Strategic Planning Methodology and Guidance for Establishing Effective Floodplain Management Programmes: Case Study Oyan Dam floodplain

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Abstract

Policies and regulations in Nigeria have put in place adequate regulatory framework for water resources utilisation, protection and management. In the same manner there are adequate laws and regulation to mitigate the negative effects of floodplains development, but unfortunately, these provisions have not adequately taken care of the benefitting stakeholders. This presentation looks at the roles of the various statutory development agencies and believes that the State and Local Governments have huge roles to play in the development programmes of the water resources sector; floodplains and wetlands in particular. A simple strategic planning procedure is presented.

Keywords: Floodplain, reservoir, risk, stakeholder, strategic

Introduction

Oyan dam floodplain spans across the Rain Forest into the Lowland Rain Forest. The Oyan Dam is very important for water provision to both Ogun and Lagos States and has a good potential for 9MW of power production; it is a high risk dam considering the downstream settlements.

Oyan River Dam

Dams are very significant human interventions in the hydrological cycle and have been significant part of social development for many centuries (Acreman, 2000). They are built to impound water in reservoirs during times of high flow, so that it can be used to meet water requirements during times that natural flows are inadequate. The Oyan River Dam (Figure 2) is one of such structures and it is in Abeokuta North Local Government Area of Ogun State in the South-West Nigeria. It is about 20 km North-West of Abeokuta, the State capital. The dam was constructed across Oyan River, a major tributary of Ogun River. It is primarily conceived to supply raw water to Lagos and Abeokuta, but with auxiliary uses in irrigation and power generation.

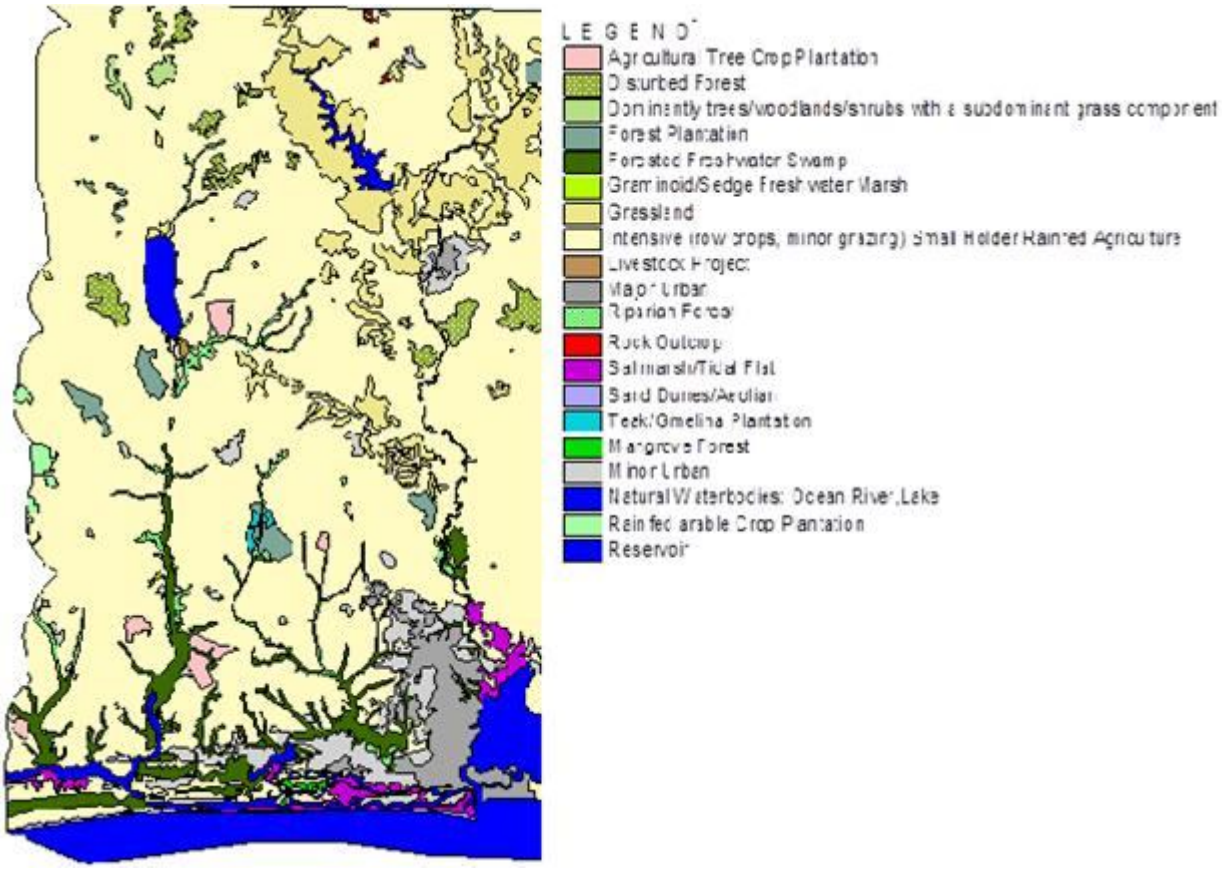

Fig. 1: Oyan Floodplain Landuse Pattern

Fig 2: Oyan Dam Downstream Face showing Hydropower Building

The dam was commissioned on 29 March, 1983 and is operated by the Ogun-Oshun River Basin Development Authority (OORBDA). The reservoir is situated within the coordinates 07^{o} 15 – 07^{o}

