

## Review

# Water uncertainties in Southeastern Nigeria: Why government should be interested in management

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Accepted 21 April, 2009

This paper takes a look at the general condition of water resources availability and management practices in Akwa Ibom State, southeastern Nigeria. The paper observes high incidence of inequity and access burdens on the general population (especially the vulnerable groups) as well as reckless incidence of exploitation of the aquifer for private market. These were all linked to weak government involvements in the management of the resource, a situation that has given rise to uncertainties relating to the survival and the ability of the resource system to sustain livelihoods beyond this generation. The observations in the study reflect the general absence of a strong government commitment in Nigeria to managing water resources with specific concerns on the survival of the ecosystem. While striving to meet the various international commitments on universalizing water access and services, the paper cautions that meeting human needs for water should not be at a degenerating cost to the ecosystem. In the recommendation, the paper advocates a centralized and coordinated water management practices with an ecosystem focus. Attaining this requires strong precautionary policies on water demand management backed up by effective regulatory measures to ensure optimum and balanced supply, efficient use as well as the protection of the natural system.

**Key words:** Water uncertainties, precaution, effective governance, Akwa Ibom State, Nigeria.

## INTRODUCTION

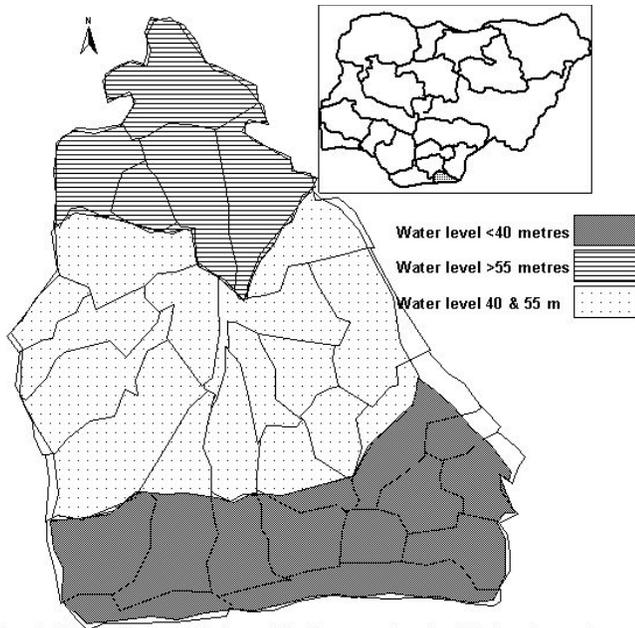
Global concern on uncertainties in the water sector has risen over the years. Much focus border on the worsening condition of the hydrosphere e.g., uncertainties in the freshwater reservoirs, fragile aquifers and poor and unsustainable practices in management. The challenges of the rising urban population and industrial activities have only helped to complicate the risk and uncertain situation. International efforts at containing water related risks over the years are very well documented in the literature (Castro, 2007). These include tackling desertification, controlling water pollution, developing conflict prevention measures, monitoring and preventing water related threats and hazards, promoting policies aimed at scaling down deficiencies and inequalities in the allocation of water especially in developing and transitional economies. Concerns over these issues are louder and more important in developing countries which harbor the world's most poorest people and are constantly affected

by leadership problems and weak citizen's involvements in water management issues and debates. The second world water assessment report (UNESCO, 2006) has identified the world water crisis (associated with the lack of an adequate water supply and sanitation for people) to be primarily a crisis of governance, so governance is very crucial in the water management issues in the developing countries.

