

The use of traditional belief systems in the management of the coastal lakes and their fisheries in Bayelsa State, Nigeria

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Abstract

The aim of this study was to understand the role of indigenous knowledge and belief systems in the conservation of the lakes and their fisheries resources. The research was conducted through the qualitative research methodology. Customary practices and regulations in the study communities appear to have aided the conservation of the ecological integrity of these lakes and contributed to the relative abundance of fish species in this region. This indigenous management system hitherto unrecognized, should be incorporated in the conservation and sustainable exploitation of the resources. Hence, we advocate a robust regional management system, which takes cognition of the natural indigenous resource management practices of this region. Socio-ecological systems such as these could act in parallel with state managed systems in the management of biodiversity within the region.

Keywords: belief systems, fisheries management, coastal lakes, Bayelsa State, Nigeria

INTRODUCTION

According to Tanyanyiwa and Chikwanha (2011), indigenous knowledge includes all of the social, political, economic and spiritual aspects of a local way of life. The belief systems fall within the spiritual aspects. Indigenous knowledge as natural conservation systems is also known as traditional, community or customary management systems. Warren (1991) recognized the uniqueness and peculiarity of indigenous knowledge to any given people, culture or society; whereas World Bank (1997) acknowledged the significant contributions of indigenous knowledge to human kind development. Dewalt (1994) outlined some features of indigenous knowledge relevant to natural resources conservation and sustainable development to include but not limited to locally appropriate, respect for nature, social responsibility and restraint in resource exploitation.

The main objective of fisheries management, conservation or regulation is to ensure long-term viability through sustainable exploitation of the fisheries resources. Prior to the advent and during the application of conventional fisheries management and conservation methods to the developing world, traditional systems had existed. These systems, in the form of beliefs, taboos or some other cultural and customary practices, had similar end objectives, and had similar achievements; that is, sustainable exploitation ensuring long-term viability. As noted by NRCS (2010), the term 'natural resource conservation' is a western management term which seems to exclude or eclipse traditional/indigenous management systems and conservation approaches. By contrast, traditional systems adopt a bottom-top approach as opposed to top-bottom approach of most conventional systems. As such, implementation of indigenous systems is easier because it rests with the resource users themselves.

To a large extent, traditional fisheries management systems are environment friendly. Such practices apply access restriction, controlled exploitation, habitat conservation, ecosystem integrity and encourage equitable resource sharing to achieve sustainable resource utilization (Olomola, 1993). Recently, the United Nations Food and Agricultural

Organization (FAO) is developing toolkits for what is now known as Ecosystem Approach to Fisheries management (EAF). This new fisheries management system more or less advocates the values and features of the traditional management systems. In many cultures, traditional management systems in whatever form, has been used to avert what Hardin (1968) referred to as the 'Tragedy of the commons'. The present study is one more addition to the effectiveness of indigenous knowledge to natural resources management and conservation.

MATERIALS AND METHODS

Frame surveys were conducted in two states of the inner delta (Bayelsa and Delta States). Subsequently, in-depth studies were done within Bayelsa where more ox-bow lakes and seasonal ponds were found. Questionnaires were distributed according to number of families within the four villages of the Biseni community comprising Akpede, Tuburu, Egbebiri and Tein; and another four villages in Osiama community, namely: Osiama1, Ogbubolama, Awegbene and Ogbunugbene (Figure 1). A total of two hundred and seventy seven (277) questionnaires were administered but only two hundred and sixty two (262) were retrieved. Fifteen (15) questionnaires could not be retrieved from Awegbene village. The questionnaire asked respondents to provide information on cultural/traditional natural resources management practices, impact of the practices, socioeconomic benefits derived from the resources and local laws enabling traditional conservation efforts. Filed visits, on-the-spot observations and interviews of key informants/social groups, validated information from the respondents.