25' N and 03^{o} 06' – 03^{o} 18' E. It is in the northern fringe of the rain forests belt. It covers 4,000 hectares and has a catchment area of 9,000 km^{2}. The dam has an embankment crest length of 1044 m, a height of 30.4 m, four spillway gates (each 15 m wide and 7 m high), and three outlet valves (each 1.8 m in diameter). The reservoir has a surface area of 40 km^{2}, a gross storage capacity of 270 million m^{3}, and a dead storage capacity of 16 million m^{3}. Three turbines of 3 megawatts each were installed in 1983, but as of June 2010, they had not been used. During construction, 22 villages were submerged, with the displaced people moved to three settlement camps. Some of the settlers fish on the lake and grow vegetables along the fertile shoreline as the lake recedes in the dry season.

The dam was designed to support 3,000 hectares in the first phase, but development has not fostered the plan. The lake is relatively rich in fish and other wildlife, and has potential for ecotourism. The reservoir is used for breeding fish, sprinkler irrigation, and water supply to downstream end-user and livestock watering.

Water discharge is by a regulated opening of the gates and valves. For water releases to the intended users, the percentage opening for each day is set and the water level is read off an automated gauge. Water discharge during each opening period was read off an operating chart provided by the construction engineers.

Stakeholders

Wetlands provide both direct and indirect economic benefits to communities located within them**.** The people living within Oyan Dam Floodplain gather wetland resources such as timber, snails, wild meat bamboo shoots and mushrooms in the rainy season, as well as other minor forest products e.g. honey and edible plants. The water storage in Oyan reservoir was conceived for domestic consumption, agriculture, fishing, livestock watering and for power generation. Moreover, it was found that Oyan reservoir is an attractive resource for research, students' industrial attachment, outdoor recreation, adventure and nature study. The indirect values of Oyan floodplain as bird habitat, food sources of aquatic animals, underground water sources, prevention of flood and drought and for building conservation awareness is difficult to evaluate.

The Oyan floodplain traverses the lowland rainforest/montane forest southwards, through the freshwater swamp forest/mangrove forest and finally discharges into the lagoon of the Atlantic Ocean through the coastal vegetation ecologies. The physical and climatic diversity permits the growth of a wide variety of crops. The 960 km coastal area in the south is indented by lagoons and by the immense Niger River Delta. There exist four broad systems of land use in the floodplain: crop production (rotational fallow, semi-permanent or permanent cultivation) and mixed farming; livestock production (predominantly pastoral); fisheries (inland freshwater and brackish water); and forestry (agro–forestry). Bearing these uses in mind, the following roles and stakeholders are recognised:

i. Infrastructure development, management and coordination: The OORBDA as representative of the Federal Government

ii. Downstream infrastructure development and management: States and Local Governments, Agricultural Development Projects and other Federal and State Ministries and parastatals, lawmakers;
iii. Water users: Ogun State Water Corporation, Lagos State Water Board and Power Holding Company of Nigeria (Oladoja and Adeokun, 2009);
iv. Resource users: crop farmers, Fulani pastoralists, livestock farmers, fish farmers (Ikenweiwe et al, 2007);
v. Resource harvesters: fishermen, hunters, firewood exploiters, cottage industrialists;
vi. Researchers: Federal University of Agriculture, University of Lagos, Ogun State University, Nigerian Institute of Freshwater Fisheries Research, etc (Oyebande et al, 1980; Akinbile, 2007; Ikenweiwe et al, 2007; Omotayo, 2010)
vii. Pollution Monitoring: National Environmental Standards Regulation Enforcement Agency NESREA and States' Environmental Protection Agencies (Ofoezie et al, 1997; Ofoezie and Asaolu, 1997; NIFFR, 2002; Uyigue, 2005; Steinmann et al, 2006; Sam-Wobo et al, 2009)
viii. Disaster control and relief management: Federal and States' Emergency Management Agencies and Local Governments (thenationonline, 2009)
ix. Extension works: States' Ministries responsible for Agriculture, States' Agricultural Development Projects and Local Government;
x. Land monitoring and peace making: Local Governments and the traditional rulers;
xi. Rural land allocation & monitoring: Local Government, Traditional rulers