The need for clean water for drinking, cooking, bathing and other household needs had long been recognized. However, it is estimated that over 1 billion people still lack safe domestic water supplies and 2.4 billion lack adequate sanitation (Meinzen-Dick and Rosegrant, 2001). This statistics, no doubt, holds true mostly in the developing economies of Asia, Africa and Latin America where poverty has assumed endemic root. 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. In most countries, there are increasingly various degrees of water uncertainties arising from over pumping of the aquifers, falling water tables

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**Figure 1.** Akwa Ibom State with approximate water levels.

tables and sharp deterioration of the aquatic ecosystems. 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. In Nigeria, uncertainties over water resources have grown over the years in relations to the dramatic changes in the demographic, socio-economic and ecological characteristics. The gap between the south and the north is increasingly becoming yawning-the north being 'water scarce' while the south is presumed 'water abundant'. Within the south, there are internal variations and variability with rising uncertainties in the oil producing areas as well as most other non-oil producing areas. While oil-and salt-based pollution are common in oil producing areas, most other non-oil producing areas experience intermittent form of spatial and temporal scarcities.

In this study, we attempt to capture the degree of uncertainties in an analytical and descriptive manner in southeastern Nigeria, using Akwa Ibom state as a case. Considerations have been given to the geography of the study area in relations to water resources condition, general variability and access conditions, as well as current water resources management approach. We conclude by highlighting the need for strong government intervention.

## AKWA IBOM STATE AND WATER RESOURCES

Akwa Ibom state is a part of Southeastern Nigeria, located between latitudes  $4^{\circ}30'$  and  $5^{\circ}30'N$  and longitudes  $7^{\circ}30'$  and  $8^{\circ}20'E$  (Figure 1). With a total land area of  $8,412 \text{ km}^2$ , 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 40 m). The south happens to be an area dominated by onshore/offshore petroleum oil exploration with such major oil multinationals (Shell, Exxon Mobil, Agip, Elf and Total) 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 55 m). 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 classification, 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 va-

**Table 1.** Percentage of urban population served by AKWCL (2001-2006).

Urban LGA	2001	2002	2003	2004	2005	2006
Abak	0.7%	0.7%	0.7%	0.7%	0.1%	0.1%
Eket	2.1%	2.1%	2.2%	2.2%	2.2%	2.2%
Etinan	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Ikot Abasi	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Ikot Ekpene	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%
Itu	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Oron	1.3%	1.3%	1.4%	1.4%	1.4%	1.4%
Uyo	2.3%	2.3%	1.1%	3.8%	3.8%	3.8%

Source: Udom (2008)

riation 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). This does not convey a pollution-free status for groundwater quality since in the process of percolation, various types of chemical elements from the weathered rock will be dissolved into groundwater aquifer, in addition to the product of human and industrial activities (USEPA, 1998; Population reports, 2000). The dissolution of these chemical elements (natural deposits of salts, gypsum, metals in soils) could be of a different magnitude depending on the nature of the weathered rock or the hydro geological formation. Apart from the middle part of the state, groundwater use is not a safer option in the north (because of mineral based pollution) and south (because of saline intrusion and petroleum based pollution). In actual facts, the north and southern part of the state are placed at disadvantaged position with respect to potable water accessibility. The next discussions elaborate this much better.

### GENERAL VARIABILITY AND ACCESS TO WATER IN AKWA IBOM STATE

In the study area, over 90% of the population live without access to public water services. Current public water supply efforts of government is concentrated in the urban areas. Statistics in Table 1 show that the highest % of urban population having access to public water services

is 3.8% for Uyo, the state capital.

The story in the rural areas is worse as current statistics (Udom, 2008) also show that over 90% of the state rural water projects suffer various degrees of difficulties e.g., abandonment, disuse, not functional, unsuccessful or uncompleted. The very few available ones are mostly and extremely irregular in services. Consequently, there is a very deep gap between water needs and supplies across the 3 hydrogeological zones, be it in terms of quality, public investments or other factors (Table 2)

