The Application of Strategic Management in the Control of Environmental Resources (Fresh Water)

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ABSTRACT
In the maintenance of biodiversity, human welfare and economic development are sustained through the conservation and management of forests and water resources in order to ensure food security and maintain the ecological system, as the hallmarks of the world millennium development goal (MDG). The study is aimed at a critical analysis on the effect of strategy on targets 9 and 10 of the millennium development goals, MDG) in Nigeria. It highlights areas where the country has performed well, and areas which need to be improved upon. The MDG is a holistic strategy encompassing the integration of the needs and aspirations of all segments of society which would lead to improvement in access to water and sanitation, reduction in biodiversity loss and conservation of forest. These, when achieved, would save Nigeria the estimated US$5.1 billion cost (in economic terms) which unsustainable development might have cost the country.

INTRODUCTION

Environmental management refers to those aspects of the overall management function which determine and lead to implementation of a sustainable environmental policy (Sturn, 2002). Proper environmental management is based on the principle of sustainable development. Sustainable development is a series of activities which meet their own needs (Brundtland Commission, 1987). Strategy provides general guidance for special action in pursuit of particular ends (ISMN study pack, 2010). Strategy, as an effect on environmental management, looks at how the national target is achieved as depicted in Targets 9 and 10 of the millennium development goals (MDG). Target 9 of MDG states: *"integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resource"* target 10 of MDG states that *"had by 2015, the proportion of the people without sustainable access to safe drinking water and improved sanitation".* Simply put, targets 9 and 10 of the MDG constitute the combination of the goals for which the firm (Nigeria) is striving to achieve and the means (management plans, action plan etc), by which it is seeking to get there. This view of strategy is consistent with Michael Porter's definition of strategy as *"a combination of ends (goals) for which the firm is striving and the means by which it is seeking to get there"* (ISMN Study Pack, 2010). The provision of water can be an instrument for poverty alleviation lifting people out of the degradation of having to live without access to safe water and sanitation, while at the same time bringing prosperity to all. After almost sixty years of water supply development in Nigeria, it is regrettable that only 60% of the households have access to good table water (Gbadegesin *et al.,* 2007). In recognition of the poor state of water management in the country and its implication for sustainable socioeconomic development, the Obasanjo Administration prepared the first national

policy on water resources development in the year 2000. A major objective of the policy is to provide safe drinking water.

OBJECTIVES OF THE STUDY
1. Assessment of the environment action plan of Nigeria to ascertain how they meet and satisfy Targets 9 and 10 of millennium development goals (MDG).
2. Assess how sustainable development principles have been integrated into Nigeria's policies and programs.
3. Assess the proportion of the Nigerian population with access to drinking water.
4. Assess the proportion of the Nigerian population with access to adequate sanitation.

RESEARCH QUESTIONS:
1) How does environmental management affect biodiversity?
2) In what ways have the MDG influenced the availability of fresh water?

REVIEW OF RELATED LITERATURE:
Nature is stable until pushed beyond its carrying capacity. Since the 1970s, water scarcity intensity and prolonged drought has killed more than 24,000 people per year and created millions of environment refugees (Avers, 2003). The four variables under discussion in this article are forest, biodiversity, water and sanitation. They shall be termed environmental resources.

Environmental resources management strategy is a five-stage procedure. Thus,

(i)   At the government and decision-making stage, questions are answered by both the policy makers and general public. These answer are determined by the ways of life of the people, or their knowledge system, culture beliefs and values, according to Nigerians report to the united nation (NGA, 1999), the strategy to integrate environment into economic and sectorial policies, planning and decision making processes include: a)improving the provision of the federal level, establish sustainable development units (SDUs) in state budget and economic offices with the same responsibility and function as the SDUs in the national planning commission and religion planning. Department of the ministry of works and house to enable sustainable land use management; and c)adopting the system of national accounting to adequately reflect the extent to which economic development activities have increases or decreased environment pollution and natural resources.

(ii)   The environmental resources management strategy is the environment's resource modeling. It is at this stage that the questions 'How much resources are available? And 'who needs it?' are answered. Specifically, this state involves defining the policies, regulations, capacity requirements, and the enabling environment as well as the mechanism for sharing the resources between competing interests. The determination of the quantum of available environmental resources over space and time as may be depicted by population growth, industrialization and the changing habit of use as well as the socio-economic and ecological implications of the demand and supply of environmental resources.

(iii)   Management guideline development is the third stage in the environmental resources management strategy. At this stage, the question "who gets how much?" is answered. Specially, it involves defining the policies, regulation, capacity requirement and enable environments as well as the mechanism for sharing the resources between competing interests.

(iv)   Implementation stage is the stage that decisions about cost and price are determined. Other issues such as funding, institutional or capacity building, environmental sustainability, and public awareness are tackled at this stage. The last stage is the environmental supply stage. It involves conservation of evaluating the use of environmental resources and its implications such as the human dimension of water supply, environment sustainability, trans-boundary conflict of interests and effects of economic and population growth. The five stages in the environment resources management strategy are interrelated and interdependent, and therefore, integratable.

