

The Role of Inland Wetlands in Food Security at Ede Wetlands, Southwestern Nigeria

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Abstract. The study investigates the utilization of wetland resources in Ede region with a view to exploring them for agricultural production and food security. Data for the study was sourced from primary and secondary sources. The Global Positioning System (GPS) which equally served as a primary source of data was utilized for ground truthing and validation of potential Fadama sites identified by the Digital Terrain Model (DTM). Topographic map which served as secondary data was processed using geospatial techniques and the contours interpolated to create a Digital Terrain Model (DTM) to determine the most appropriate locations for Fadama activities. The results show that areas below 213.4m above sea level are the most appropriate sites for Fadama activities suitable for the cultivation of food crops such as rice; maize as well as for fish farming and market gardening. The study identified anthropogenic activities: pressure from increasing human population as a threat to wetlands existence and human survival especially low income earners. The study concluded that wetland resources potentials and utilisation have not been fully and properly harnessed to ensure food security and reduce the incidence of poverty in the study area.

Keywords: wetlands, digital terrain model, food security and poverty

1. Introduction

The 2012 floods that ravaged the main flood plains of Nigeria is a pointer to how pressures from growing population and quest for human settlement and poverty are threatening the existence of wetlands in many communities. The importance of wetlands to humanity and sustenance of ecosystems cannot be overemphasised in this country considering the events of the past few months. Schuyt [1] observed that in some instances wetlands have proven to be the almost exclusive source of natural resources upon which rural economies depend. In a study of Yala Swamp wetland in Western Kenya, it was found that communities rely 100% on water extracted from wetlands for drinking, cooking and washing while building materials such as clay, sand, wood, and papyrus provide resources for about 86% of the population (Jansen and Schuyt, [2]). Sustainable management of wetlands can be claimed to be critical to the livelihoods and sustenance of many human settlements therefore. Food and Agricultural Organisation [3] observed that Nigeria is among those nations that are technically unable to meet their food needs from rain fed agricultural production (Mashi and Ishaya, [4]). Okechukwu [5] stated that, Nigeria is the largest importer of rice in the world, spending N365bn per year importing 2.1 million MT of milled rice. The report stated further Nigeria was importing over \$11bn worth of wheat, rice, sugar and fish and that its food imports are growing at an unsustainable rate of 11 per cent per annum which fuels domestic inflation and is of great concern to the Government and the people. Wetlands (*Fadama or Akuro*) have been used for dry season farming in Nigeria and have contributed greatly to food crop production in the country particularly in the arid and semi arid regions (FAO, [3] and Enplan Group, [6]).

Worldwide it is estimated that wetlands cover about 6% of the earth's land surface and are unevenly distributed across the globe and are found across every climatic region (Millennium Ecosystem Assessment

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MA, [7]). The cool temperate and sub-artic zones favour the development of bogs, which account for over half of wetlands globally (Mitsch *et al*, [8]). Wetlands cover between 1% and 16% of the African continent (Koochafkan, [9]) an area between 220,000 km² to 1,250,000 km² (Bullock *et al*, [10]). In Nigeria they cover over 24,009 km² (Kio and Ola-Adams, [11]).

It has generally been observed that despite the fascinating ecological and evolutionary potentials of wetlands, they have been the least appreciated of all habitat types. They provide potentials for dry season farming activities for crops such as rice (*Oryza Sativa*) which could be grown three times in a year, maize (*Zea Mays*) four times in a year, yam (*Dioscorea allata*) twice in a year; as well as okro (*Hibiscus Esculentus*), pepper (*Capsicum Annum*), poultry farming, market gardening, fish farming, green pastures for grazing animals throughout the year and raw materials for handcraft (Gasu *et al*, [12]; Mashi and Ishaya, [4]; Gasu, [13]). Their presence is still misconstrued in some communities, nonetheless whereas swamps are conjured as images of mosquitoes, leeches, filthy water, and waste dump areas (Bush, [14]). This is to say that until recently wetlands were considered to be worthless by both Government and public. As such the USA Lands Acts of 1849, 1860, and 1868 expressly encouraged drainage and reclamation of wetlands which led to the destruction of about 53% of the 42 m ha of wetlands in the country with as high as 95% destruction rate recorded in the Mississippi valley (Bush, [14]).

Fadama is Hausa word for wetlands that has been accepted universally because of the significance of the resources in semi-arid Nigerian environment (Enplan Group, [6]. It refers to low-lying areas characterised by flooding and usually enriched with alluvial deposits when the floods retreat suitable for agricultural production (FAO, [15]). The National Fadama Development Project (NFPD), which is in its third phase now (NFPD-II christened Fadama III) was initiated in the early 1990s to promote simple and low-cost improved irrigation technology under the World Bank for all the states of the federation. Its widespread adoption enables farmers to increase production, by more than 300% in some cases (World Bank, [16]). The Federal Government of Nigeria, impressed by the achievements of the first NFDP (Fadama I) between 1992-1998, approached the World Bank through the African Development Fund (ADF) for loan in support of expanding the achievements of Fadama I in scope and size during the second NFDP (Fadama II) and Fadama III phases. The main objective is to increase incomes of Fadama users through expansion of farming and non-farming activities and with high value added output through the establishment of agro-allied processing industries. The programme adopted the Community-Driven Development (CDD) approach with emphasis on extensive participation of stakeholders at the early stage of the project cycle. This approach is very much in line with the road map towards achieving the MDGs and development strategies for Nigeria, on poverty reduction, private sector participation and beneficiary participation for all involved (World Bank, [16]). NFDP is a major instrument for achieving the Government's poverty reduction objective in the rural areas of Nigeria. The beneficiaries are the private economic agents who achieve their livelihood directly or indirectly from the exploitation of the natural resources in a given Fadama area. The project empowers the Fadama Community Associations (FCAs) with resources and the needed training and technical support to properly manage and control these resources for their own development.