The problem of access to water in general and public water services in particular in Akwa Ibom state is a common problem both in the rural and urban areas. In the rural areas, there is a high dependence on all forms of natural sources of supplies (streams, ponds, rain, hand-dug wells). Availability of these sources vary over the seasons. For instance all the stream sources always dry off in the southern areas during the dry season while the few available ones remain physically and chemically polluted because of inability to naturally renew themselves. There are also the problems of natural and human induced pollution common in these areas. Other regions also experience different levels of relative scarcities. For instance, it takes great difficulties, and most times, unsuccessful efforts to access groundwater in the northern part of the state because of the nature of the hydrogeology. In the middle region, experiences of water scarcity is often as a result of the rising pressure caused by expanding demographic and socio-economic characteristics. The only source of water for the urban populace during the dry season is from commercial borehole. This is because the capacities of the state water agencies at meeting the water needs of the people is grossly inadequate in terms of funding, manpower and technical capabilities. There is no clear and dedicated funding for water resources projects in the state over the years. For instance record at the Akwa Ibom state water company limited (AKWCL) show no evidence of budgetary provision for the water sector over the years. 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 (Table 1). 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 other livelihoods activities, among others. Table 3 lists such access issues which were noted to cut across all the hydro geological zones in the study area.

Water has always been a very crucial issue on the United nations agenda. It was such importance attached to water supplies that the UN set up a target anchored on the Millenium development goals (MDG). The aim embodied

**Table 2.** Issues and trends related to water resources variability in Akwa Ibom State.

Variability	Regional water areas (Hydro geological Zones)		
	Water Level A (South)	Water Level B (Middle)	Water Level C (North)
Hydro geological Characteristics	Groundwater is accessed below a depth of 40 meters	Groundwater is accessed between 40 and 55 m deep	Groundwater is accessed above 55 m depth
Water Quality Issues	Pollution induced by petroleum oil exploration	Relatively safe for use except where urbanization impacts manifest	Soil mineral-based pollution
Seasonality Factor	Stream sources dry up in the dry season, in addition to surface water pollution	Prolonged scarcity in the dry season	Scarcity in the dry season
Dominant sources of water	Natural sources (rain, stream, pond, hand-dug wells)	Commercial borehole in urban areas and natural sources in the rural areas	Natural sources (rain, stream, pond, hand-dug wells)
Public Investments	Weak public investments which are concentrated in the urban areas	Weak public investments which are concentrated in the urban areas	Weak public investments mostly concentrated in the urban areas
Private/Commercial Investments	Strong commercial water services in the urban areas	Strong commercial water services in the urban areas	Strong commercial water services in the urban areas

Source: Field observation

**Table 3.** Access Issues in water supplies in Akwa Ibom State.

Access Issues	General Observations	Specific Remarks
Heavy workloads on women	A common problem	This may be minimised where there are children
Children are mostly engaged	A common problem	Children usually are late to school or absent
Much time and energy are wasted in search of water	Same as above	Excepting few communities who live close to stream sources
Impacts on other livelihood activities	Same as above	-
Risk in drinking polluted water from open sources	Same as above	Most serious during dry seasons
Additional expenditure on water storage facilities	Same as above	-
Natural sources of supply dominate	Same as above	Streams, rain, hand-dug wells, ponds, etc
Severe impacts of scarcity in the dry season than rainy season	Same as above	Communities in the south ('A' zone) are worst affected
Absence of public water infrastructural project	Same as above	Where such project exists, it is either not functional or very extremely irregular
Exploitative commercial supply services	Same as above	-

Source: Udom (2008)

in the goal (Goal 7) is to reduce by half the proportion of people without access to safe drinking water by 2015. Considering this picture as at this 2008 in Akwa Ibom state, it is clear the state is still far below the starting line. The importance of water in defining the livelihoods of man was re-emphasized when the International water

resources association (IWRA, 1991) declared that water management should receive a much higher priority, particularly in the developing world, given its potential contribution to sustainable development. In spite of the various authoritative recognition of the importance of water, current access to this resource in Akwa Ibom state

