

AN ASSESSMENT OF THE IMPACT OF HUMAN ACTIVITIES ON WILD BIRDS AND FISHES IN DAGONA WATERFOWL SANCTUARY, NIGERIA

*¹Saleh A. and ²Ahmed A.

¹Department of Geography, Federal University, Gashua, Nigeria

²School of Preliminary Studies, Sule Lamido University, Kafin Hausa, Nigeria

*Corresponding author's email: abbasalehgs@gmail.com, abubakar8550483@gmail.com

ABSTRACT

*Natural resources management and conservation has been a persistent theme in discourse of human survival and environmental development. Conservation means the sustainable use and protection of natural resources. It is also seen as the process through which natural resources are managed to allow partial or total exploitation for individual, community, or commercial use without jeopardizing the long-term ability of the resource base for future generations with minimal environmental damages. The study employed systematic sampling techniques in selecting the respondents for the interview. The selection was based on the settlement arrangement in the study site as sampling frame. The structured questionnaires were administered to the respondents with aid of research assistant for proper interpretation of the questionnaire to local language (Bade). The study found that there were different bird species both native and migratory birds from Europe and other parts of the world. The use of these birds includes tourism, source of meat, income and beautification of the natural environment. Farming hunting and fishing remain the dominant economic activities that provide income, food and tourism in the area. Hunting and fishing reduces the number as well as the composition of birds and fish species in the area. *Protopterus annectens* and *Egretta garzetta* were the dominant fish and bird species respectively. A lot of efforts were made to conserve and protect the waterfowl against natural and anthropogenic effects from national and international environmental concern organizations.*

Key words: natural resource, human activities impact, wild birds, fishes, Dagona Waterfowl Sanctuary

INTRODUCTION

Naturally, the survival of any organism on earth depends on exploitation of resource in the environment (Aliyu, 1993). It is the environment that provides man with resources that are utilized in several sectors, ranging from agriculture to manufacturing industries. Ezealor (2002), regarded environment as the sum of all external conditions affecting the life, development and survival of an organism. On the other hand, the exploitation and processing of these environmental or natural resources is referred to as human activities (Akanji *et al.*, 2016).

The Dagona Waterfowl Sanctuary is a functional ecosystem endowed with a variety of resources that are of socioeconomic and ecological importance to the people (Crump, 1991). According to Manu (2000), a sanctuary is any area of land or sea specially dedicated to the protection of biological diversity. And of natural and associated cultural resources, and is managed through legal or other effective means. It is also for economic value, domestication and biotechnology potentials (Auwalu, 2004). The establishment of the waterfowl sanctuary in Dagona stems from the threats to the environment due to the demand for resources by increasing human and animal population whose survival depends solely on resources exploitation

(Idowu *et al.*, 2020). It was this concern for scarce resources that resulted in the formation of the Natural Resources Conservation Council under Decree No 36 of 1991 with the Head of State as the Chairman (Auwalu, 2004).

It is important to note that the survey of the sanctuary was first conducted in 1949 and this was followed by the establishment of a 300-date palm tree plantation in 1963 (Rowley and Winter, 1998). The then Borno Native Authority designated the area a Site of Special Conservation Interest (SSCI) in 1966 (Mbanyiman, 1990; Wakirwa, 1999). Later, the area was declared a sanctuary on 17th Feb., 1987.

The ultimate goal of establishing Dagona Waterfowl Sanctuary is to improve the general quality of life of the people and sustainable utilization of the resources therein. The success of any policy establishing a conserved or protected area depends largely on proper utilization and effective management by both the people and the concerned authorities, especially, the fact that all protected areas are social spaces (Adewumi, 1998; Gisilambe, 1998). The conservation of the sanctuary is for resources protection and maintenance for future prosperity (IUCN, 1988). The study examined the contemporary status, diversity and composition of fish and bird species in the sanctuary.

MATERIALS AND METHODS

The Study Area

Dagona Waterfowl Sanctuary is part of the Bade-Nguruwet lands sector in Yobe state, Nigeria. The sector is found between latitudes 12°13' - 13°00'N and longitude 10°00'-11°00'E. It covers an area of 9385 km². The Dagona Waterfowl Sanctuary being the focal point of the sector made Dagona village the most important of all the villages in the Bade Local Government Area (Auwalu, 2004).

