined products is greater than 100 tonnes/day; Petrochemicals all sizes; Non-ferrous primary smelting Aluminum - all sizes / Copper - all sizes; Non-metallic -Cement - for clinker throughput of 30 tonnes/hour and above/ Lime – 100 tonnes/day and above burnt lime rotary kiln or 50 tonnes/day and above vertical kiln; Iron and steel-requires iron ore as raw materials for production greater than 100 tonnes/day; or using scrap iron as raw materials for production greater than 200 tonnes per day; Shipyards -Dead Weight Tonnage greater than 5000 tonnes; Pulp and paper industry-Production capacity greater than 50 tonnes/day.

i. **Infrastructure** - Construction of hospitals with outfall into beachfronts used for, recreational purposes/Industrial estate development for medium and heavy industry covering an area of 50 hectares or more/ Construction of Expressways, national highway, new township

j. **Ports** - Construction of ports/Port expansion involving an increase of 50 percent or more in handling capacity per annum.

k. **Mining** - Mining of materials in new areas where the mining lease covers a total area in excess of 250 hectares; Ore processing, including concentrating for aluminum, copper or gold; Sand dredging involving an area of 50 hectares or more.

l. **Petroleum**

m. **Power Generation and Transmission**

n. **Quarries**

o. **Railways**

p. **Transportation**

q. **Resort and Recreational Development**

r. **Waste Treatment and Disposal** - Toxic and Hazardous Waste; Municipal Solid Waste; Municipal Sewage

s. **Water Supply** - Construction of dams, impounding reservoir with a surface area of 200 hectares or more; Groundwater development for industrial, agricultural or urban water supply of greater than 4,500 cubic metres per day.

Other legislative framework include; Water Works Act 1915, National Rural Water Supply and Sanitation Policy 2000, National Water and Sanitation Policy 2004 and National Water Resources Management Policy 2003.

The following bodies are in charge of ground water exploitation and utilisation in Akwa Ibom state and they are;

Firstly, the Akwa Ibom State Water Company Limited (AKWCL) which show no evidence of budgetary provision for the water sector over the years. Second, the Akwa Ibom State Rural Water and Sanitation (AKRUWATSAN) shares the same story. This implies that water project development and management are in practice outside the realm of the state

development and political agenda. Third, the Inter-Ministerial Direct labour coordinating committee (IMDLCC) and lastly, the Ministry of Rural Development.

The uncertainties thus created are already manifesting at 2 fronts. First, is the rising inclination in reckless exploitation of the groundwater for private market. The second is the socio-economic burdens imposed on the ordinary citizens in securing access to water for daily livelihoods. For instance, daily engagement of children in water supplies, expenditure on water storage facilities, overdependence on poor quality sources, impacts on women and children.

**AKWA IBOM STATE RURAL WATER SUPPLY AND SANITATION AGENCY
(AKRUWATSAN) (C.A.P 116)**

The law for the agency was made in 9th December 1996 and signed into law in 1998.

“A law to establish an agency for the provision of accessible and potable water for every rural community and for purposes connected therewith (9th December 1996).”

