USE AND MANAGEMENT OF ADO-ODO WETLANDS FOR AGRICULTURAL PRODUCTION

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Abstract

The wetlands of Ado-Odo area of Ogun State, southwest Nigeria contain critical ecosystems that have been a life-line in agriculture-dependent economies. But available evidence shows that they are grossly underutilized, compared with their potential for agricultural production and the socio-economic benefits that could be derived from them. This study examined how the Ado-Odo wetlands are being used and what are their natural and anthropogenic limitations. Primary data were gathered through direct measurement, personal interviews and questionnaires. Issues of interest were size of area cultivated, crop type and yield, and economic returns from agricultural and other activities undertaken on the wetlands as well as challenges encountered by wetland users. Crops cultivated were vegetables, maize, rice, sugarcane, plantain and banana. Period of cultivation varied from 3 to 9 months annually on areas that varied from 3 to 5ha. Annual /seasonal economic returns were between N80, 000 and N100, 000 per farmer depending on the crop cultivated. Fishing and craft-making yielded N65, 000 to N182, 000 and N61, 000 to N87, 000 respectively.

Challenges to more beneficial use of the wetlands included fragmented farm holdings, low application of appropriate technology in wetland use, lack of appropriate policy and guidelines from government, and absence of incentives such as farming inputs at subsidized rate. The study suggested measures to turn the situation around. These measures include putting relevant guidelines in place, provision of infrastructure such as roads and storage facilities, undertaking focused study to further identify issues that can engender wetland use and conservation and on-the-farm training of primary users of the Ado-Odo wetlands, i.e., farmers, fishermen and craftsmen.

Introduction

- Wetlands are comprehensive landforms and ecosystems that play a key role in the maintenance of natural balances.
- Wetlands are areas of marsh, fen, peat land or water whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt including areas of marine water the depth of which at low tide does not exceed six meters (Ramsar Convention ,1991).
- Landforms such as salt marshes, swamps, bogs, prairie potholes and vernal pools are all wetlands.
- In Africa wetlands embrace river floodplains of various sizes and kinds, marshes, lakes, swamps and coastal deltas and brackish and marine environments, including mangroves (Burgis and Symoens, 1987).
- They are highly productive, contributing significantly to human food supplies.
- They also provide key functions which include storage of water during wet periods (groundwater recharge), serving as hydrological buffer to reservoirs by releasing water during dry periods (groundwater discharge) and control flood to enhance recreation and tourism.
- They, therefore, represent very valuable natural capital assets, which require conservation and sustainable management and development.
- Because the Brundtland Commission (WCED 1987) defined sustainable development, as development that meets the needs of the present without compromising the ability of future generations to meet their own needs, the neglect and improper exploitation of the wetlands is a cause for concern.
- In dire cases, large areas of wetlands have been lost to presumed developmental purposes as the quest for land by unplanned population increases take its toll.
- Occasional flooding, loss of biodiversity, prolonged dryness of the soil during the dry season due to absence of groundwater discharge are some of the consequences.
- These and other related problems could have been avoided by using a holistic approach in wetland management.
- In some instances, wetlands have even been viewed and used mainly as dumpsites for wastes generated from diverse processes and sources.
- It is thus obvious that misuse and disuse of wetlands principally arise from inadequate understanding and lack of appreciation of the immense socioeconomic and health benefits wetlands have in stock.
- Abocho (2014) noted that experts say that wetland contributes about 56% of Nigeria's food supply, while upland and other domestic production contribute 33.4 and 10.3%, respectively. Nwakoala, 2012, also identified 11 functions of wetlands in relation to 8 types differentiated by location and ecosystem type. Indeed, the Ado-Odo wetlands are presently only marginally used, but have untapped benefits in terms of higher economic returns from agricultural production, among others.
- Hence, the focus of this study is to highlight the economic benefits accruable from the use of smaller wetland areas such as those found in Ado-Odo and its environs. Such small wetlands are otherwise often neglected, and are rather reclaimed for land development.