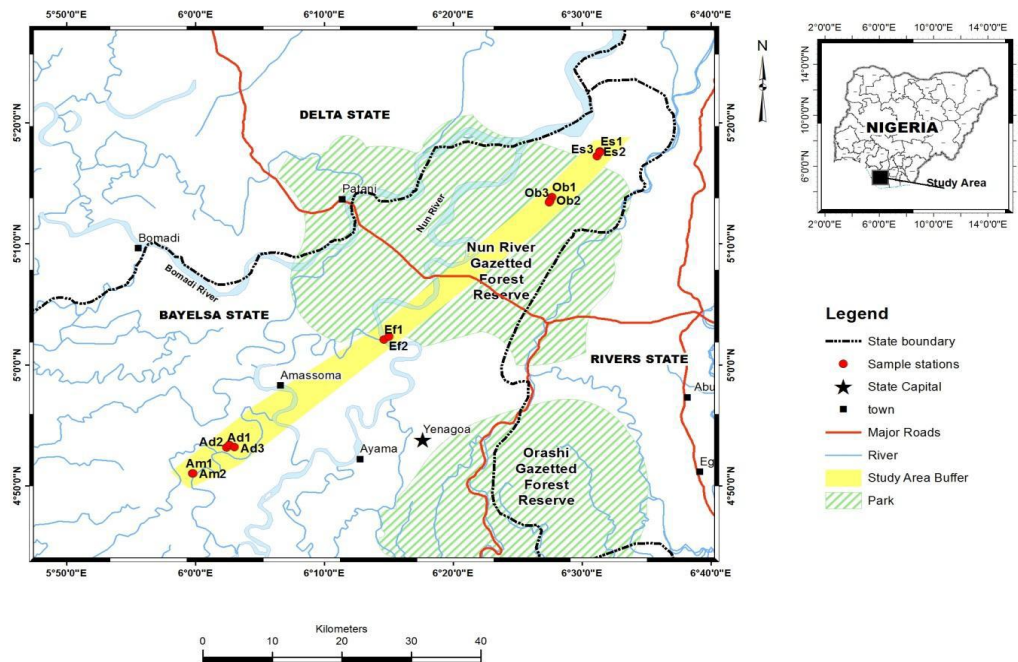


Figure 1. Map of Bayelsa State showing sampling areas

RESULTS AND DISCUSSION

Fishing Practices in survey villages

Fishing in the lakes by traditional societies involved several rituals and customary observances tied to the traditional belief system, particularly in lakes considered as sacred, as described by elders within these communities. Hence, for these traditional societies, getting a good harvest is perceived as being dependent on the sacrifices done by the priest of the lake and also on the benevolence of the god of the lake. Traditional fishing materials seen were made out of fibres processed from the rattan plant (*Calamus* sp.) harvested from the surrounding forest. Different social groups within the social structure used different materials for fishing. In Tungbo (a town visited during frame survey field work) for instance, the women's fishing basket is distinct from that of the men. In some other communities visited, for instance at Sabagreia and Osiama there has been a gradual evolution from using some of these traditional materials of fishing to

using modern implements. The traditional instruments of fishing appear not to relate to belief systems, whereas traditional fishing implements were fashioned based on availability of local materials within the reach of the people. Traditional fishing implements were species-specific. For instance, the traps woven by the women group in Biseni for crayfish fishing are designed to trap just crayfish (and sometimes small fishes were bycatch). Similarly the recent introduction of nets into the communities also has the advantage of selective fishing. Mesh sizes noted within these communities varied from 35mm to a maximum of 115mm.

Harvesting of fish from lakes within these communities is highly regulated and has a periodical cycle (Table 1). For instance in Osiamia community, fishing of the Adigbe Lake is usually done twice in a year; dry season fishing (May to June) and Wet season (November). Yet, others interviewed during field visits reported that they waited as long as four years to fish and then it was a joint venture between two communities.

Table 1. Some Fishing Restrictions and Conservation Practices in survey Communities

Name of community (name of lake)	Group Period	Fishing	Local Area	Government	State	Ownership	Restrictions	Protected species
Osiamia (Adigbe)	Twice in a year: Dry Season Fishing, May to June Rainy Season Fishing, November to December		Sagbama		Bayelsa	Community	Open and closed season for fishing, restricted gears, Open only to Osiamia indigenes	Crocodiles
Igbedi (Akakotokoto)	None		Kolokuma/Opokuma		Bayelsa	Community	No activity allowed.	All aquatic resources within lake
Tungbo (Akpokakia) Sabagreia (Efi)	Once in Two years Once in Five years		Sagbama Kolokuma/Opokuma		Bayelsa Bayelsa	Community Family	Restricted fishing. Open and closed season for fishing, restricted fishing gear.	Crocodiles None
Uzere (Eni)	None		Warri South		Delta	Community	No activity allowed, except for annual sacrifice to deity.	All aquatic resources within restricted area of lake
Biseni (Esiribi)	Once in Two years: Rainy Season, May to June		Yenagoa		Bayelsa	Family	Open and closed season for fishing, restricted fishing gear, restricted to owners of the lake.	Crocodiles and monitor lizards
Ikiribi (Obgbulokalado)	Twice in a year		Kolokuma/Opokuma		Bayelsa	Family	Seasonal fishing, set aside for fish regeneration.	None
Bomadi-Ekpetiama (Opuan)	As prescribed by Chief Priest of the Lake		Yenagoa		Bayelsa	Family	Restricted fishing.	Crocodiles
Akumoni-Okordia (Samei)	Once in Two years		Yenagoa		Bayelsa	Family	Open and closed season fishing.	None

Wetland Restrictions and Laws

Some laws served to maintain order, fostering a kinship spirit among the people, while other laws set a defined boundary on natural resources. From the survey analysis, a small fraction (5.3%) of respondents indicated that they were not aware of any customary laws or restrictions on the use of the wetland. Table 2 presents responses from the two communities on perception of restrictions.