The condition for assessing funds from the Fadama programme is based on counterpart funding by both beneficiaries; Local Government, State Government, Federal Government and The World Bank. Benefiting farmers must form Fadama Users Groups (FUGs) of between 10-20 members per group who are expected to constitute themselves into Fadama Community Associations (FCAs) which is the apex body of between 10-15 FUGs at the community level and identify their area of comparative advantage. FCAs will take charge of their own destiny through real empowerment (World Bank, [16]). A minimum of ten (10) Fadama Community Associations are to be formed in the each of twenty (20) participating Local Government Areas (LGAs) making a total of at least 200 FCAs. The programme envisaged that, for each member of the Fadama User Group (FUG), fifteen (15) household members will benefit from Fadama III. Hence, there would be (300) household members benefiting (Osun State, [17]). The State and Local Governments as well as Ife area office co-fund the project with the World Bank and ADB as shown in Table I.

The Nigerian rural sector is dominated by the majority rural poor who are into small scale agriculture, mainly dependent on rain-fed, low land and labour intensive farming methods. However, the country has comparative potentials in the production of a variety of fresh and processed high value crops, especially

vegetables, livestock products (meat and milk) and fisheries products throughout the year considering its favourable agro-ecological conditions in Fadama areas. This study sought to advocate for wetlands utilization that will create the synergy and interrelationships amongst the identified wetlands potentials (products and services) for sustainable rural development, food sufficiency and poverty reduction in Nigeria.

Table I: The percentage contribution by each Fadama stakeholder.

COMPONENT	IDA	STATE	LOCAL GOVT.	COMMUNITIES
Capacity Building	30%	35%	35%	-
Rural Infrastructure	90%	-	-	10%
Advisory Services	70%	30%	-	-
Input Support	50%	-	-	50%
Asset Acquisition	70%	-	-	30%

Source: Osun State Fadama III, 2010.

2. Study Area

The study was conducted in Ede Region Osun State, Nigeria. Located between latitude 7 °31' and 7 °55' North and longitude 4 °15' and 4 °40' East. Ede region accommodates the wetland areas of Ede South and Ede North LGAs. Ede is bounded to the South by Ayedade, to the East by Atakumusa and Osogbo, to the North by Egbedore and to the West by Ejigbo and Ayedire Local Governments Areas of Osun State. The region is drained by Rivers Shasha and Osun, along with their tributaries. The soils are associated with Iwo and Egbeda associations. They have been mapped out as montmorillonite soils with inherent poor drainage because of the presence of 2:1 clay minerals (Okusami, [18]). The low-lying nature of the area makes possible the deposition of alluvial soils rich in agriculture and digging of shallow wells for irrigation.

The two LGAs had a population of 159, 866 at the 2006 census (NPC, [19]). Even though the area is in the tropical rainforest belt natural-vegetation is depleted largely for crop cultivation which is the dominant economic activity. It is characterised by tufted savannah grasses and dotted with trees especially oil palms (Symth and Montgomery, [20]). The main crops are foods such as cassava, maize, beans and yam. Cash crops such as cotton, cocoa and palms serve the local cottage industries such as cotton weaving, cottonseed milling, cocoa and palm processing. Wetlands locally called 'akuro' in Yoruba is limited to major floodplains.

3. Materials and Methods

Materials include; topographic maps of Ede region at the scale of 1: 50,000 produced in 1962, obtained from the Ministry of Lands, Osogbo and Global Position System (GPS) Gamin 72H. The Global Positioning System (GPS) was used to update the positional location of wetlands, settlements, socio-economic activities and other land use features. The topographic maps of 1962 sheet 1 and 2 were scanned and imported into the ILWIS environment. The maps were then georeferenced, geocoded, edge-matched, resampled and a sub-map of the study area (Ede region) extracted, digitized and incorporated into the spatial data base. The digitised contours were then exported and interpolated in the ArcGis software to produce the Digital Terrain Model (DTM) for the study area. This was followed by on screen digitization of settlements, roads, demarcation of the Potential Fadama Sites (PFS) and other features.

