Wetland Ecosystem Conflict: Implication for Agricultural Productivity and Food Security in Mbiabo, Odukpani, Cross River State, Nigeria.

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Abstract

Conflict is a common daily occurrence in individuals, groups, communities and nation states. This study examined the consequences of communal conflict of 2010 on peasant agricultural productivities in Mbiabo wetland of Odukpani Local Government Area, Cross River State. The data for this was generated through questionnaire administration, participatory rural appraisal and on the spot observation of the area. The population of farmers were drawn from six villages out of ten in the two communities. A total of 426 household heads form the sample size. The Likert scale which has the attributes Strongly Agreed (SA), Agree (A), Disagree (D), Undecided (U) and Strongly Disagree (SD) was used to analyse the causes of the conflict while the analysis of variance was used to test for the variation in crops productivity before and after the conflict in the area. At 0.05 level of significance, the calculated value of 3.08 was greater than the table value of 2.23. This led to the rejection of the null hypothesis, that there is no significant variation in agriculture productivity before and after the conflict and accepting the alternate one. The work revealed that conflict affected the utilization of wetland for farming thereby reducing the income generated from farming and also reduced the quantity of crops harvested by approximately more than 50 per cent with overriding influence on the quality of life of the people in the study area and the environs.

Key words: wetland, Ecosystem, Productivity, food, security, conflict, agriculture

1. Introduction

Man depends on the environment for his basic needs. The environment consist of materials human beings transform into resources capable of satisfying man's need of food, shelter, warmth, clothing, health, wealth, possessions, etc. Such resources include, water, soil, wildlife forests, minerals, a variety of plants and animals species.

Increase in human population without corresponding increase in resource availability has become the greatest problem facing man in recent times. The non availability of resources to meet the demand of the population, according to Karl Max (1798), breeds conflict because there is bound to be struggle over the scarce resources. Himes (1980) defines conflict as purposeful struggle between collective actors who use social power to defeat or remove opponents and to gain status, power, resources and other scarce values. Aja (2007) observed that conflict involves two or more parties in opposition to interest, principles, practice or strategies. In other words, conflict reflects a clash of interest or goal between parties, which may be individuals or group of individuals, ethnic groups or states (Burton, 1990). Conflict reflects a determined action or struggle over a goal, which may be overt or subtle, manifest or imaginary. In behavioural terms, Deutsch (1993) viewed conflict as an action, which prevents or obstructs, interferes, with, injure or renders ineffective another action with which it is incompatible. In a similar manner, Ortiz (1999) is of the view that conflict is a struggle involving ideas, values and or limited resources. Hence, it is not out of place to view the Ikot Offiong and Oku Iboku communal conflict on the Mbiabo wetland in line with their views as conflict arising from the struggle for scarce resources of which has to with scarcity of land for agriculture.

Throughout the world and the beginning of human history, people have turned to wetland to sustain their lives (Ramsal convention, 1971). According to Scones (1992) Wetlands are areas where shallow water dominates the environment. This may be because the water table is at or near the land surface, or because the land is covered by shallow water which makes it readily available for human confusion. Wetlands water may be fresh, brackish, or salty, including areas of marine water whose depth at low tide does not exceed 6m (Cowardin, 1979). Wetlands occur in many countries and are estimated to cover about 6 per cent of the earth's land surface, about 570 million hectares or 5.7 million

sq km (UNEP, 1993). About 30 per cent are peat lands (or bogs), 26 per cent marshlands (or fens), 20 per cent swamps, 15 per cent flood plain and 2 per cent lakes. Mangroves cover some 240, 000 sq km of tropical coast, while coral reefs extent over an estimated 600,000 sq km world wide Scones (1992). Wetlands are among the most productive ecosystems in the world. Frazier (1996) classified wetland into five basic categories namely: lacustrine, riverine, palustrine, marine and esuarine. In Nigeria, estuarine wetlands are found in the Lagos – lekki lagoons, stubs creek forest reserve (Akwa Ibom State) Bakassi peninsula Cross River State) the Hadejia Nguru and Lake Chad are examples of lacustrine wetlands while the Niger Delta marshes and artificial wetlands in FESTAC town in Lagos are palustrine wetlands.

Conflict is inevitable in human life. Man has been struggling to improve his sustenance level by seeking a change from his present status to a higher one. The struggle towards this improvement revolves around resources and value - based needs. Albert (2001) and Aja (2007) described the cause of social conflict to be competition for inadequate (or perceived inadequate) resources, contradicting value systems (religious, beliefs, ideological position and general worldview), and psychological needs of groups and individuals.