Table 1: Floodplain Situations

S/No	Stakeholder	Constitutional Mandate	Accomplishments	Remarks
1	FGN/ OORBDA	Develop Infrastructure	i. Developed Dam ii. Flood monitoring and regulation iii. Hydropower infrastructure (Fig. 2) iv. Fishery regulation and control v. Established 3No settlement camps: Ibaro and Abule Titun in Ogun State and Igbo-Ora in Oyo State vi. Irrigation facility emplacement is on-going	Oyan Dam is a high risk structure thus there is need for proper funding for effective maintenance of the structure (Fig 3). Needs strengthening to be able to complete planned irrigation scheme. (Fig. 4) For effectiveness irrigation, fisheries, etc. development should be ceded to the States and Local Governments.
2	States	Downstream infrastructure Development	Water Supply through the water Supply Agencies.	There is need for the states to be involved in downstream infrastructure development for fishery, Agriculture, Irrigation, Tourism, etc. in accordance with the provisions of Chapter II of the the Constitution (FGN, 1999). .
3	Local Govts		Noticeable involvement of these groups are not observed	The Local Government are to function in the Government of the State in matters relating to primary, adult and vocational education, health and the development of agricultural and natural resources and other functions a that may be conferred by the State Assembly (FGN, 1999a)
4	Legislators			
5	PHCN	Power generation	Nil	PHCN needs to immediately set up the machinery to work with the OORBDA towards commissioning of the 9 MW potential on this dam
6	Resource users	i. Farming, fishing, livestock, etc	Level of participation limited by finance, technology, education, land ownership,	Coordination by the extension agents of the States and Local Governments is essential
7	Researchers	Academic requirements for promotion	Fisheries, flood mitigation, agriculture, tourism, livestock, health, socio-economics: UL. FUAB, UI, OgSU	Very little research funding are noticed in the reports accessed.
7a	NIFFR	i. Fishery ii. Water weed control and utilisation	i. Clupeid enrichment of small water bodies ii. Annual Pre-season Training of Rural Fish Farmers	This agency needs funding to be very effective
S/No	**Stakeholder**	8**Constitutional Mandate**	**Accomplishments**	**Remarks**
8	Students	Industrial Attachment	293 University of Agriculture, Abeokuta students on IT between 1994 and June 2006	This floodplain offers excellent environment for IT in agriculture, water resources, tourism, etc
9	NEMA/SEMA	Disaster relief and mitigation measures	May 2009- Oyan dam flood Sept 2009, 2010 Across the country (Fig	These agencies should mature beyond relief to mitigation measures
10	NESREA/ SEPA	i. Water quality standards ii. Limitations on effluents for source points iii. EIA assessment for new projects 1992	i. Investigations into distribution of snail host and human schistosomiasis.	NESREA/SEPA need to be properly strengthened to maintain and improve the quality of the unique environment resource endowment and physical characteristics of the wetlands and prepare ecological masterplans to guide the use of wetlands for diverse and often conflicting individual and social activities for the continuous viability of all aspects of the ecosystem
11	Ministries of Agriculture	i. Agric. Landuse mapping ii. Extension Services	Both Ministries have extension agents but are lacking in facilities to carry out the extension work.	Adequate capacities are not made available at state level for project implementation.
12	Ministries of Commerce and Industry	Tourism	The Ministries will have to address the issues of high, uncompetitive costs to the export oriented businesses, low capacity utilisation for medium scale industries and frustration, late deliveries and poverty to small-scale businesses (OgSG,	Promote establishment of infrastructures for tourism, water sports, cottage industries, etc (kenweiwe et al, 2007)
13	Community Leaders	Land allotment advisory services to Local Govts, States	Land allotment, conflict resolution	Most conflicts can be resolved at LGA level with the assistance of traditional rulers of the communities concerned (Fig. 5). There is need to develop a strategy for On-Farm Animal Feed Security (Fig. 6 & 7))
14	Inhabitants and Developers	Ensuring compliance with development regulations	Very often obtain fake permits or out of ignorance for development purposes and thus are subject to flooding (Fig. 8).	Developers will benefit from Enlightenment campaign and community education programmes. States and Local Govts should rise up to provision of facilities (education, health, etc) and for the citizenry (Fig. 9)