The Dagona Waterfowl Sanctuary is one of the three major ecological entities designated as fully protected areas under the control of Chad Basin National Park (Stopfords, 1999). It serves as a habitat for waterfowl. The area is a Fadama (a valley-bottom, floodplain or lowland around a river that floods or becomes wet when the river is high) which is flooded in the wet season; it is endowed with diverse physical and biotic composition (Ipinyolu, 1999). The area is situated in a semi-arid environment (Manu, 2000). The climate therefore is hot and dry for most part of the year. Temperature rises up to 43°C in the hottest months of May to June, the dry season lasts from November to June, the rainy season starts in early July and ends in October (Manu, 2000). Rainfall is generally erratic in its distribution and amount; it roughly lasts for 120 days. Rainfall values range from 23 to 335 mm, while the mean annual rainfall is about 180 mm. (Auwalu, 2004). The vegetation is entirely Sahel savannah type which consist of mainly drought resistant tree species (xerophytes) such as Doum palm (*Hyphenia thebaica*), African Mahogany (*Khaya Senegalis*), Acacia species such as Gum Arabic (*Acacia nilotica*) Senegal gum (*Acacia Senegal*) Neem (*Azadiricta indica*) among others. Fishing, farming and hunting are the major economic activities in the area (IUCN, 1988).

Sampling Technique

Systematic sampling technique was used to cover Dagona through which heads of households were selected as samples and interviewed as respondents. Their selection was based on their house arrangement which was used as sampling frame for this research work. Houses were skipped houses at regular interval of two houses before conducting an interview exercise with another respondent. The interview exercise was conducted with each head of household selected. The questionnaire was divided into three sections A, B and C where section A contained questions on the respondents' personal profile while section B contained questions on environmental impact of the sanctuary, resources, ranking and their uses and section C contained questions or items on socio-economic impacts of the sanctuary. The method of the questionnaire administration employed was self-administered method in which the researcher met the respondents in their respective places of resident to interview

them. The choice of this method of questionnaire administration was largely due to the fact that quite a substantial number of the respondents were not literate enough to answer the questions on their own. The researcher sought the assistance of three research assistants who were literate and also fluent in the dominant local language of the Bade tribe.

Statistical Analysis

The percentage method of statistical analysis was adopted. In rating the effectiveness of the conservation measures in the sanctuary, a list of conservation measures were listed as options for the respondents to select the one that best suit their interest or opinion and out of these options or alternative conservation measures, the one that was chosen by the highest percentage of the people was then regarded as the most effective conservation measure in the sanctuary.

RESULTS AND DISCUSSION

Socio-Demographic Characteristics of the Respondents

Table 1 shows some of the socio-demographic characteristics of the respondents. People below the age of 18 constitute only 3.1% which is a very insignificant percentage of the respondents. People in the age group 57-69 years represent 15.62%. Overall, the age group 44 and above represents over 70% of the respondents. The active age group comprises people who are aged 18-42 years. They represent the youths, who are to be innovative and up-to-date with regard to conservation and environmental consciousness.

Educational Qualification of the Respondents

Education being the basis for any meaningful development also serves as a weapon against poverty, hunger, ignorance and diseases. It can also be seen from Table 1 that, out of the respondents, only 3.13% were educated up to a degree level. The form of education with the highest percentage is Quranic Education with 41.25%.

Occupation of the Respondents

The occupation of the respondents before and after the establishment of the sanctuary indicated little differences in the percentages for the occupations, as can be seen from the data in Table 1. Before the establishment of the sanctuary, only 12.19% of the respondents were in civil service and trading but presently or after the establishment of the sanctuary the percentage of the respondents who are engaged in the civil services or trading has increased up to 31.25%. This shows that there has been a palpable occupational change among the people due to the establishment of the sanctuary in the area. More people engaged in farming, fishing and hunting to improve their livelihood.