Study Area

- ✓ **Ado-Odo and its environs lie within longitudes 2053'E and 3000'E and latitudes 6031'N and 6042'N in the Ado-Odo/Ota local government area in Ogun State (Figure 1).**
- ✓ **Major settlements in the wetlands area are Aromokala, Ijomo, Ere and Ado-Odo town.**
- ✓ **These settlements and the wetlands cover an estimated area of 1,543 sq km, which is about 7% of the total landmass of Ogun State.**
- ✓ **The area lies in the tropical subequatorial climatic zone and experiences a high temperature throughout the year.**
- ✓ **Rains are received as early as March. The vegetation is characterised by plants typical of Rainforest and Mangrove Forest.**
- ✓ **River Yewa, and its tributaries R. Yema, R. Ijomo and the seasonal R. Ojupa drain the region.**
- ✓ **The soils are poorly drained and exhibit the color of the underlying geology.**
- ✓ **The people almost exclusively engage in farming, fishing, Craft-making, trading and hunting.**

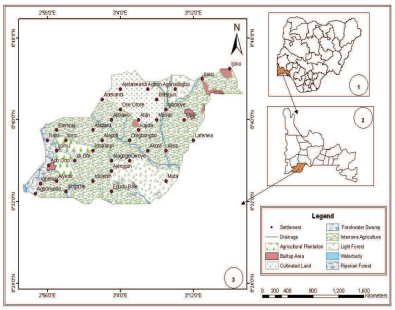

Fig.1: Ado-Odo Wetlands relative to other landuses

Methodology

The overall aim was to examine the use and management of the Ado-Odo wetlands in Ogun State, south-western Nigeria. The objectives were:

- ❖ to identify the uses to which the wetlands are put with emphasis on agricultural crop production and other means of livelihood ,
- ❖ to quantify economic returns derivable from each of the activities undertaken on the wetlands,
- ❖ to identify natural and anthropogenic limitations to optimal use of the wetlands, and
- ❖ to proffer measures that can address issues identified.

❑To achieve these objectives, spatial and non-spatial, primary and secondary data were used.

- ❑ The primary sources of data used for this study included direct field observations and measurements, questionnaire administration and interview sessions.

❑Secondary data sources were:

a. Topographical maps (Sheet No 278 SE and part of 278 SW) obtained from the Federal Survey of Nigeria and the administrative map obtained from the Ado-Odo/Ota Local Government, and other relevant publications and
b. rainfall data and other climatic information or extracts obtained from the Internet.

Results and Discussion

4.1. Age distribution and years of farming experience of respondents

Age statistics show that 14% of the farmers are 15-25 years old, 20% are 26-35 years old, 26% are 36-45 years old while 40% are more than 40 years in age. In terms of farming experience, 10% has 1-4 year-farming experience, 20% has 5-9 years, 30% has 10-14 years while 40% has been engaged in wetland farming for more than 15years.

4.2. Type of farming engaged in.

32 (64%) of the respondents are engaged in wetland farming activities, 8 (16%) on 'relative upland' farming while 10 (20%) engage in fishing within the wetlands. Faith and Itoro, 2014 also found that majority (126 out of 399, i.e., 31.60%)of those using the wetlands of Ibiono-Ibom LGA, south-east Nigeria were engaged in farming activities while 14.79% were fish farmers.

4.3. Level of formal education

36% of the farmers have no formal education, 40% has primary school education, and 16% finished secondary school education while only 8% are graduates of tertiary institutions.

4.4. Size of farmland

Figure 2 shows that of the 40 farmers sampled, 25% each has farm size that is less than 0.5ha in size, 37.5% has -1-2ha as farm size while another 37.5% has farm sizes more than 2ha each.

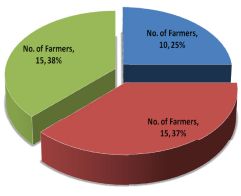

Fig. 2: Relative farm sizes.

4.5. Type of labour employed and scale/level of farming operations

30% of the farmers use family members only, 60% use hired hand for farming activities while the remaining 10 use others. 46% undertake farming at the small scale, another 46% operate at medium while only 8% is engaged in large scale farming.

4.6. Start of land preparation and method of farming adopted.

Figure 3 shows that 57% of the farmers start land preparation for crop cultivation at the onset of the wet season, 30% commence land preparation at the end of the wet season while 13% prepare land for cultivation during the dry season.

Statistics generated with respect to farming method adopted shows that only 15 or 37.5% of the crop farmers used manual labour in farming activities while the remaining 25 (62.5%) are involved in partly mechanised method of crop production.

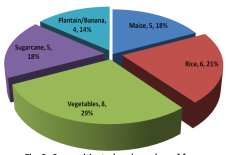

Fig. 3: Crop cultivated and number of farmers involved

4.7: Land/soil conservation practices adopted.