Table 2. Wetland restrictions/laws

Question	Response category	Communities		Total
		Biseni	Osiamia	
Are there restrictions placed on the uses of the wetland within your community?	Yes	182 (98.4%)	66 (85.7%)	248 (94.7%)
	No	3 (1.6)	11 (14.3)	14 (5.3)
What are these restrictions?	No restrictions	3 (1.6%)	11 (14.3%)	14 (5.3%)
	Gender restrictions	36 (19.4)	4 (5.2)	40 (15.3)
	Ownership restrictions	22 (11.9)	0 (0.0)	22 (8.4)
	Species restrictions	42 (22.7)	5 (6.5)	47 (17.9)
	Gear restrictions	5 (2.7)	0 (0.0)	5 (1.9)
	Belief system restrictions	77 (41.6)	57 (74.0)	134 (51.1)

In addition, it is important to note that in both communities these restrictions are considered necessary because the laws bring an abundance of fish (Table 3). It therefore appears that economic benefits are important outcomes of maintenance of these laws in these communities.

Table 3. Impact of restrictions on community

Question	Response category	Total (n = 262)
Do you think they (the laws) are necessary?	0 [not applicable to respondent]	14 (5.3%)
	Yes	238 (90.8)
	No	10 (3.8)
Do you think they (the restrictions) should be removed?	0 [not applicable to respondent]	14 (5.3%)
	Yes	11 (4.2)
	No	237 (90.5)
Why are they (the laws) necessary?	0 [not applicable to respondent]	14 (5.3%)
	Because of the laws we always have fish to eat and to sell	174 (66.4)
	Because of the laws there is peace in our community	63 (24.0)
	Others (specify)	11 (4.2)
How do these restrictions/laws affect your livelihood activity?	0 [not applicable to respondent]	14 (5.3)
	I make enough during the fishing season to meet all my needs, so it doesn't change anything	130 (49.6)
	I do not make enough during the fishing season to keep my family, so I have to look for other alternatives of making money	64(24.4)
	I borrow money from money lenders till the next fishing season	4(1.5)
	I have to move to other fishing communities to continue fishing	50(19.1)

Occupation and Significance of Wetlands

The two communities share similar occupations, though with slight variations. Both are geographically located within the same ecozone; however Biseni is in the inland flood zone, occupying the Taylor Creek area, while Osiama is at the inner Delta, situated in the marsh forest zone. Both communities have seasonal flooding and crops farmed include sugar cane, plantain and cassava. It is probable that in the case of Osiama, taking more to farming than fishing is a recent development. There may be several underlying causes, but it is likely that population increase, and its attendant effects are important.

In Biseni, 80.5% of the respondents reported that household income is made from fishing. While 35.7% of respondents reported fish earnings per month as being between N5,000-10,000; 25.9% said they make between N10,000, 000 - 15,000 (Table 4). However, although fish earnings per month are more than the national minimum wage of N5,500 (National Minimum Wage Amendment Act, 2000) in both categories, income generated from fishing is said to be inadequate in meeting the needs of their households. However in Osiama, the 28.6% of respondents who make the same amount as their Biseni counterparts said the money realised from fishing activities is adequate to meet their household needs (Table 5). This is probably explained by the fact that in Osiama, the dominant occupation is farming.

Table 4: Estimated Earnings from Fish Sales

	Categories	Community	
		Biseni	Osiama
How much do you make monthly from this activity?	0 (Not applicable to respondent)	36 (19.5%)	19 (24.7%)
	N5,000-10,000	66 (35.7)	22 (28.6)
	N10,000-15,000	48 (25.9)	11 (14.3)
	N15,000-20,000	18 (9.7)	10 (13.0)
	N20,000-25,000	8 (4.3)	7 (9.1)
	N25,000-30,000	4 (2.2)	4 (5.2)
	Others	5 (2.7)	4 (5.2)
	Total	185	77

Table 5. Adequacy of fish earnings

	Categories	Community	
		Biseni	Osiama
The money you make from fishing is it enough to meet your family needs?	0 (Not applicable to respondent)	36 (19.6%)	19(24.7%)
	very adequate	6(3.3)	4(5.2)
	somehow adequate	28(15.2)	23(29.9)
	uncertain	23(12.5)	1(1.3)
	somehow inadequate	50(27.2)	9(11.7)
	very inadequate	41(22.2)	21(27.3)
	Total	184*	77