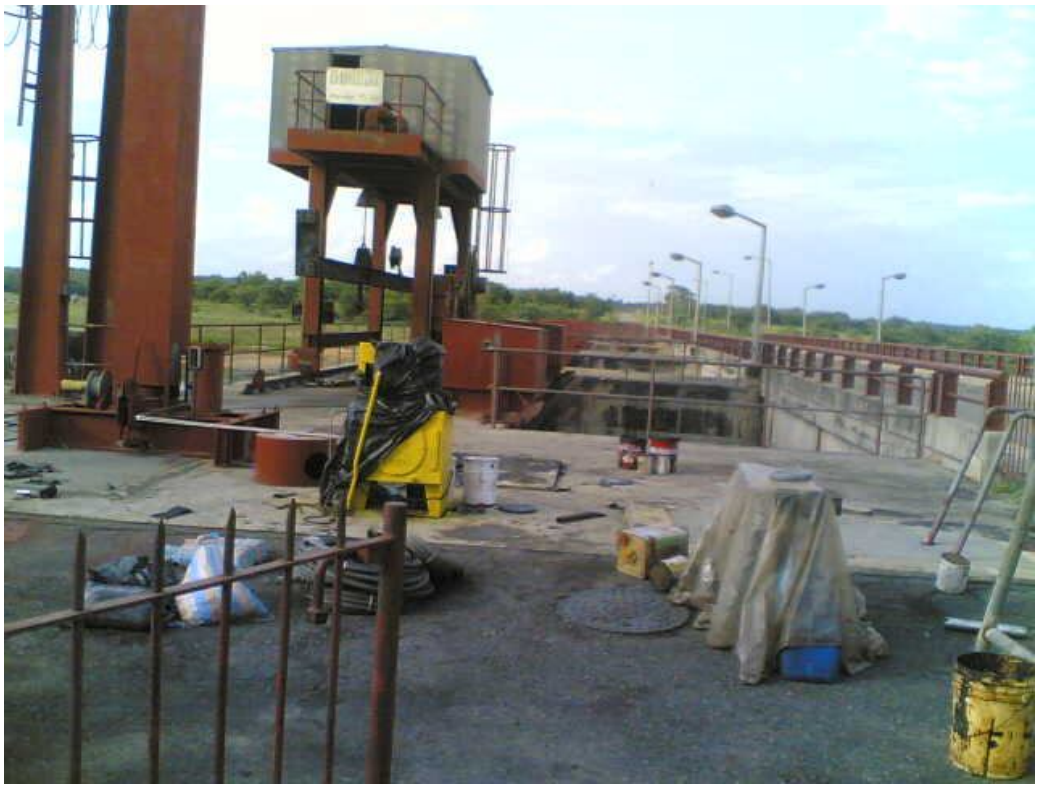

Fig. 3: On-going maintenance activity (May, 2010)

Fig. 4: Construction activity for expansion of irrigation scheme

Fig. 5: The Baale of Ibaro with some members of the community

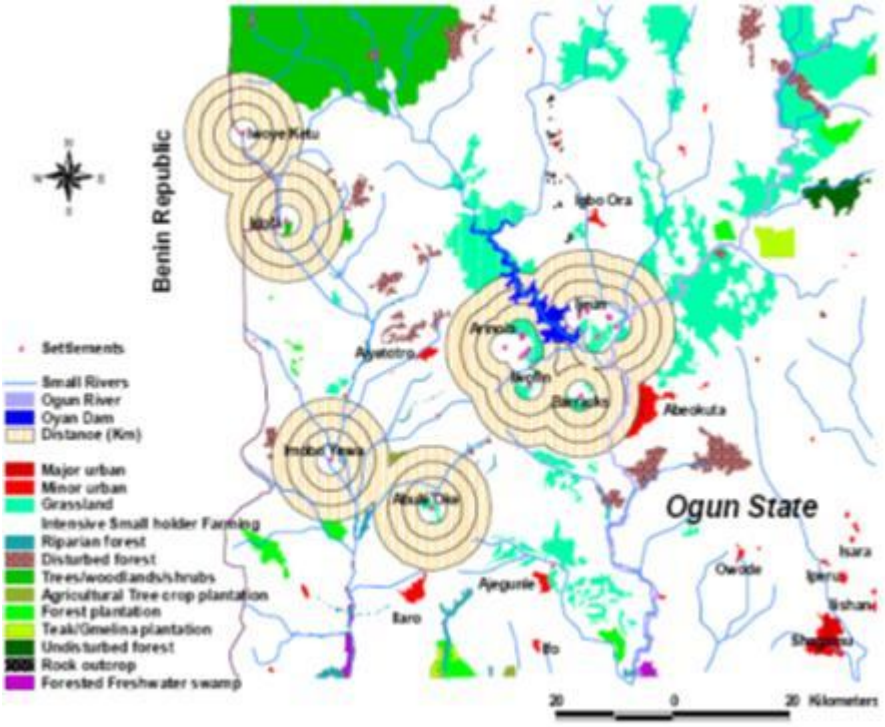

Fig 6: Map of a section of Ogun State showing the spheres of influence of Fulani Pastoralists' activities (Omotayo, 2010)

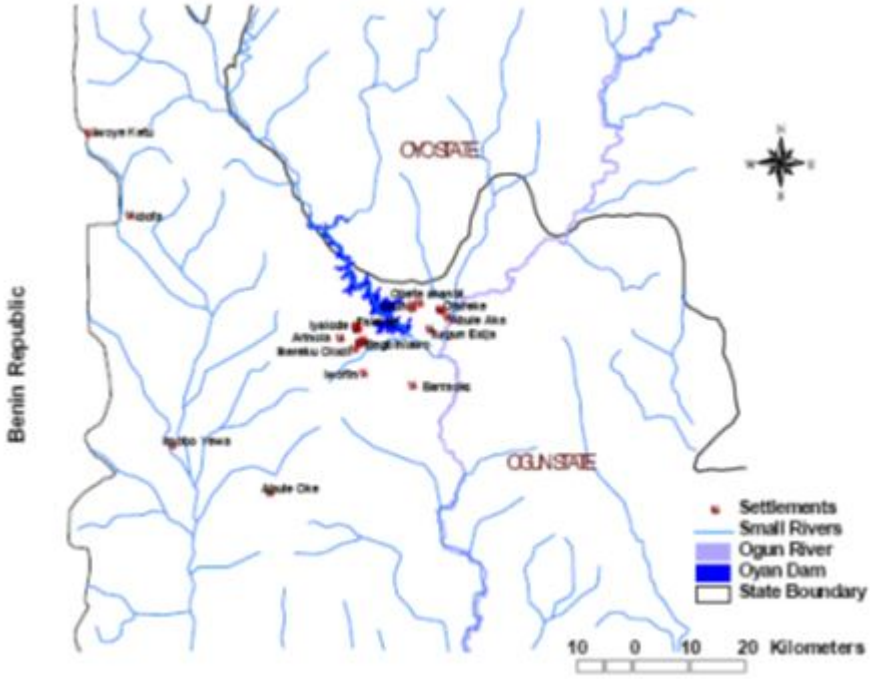

Fig.7: Map of a section of Ogun State showing Fulani Pastoralist settlements

Fig 8: Flooded Ikorodu Area of Lagos (Metro Oct 19, 2010 Vanguard on line edition)