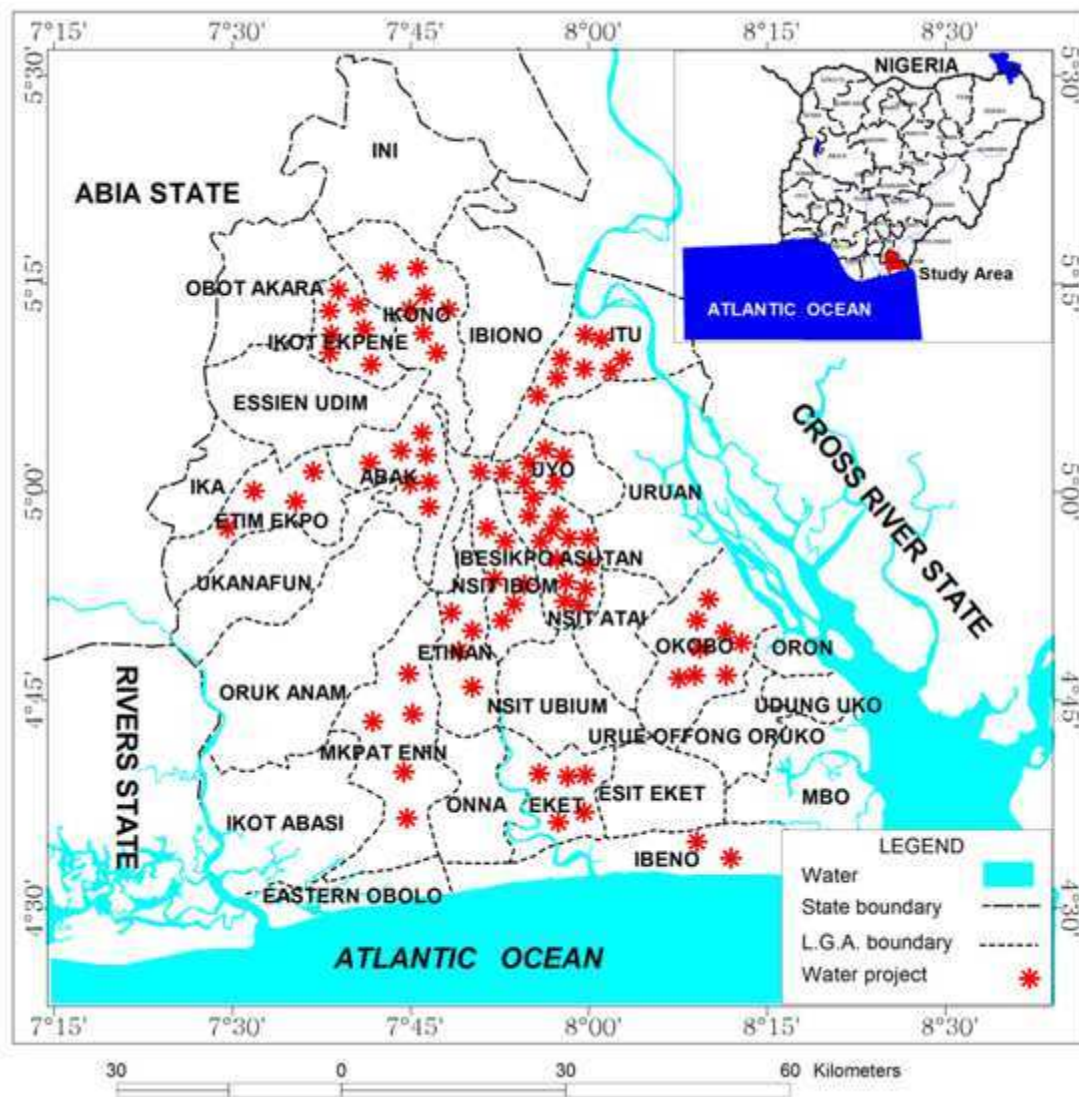
The function of the agency amongst others include; provision of accessible and potable water for every rural community; ensuring water supplied is clean and healthy; establishment, control and maintenance of water works and supplying water at an affordable cost (AKSG, 2000). The powers of the agency include; to construct, maintain and operate water works; carry out through pipes after reasonable notice to the occupiers without compensation; abstract water from natural sources (lake, dam, stream, spring, rivers etc); dig wells where necessary, improve springs and develop other sources of water supply.

Generally, the level of water supply in Akwa Ibom State is poor. The situation is pathetic in the rural areas where water is either scarce or costly when it is available. Many

trek several kilometres every morning and evening in search of water while others depend on polluted water from ponds, stream, rainwater and floods for domestic use, thereby increasing health hazard (Enefiok and Ekong, 2014). The lapses observed here is that, the law exists but the agency has done little or nothing in the area of performing their functions. The agency can be said not to have exercised its constitutional powers.