Communal conflict in Africa and Nigeria in particular has been a great obstacle to peasant agricultural development. In rural areas, more than 90 percent depend on farming as a major source of livelihood. Incessant dispute over fertile land has not only brought untold hardship but also destruction of lives and properties. The Ikot Offiong – Oku Iboku war experienced in (2001) showed that the resultant carnage devoured not only men but women and children, as well as their properties. The Mbiabo community was also severely affected where market and houses were demolished, farmland destroyed and the wetland was abandoned due to tension from the conflict and subsequent displacement and relocation of some people to Calabar and others in Diaspora hereby increasing the population of Calabar and other villages in Odukpani and Itu Local Government Areas. Wetland has been a rich base for agricultural products such as Okro, pepper, cassava, cocoyam, water yam, pumpkins, garden egg and other benefits such as fish, timber, bush meat and palm wine. With the conflict, the production of crops and other materials have reduced and have also affected the nearby urban markets (Calabar and Aba) that depend on the communities for food and other resources.

The conflict had its effect on the revenue generating capacity of Itu Local Government Council as greater part of its income was from taxes, market tolls and revenues. Also vehicles travelling along the Calabar - Itu high way were set ablaze and houses razed down. The vanguard newspapers of December 25th 2001 confirm that no fewer than fifty cars were burnt and about 42 houses were razed down. At the time of this study, economic activities such as farming, fishing, harvesting of non timber forest products from the wetland were at their minimum due to tension and fear.

Most studies concentrated on social and economic effect without considering the land resource base on which the population is dependent. This study examined the effects of conflict on the utilization and productivity of the community's natural resources base which is abandoned by the people because of the communal conflict.

2. Objectives of the Study

1. To examine the causes of the communal conflict in the study area.
2. To examine the effect of the conflict on crop productivity and food security.
3. To recommend possible solutions to the conflict.

3. Research Hypothesis

There is no significant variation in agricultural productivity in the area as a result of conflict over the wetland.

4. Study Area

4.1 Location

The study areas are in the Mbiabo communities along Odukpani – Itu Bridge in Cross River States. The portion is located on latitudes $5^{0}00N$ and $5^{0}15^{1}N$ and longitudes $8^{0}00^{1}E$, and $8^{0}15^{1}$. The area is bounded to the North by Biase Local Government Area, to the South by Calabar Municipal, to the East by Akamkpa Local Government Area and to the West by Itu Local Government.

The area falls within the equatorial region with a mean annual rainfall of 2,558mm. The wet season begins in April and last till October. The dry season commences in the middle of November and ends in March.

The temperature is generally high throughout the year and falls between 25^0c to 28^0c. The highest temperature is recorded between February and April. The mean daily temperatures decrease in the month of December and January because of the influence of the cool harmattan wind. These climatic conditions favour farming in the area.

The dominant vegetation is the rainforest while fresh water swamp forest occupies the coastal areas. The tree species found in this freshwater include: *Pycnanthus angolensis* (abakan), *Pterocarpus* species (campwood), *Raphia vinifera* (raphia), etc. Some edible fruits and medicinal plants are found in this area. They include: *Gnetum Africana (*afang), *Cola acuminate (*native cola), *Lasianthera africanum (*editan), *Heinsia crinata (*atama), *Garcinia mani (*chewing stick), *Tetrapleura tetreaptera (*uyayak), *Dacryodis edulis (*pear), *Raphia hookeri (*palm wine), *Aframonum melegueta (*alligator pepper), and *Cinchona catisaya (*Nnyan) used for the treatment of malaria (Bisong, 2001). Though the vegetation has been modified by human activities traces of birds, snakes, bush fowl, hawks, squirrels, rabbits can be found in the area.

The sediments tend to be muddy with large amounts of organic materials. The average organic content recorded in this soil is about 1.72 per cent (Bisong, 2007). The soil is characterized by loamy clay, which has a higher water retention capacity.

The 2006 population census shows that the study area comprising Oku-Iboku sampled villages (Ikot Adakpan, Ikot Abiyak, Ikot Essien, Ika-Oku Iboku, Ikot Antuen) has a population of 6369 people while Ikot Offiong has 2159 people.