Table 2: Summary of Infrastructure Situations

S/N	Infrastructure	Availability	Remarks
1	Electrification	Poor	No electrification is observed in Ibaro community
2	Water Supply	Poor	Water supply is from wells
3	Transportation	Poor	Commercial vehicles are scarce: probably only on hire
4	Communication	Fair	GSM networks exist
5	Healthcare	Poor	The walking distance to a hospital is 14 km
6	Education	Poor	No secondary school. The roof of the existing primary

			school is blown off (Fig. 9)

Fig.9: The Primary School in Ibaro (January, 2011)

Dam, Reservoir and Floodplain Management Scenario

Dams, reservoirs and floodplains are components of water resources. The constitution of the Federal Republic of Nigeria charges the three tiers of government in Nigeria to be involved in the administration and management of water resources in the country since the management and development of water resources is in the exclusive and concurrent legislative list in the Nigerian Constitution (FGN, 1999b).

At the Federal level, there is The Federal Ministry of Water Resources (FMWR) with the River Basin Development Authorities. At the State level, we have the administration of water resources being undertaken by various State Ministries such as Agriculture, Natural Resources, Works and Public Utilities. At the Local Government level, attention is paid to rural water supplies and sanitation.

The overall management of water resources is the exclusive responsibility of the FMWR headed by the Minister for Water Resources with the responsibility to enforce all national policies, federal laws and regulations relating to water resources management and development. The FMWR thus has the overall responsibility for policy advice and formulation, data collection, monitoring and planning, management and coordination of water resources.
The Federal Ministry of Water Resources, like the River Basin Development Authorities, was not spared the consequences of policy inconsistencies as it was severally merged and separated from the Federal Ministry of Agriculture and Rural Development in the past. The series of changes affecting the institutional arrangements, in term of policies and acts, are as detailed below:

1915 The Waterworks Act of 1915 wherein Colonial Nigeria (shortly after Amalgamation in 1914) passed the law specifically to keep water from being polluted. It prohibits the pollution of water in Nigeria by noxious or harmful matters;

1917 The Minerals Act of 1917 (as amended), now Cap. 226 that This law vests the Head of State of Nigeria with power to make regulations for the prevention of pollution of any watercourse;

1917 The Public Health Act of 1917 prohibits the fouling of water and vitiation of the atmosphere;

1968 The Oil in Navigable Waters Act, 1968 prohibits water pollution by oil spillage;

1969 The Petroleum Act, 1969 covers prevention of pollution by inland waters, rivers, lakes and watercourses;

1971 Public Health Act, 1971 which prohibits the fouling of water and the Pollution of the atmosphere;

1972 The National Electricity Power Authority Act, 1972 in part 11, empowers the Authority to construct buildings and works necessary for the abstraction of water from any lake, river, stream or other natural;

1973 Decree No. 33 of 1973 establishment of the Sokoto Rima Basin Development Authority and the Chad Basin Development Authority;

1976 Decree No. 35 of 1976 that increased the number of River Basin Development Authorities from two to eleven;

1979 Decree No. 37 of 1979, that expanded the scope of activities of the RBDAs to include the development of water resources, agriculture, transportation, fisheries, livestock, forestry, industrialisation, rural development, energy, etc;

1980 Establishment of the National Council on Water Resources;

1985 Decree No.3, 1985 that established the National Water Resources Institute located at Kaduna as a training and research institution;

1987 Decree No. 35 of 1987 was enacted to repeal the 1979 Decree, thus modifying the functions of the RBDAs to exclude agriculture, transportation, fisheries, livestock, forestry, industrialisation, rural development, energy, etc.;

1988 Harmful Waste (Special Criminal Provisions, etc.) Act 1988 prescribes Criminal Prosecution for dumping of harmful wastes in Nigerian Territorial Waters or its Inland Waterways;

1989 National Policy on Environment 1989;

1990 RBDA Act, 1990 defines the mandate and functioning of the River Basin Development Authorities;

1990 Oil Pipelines Act 1990: Empowers the NNPN to refrain from issuing any license as would permit the construction of such works in, under or over, or deposit such material in or make such alteration in the flow of water required for domestic, industrial or irrigational use as would diminish or restrict the quantity of water available for such purpose, or construct such works or make such deposit in any waterway as would cause flooding or erosion;

1990 The Minerals Act, 1990 which while vesting control of all rivers, streams and water courses throughout Nigeria in the State authorities empowers the Minister for Solid

Minerals Development to issue licenses to the holder of a mining lease for construction of a dam, reservoir, pumping station or any construction for the collection, storage, conveyance of water for mining activities;

1991 National Effluent Limitation Regulation 1991: Control of discharge of industrial waste and sewage into watercourses;

1991 National Guidelines and Standards for Environmental Pollution Control in Nigeria 1991: Pollution control in watercourses as part of the environment;

1991 Nigeria Ports Authority Decree, 1991 empowers the Nigerian Ports Authority to supply water to shipping vessels and control pollution arising from oil or any other substance from ships using the port limits or their approaches. The authority also has power in section 8 to construct work and develop embankments and jetties;

1991 Pollution Abatement in Industries and Facilities Generating Wastes Regulation 1991: Control of industrial pollution;