4. Results and Discussions

The result identified potential sites for *Fadama* activities in the region to be below 243.8m above sea level, with the most appropriate sites found below 213.4m which has been clearly demarcated and labeled as Potentials Fadama Sites (PFS) on the DTM Figure 1. These activities include; fish ponds and rice (*Oryza sativa*) at Oladuye, Owode, Sekona and Abere; market gardening for crops such as: maize (*Zea Mays*), okro (*Hibiscus Esculentus*) and pepper (*Capsicum Annum*) as well as poultry farming, at GAA Elegun, Timi Agbale, Abere, Ekiniku, Owode, Araro, Akoda, Sekona, Agbale and Ededimeji (Figure 1) (Gasu, [14]). Other important wetlands crops of economic importance mapped in the region include: sugar cane (*Saccharum Officinarum*), banana (*Musaceae*) and plantain (*Musa Paradisiaca*). The crops identified to thrive well in the upper drier areas are upland rice which could be cropped on a rotational basis with yam

(*Dioscorea allata*) and cassava (*Manihot esculenta*) (Okusami and Rust, [21]; Okusami, [22], [18]). The DTM could also aid in the construction of dams and mini water irrigation projects since it has the potentials to show the area and extent of dam coverage and of flood plains for Fadama activities.

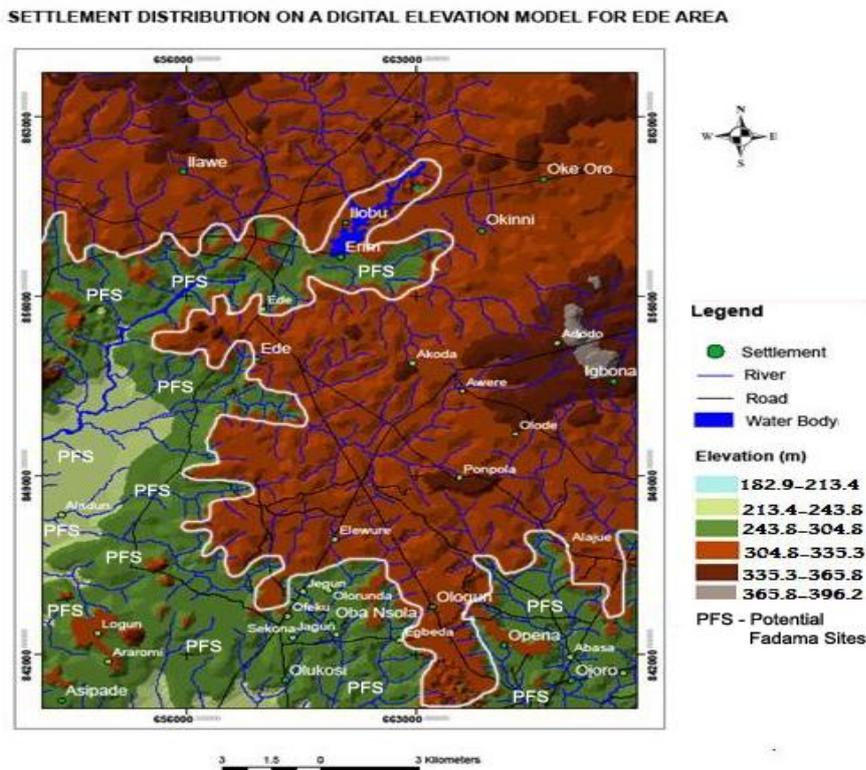


Fig. 1: Digital Terrain Model (DTM) of study area showing potential fadama sites.

5. Conclusion /Recommendations

The study mapped the whole area and identified the flood plains (213.4m to 243.8m) as the most Potential Fadama Sites (PFS) for FADAMA activities which if properly utilised could meet the Nations food production deficit thereby ensuring food self sufficiency. Therefore all human settlements found within (213.4m to 243.8m) on the flood plain are recommended to be removed to ensure, safety, healthy, harmonious co-existence between man and his natural environment. The study identified anthropogenic factors such as agricultural production, road construction, human settlement development especially housing and deforestation as the key drivers of land use change. It could therefore be concluded from these results that human settlement expansion activities, agriculture and deforestation are encroaching on water bodies and wetlands in the study area.

Mapping of the whole of Osun State and why not the whole country to determine the Potential Fadama Sites (PFS) locations for FADAMA activities which could be put into sustainable continuous cultivation to increased food production thereby ensuring food security of the region and the country at large is highly recommended. The mapping will also identify human settlements living within the flood plains that constitute a danger to human existence. Therefore, such settlements are recommended to be removed to ensure safety of lives, property and a healthy living for all. This mapping will also assist the National Emergency Management Agency NEMA plan for relocation of residents of flood plains to safer grounds and also plan relief and intervention response strategies. Policy makers in approving the conversion of wetlands for agriculture, urbanization and industrial development must take into account the costs of such endeavours and the importance of wetlands to the local people particularly those who live within the wetlands and where these resources constitute their source of livelihood. Proper valuation of wetlands to determine their true values are there recommended. This is so because those from outside the wetlands do consider mostly the economic values of goods and services wetlands offer while those within who are driven by population pressure and poverty and therefore, do not use wetland resources in a sustainable way, hence, these two conflicting ends must be reconciled in any valuation process to ensure environmental sustainability.

6. References

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