Note: *Missing value omitted

Given that the minimum doubling time of the populations of most of the fishes found within these lakes is between 1.4 to 4.4 years (see www.fishbase.org), it appears that these traditional institutions, through experiential knowledge, have fixed the times of fishing for maximum yields. Fish is the primary resource obtained from the wetlands as noted throughout the field work. The men's group in Biseni noted the abundance of *Citharinus citharus* in lake Esiribi and commented on the earnings made from the group fishing season in 2005 worth four million naira (N4, 000, 000). Likewise the men's group in Osiama recounted that *Citharinus* brought more money than any species of fish for them. However, as narrated by the fishing groups, the commercial value of *Gymnarchus* seems to be higher than that of *Citharinus*. The fact that *Citharinus* is considered to be an important economic species might be related to its being the most abundant species found in the waters within these areas, as related by the men's group in Biseni. Also, the results of the relative numbers of different fish species in these lakes demonstrated the dominance of *Citharinus citharus*. In Lake Adigbe for instance, *Citharinus* totalled 58.17% of the fish species sampled from the lake. During the flood season, members of the family harvested fish from ponds around the perimeter of the lake that they had dug during the previous dry season. This suggests that Lake Esiribi seeds the surrounding swamp forest during the flood season. This might well be a very important function of such lakes that are seasonally fished. Swamp fishing is another important source of livelihood for fisherfolk within this region.

The other resources within some of these lakes which are not harvested are the very important crocodile species the West African Dwarf Crocodile (*Osteolaemus tetraspis*) and the Nile Crocodile (*Crocodylus niloticus*). *O. tetraspis* is known generally as a nationally threatened species and also has a "vulnerable status" on the red data list (IUCN, 1996; 2007), while its relative *C. niloticus* is categorised on the same data list as a lower risk species. Esiribi teems with an unknown number of these crocodiles, but in comparison to other areas, the men group in Biseni noted their protection and abundance in Lake Esiribi.

Social codes based on the potency of the gods of the lakes appear to regulate these fishing practices and cycles of fishing. For instance in Bomadi-Ekpetiama, violators were said to risk death except the culprit confessed and did the prescribed rites of appeasement. These practices help strengthen the social capital of these communities, which in turn protects the natural systems. Additionally, the institutions regulating access and control in these communities are important in the governance and use of natural resources within these areas. The culturally derived rules and the organised form of fishing guarantee the sustainability of fishing and appear to reduce conflicts between users of the common resources. Indigenous beliefs form a system of environmental ethics which are beneficial to the society and are also beneficial to biodiversity. For instance, the setting aside of one day in the week where members of the community do not go to the forest or use any part of the wetland, implies a stewardship principle. Though these laws do not affect natural processes such as invasion of water hyacinth and rising flood tides, they appear to regulate the society's behaviour and are important for the sustainability of each community's management of natural resources.

Through indigenous knowledge of the wetland systems, communities know which of their lakes have a greater diversity. Prior to ecological sampling of these lakes (Anwana, 2008), various fisherfolk gave precise details of the fish diversity of each lake. Field assessments of the lakes confirmed this. Indigenous knowledge within these communities also revealed that some fish species have disappeared (Anwana, 2008).

Various natural resource practices related to fishing and associated with the belief system of these communities were identified. Practices include operating a well structured pattern of open and closed fishing seasons; using simple and non-intrusive fishing implements. Hence, harvesting of fish from lakes within these communities is highly regulated and the periodical cycle, as noted during interviews with different groups, benefits the aquatic resource base. Also, in most communities within the region, including Osiama and Biseni, there are restrictions on the people allowed to fish within

their lakes (see Table 1). In most cases, fishing rights were exclusive to natives of the community. This confirms that artisanal fishing within these areas is conducted entirely by local residents, and is important in building institutional networks within the region. From observations made during the field surveys, the traditional implements used for fishing are selective and are built to trap specific organisms. This selectivity of fishing gears, in addition to restricted fishing seasons, aid in the regeneration of fish species as noted in a similar traditional setting in Lake Chilwa, Malawi (Kalanda-Sabola *et al.*, 2007). Hence, traditional tools as those used in Biseni and regulations stated above, coupled with the fixed time of fishing ensure sustained yields. This is particularly important in these areas as the main livelihood of the people within these communities depends on small-scale fishing. The rules and codes put in place in line with the cosmology of these communities maintain the ecological integrity of these sacred lakes. For instance, sources of pollution are reduced by the practices of not defecating near the lake and of prohibiting menstruating women from entering the lakes. These practices (i.e. not defecating near the lake etc.) help to reduce direct pollution of these lakes and improve water quality and the ecological integrity of these freshwater lakes.

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