1991 The National Electricity Power Authority Act, 1972 in part 11, empowers the Authority to construct buildings and works necessary for the abstraction of water from any lake, river, stream or other natural;

1991 Waste Management Regulation 1991: Waste management;

1992 The Environmental Impact Assessment (EIA) Decree, No. 86 of 1992 seeks to protect the physical and aquatic environment;

1993 The Water Resources Act 1993 vests control of all surface and groundwater and any water course affecting more than one State in the Government of the Federation for purpose of planning, co-ordination and management;

1997 The Inland Waterway Authority Act, No 13 of 1997 empowers the authority to grant licenses for water intake in respect of all Federal navigable waterways as contained in the second schedule of the Act in respect of navigation of those waterways;

1999 The 1999 Constitution of the Federal Republic of Nigeria puts in the Exclusive Legislative List (ELL) shipping and navigation on the River Niger, and on any such other inland waterway, as may be designated by the National Assembly to be an international waterway or to be an interstate waterway. The ELL also includes water from such sources as may be declared by the National Assembly to be sources affecting more than one and in the concurrent legislative list such acts as the regulation of the right of any person or authority to dam up or otherwise interfere with the flow of water from sources in any part of the Federation; protect and improve the environment and safeguard the water, air and land, forest and wild life of Nigeria.

2000 Niger Delta Development Commission (Establishment) Act, 2000 empowers the Niger Delta (Joint) Development Commission to conceive, plan and implement development projects for waterways and water supply in the Niger Delta and addressing environmental problems arising from oil exploration, and also to advise States on prevention and control of oil spillage;

2007 NESREA Act 2007: With the approval of the Minister, NESREA can "establish programmes for setting standards and regulations for the prevention, reduction and elimination of pollution and other forms of environmental degradation in the nation's air, land, oceans, seas and other water bodies and for restoration and enhancement of the nation's environment and natural resources;

The 36 States all have additional and separate laws designed for the management of water in their jurisdictions. In RBDA Act 1990, the RBDAs are charged in their respective catchment areas with the development of surface and groundwater resources with emphasis on provision of irrigation infrastructure, control of floods and erosion and watershed management. They are empowered to construct, operate and maintain dams, dykes, wells, boreholes, and irrigation and drainage systems. They are also charged with the supply of water from storage schemes and the development of comprehensive water resources master plans (Okoye, 2007). However, as part of its service provision and delivery goals, OORBDA intends to facilitate policies of the government in putting all irrigable land under irrigation projects into use by the year 2025. It is hoped that the States and Local Governments within the catchment areas of these RBDAs will immediately rise up to these opportunities of harnessing the potentials of these development for the benefits of the citizenry and relief the RBDAs the ordeal of awaiting funds for project completion. Some limitations facing OORBDA are:

i. The inadequate fund allocation and releases for projects affect ability to attain Missions and Vision.
ii. Lack of fund to ensure staff training and development.
iii. Insufficient relevant equipment to prosecute projects by direct labour**.**

Strategic Planning

Planning becomes feasible and usable when specific problems are identified and there is concerted plan to address the issues involved. Very often, such comments by the intelligentsia like "these flood-induced emergencies occasioned by water deliberately released from dams (Usoroh, 2010)" are orchestrated in the news media. An extreme case is the court action by the Niger State Government against PHCN (Sule et al, 2011). The Niger State action is an attempt to divert the attention of the populace from its inability to rise up to the challenges of its responsibilities (FGN, 1999) to the citizenry. If the other States have not taken PHCN to court, they are not faring better in the discharge of their responsibilities with regards to flood situations.

The Strategy

In addition to the flood management challenges, OORBDA needs a consistent cooperative approach to support States and Local Government partnerships and the ability to leverage State capability. Strategic planning is a collaborative business practice that can be used by OORBDA, the States and the LGAs to establish a vision for an effective and comprehensive State floodplain management programme/partnership. It can increase development activity and financial accountability and link funding to State and Local Government needs, capabilities and capacities.

Strategic Plan Goals

The following goals may be considered appropriate for the strategic plan for a floodplain:

i. Lead an integrated approach that strengthens the Nation's ability to address disasters, emergencies and plans;

ii. Deliver easily accessible and coordinated assistance for all programmes;
iii. Provide reliable information at the right time for all users;
iv. Allow for mutual investment by the service provider and the beneficiary to ensure mission success;
v. Build public trust and confidence through performance and stewardship.

To accomplish the goals the programme shall be:

i. Clear, well-communicated and based on well-understood national policy;
ii. Beneficiary-focused, field-based, and results-oriented;
iii. Compassionate and oriented towards service delivery to all stakeholders;
iv. Provided executing agents with strong leadership spirit subject to teamwork and accountable at all levels;
v. Have professional workforce of motivated employees who are empowered and equipped to act;
vi. Involved all stakeholders at all levels of planning, design, emplacement and management;
vii. Strong partnerships that leverage capabilities and capitalise on public-private efficiencies;
viii. Business approach focused towards achieving desired results with a strong foundation in technology,
ix. Emplaced a monitoring and evaluation schedule to ensure continuity and sustainability

Characteristics of Effective Floodplain Management Strategy

1. Establishment of an effective network of hydrometeorological information gathering, processing, storage and utilisation programme

It is suggested that in the first instance the ideal network size is determined. In determining the network, all potential users of the data should be consulted. Each station in the ideal network should be prioritised. In order to do this, a simple prioritisation system, such as the one in Table 3, will be useful.