is more a function of wealth, income level, political connection and locational characteristics. Currently, the low income earners tend to spend higher than those in the high income class. In 2004, 25 l of water could be obtained at #3 (Akpabio, 2004). Currently, same litres of water costs #5 and will double at #10 in the dry season. A survey update of the 2004 report (Akpabio, 2004) shows that people spend as high as 20.7% of their monthly income on water in the city (with upto 5 adults person in the household), excluding other related expenditures (e.g., water storage and sanitation facilities). For instance, with a #5 charge per 25 l, a household that needs 100 l of water in a day has to budget a daily sum of #20 and in a month, such a household will spend a total sum of not less than #600 or US\$4. This is double the monthly official flat rate of #300 or US\$2 to consumers linked to the AKWCL network. This is a complete negation of the Rio de Janeiro (1992) declaration whereby world leaders found it important to commit themselves to a comprehensive programme to provide sustainable water supply and sanitation services to the hundreds of millions of the world's population who currently lack them. This declaration did not imply that poor people should pay more than the rich. The case in urban areas in Akwa Ibom is a reflection of absolute lack of commitment on the part of the government towards addressing the tenets contained in Agenda 21 of the UN summit at Rio. 16 years after the declaration, poor people are still constrained by daily struggles for water and water services. Confronted with this apparent and unacceptable disparities, the immediate past regime of Governor Victor Attah mandated the AKWCL to take full responsibilities of supplying and connecting all the inhouse water plumbings and pipes to whoever needs it, while cost recovery for the facilities would be gradually effected alongside monthly tariffs (in the urban areas). This did not work out as planned considering the very low income status of the very large number of the urban population. A total sum of #1000 (US\$6.7) was to be recovered monthly from consumers for the plumbing and piping facilities excluding the monthly tariff. Given a minimum monthly wage of #5500 (US\$36.7) for a formal sector worker, it was apparent many households would not survive a further deduction of #1000 excluding the monthly tariff and so the "uncertainties" remained.

Castro (2004) has succinctly demonstrated the relationship between access to water services and citizenship right, especially in the notion that water for human consumption is a public good, a universal right, which is found in many different cultures and predated the development of modern citizenship systems (the author cites many authorities, e.g., Glick, 1970; Meyer, 1984; UN, 1977, among others). The current situation in urban areas of Akwa Ibom state (when the citizens are subjected to the exploitative services of the private sector) is a complete negation of these principles as many households continue to live deeply below 25 l of water in a day

(in a humid tropical environment) as against the internationally estimated standards of 100 l for household needs (Castro cites Clarke, 1991).

### **CURRENT WATER MANAGEMENT APPROACH IN AKWA IBOM STATE**

There is currently no clear water management approach in Akwa Ibom State. Available legislative and legal basis related to water management are indirect, outdated and unintelligibly located within the general water resources documents of the Federal Republic of Nigeria (FGN) (Table 4)

3 levels of government are involved in the production and distribution of water and water services in Akwa Ibom State. These include the federal, the state and the local governments. The Federal ministry of water resources (FMWR) (created in 1976) is responsible for formulating and coordinating national water policies, management of water resources including allocation between states and approving development projects. This is so because the water resources decree 101 of 1993 vests all the waters within the country's territorial borders on the FGN. Current national policy on water supply (which was launched in 2000) allocates responsibilities for water supplies (for urban and rural areas) to the various tiers of governance in the country. For rural water supply, the FGN's involvement is 50%; State (25%); Local Government Areas (LGAs) (20%) and Community (5%). For the urban areas the FGN has 30% responsibility; State government has 60% while 10% is reserved for the LGA. The hierarchy in the FMWR is strengthened and complemented by two other bodies namely the national water resources institute (NWRI) and a utility charges commission (UCC). While the NWRI (created in 1985) is responsible for engineering research functions related to major water resources projects and training sector professionals and technicians, the UCC (created in 1992) was mandated to monitor and regulate utility tariffs, including those of state water agencies (SWAs). Added to these federal structures are 2 other contradictory legislative acts namely the Landuse Acts of 1978 and the water resources decree 101 of 1993. Contradictory because while decree 101 vests all rights and control of water resources, within the Nigerian border in the federal government, the landuse act gives individuals and sub-governments unrestrained access to ground water within its boundary property. This implies the powers of the federal government to exclusive control of all waters is already punctured by the land use act, which empowers states, local authorities and individuals to free exploitation of waters within their tenure boundaries. This is one of the constraints of enforcing a holistic plan for water resources development for Akwa Ibom State (Akpabio, 2008). Within Akwa Ibom state, the Cross river basin development authority (CRBDA) is one of the river basin development authorities (RBDAs) in Nigeria set up specifically to take charge of the water re-