Table 1. Locations of Mini Water Project by Akwa Ibom State Rural Water Supply and Sanitation Agency (AKRUWATSAN 2012 -2013)

S/N	Water Projects/Location	Local Government
1	1. Itak Ikot Akpandem 2. Nung Ukim, 3. Ibiaku Ata, 4. Ikot Nseyen, 5. Nung Imoh 6. Nkwot, Ediene Ward 9 7. Itak	Ikono
2.	Ikot Ebre, Afaha Offiong, Nsidung, Ikot Ita Obotim, Ikot Ekong, Obotim Ikot Atim.	Nsit Ibom
3.	1. Ikot Ebido, 2. Ikot Mbonde, 3. Obio Atai, 4. Attan Offot, 5. Obot Obom Etoi, 6. Ifa Ikot Abia Ntuen, 7. Mobile Base Idoro	Uyo
4.	Mbak Obio, Mbak, Mbiatok, Ikot Andem, Oku Iboku, Okpolo Ididep, Ibiaku Itam, Ekit Itam	Itu
5.	1. Ikot Obio Ndua, 2. Ikot Ebre, 3. Afaha Ikot Obio Nkan, 4. Ikot Ide 5. Mbiakpong, 6. Ikot Ikan, 7. Ikot Akpasin, 8. Edem Ibiok, 9. Ikot Iko, 10. Nsidung, 11. Oboyo Ikot Ita, 12. Obotim 13. Ikot Ekong	Ibesikpo Asutan
6.	Midim, Ibong Ikot Akpan Otoro Ediene, Offot Abak, Otoro, Oku Abak, Manta Abak	Abak
7.	Amamong Offi, Atabong, Ikot Okiuso, Itak Ekim Oti-Oro, Okopedi, Akpabasi Ayak	Okobo
8.	Ikot Umoh, Ikot Udobia, Ikot Udo Afaha Obo	Etinan
9.	Ikot Essien Enang, Itak Ikot Udo, Ikot Abia Idem Ikot Enwang, Abiakpo Ikot Obio Nting, Ikot Obong Idung	Ikot Ekpene



Source: Enefiok and Ekong, 2014

This map indicates inequity in the distribution of water programs and this can affect the utilisation of water resources. If the coverage or siting of water schemes is lopsided, it can also manifest in the utilisation pattern and distribution of water borne diseases.

AKWA IBOM STATE WATER CORPORATION ACT

“A law to establish a board for the control and management of water works in the state and to provide for the supply of water and for purposes connected therewith (1st May, 1988).

The function of the corporation amongst others include; to control and manage all water works; to establish, control, manage, extend and develop existing water works; to ensure that water is supplied at affordable prices and in reasonable quantity and quality; to organise and conduct comprehensive research on water exploitation/utilisation for the formulation of water policies; provide rural/urban areas with water supply by digging wells, improving springs and developing others sources connected therewith; construct, reconstruct, maintain and operate waterworks and all other stations; carry pipes through streets after notifying the occupiers without pay compensation; abstract water from natural sources; from time to time examine any surface or groundwater to determine if pollution exists; laying, examining, repairing or removing water pipes; ascertain amount of water taken or used through service meters and to disconnect the supply of water to any tenement when it thinks necessary.

DISCUSSION

Governmental attitude to environmental and water issues in Nigeria can best be described as reactive rather than proactive. This assertion can be backed up by the series of actions taken by government which has resulted in the few legal tools available for the protection of the environment. The creation of the National Water Resources Institute (NWRI) and the River Basin Development Authorities (RBDA) in 1976 and Federal ministry of water resources (FMWR) in 1977 were in direct response to the threat of famine brought about by the drought of the early 1970s (Handidu, 1990). While FMWR was charged with the responsibility of policy formulation and advising, the NWRI was set up to embark on research and manpower

training. The RBDAs, on the other hand, were saddled with the responsibility of providing water to communities for the purposes of agricultural, domestic, and industrial consumption (FMWR, 2007). NWRI and twelve RBDAs spread across the entire country are subsidiaries of the FMWR. The RBDAs are backed up by the RBDA act of 1986 (Kuruk, 2005).

The study supports the fact that lack of maintenance, lack of community participation, lack of coordination and co-operation among the stakeholders, political factor, inefficient monitoring, and poor attitude towards public property to be the factors responsible for the incommensurate water situation in the study area. Rain water harvesting with its various advantages among other strategies has been recommended.

THE CHALLENGES OF SUSTAINABLE WATER SUPPLY MANAGEMENT IN AKWA IBOM STATE

Water Supply Status in the State

There is an acute shortfall in the exploitation and utilisation of water to a significant number of people in the region inspite of the general recognition of the importance of water. Figure 2 shows water supply imbalances in the area of study and the challenge of meeting this shortfall which is becoming endemic.