Table 3: A simple prioritisation sytem

S/No	Category	Priority	Relative Importance
1	A	High	Major multi-purpose water resources development site, state boundary river, operation of major scheme, major ungauged basin, heavily polluted major supply source
2	B	Medium	Medium scale water resources development project site, secondary basin, industrial development area i.e. potential water quality problems)
3	C	Low	Minor irrigation project site, secondary gauging station on tertiary tributary, major water course but already extensively gauged

The above categories and priorities are merely highlighted by way of example. Each State /Local Government/ Development Stakeholder needs to set its own priorities based on its own policies and objectives. In prioritising sites, the following questions should be asked:

i. What are the socio-economic consequences of not collecting streamflow data at the site?
ii. What are the alternatives to establishing a streamflow gauging station at the site under consideration?

An estimate of the number of stations within each State, Division and Sub-division which can realistically be well maintained should be made. When deriving this estimate, the following factors should be considered:

i. The recurrent budget implications;
ii. Short and longer term manpower requirements and availability of suitably skilled personnel;
iii. Capacity of instrument repair, spare part provision and calibration facilities;
iv. Long term availability of logistic support facilities such as vehicles.

The ideal and realistic network size estimates should be compared. If necessary, the size of the ideal network should then be reduced by removing the lower priority stations.

For OORBDA, the coordination of the hydrometeorological network shall be the responsibility of the OORBDA, but will be subject to harmonisation with the national network. An ideal network would comprise:

i. Thermometer (Max/Min/Ord);
ii. Automatic Raingauge;
iii. Barograph;
iv. Hair Hygrograph;
v. Thermograph;
vi. Pyranograph;
vii. Sunshine Recorder;
viii. Soil Thermometers (5,10,20,30,50,100cm);
ix. Barometer;
x. Dew Recorder;
xi. Grass Minimum thermometer;

However, Local Governments may not be able to maintain this ideal station, but may, in some cases be limited to meteorological stations which can be placed in schools for data collection and as visual aid for learning in natural sciences.

2. Floodplain management programmes need strong, clear authority.

i. A floodplain development programme must be registered with the administering RBDA; and
ii. Effective wetlands development programmes should be stable and long lasting – they are founded with clear legal authority, work cooperatively with Local Governments and

other State and Federal agencies, and are supported by adequate resources. Good State-level floodplain management programmes allow evolution and improvement in response to changes such as major floods, new research and management techniques, and new Federal programmes and initiatives.

3. Floodplain management programmes should be comprehensive and integrated with other State and Local functions. Through proper coordination, well-informed efforts, the public and private sectors can:

i. Reduce loss of human life and property damage resulting from flooding;
ii. Preserve the natural, beneficial and cultural functions of floodplains; and
iii. Avoid actions that exacerbate flooding on others, now and in the future.

4. Flood hazards within the floodplain must be identified and flood risks assessed.

One of the basic foundations of floodplain management is the identification and delineation of flood prone areas and floodplain resources within the floodplain; however there is need to recognise that flood hazard areas change over time, through deliberate modification, development activities or as a result of natural changes in the watershed or the body of water itself. An effective floodplain management programme ensures that the flood risks are known and that changing conditions are accounted for. Flood hazard areas need to be identified and delineated in order to:

i. Avoid future flood damage and disaster costs;
ii. Apply regulatory criteria;
iii. Inform property owners and the public; and
iv. Craft mitigation measures for existing at-risk development

5. Natural floodplain functions and resources throughout the basin need to be respected.

Effective State floodplain management programmes recognise the additional effort needed to manage the floodplain resources and functions, and allow for the fact that not all flood loss reduction techniques automatically account for natural functions and resources. Effective programmes take a holistic approach to floodplain management—one that moves beyond simply protecting people and property to recognising the value of allowing floodplains to function as floodplains, and enjoying the benefits that accrue when they do. Effective project planning coordinates and integrates their goals and activities with the many other projects (and federal, local, and private) programmes, agencies, and departments whose activities affect floodplain functions, such as:

i. Control of sediment and erosion;
ii. Protection of water quality, wetlands, aquifer recharge, and open space;
iii. Management of coastal areas, shorelines, overall growth, and stormwater;
iv. Preservation of wild and scenic rivers, rare and endangered species, cultural resources, and agricultural lands; and
v. Public recreation.

Effective State floodplain management programmes set a performance standard by ensuring not only that flood hazards are identified, avoided, minimised, and mitigated but also that floodplain functions and resources are protected whenever State construction projects or State-funded projects are undertaken. In addition, State floodplain management programmes should be comprehensive and be integrated with elements from many State agencies and programmes (ASFPM 2010, 2011a)-

6. Development within the floodplain must be guided away from flood-prone areas; adverse impacts of development both inside and outside the floodplain must be minimised.

Adverse floodplain impacts can be avoided or minimised if communities within the floodplain have the authority, tools, and political will to guide development to less hazard-prone areas, or to examine the full extent of impacts—both on-site and off-site—when floodplain development *is* proposed. By guiding development away from flood-prone areas, the development agency protects its citizens in the following ways:

i. It protects landowners by requiring that their development activities meet certain standards to avoid flood damage to their property.
ii. It protects the entire community by requiring that those activities do not adversely affect others. (ASFPM, 2004)

Participating communities regulate the location and design of floodplain construction in order to minimise flood loss and guide development away from flood-prone areas (King, 2005).