Olokesusi (1990) suggested some policy guidelines for the future which include an integration of the technical, operational, and financial and health issues right from the start of the planning process to improve result. Participation of the communities in all project phases with special attention to the role women play and should play in community water supply and sanitation, would also contribute to improvements in the welfare of communities. Lack of adequate potable water supplies is a recurring problem in many parts of Nigeria. In Imo State of Nigeria, Mr Ako Amadi designed a water provision and conversion system as a leading example of reliable approach to environmental management strategy in the "Water Provision and Conservation System in Imo State of Nigeria". Ako's overall objective is to help communities design and implement environmental initiatives which are ecologically suited to the needs of rural and suburban communities. Ako conducted a feasibility study and designed a system that dramatically improves the water supply of the thirteen communities in which he works. Thereafter, he designed a water provision and conservation system that closely matched local needs. He then got the community interested through several meetings with the community leaders, and agreed to support the effort. To strengthen their commitment, Ako set up a local governing committee, which included local leaders, to manage and monitor the system after Ako has moved on to other communities. The project is thus designed to be managed by local communities.

In Ako's project, for harvesting the wet season's rainwater, a network of cement-lined gutters is constructed. The gutters slope and empty into an open cement cistern in which water hyacinths and lilies are planted on a gravel bed for microfiltration. Over this, bamboo or metal sheets channel collected water into a closed tank, while excess drainage runs into the cistern. Separate taps are attached to each cistern for the water supplies for agricultural and domestic purposes, respectively. The system is designed to be village property and open to everyone without a fee. In addition to providing a safe domestic

public water source and water for agriculture and commercial use, the initiative simultaneously provides a training program for young people in the field of water resource management. Ako plans to spread his idea by implementing it in all the thirteen communities in which he presently works in Imo State. He has already received a substantial Ford grant for his water project pilot and several other projects his organization is involved in, and he is confident that with the success this pilot, he will be able to get funding to spread the idea. An important lesson from Ako's project is that the principle of co-management should guide water resources development (and, of course, environmental resources) and management strategy. The "top-down" governance of science and technology should yield to this reality. This implies that local beneficiaries and "outside experts" work together giving equal weight to both knowledge types. This approach would produce more positive outcomes if the process of project development and acquisition of traditional knowledge are carried out in a participatory manner, rather than through consultation.

RESULTS
The study showed that 99.8% of Nigeria's population had access to adequate sanitation in 2003 (as peak) but was lowest in 1990 with 49%. This means that between 1990 and 2000, there was a 16.3% increase; while between 2000 and 2003, there was a 75.08% increase.

MDG GOALS	1990	2000	2003
Nigerians with access to safe drinking water (5%)	49	57	99.8
Access to adequate sanitation	60	63	100
Percentage of average annual deforestation	2.6		

Source: World Development Indicators (2002).

Access to adequate sanitation peaked in 2003 with 100.0%, especially through the monthly environmental sanitation exercise, and was lowest in 1990 with 60%. This shows that there was a 5% increase between 1990 and 2000; and 58.73% increase between 2000 and 2003, respectively. During the 1990 to 2000 decade, deforestation (or encroachment of the forest by man) was at 2.6%.

DISCUSSION
In Nigeria, there are several sources of freshwater. The sources vary from natural source like streams, ponds, rainwater, and human made source like wells, boreholes and in some cases (especially urban areas), pipe borne water.
Common causes of freshwater shortages include drought, climatic change, and changes in rainfall pattern. Pollution of freshwater reduces the utility of water from human consumption standards to other uses. Some of the factors that pollute freshwater include:
a) Bad farming practices.
b) Rusting of Septic tanks.
c) Industrial waste.
d) Heat.

Types of Sanitation Systems

According to Gbadegesin et al (2007), documented sanitation facilities existing in Nigeria include

(i)   Flush toilet.
(ii) Traditional pit toilet.
(iii) Ventilated improved pit (VIP).
(iv) Latrine.
(v)   Bush/Field.
(vi) River.

Causes of Poor Sanitation Systems:

Lack of maintenance and poor funding of the environmental sanitation sector form the principal causes of degrading sanitation systems.

With a study population estimated to be one hundred and eighty million (180,000,000), population growth, infrastructural development and lifestyle changes also form the determinants of demand on water and sanitation, as well as pressure on forest and biodiversity in Nigeria.