Isolated and linear settlement pattern is the common characteristics in this area. The buildings are constructed with wood and thatch collected from the plant species from the wetland. The population of the settlement is migratory in nature; some of the farmers live permanently in Itam, Oku-Iboku, Ikot Essien, Ikot Abiyak while some are indigenes of Ikot Offiong. During the dry season, between November and April when water recedes, the area witnessed influx of migratory farmers and fishermen utilizing the wetland for their various activities.

The dominant economic activities in the Mbiabo wetland are its importance as a source of food and income from farming, traditional hunting, and gathering, lumbering, sand excavation and fishing. Few opportunities exist for regular employment. Less than 10 per cent of the farmers employ permanent labour, and current wage rates are less than one would receive from fishing, lumbering, farming and hunting. Few thatch shops are springing up again after the conflict along the road though patronage is low due to the relocation of the Ikot Offiong people.

5. Methodology

The sources of data used in this study include observations of the situation in the field, Participation Rural Appraisal. Here, four interest groups which included the village heads, farmers, fishermen and gatherer of non timber products were used for the interactive forum. In this process, information on the historical perspective of the conflict between the two communities, ownership of the land and the impact of the conflict on the lives of the people were sought. Also the questionnaire method was used to verify some of the informations derived from the PRA. The questions here bothers on size of farmland, causes of conflict in the area, resources exploited and the income generated by exploiters of the wetland.

Six communities comprising Ikot Adokpan, Ikot Abiyak, Ikot Essien, Ika Oku Iboku, Ikot Antuen and Ikot Offiong were used for the study. The choice of these communities bothers on their proximity to the wetland and their role in the utilization of the wetland. The other four communities in the area have little or no access to the wetland and so were not represented in the study. Five percent of the population of each sampled village constituted the sample size. Thus, a total of 426 household heads were served with copies of questionnaire.

Table 1: Population of sampled villages and questionnaire distribution

S/N	Area	2006 Census population	No of copies of questionnaire per sample Area.
1	Ikot Adakpan	687	34
2	Ikot Abiyak	1664	83
3	Ikot Essien	1581	79
4	Ika-Oku Iboku	674	34
5	Ikot Antuen	1763	88
6	Ikot Offiong	2158	108
Total		8525	426

Data source: NPC census figure (2006)

The houses used were numbered physically and then written on a price of paper and squeezed into a container. Here, the household is to be served with copies of questionnaire were systematically selected. The statistical tools used include tables, graph and charts. The analysis of variance which is denoted by

$$\frac{S_1^2}{S_2^2}$$

Where S_1^2 is the greater variance estimated and S_2^2 the lesser variance estimate was used to test the hypothesis which states that there is no significant variation in agricultural productivity in the area as a result of the conflict.

The likert scale which has the attributes Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) Strongly Disagree (SD) was used to analyse the causes of the conflict based on the variables that constituted the causes of conflict. In order to determine the quantity of crops produced by each farm, weighing scales were used. First and for most an empty basket was employed and the weight determined. Each basket was then filled with a particular crop and the weight determined in a weighing scale. The weight of the empty basked subtracted from the weight of the crop inside the basket gives the quantity (kg) of that particular crop produced. This was then multiplied according to the number of basket of each crop produced by a particular farmer to arrive at the total quantity of that particular crop produced per annum.

6. Data Presentation, Analysis and Discussion of Findings

6.1 Causes of the Mbiabo Communal Conflict

The causes of conflict over the Mbiabo wetland were weighted using the Likert scale analysis. The result is presented in table 2. It shows that boundary dispute with the mean value of 2.73 accounts for the major cause of the conflict over Mbiabo wetland. Following the ranking table, the second major cause of conflict is limited land for agriculture attributed to the establishment of the Nigerian news print Manufacturing Company at Oku –Iboku with a land mass of 3km^2. This had an impact on the land use from agricultural to industrial thereby reducing the available land for farming. The ranking table shows that increase in human population (2.05), exploitation of natural resources (0.33), fertility of the wetland (0.25) and sitting of market (0.18) in this order shows less indication of these variables as the possible causes of the conflict.