Table 1: Socio-demographic characteristics of the respondents of the study

Age Group	Number of respondents	Percentage (%)		
Less than 18	10	3.1		
18-30	26	8.1		
31-43	40	12.5		
44-56	43	13.43		
57-69	50	15.62		
70-82	84	26.25		
83 and above	67	21		
Total	320	100		
Qualification	Number of respondents	Percentage (%)		
Degree or its equivalent	10	3.13		
Diploma or its equivalent	21	6.56		
SSCE or its equivalent	42	13.13		
Primary school	79	24.25		
Quranic education	132	41.25		
Others	36	11.25		
Total	320	100		
Occupations	Number of respondents	Percentage (%)		
	Before	After	Before	After
Crop production	160	106	50	33.12
Animal rearing	56	53	17.5	16.57
Fishing	24	22	7.2	6.88
Hunting	41	39	12.81	12.18
Others (civil service & teaching)	39	100	12.19	31.25
Total	320	320	100	100

Source: Field Survey, 2018. 'Before' and 'After' refer to before and after establishment of Dagona Waterfowl Sanctuary, respectively.

Wild Birds in the Sanctuary, Their Uses and Ranking (Section B of the Questionnaire)

Table 2 shows the major types of wild birds found in the sanctuary, how the respondents use them, and their ranking before and after establishing the sanctuary. As can be seen in this table, the bird *Plagedis Fakinellus* (Sarauniyar Kyau [Hausa]) maintained its ranking as number one bird before and

after the establishment of the sanctuary, *Anas sparsa* used to be number two bird before the establishment of the sanctuary but as at the time of this research it was ranked third, while *Egretta garzetta* maintained number seventeen before and after the establishment of the sanctuary. The uses of these birds according to the respondents include tourism, income generation (through hunting of the wild birds) beautification and as a source of meat. The sanctuary is blessed with local and migratory birds that visit the area from Europe (Ringim *et al.*, 2017). People regard these birds as readily available source of food and income. However, both the local and migratory birds are found to be fast decreasing due to poaching and unregulated hunting. Birds are hunted for meat, caught for domestication or displayed in cages for sale (Weins, 1997). The Hadejia-Nguru Wetlands Conservation Project (HNWCP), Royal Society for the Protection of Birds (RSPB), Nigerian Conservation Foundation (NCF) and Chad Basin National Park (CBNP) are organizations that initiated measures and put many resources in place order to protect the birds from poachers and hunters. The people however, regard the measures as an attempt to deny them their right. They accuse the authorities for giving much consideration to birds instead of their situation as humans, because of that hunters do not find the conservation measures as being important and beneficial to them. For any policy to succeed people as stakeholders in any development should be accorded priority. There is much to be done to protect the remaining threatened birds in the sanctuary. Most of the structures put in place in the sanctuary require serious attention, like many other projects, the sanctuary is also rot by insufficient funding.

Table 2: Wild birds in the sanctuary, their uses and ranking

S/N	Scientific Names	Hausa Name	Uses	Ranking	
				Before	After
1	<i>Plectropterus gambensis</i>	Dinya	M, I, T, B	03	02
2	<i>Leptoptilos crumeniterus</i>	Borin-tinke	M, T	08	07
3	<i>Anas clypeata</i>	Tinjimi	M, T	06	08
4	<i>Balearica pavonina</i>	Gauraka	M, T, B	07	06
5	<i>Anas querquedula</i>	Kwasakwasa	M, T	09	10
6	<i>Serkidionus melanota</i>	Kwarwa	M, T, B	11	09
7	<i>Sagittarus sepentarias</i>	Kakakiya	M, T, B	12	11
8	<i>Francitinus bicakaratus</i>	Fakara	M, T	04	05
9	<i>Numida meleagris</i>	Zubuwa	M, I, T, B	05	04
10	<i>Anas sparsa</i>	Kwakwa	M, I, T, B	02	03
11	<i>Plagedis falcinellus</i>	Sarauniyarkyau	M, T	01	01
12	<i>Phoenicopterus minor</i>	Zalbe	T	16	16
13	<i>Egretta garzetta</i>	Balbela	T	17	17
14	<i>Circaetus galhaus</i>	Shaho	T	15	15
15	<i>Falcon tinnunculus</i>	Kabarai	M, T, B	14	13
16	<i>Limosa limosa</i>	Buru-Buru	M, T, B	10	12
17	<i>U. senegalensis</i>	Kahuhu	M, T, B	13	14

Source: Field Work, 2018. Key: M - Meat, T - Tourism, I - Income, B - Beautification