**Table 4.** Water resources management instruments in Nigeria.

Instruments	Period	Key Provisions
Indigenous Management tools	Pre-colonial	Community-centred water management
Waterworks Act (1915); the Minerals Act (1917); the Public Health Act (1917)	Colonial	Aimed at protecting water bodies against from pollution arising from impacts from the respective sources
The oil in navigable water Act (1968); the Petroleum Act (1969); EIA Degree (1992); Various other pollution and waste management regulations (1991)	Post-colonial	Same as above
Land use Act (1978)	Post-colonial	Ownership of land linked to ownership of water
RBDA Decree (1976, 1979, 1987)	Post-colonial	Attempted to promote a comprehensive and integrated water resources development
Water resources Decree (1993)	Post-colonial	Vests full ownership and control of all waters in the Federal Government

Source: Various.

development of the state and its neighbouring Cross River State in a holistic and integrated manner. Again, the CRBDA has remained a 'toothless bull dog' owing to the contradictory regimes of many management authorities which tend to frustrate efforts at a coordinated and centralised water management within the area. Currently, Akwa Ibom state is faced with a situation where many agencies and individuals are involved in water resources exploitation for a number of reasons, including political, economic and market or commercial reasons. In the perspectives of government agencies, there are many forms of failed and abandoned water projects bearing the marks of many different agencies and political representatives e.g., political constituency water projects of the various local, state and national legislators, the CRBDA water projects, Niger Delta development authority (NDDC) water projects, petroleum trust fund (PTF) water projects, Inter-ministerial direct labour (a form of political patronage), local government water projects as well as thousands of commercial boreholes, among others and besides the services provided by the AKWCL and AKRUWATSAN. Over 99% of these water projects are groundwater based (boreholes). The consequent pressure on available groundwater systems tend to multiply the degree of uncertainties on the resource. As explained by Homer-Dixon et al. (1993), unrestrained human activities can contribute to environmental change and in the case of water there could be a decrease in the quality and/or quantity of supply, if they are used at a rate faster than they can be renewed (besides the aquifer problem). The phenomenon of corruption and inter-agency competition have often been held as the reasons for the drive for government water projects as well as the failures of

such projects. In most studies, it is demonstrated that the cost of drilling a borehole could be inflated as many times as possible with over 95% of such project fund disappearing into individual pockets (Akindele and Adebo, 2004; Akpabio et al., 2007; Salau, 1990; Akpabio, 2008).

In January 2000, the FGN adopted additional programme tagged national water and sanitation policy (NWSP). This policy recognizes the supply of water and sanitation a right of all Nigerians and gives responsibility to the three tiers of government, the private sector and the beneficiary. The cardinal point of this policy was its recognition of water as an economic good and the need to run water supplies as business identifies the need for reform and for private sector participation. The policy further recognizes the special needs of women and the poor and the need to link improved sanitation with water supply. Current practice shows that the implementation of this policy in the state seems more biased to emphasize the aspect that tends to transform water into a market commodity. Already, the state water agencies have fully commenced the application of the full principle of demand responsive service provision in water supplies. According to an official in the AKWCL: ".....by this arrangement, those who cannot afford to connect water in-house should depend on private commercial borehole". This ultimately has dampened the prospects of extending water services to the poor both in the available urban and the rural areas. The implication is that there is and will continue to be a high incidence of dependence on commercial borehole markets. This is likely going to lead to a mushroom of the commercial borehole industry, thus further increasing the uncertainties on the capacities of the groundwater resources to sustain the needs of the

growing population.

### **WHY STRONG PUBLIC INVOLVEMENT IN THE MANAGEMENT OF WATER IS IMPORTANT**

From the analysis above, it is obvious that water supply to humans and ecosystems is facing serious challenges of uncertainties as a result of increasing demands for domestic and other socio-economic activities. Current government focus (though grossly inadequate) revolves around managing the various human needs for water while concern for the ecological stability has been largely neglected. This lies the aspect of uncertainties which needs some precautionary policy interventions.