Investigation reveals that the major land/soil conservation method adopted by the crop farmers are basically prudent use of the farmland with regards to soil requirement for crop production. 15 (37.5%) claim they engage in mulching, manure application, fallowing and shifting cultivation to optimise yield of crops within the wetlands; the remaining 5 (12.5%) are not engaged in any land/soil conservation practice. Furthermore, only 5 (12.5%) 'relative upland' farmers adopt these measures while the remaining 3 do nothing.

4.8. Start of land preparation and method of farming adopted.

Figure 4 shows that 57% of the farmers start land preparation for crop cultivation at the onset of the wet season (March), 30% commence land preparation at the end of the wet season (August-September) while 13% prepare land for cultivation during the dry season.

Statistics generated with respect to farming method adopted shows that only 15 or 37.5% of the crop farmers used manual labour in farming activities while the remaining 25 (62.5%) are involved in partly mechanised method of crop production.

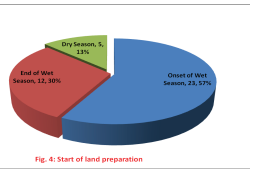

Fig. 4: Start of land preparation

4.9 Economic returns from agricultural use of Ado-Odo wetlands

The seasonal yield of agricultural activities and their total returns from the utilization of the Ado-Odo wetlands are shown in Table 1. Maize had the highest Seasonal Return of N120, 000 from the 2ha-land cultivated in a planting season that spans 3months. Plantain/Banana cultivated on a 0.8ha land, had the least, N43,000, although its planting season was 9 months. Also from the statistics presented, maize had a Total Returns of ₦ $3.84X10^6$ while the least was from Plantain/Banana with ₦$1.376x10^6$. Furthermore, daily fishing activities yielded a Total Return of ₦$1.28x10^6$ while Craft-making that produces big baskets generated a Total Return of ₦$1.314x10^6$.

Table 1 refers:
a- Seasonal Returns x Total No of Wetland Farmers (32),
b- Seasonal Returns x Total No of Fishermen (10),
c- Seasonal Returns x Total No of Craftsmen (15)

Table 1: Seasonal Returns from Use of Ado-Odo Wetlands.

AGRICULTURAL ACTIVITY	(1) AREA CULTIVATED (Ha)	(2) LENGTH OF SEASON (Months)	(3) RETURNS/SEASON (₦)	TOTAL RETURNS (₦)
I. Crop Production				[(3x32)]a
(i) Vegetables	1.2	3	80,000	2,560,000
(ii) Maize	2	3	120,000	3,840,000
(iii) Rice	3.3	6	110,000	3,520,000
(iv) Sugar Cane	1.7	3	88,000	2,816,000
(v) Plantain/Banana	0.8	9	43,000	1,376,000
II. Fishing				[(3x10)]b
(i) Rainy Season	NA	5	65,000	650,000
(ii) Dry Season	NA	7	128,000	1,280,000
(iii) Daily	NA	12	182,500	1,825,000
III. Craft Making (Baskets)				[(3x15)]c
(i) Small	NA	0.1 (3 Days)	61,000	915,000
(ii) Big	NA	0.17 (5 Days)	87,600	1,314,000

Table 2: Gross Seasonal Returns from Ado-Odo Wetland Utilization for Crop Production.

CROPS CULTIVATED	(1) AREA CULTIVATED (Ha)	(2) LENGTH OF SEASON (Months)	(3) RETURN PER SEASON (₦)	(4) DERIVABLE TOTAL RETURNS (N)	(5) ACTUAL RETURNS FROM WETLANDS USE (₦) [(4 x % Utilization)]d
(i) Vegetables	1.2	3	80,000	2,560,000	732,000
(ii) Maize	2	3	120,000	3,840,000	687,000
(iii) Rice	3.3	6	110,000	3,520,000	753,000
(iv) Sugar Cane	1.7	3	88,000	2,816,000	504,000
(v) Plantain/Banana	0.8	9	43,000	1,376,000	195,392

The gross seasonal returns from crop production (Table 2), shows that there are differences in the returns derivable and in the actual returns made from each cultivated crop. While the statistics from derivable total returns showed that the highest revenue was from maize cultivation, the cultivation of rice actually yielded the highest revenue accruable to the wetland farmers. The cultivation of plantain and/or banana yielded the least returns both in the derivable total returns and the actual returns.