Table 3: Fishes in the sanctuary, their uses and ranking

S/N	Scientific Names	Hausa Name	Uses	Ranking	
				Before	After
1	<i>Oreochromis niloticus</i>	Karfasa	M, I, T	01	01
2	<i>Clasias anguillaris</i>	Tarwada	M, I, T	02	02
3	<i>Lates niloticus</i>	Musko	M, I, T	04	03
4	<i>Alestes macrolepidotus</i>	kawara	M, I, T	05	04
5	<i>Bagrus bayad</i>	Ragon-ruwa	M, I, T	08	09
6	<i>Schilbe mystus</i>	karaya	M, I, T	06	05
7	<i>Hydrocymus forskalli</i>	Tsage	M, I, T	15	14
8	<i>Synodontis nigrita</i>	Kurungu	M, I, T	10	10
9	<i>Heterotis niloticus</i>	Bargi	M, I, T	07	06
10	<i>Polypterus senegalus</i>	Gartsa	M, I, T	09	07
11	<i>Malapterurus electricus</i>	minjirya	M, I, T	12	15
12	<i>Gymnarcus niloticus</i>	Dan-sarki	M, I, T	03	08
13	<i>Hetero branchusbidorsalis</i>	Jari	M, I, T	13	11
14	<i>Protopterrus annectens</i>	Gaiwa	M, I, T	11	13
15	<i>Momyrus rume</i>	Sawayya	M, I, T	14	12

Source: Field Work, 2018. Key: M - Meat, T - Tourism, I - Income

Fishes and Their Uses

Table 3 illustrates the species of fishes existing in the sanctuary and their usefulness to the respondents. The uses to which these fishes are put by the respondents include tourism, source of income and source of meat for human consumption. The names are given in both scientific and Hausa. The ranking of these fishes before and after the establishment of the sanctuary shows very insignificant changes as many of these fishes retained their ranks before and after the establishment. Fishing is one of the major human activities in the area and this is largely due to the presence of rivers and streams which makes water available for production of fish for domestic consumption and commercial use as a source of income.

Fishing, being one of the predominant activities in the Dagona village takes place during dry season, but it is occasionally done during the rainy season. Initially fishing activity was not properly regulated in the area and this caused so much damage to the fisheries resources of the sanctuary (Ramsar Convention Bureau, 2000). Because of its importance to the socioeconomic life of the people, government and non-government organizations, amongst which are North East Arid Zone Development Program (NEAZDP), Hadejia-Nguru Wetlands Conservation Project (HNWCP) and Yobe State Ministry of Livestock and Fisheries initiated a number of conservation measures through policy formulation on fishing gears, development of artificial fish ponds, strict law on harvesting and consumption of young fish. The major constraint to the measures put in place is the people's attitude; they have to exploit the fisheries resources in order to survive. But fishing regulations for rational exploitation of resources are feasible, taking into consideration the need to sustain humanity. Despite the importance of the fisheries resources to human survival, the need to create awareness about the dangers of over fishing among fishermen cannot be overemphasized. Therefore, fishermen are advised to seek viable alternative(s) to diversify their livelihood.

CONCLUSION

Dagona people are engaged in exploitation of natural resources through various human activities such as fishing and hunting for livelihood. The study concludes the composition and diversity of both fish and bird species have reduced by 20% and 28.44% respectively. These human activities have obvious negative impact on the sanctuary and they do not guarantee sustainable utilization of the natural resources (birds and fishes) as time goes on. Although many governmental and non-governmental organizations are involved in the conservation activities in the sanctuary to save the environmental resources for the benefits of man.

RECOMMENDATIONS

People's Partaking in Policy Formation/Execution

Any conservation policy formulated should be people oriented so as to carry people along. The people are the beneficiaries, they are in a better position to contribute and appropriate the conservation activities. Such policy must reflect their social, economic and cultural status.

Environmental Education

Sustained campaign about the risk of unsustainable utilization of the resources through various human activities. The people at the rural level should be educated on how to protect, utilize and maintain the quality and quantity of the environmental resources without jeopardizing their livelihoods.

Funding

The Dagona Waterfowl Sanctuary management and other relevant ministries and organizations should be given enough money that would be judiciously used to facilitate their smooth operation.

Acquisition of Skills

The people should be encouraged, through capacity building to acquire technical skills that will enable them partake in decision making and implementation as well as management of the sanctuary.

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