7. Flood mitigation and recovery strategies should be in place throughout the floodplain.

There is usually a "damage, recover, damage again" cycle in flood situations, particularly since many developments and public infrastructure installations were constructed before the frequency and impacts of flooding were fully recognised. The flood cycle would thus continue unless it is broken by changing what is at risk.

Effective floodplain management programmes use post-flood mitigation and recovery strategies to break this cycle. Immediately after a flood, citizens and governments are most aware of the risks and far-reaching consequences of flood losses. In addition to prompting a higher degree of cooperation, this scenario may make it possible to leverage additional funds to implement specific flood-reduction projects because governments feel compelled to help right after a disaster.

8. The stakeholders need to be informed about flood hazards and mitigation options.

An effective State flood management programme provides the appropriate authority and encourages use of informational tools for flood hazards. Better informed citizens, property owners, private sector entities, public officials, and government agencies are more likely to make sound decisions about whether and how to develop and redevelop property, and how to make sound land and home purchases (ASFPM, 2004; ASFPM, 2011).

9. Training and technical assistance in floodplain management need to be available to the stakeholders.

Effective State programmes assess community needs and provide ongoing training opportunities and access to technical assistance. In most communities, floodplain management is just one of the many responsibilities that must be handled by small staffs, but the administration of the floodplain provisions can be quite complex, and the consequences of inadequate attention to the flood hazards can be disastrous and expensive. Effective planning and management programmes should be able to:

i. Produce a reference manual to inform local officials about floodplain management;
ii. Monitor how communities are administering their regulations, including enforcement actions for any violations;
iii. Support community efforts to participate in the Community Rating System;
iv. Hold workshops and training on a variety of issues;
v. Encourage local staff to become Certified Floodplain Managers;
vi. Support State-level professional associations;
vii. Produce newsletters and web pages; and
viii. Are accessible to local staffs. (ASFPM, 2004; ASFPM , 2011a)

10. The levels of funding and staffing for floodplain management should meet the demand within each project.

Effective floodplain management projects know that it is not enough to rely on Federal funding to meet State or Local Government needs or to effectively reduce State, regional and local flood costs and damage. Behind an effective floodplain management programme are State executive and legislative branches that have committed adequate staff resources and funding to the necessary programme elements and agencies.

Effective projects have assessed the needed level of funding and staffing, based on factors appropriate to their States, such as frequency and severity of flooding, extent and capability of local administration and the anticipated functions of staff members. With this information, a budget is developed that includes salaries, operations, mapping, mitigation grants and other activities. Creative ways of obtaining funds and generating revenue should not overlooked.

The second most important element of an effective floodplain management programme is adequate financial and staffing support.

11. Monitoring and evaluation of the effectiveness of floodplain management programmes is essential and successes should be documented.

Achieving and maintaining an effective floodplain management programme is an ongoing effort. When programme effectiveness is measured through regular evaluations, it is easier to identify opportunities to make adjustments or to add new programme elements. An effective programme finds ways to tally and keep records on different aspects of the status of floodplain management within its jurisdiction, such as inventorying flood-prone property, taking advantage of the post-disaster period to document damage avoided and the success of mitigation projects, taking an accounting of areal extent of floodplain lands preserved in

a natural state or otherwise protected, monitoring community programme administration, and tracking the progress of mitigation projects. Such data are essential in evaluating how effective programmes are, and how to adjust the programme to be even more effective.

Characteristics of a useful Strategic Plan

A useful strategic plan exhibits many characteristics (Cox, 1997). Specifically, it should be:

i. A set of priorities. Setting priorities allows for the plan to be adjusted according to changing needs or resources.
ii. Achievable, measurable, and time sensitive. Remember, it's better to do a few things well than many things poorly. The plan should contain goals that are measurable and have deadlines.
iii. Flexible and responsive to changing conditions. The plan is a road map that may contain unforeseen detours such as unexpected crises, new opportunities, or changes in resources.
iv. Short and simple. Plans that are more like a book will sit on a shelf. Keep it focused on the most important things to accomplish.
v. A unit, not a menu. A useful plan is not a wish book. Everything in the plan needs to be accomplished.
vi. The means to an end, not an end in itself. The plan is the process by which it reaches its destination; it is not the destination.
vii. Based on a three- to five-year period. The strategic plan should be a living document that has a one-year drop off and a new year added so that it always covers the same time period.

Conclusion

Floodplain development and management in Nigeria has been ascribed by other tiers of government to the Federal Government, whereas the Constitution of the Federal Republic stipulates that all the three tiers of government have responsibilities in this regard to the citizenry.

There is adequate regulatory framework for water resources utilisation, protection and management. In the same manner, there are adequate laws and regulation to mitigate the negative effects of floodplains development, but unfortunately, these provisions have not adequately taken care of the benefitting stakeholders.

This presentation is of the view that the resources available in the floodplains of Nigeria can best be harnessed for economic development if the three tiers of government play their respective roles. A simple method for the development of a strategic plan is presented.

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