NB: d= Total Returns Derivable (4) x Percent farmers involve as shown in Figure 4.3 and Section 4.6.

Table 3: Gross Seasonal Returns from Ado-Odo Wetland Use for Fishing.

FISHING ACTIVITY	(1) PERIOD/LENGTH OF SEASON (Days)	(2) RETURN PER SEASON (₦)	(3) DERIVABLE TOTAL RETURNS (₦)	(4) DERIVABLE TOTAL RETURNS (₦) [(3 x % Utilization)]e	(5) ACTUAL RETURNS PER DAY (₦)
(i) Rainy Season	5	65,000	650,000	224,500	150
(ii) Dry Season	7	128,000	1,280,000	441,600	210
(iii) Daily	365	182,500	1,825,000	629,625	175

As shown in Table 3, fishermen who made the highest returns per day (N210/day) were those who carried out fishing activities during the dry season when the waters of both the wetlands and rivers drain into larger water bodies. The least seasonal returns that were actually realized were made during the rainy season.

NB: e=Total Returns Derivable (3) x Percent Fishermen Involved, i.e., 34.5%.
f=Actual Returns ÷Number of Days/Months Involved.

Table 4: Gross Seasonal Returns from Ado-Odo Wetland s Use for Craft Making.

BASKET MAKING	(1) PERIOD/LENGTH OF SEASON (Days)	(2) RETURN PER SEASON (₦)	(3) DERIVABLE TOTAL RETURNS (₦)	(4) ACTUAL RETURNS FROM WETLAND USE (₦) [(3 x % Utilization)]e	(5) ACTUAL RETURNS PER DAY (₦)
(i) Small (₦500/Dozen)	3	61,000	915,000	473,055	157,685
(ii) Big (₦1,200/Dozen)	5	87,600	1,314,000	679,338	135,867

Factors responsible for the low returns per day accruable during the rainy season may include the fishermen being engaged in other activities like farming. Others include the volume of water in the river/wetlands, which has increased making it more difficult to catch fishes and the danger of rain falling while on the river, which might put the fishermen at risk. The analysis of craft production (Table 4) was based on the days taken to weave the small and big baskets. Given the number of days used in production, small baskets had higher turnover and thus yielded higher returns than bigger baskets. In real terms, returns from the weaving of small baskets were N157,685 as compared to the N135, 867 made from weaving big baskets

Conclusions

The economic returns from the use of Ado-Odo wetlands for agriculture and agriculture-related activities seem worthwhile but are really low when compared with what the optimal use of the wetlands can yield. The statistics presented came from the use of the wetlands for only a fraction of the year. Most crops are currently cultivated for between 3 and 6 months. Because wetlands have water available for crops throughout the year, this underscores the underutilisation of Ado-Odo wetlands. Indeed, it is water availability al-year-round that gives 3-fold the agricultural value of upland to wetlands.

The foregoing suggests that the adoption of holistic management technique in the use of Ado-Odo wetlands will enable all season crop production. Such techniques must, however, incorporate soil-hydrology-climate continuum to guarantee the sustenance and conservation of the wetlands. With this in place, 2 to 3-fold current economic returns become feasible with an attendant improved socioeconomic well- being of the primary producers and their dependants. This will in turn have greater multiplier effect such that wetland farming becomes more attractive, more people will be gainfully employed and a boost is recorded in the immediate society.

Recommendations

1. Formulation and implementation of a holistic policy by government to specifically control use and management of the wetlands and institutionalisation of appropriate mechanisms for improved wetland research within the area.
2. Provision of necessary infrastructure at basin level for proper wetland resources assessment and monitoring.
3. Capacity building should be encouraged and be seen as a long-term continuing process by the Ogun-Oshun River Basin Authority that has jurisdiction over the Ado-Odo wetlands.
4. A science-based data recovery and compilation scheme from different organisations should be developed to strengthen the available hydrological and hydrogeological data and other relevant information. This will form the basis for sound policy formulation on sustainable wetland management and monitoring.
5. On-farm training of primary users and public enlightenment and involvement through mass literacy, periodic workshops on importance of wetlands and its sustainable utilisation should be undertaken.
6. For long term effect, full Environmental Impact Assessment (EIA) of all major upstream water resources projects should be undertaken in the area and the surrounding regions because the sustainable development of the Ado-Odo wetlands depends on the availability of water of adequate quality from upstream.

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