Data Collection & Analysis:

Data collection activities followed directly from the objective of the study. Relevant policy and program document of government were collected and reviewed. This study adopted a combination of qualitative and quantitative methodology, for judicious combination of qualitative and quantitative methods can help solve problems which are associated with each type of method taken separately (Kanbur, 2001; White, 2002). There was a continuous increase in the number Nigerians with access to safe drinking water and adequate sanitation as shown in our table 1. There is a widespread apprehension over the suspicion that the rich in the urban areas may have benefited more from the increase than the rural poor to whom it is directed. The generic method of data collection (that is through surveys) and analysis used in this study corresponded with that of Niyi Gbadagesin et al (2007) in their work titled *"Assessment of Rural Water Supply Management in Selected Rural Area in Oyo State, Nigeria".* This finding is consistent with Niyi Gbadagesin's assessment of rural water supply where they found out that, though access to safe water was increasing, the rural poor are maligned. Since 70% (estimated figure) of Nigerians live in the rural areas, more strategies designed at reaching the rural poor with safe drinking water and sanitation should be explored and implemented.

Annual deforestation rate between 1990 and 2000 was 2.6%. This figure implies a 2.6% reduction in land area covered by forest as well as biodiversity. Reduction in biodiversity is so because some plants and animal reside in the forest. Strategies to sustainable forest management and biodiversity conservation should be explored and implemented.

CONCLUSION
The management of environmental resources (such as biodiversity, forest, safe drinking water and adequate sanitation) in Nigeria faces the challenges which slow down the development of safe drinking water. The MDG water policies reviewed include:

- *The deficiency of the resource itself;*

- *Unnecessary duplication and overlap in organization, structure and functions of the relevant bodies;*

- *The ill-defined and uncoordinated role of the Federal, state and Local Government agencies responsible for environment resource development;*

- *Failure to recognize the inter – relationship between surface and ground water, and between water resource and land use; and*

- *Lack of effective water and environment protection laws, and the means to enforce the already existing laws.*

Although the 2000 National Water Supply and Sanitation Policy stated that government shall sponsor capital investment for rural water supply, the level of provision of water in the rural area is still very low. Existing data shows that the rural areas in Nigeria lagged behind urban area in various source of drinking water available to household, except the open public well, river/streams and rain water they have higher percentage compares to the urban. The costs and benefits of improvement to water supply and sanitation are a key issue, but calculating these cost and benefits can be difficult as many are not direct, in terms of material changes to economic costs and outpoints. A recent study by the World Health Organization (WHO) provides an overview at a global level of the main costs and benefits that would flow from different levels of improvement to the access of people to safe drinking water and improved sanitation. The findings are dramatic. For four different level of intervention, ranging from achieving the MDG for water supply alone to a minimum of water disinfected at the point of use for the world the benefits far outweigh the cost of making the improvements: by at least as much as 3 times and by as much as 60 times in the major regions of the developing world. The benefits take many forms, most of which directly and materially affect productivity levels or would free up scarce government resources from health intervention. There are many other benefits: far better nutritional standards, improved school attendance, reduced mortality levels and others. Taken together, the economic case for making investments in improvements to both water supplies and sanitation is compelling, and significant in poverty reduction terms, the poorer people and countries are, then the higher the potential benefits – cost ratio is. Studies have indicated that the country (Nigeria) would suffer large ecological and economic losses if these major environmental problems continue unchecked. Initial estimates indicate that the cost of unsustainable development for Nigeria may be as high as US $5.1 billion per year. Corrective action and new investment programs are needed now to reduce and eventually prevent these losses

RECOMMENDATIONS

Future measures are being considered to redress the major environmental problems affecting Niger. These measures build on the gains so far achieved in environmental protection and ensure that environmental protection programs are anchored on a solid foundation. The strategy includes the following aspects

(a) Strengthening the legal framework, and integrating the environment into managing environmental information and education to generate adequate public awareness for development planning, and improving funding for alleviating poverty and decision-making;

(b) Creating and improving partnerships and the capacity for sustainable development;

(c) Harmonizing International, Federal, State and Local Government responsibilities for environmental management by adopting and promoting the use of existing environmentally sound technologies; and

(d) Internalizing the use of economic instrument in the management of natural resources.

Implementation of the Nigeria's National Policy on Environment depends on specific action directed toward major sectors and towards problem areas of the environment. The management approach adopted in the policy is based on an integrated, holistic and systemic view of environmental issues. The program activities of this policy are expected to establish and strengthen legal, institutional, regulatory, research, monitoring, evaluation, public information, and other relevant mechanism for ensuring the attainment of the specific goals and targets of the policy. It will also encourage environmental assessment of proposed activities which may affect the environment or the use of natural resources prior to their commencement. The recommendations put forward for effective water resources management in the policy include:

(i) Promulgation of a national resource law to co-ordinate continuous data collection for resources monitoring and water resources development and management with robust economic incentives for compliance.

(ii) Formulation of a water resources master plan.

(iii) Improvement of water use conservation and efficiency measures including inter-basin water transfer for sustainable development.

(iv) Establishment national water quality and emission standards to protect human health and aquatic ecosystems and species.

(v) Establishment of environmental monitoring stations or networks to locate and monitor sources of environment pollutants and to determine their actual or potential danger to human health and the environment.

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