Table 2: Likert Scale Analysis of Causes of the conflict

Causes of Conflict	Frequency of opinion				
	SA	A	U	D	SD
Exploitation Resources	28	19	5	100	274
$\sum$	141	76	15	200	274
$\bar{X}$	0.33	0.18	0.04	0.47	0.64
Increase in Population	173	53	8	69	121
$\sum$	875	212	24	138	121
$\bar{X}$	0.05	0.05	0.06	0.32	0.28
Sitting of Market	15	25	10	95	281
$\sum$	75	100	30	190	281
$\bar{X}$	0.18	0.23	0.07	0.45	0.66
Fertility of the Wetland	21	39	23	100	243
$\sum$	105	156	69	200	243
$\bar{X}$	0.25	0.37	0.16	0.47	0.57
Boundary Dispute	195	127	4	50	40
$\sum$	975	508	12	100	40
$\bar{X}$	2.29	1.19	0.03	0.23	0.09
Limited Land for Farming	233	108	30	22	33
$\sum$	1165	432	90	44	33
$\bar{X}$	2.73	1.01	0.21	0.10	0.08

Source: Author's Field Survey, (November, 2011)

Note A - Agree
SA - Strongly Agree
D - Disagree
SD - Strongly Disagree
U - Undecided

Table 3: Mean distribution of respondents' opinion on causes of the conflict

Variables	X Strongly Agreed	X Strongly Disagree	Ranking
Exploitation Resources	0.33	0.64	4
Increase in Population	2.05	0.28	3
Sitting of Market	0.18	0.66	6
Fertility of the Wetland	0.25	0.57	5
Boundary Dispute	2.73	0.08	1
Limited Land for Farming	2.29	0.09	2

Data Source: Author's Field Survey (November, 2011)

Table 4: Estimated Quantity of crops harvested before and after the conflict

Crops	Range of harvest (kg)	Respondents		Quantity (kg)	
		Before conflict	After conflict	Before conflict	After conflict
Okro	1 – 50kg	81	12	2025	300
	50 – 100kg	35	94	2625	7050
	100 - 150kg	60	78	7500	9750
	150-200kg	37	86	6475	10750
	Above 200kg	213	41	42600	8200
Total		426	426	61,225	36,050
Cassava	1 – 50kg	61	116	1525	2900
	50 – 100kg	83	94	6225	7050
	100 - 150kg	85	111	10,625	13,875
	150-200kg	32	61	5,600	10,675
	Above 200kg	165	44	33,000	8800
Total		426	426	56,975	44,300
Fluted pumpkin	1 – 50kg	66	142	1650	3550
	50 – 100kg	52	76	3900	5700
	100 - 150kg	-	3	0	375
	150-200kg	78	120	13650	2,100
	Above 200kg	230	85	46,000	8,500
Total		426	426	65,200	39,075
Pepper	1 – 50kg	44	127	1100	3175
	50 – 100kg	54	44	4050	3300
	100 - 150kg	78	106	9750	13,250
	150-200kg	50	94	8750	16,450
	Above 200kg	200	55	40,000	11,000
Total		426	426	63,650	47,175
Water-yam	1 – 50kg	60	178	1500	4,650
	50 – 100kg	114	89	8550	8,100
	100 - 150kg	99	89	12,375	7,125
	150-200kg	68	28	11,900	9,450
	Above 200kg	85	42	17,000	4,200
Total		426	426	51,325	35,550
Yam	1 – 50kg	137	186	3,425	4,650
	50 – 100kg	143	108	10,725	8,100
	100 - 150kg	78	57	9,750	7,125
	150-200kg	23	54	4,025	9,450
	Above 200kg	45	21	9,000	4,200
Total		426	426	36,925	33,525
Tomatoes	1 – 50kg	45	179	1125	4425
	50 – 100kg	136	119	16,200	8,925
	100 - 150kg	120	68	15,000	8500
	150-200kg	32	34	5600	5950
	Above 200kg	53	26	10,600	5200

Total		426	426	42,525	33,050
Garden egg	1 – 50kg	42	165	1025	4125
	50 – 100kg	56	110	4200	8250
	100 - 150kg	51	84	6375	10,500
	150-200kg	21	32	3675	5600
	Above 200kg	257	35	51400	7000
Total		426	426	66,675	35,475

Data Source: Author's Field Survey (November, 2011)

Table 4 above shows the major crops cultivated in Mbiabo wetland and the quantity harvested before and after the conflict. The descriptive analysis of crops harvested revealed that in each of the crop, quantity harvested before the conflict was higher than the quantity harvested after the conflict. From the table, 426 respondents harvested 61,225 kilogram of Okro before the conflict and after the conflict, the harvest reduced to 36,050kg showing a difference of 25175 kilogram (41 per cent). Cassava harvested on annual basis from the wetland reduced from 56,975 to 44,300 kilogram which represents 22 per cent decrease.