The precautionary principle has arisen as part of these discussions on the most effective ways to avert any uncertain risks by protecting the ecosystem while at the same time ensuring that human needs for water are served. The precautionary principle is a tool for policy and decision-making designed to ensure that people or entities bear political responsibility for taking action to avert breakdown in water services and prevent damage to the ecosystem in the face of uncertain scientific information about the ecosystem risks (Europe, 2004). The Rio declaration on environment and development of 1992 confirmed this when it stated thus, 'where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'. The concept of precautionary principle is very relevant in the context of current experience in water management in Akwa Ibom state. On 3<sup>rd</sup> May, 2005 when the CRBDA held her first water resources stakeholder meeting, there were loud voices against increasing and reckless exploitation of the aquifer for commercial market by individuals. For Uyo metropolis alone, the rate of groundwater exploitation (through borehole drilling) is already threatening the health of the aquifer. The rise in the number of commercial borehole alone, of recent, has gone up to 552 (Okpo, 2008). This is enormous pressure on the natural system, besides the commercial exploitation that is often common with such activity. In the rural areas, there are very high incidence of reported cases of stream dry-up and siltation (AKS, 1989). This is expected to worsen the water access condition of the poor who depend solely on such natural sources for their livelihood activities. A recent report (FGN, 2000) shows that effective urban water supply coverage for Nigeria can be as low as 30% of the total population due to poor maintenance and unreliability of supplies. The report went on to state that except for Abuja and limited areas of Lagos, no urban community has a sewerage system, with the result that sewage and sullage either lie stagnant or are disposed through the storm water drainage system. These are seeds of uncertainties at many levels, including the potential for a water related natural disaster. With respect to Uyo (the capital

of Akwa Ibom state), the inability of the public water agencies to meet the daily water demands of the populace has resulted in individual self-help, namely; patronage of private water market and the proliferation of commercial borehole with all the consequences already listed. The impact of population growth will add more to the problem. At present, the state population grows at a rate faster than 3%. This is expected to have more impacts on the demand for water for both domestic use and food production. Against these backdrops are the crying needs for precautionary policies, which should aim at managing demands, addressing equity issues, regulating activities and practices and protecting the system. These are all issues bordering on substantive governance.

Managing demand is very imperative to address social inequity in access to water and sanitation as well as enhancing efforts at attaining the millennium development goals (MDGs). It has been demonstrated that poor people pay much more for water than the rich, while the rich on the other hand tends to waste much water due to inefficiencies in the management system. For instance, more than 60% of the water supply to high density areas is wasted through badly maintained service pipes and plumbing facilities in homes (Emoabino and Alayande, 2007). The authors attribute these wastage to the fact that over 90% of water supplies are currently not metered which makes the habit of saving water impossible.

Water demand management is important but that cannot take place successfully in the absence of effective and enforceable regulatory mechanisms. The current disjointed and uncoordinated water management style in Akwa Ibom state does not lend any useful platform for actualizing demand management as well as protecting the natural system. This emphasizes the need for a centralized and coordinated practice. There are benefits derivable from such practice. First, the reckless and unregulated exploitation of the aquifer will be checked, while at the same time allowing the system opportunity for natural self-regulation and constant or dynamic stability. Second, a centralized management practice will address equity issues. When water management is put in the domain of one authority, it is possible and most wholesome to plan allocation and distribution in a way that addresses the needs of the poor and the vulnerable groups while at the same time ensuring efficiencies in inter-sectoral water transfers and allocations. Given the high abundance of the resource in some regions vis-à-vis scarcity in another, a centralized and coordinated management arrangements could rectify such imbalance through intra and inter-regional transfer mechanism. It would be possible for water from the south to get to the northern parts of the state if there is strong political commitment. Consequently, the current role of the CRBDA should be strengthened legally, legislatively and in terms of financial and manpower capacities to oversee the management of water in the basin in a holistic manner.