The State like most areas in Nigeria is faced with numerous water management challenges. These challenges in urban and rural water management are ample and are threatening the sustainability of the water system as a significant fraction of the population has no access to proper (good) water supply. These include among others the following:

Poor State of Infrastructure and 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 (Ekong, et al, 2012). Power supply also affects private exploitation of water resources in the areas of pumping water from electricity powered boreholes and it also affects the utilisation of these water in the area of water treatment. If water is not properly treated, the utilisation margin is narrowed.

b. Challenges of Cost Recovery and Social Equity: Cost recovery for water has been a major challenge in water management in the Area (Chukwu, 2015). More than half of the state growing population does not have access to water and sanitation services as a result of inequity in distribution. Inequitable access often means that poorer people pay more for exploitation and utilisation of water. In urban areas, it is the poor who have to buy water from the rich who have the means to exploit groundwater resources. Existing water supply projects suffer from poor funding or neglect in terms of Operations and Maintenance leading to high level water loss from the system or epileptic services thereby creating an artificial demand and resulting in new water supplies being sourced. Government continually invest more funds in water supply projects principally to satisfy political allegiance rather than developing the people's capacity for proper management systems.

Lack of Community Participation: Community participation in water management in the region is barely absent except in the areas of the provision of private alternative sources such as wells and boreholes (Enefiok and Ekong, 2014). The resulting effect of this practice leads the poor paying more for water as they have to depend upon water vendors who sell water at higher prices. The process of getting water also involves other costs such physical energy and mental stress.

Rapid Rate of Urbanization and Environmental Sustainability:

Urban centres like Uyo, Eket and Ikot Ekpene are among the most populated cities in the State. The population is currently on the increase due to the demand for the rich natural resources of the State. The sustainability of its water resources is threatened both in terms of quantity and quality.

Lack of Maintenance Culture and End Use Inefficiency: 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. For instance more than 60% of water supply to high density areas is wasted through badly maintained service pipes and plumbing facilities in homes. More importantly, because over 90% of supplies are currently not metered, people developed very poor attitude to the use of water, and tend to waste more with no conservational attitude. A lot more water can be saved through end use efficiency through application of smart technologies and metering. Water saving strategies and technologies can be adopted in all economic sectors to achieve end use efficiency.

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.

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 National or state 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.

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.

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.

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).

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.

Strategies for Sustainable Water Supply (exploitation and utilisation) Management (WSM)

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

Sensitization Campaign/Effective Data and Information Management: Creating awareness and improving people's understanding of Water Resource Management (WRM) is the first step towards implementation of WSM in the state. 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. All stakeholders should be made to see themselves as working towards the same goals and be ready to share information.

Manpower Development and Capacity Building: The roles of the institutions and their capacities to effectively promote and implement WSM needs to be urgently understood. The technical and management skills required at the different levels of stakeholders must also be identified, and their capacities developed in a more integrated manner to cope with the challenges. 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.

Development of Institutional and 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. 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 like regulating service providers and enforcement of regulations.

System Surveillance/ Monitoring and Evaluation of Water Projects: Water agencies should adequately be funded to automate their network surveillance for rapid response to system failures. The Geographic Information System technologies will enhance the capacity of the agencies to cope with these challenges and should be pursued with vigour. 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.

Political Will and Holistically Managed Ecosystems:

The government should demonstrate as a matter of urgency the political will to declassify water supply as a “free service” in their political manifestoes but as a “user pay service”. The public should realize that qualitative water service is capital intensive and cannot be rendered as a free service. Simply put, holistic management applies to a practical, commonsense 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.

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 policymakers 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.

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 crosssubsidies 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.

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. (Ademiluyi, and Odugbesan, 2009).

Optimization of Water Resource/Improvement of Management and Maintenance

Practices: 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. Financial management, operation and maintenance, abstraction and treatment techniques and control of water sources pollution should be taken seriously.

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

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.

Conclusion

In summary, in accordance with globalization and modern water reforms, the relevant Nigerian authorities responsible for water law policy formulation must take up the challenge. The Federal Ministry of Water Resources, Federal House of Representatives Committee on Water Resources and the Bureau for Public Enterprise must begin to take proactive steps to update Nigerian's water resources policy and law to become compliant with global international standards. The implementation of the above recommendations as policies will eventually ensure a viable and stronger Nigerian water policy and law to enable Nigeria compete with international global standards.

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