Similarly, other crops harvested from the Mbiabo wetland before the conflict witnessed a reduction in the quantity harvested after the communal crisis, fluted pumpkin (40 per cent), pepper (26 per cent), water-yam (31 per cent), yam (9.2 per cent), tomatoes (22.3 per cent), and garden egg (46.8 per cent).

In order to determine whether there was any significant variation in agricultural productivity before and after the conflict, the analysis of variance was used. The result in table 5 indicates that the calculated F-value of 3.082 is greater than the critical F-value 2.23 at 0.05 level of significance. The calculated F-value is significant; therefore, we uphold the alternative hypothesis which states that there is significant variation in agricultural productivity (kilograms) in the Mbiabo wetland as a result of conflict.

Table 5: Analysis of Variance (ANOVA) in Agricultural Productivity before and After the Mbiabo Wetland Conflict

	Sum of squares	Df	Mean Square	F-cal	F-tab
Between Groups	2.9E + 09	1	2.9E + 09	3.082	2.23
Within Groups	6.2E + 09	850	7335523		
Total	9.1E + 09	851			

Source: Author's Field Survey (November, 2011).

This finding supports Kolwole (1991) views that competitive use of the land could generate conflict with the resulting influence on food productivity. He went further to state that the immediate impact of conflict on the National Fadama Development programme is drastic reduction in the quantity of crops harvested is stained relationship between one farmer and another. Mohammed's (2006) study in Plateau State, Nigeria revealed that the Southern senatorial district of plateau state was worst hit with conflict. For istance among the agricultural produce of Shendam Local Government Area are Yam, Rice, Sorghum, Beniseed, Beans and Potatoes. In the same manner Wase Local Governemnt Area produced crops such as Maize, Sorghum, Rice, Groundnut, and Beans in reasonable quantity but the outbreak of conflict affected tonnage of production of various crops and acreage under production.

6.2 Implications for Food Security

A particular geographical area and its people are food secure when their food system operates efficiently in such a way as to remove the fear that there will not be enough to eat. In particular food security is achieved when the poor and vulnerable, particularly women, children and those living in marginal areas, have secured access to the food they want. There are various measures of food security which ranges from nutritional adequacy, access to food by individuals to limited access to land. In the context of this paper therefore, food security is viewed in the light of limited access to land. When the land is available for the farmers, it called for high productivity of food for the rural residents of the Mbiabo wetland and even to supply enough to the neighbouring areas of Uyo, Aba, Ikot Ekpene and Calabar. In the study it was revealed that limited access to land was a stimulus to the communal conflict in the area. From table 2: it was realised that out of a total of 400 respondents, 322 respondents (representing 80.5%) attested that they had limited access to land which in some way generated the conflict between the two communities.

Equally, the quantity of crops produced as indicated in the table 4 decreased drastically. Okro decreased from 61,225kg to 36,050kg, Cassava decreased from 56975kg to 44300kg, Pumpkin decreased from 65,200kg, 39,075kg,

Pepper decreased from 63,650kg to 47,175kg, Water yam from 51,325kg to 35,550kg, Yam with the m 36,925kg to 33,525kg, Tomatoes 42,525 to 33,050kg and finally, Garden egg from 66,675kg to 35,425kg. The implication of this decline in food production is that the people may not have enough to eat talk less of selling for money to meet their needs. Observations along the Calabar-Itu highway especially at Itu head bridge where lie the Mbiabo wetland revealed that before the conflict, varieties of food items were being displayed by the road side for travellers to buy and take neighbouring state, but immediately after the conflict only a small quantity of such food items if at all are seen along the road. This is a manifestation of the effect of the conflict between the communities on agricultural productivity and food security in the area.

7. Conclusion

This research has been able to come out with information as it relates to the causes of disputes over the wetland in Mbiabo. As indentified in the field, the major cause of the conflict among the communities that inhabit this area is limited access to farming land. This was further heightened by the fact that the Nigerian New Print Manufacturing Company (NNMC) located there in 1986 secured a substantial part of the wetland for the industry thereby leaving the farmers with only a small proportion for cultivation. In all ramifications, this wetland is a rich resource base as the local people extract various resources (Palm wine, timber, fish, tomatoes and yam) to earn a living but the precipitated conflict affected the quantity of these resources harvested and hence affected income generation and standard of living of the people generally. It is therefore suffice to conclude here that food production at subsistence level in a wetland of this type contributes significantly in food stabilization in the face of increasing rural population so that conflict of this nature as evident here in the study area is a serious threat to food security not just in the area alone but the environs at large.

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