What is currently happening in the state is the fact that the CRBDA which, statutorily, is vested with the powers of integrated water resources management in the area faces crisis arising from hydrological circumstances and institutional inefficiencies. When the idea of integrated management of water resources was mooted in Nigeria, it is possible that variations in local hydrology and water resources conditions of local areas were not adequately factored in. This resulted in a uniform mandates and functions being imposed on all the River basin development authorities (RBDAs) which the CRBDA is among. Where an individual is able to access water freely through natural sources, it becomes practically difficult to coordinate management activities. Institutionally, integrated water resources management in the state faces numerous problems of lack of political commitment, inadequate funding attention, corruption, lack of capacity, weak legal and legislative base, and insensitive administrative governance. As water resources conditions differ across regional areas of Akwa Ibom state, it would be expected that the greater management attention be directed toward securing access for the vulnerable regions of the north and south of the state, while tight regulations be enforced to limit individuals from reckless exploitation in areas of groundwater abundance. With these, user interest and concern in the management of the resource would not only be guaranteed, it would also go a long way toward protecting the system to minimize risk of drought in the nearest future.

### Concluding remarks

Arising from the above discussion is the crying need to look at water in the wider context of the environment and development. These are the triggers of uncertainties once they are neglected. These issues are also crucial if we are to comprehend what drives people in their use of water now and where the main pressures on water resources will come from in the future. Soussan (2003) has taken time to categorize these drivers of water use to include population growth, urbanization, globalization, industrial expansion, agricultural development, energy production and use, recreation and tourism and climate change. Climate change alone over the next millennium is almost a scientific certainty (IPPC, 2001). Such changes will have much more impact on the spatial and temporal distributions of surface water resources, and may well be accompanied by a more frequent occurrence of extreme events. Developing countries in general have not got any form of capacity to respond to such changes. This underscores the need to more carefully manage the available freshwater resources for the future generation. Consequently, efforts should be directed at ensuring and sustaining the flow and quality of water for the viability of the ecosystems. In developing countries, the poor gain access to the natural resources which constitute the basis of their livelihoods. Even where water is not a direct

input into production, the availability of other important natural resources (such as forests, fishing or grazing) on which people depend is contingent on flows of water through ecosystems (Soussan, 2003). [Rennie and Singh (1996, cited in Soussan, 2003)] supported this assertion when they noted the close relationship between sustainable livelihoods of the poor and natural resources which depend on water for survival.

The current situation in Akwa Ibom state calls for strong government intervention. As natural freshwater ecosystems are strongly influenced by specific facets of natural hydrologic variability, there is need for a strong and ecologically accountable water policies and management strategies. In the words of Richter et al. (2003), 'ecologically sustainable water management protects the ecological integrity of affected ecosystems while meeting inter-generational human needs for water and sustaining the full array of other products and services provided by natural freshwater ecosystems. Ecological integrity is protected when the compositional and structural diversity and natural functioning of affected ecosystems is maintained'. We believe that the current water resources decree 101 of 1993 has a sound principle as it places water in the exclusive domain of the federal government for the purpose of centralized management and control. In practice, this principle has not been applicable in any case as many entities of authorities still exist. This paper believes such legal avenue should be revisited with a view to strengthening and enforcing its application. In the case of Akwa Ibom State, the CRBDA should be given the legal, legislative and administrative mandate to exert full authority over the development and management of water resources in its domain. In our various discussions, it is seen that integrated management of water resources in Akwa Ibom state has not been implemented in the real sense. This explains why water resources management is left to individuals and agencies without proper enforcement of regulation standards. This is not healthy for the population and the ecosystem. Given this circumstance, we like to recommend that the functions and mandates of the CRBDA be narrowed specifically to the task of approving and issuing permits and authorities to water development and sub-management agencies. Depending on performance results, its mandates could be broadened in the near future to include direct involvement in the provision and development of water resources. As there are enormous technical, manpower, information and financial challenges, the paper believes that evolving a step by step approach such as this will finally lead to full-scale management autonomy for the CRBDA. The present uncertainties in the water sector in Akwa Ibom State are too risky and should not be ignored.

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