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Fisher Folk's Response to Climate Change in New Bussa and its Environs of Kainji Lake Basin, Nigeria

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ABSTRACT

The study examined fisher folk responses to climate change in Kainji lake basin. The sample comprises of fisher folks within and around New Bussa. Eighty questionnaires were administered to obtain the primary data and analysed using descriptive and inferential statistical tools. The results revealed that majority (70%) of the respondent were male, however (61.2%) of them had tertiary education. More so, majority (60%) of the respondents were aware of changes in climate in the area. Majority 65 and 55% of the respondents were involved in incidence of deforestation and charcoal production, respectively. In conclusion, it was discovered that little knowledge about climate change and its effects were found among fisher folk, therefore, it recommends that sensitization workshops/lectures should be done to enable the fisher folk have adequate knowledge on climate change and the implications on fisheries activities in the basin.

Key words: Climate change, fisher folk, fishing communities, awareness

INTRODUCTION

Change in water and climate have been known to profoundly influence water resources, a factor that increases the vulnerability of human to infection. Generally, water resources involved all forms of fresh water needed for life necessities ranging from domestic needs to processing and irrigation to other general needs.

Nigeria is blessed with rich fish diversity potential numbering over 120 species in the inland waters, rivers, lakes, reservoirs and inshore water characterized by heterogeneity of fish species (Tobor, 1990). This natural resource provides employment, food, livelihood and trade to both local and national economies. The artisan sector (both coastal and inland) supplies the high volume of fish with an average of 356.2 metric tonnes yearly (CBN, 2000). Estimate shows that about 10 million people particularly youth are fully employed in the artisanal fisheries (CBN, 2004).

Despite the rich food diversity potential of Nigeria waters, there has been a decline in production over the years with a reduction of 3.93 million tonnes in global fish production between 1990 and 1995 (FAO, 1996). Today, variation in climate and other man made activities are posing a threat to fish production and aquaculture development all over the world (Nigeria not exempted). World fisheries are in crisis, it has been observed that the resources are endangered while fish resources are declining, more people are depending on the product for livelihood (FAO, 2004). According to FAO (1999), there are two major influences on inland resources and environment, climate cycle and human cycle. Climate cycle expressed as variation in rainfall affects inland

fishery resources by providing greater or lesser living space. Human induced changes on the fishery resources, the greatest overall threat to the sustainability of fishery resources is not over-exploitation but degradation of the environment. Some countries have lost up to 85% of their original aquatic habitat and they are being degraded faster than ever from the pollution and run off from coastal development, unsustainable fishing practices such as cyanide or dynamite fishing (Parks and Binifaz, 1995).

Many inland fisheries are threatened by alteration to water regime that in extreme cases causes whole lakes and waterways to disappear (Coe and Foley, 2001). Climate changes possess a direct effect through reduced precipitation and greater evaporation and indirect effect when more water is used for irrigation to offset reduced precipitation (Brander, 2007). Threats to aquaculture arise from stress due to increased temperature and oxygen demand, decreased pH, uncertain future water supply, extreme weather events, increased frequency of diseases and toxic events, sea level rise, conflict of interest with coastal defence and uncertain future supply of fish meal and oil from capture fisheries (Naylor *et al.*, 2000; IPCC, 2001).

This study, therefore, focuses on the response of fisher folk to climate change in some selected fishing communities around New Bussa with the following specific objectives:

- Describe the selected socio-economic characteristics of fisher folks
- Examine the awareness level of climate change among fisher folks
- Identify the human activities causing climate change
- Examine the impact of climate change on fisher folks
- Identify the coping/adaptive strategies of climate change on fisher folks

METHODOLOGY

New Bussa is located in the Borgu Emirate, one of the three emirates that made up Kainji Lake Basin. Bussa area is made up of three kingdoms namely; Borgu, Nikki and Lilo Borgu territory lies north of the rain forest and falls within the Savannah zone of the Western Sudan. Bussa itself is situated on the West Bank of Yoruba land and across the river "Nupe". New Bussa came into being as a result of the Kainji hydroelectric project dated back to 1951.

The geographical features of Bussa influenced the occupation of the people. Their main occupation is farming and fishing. The people still engage in other occupational activities such as petty trading, pottery, weaving and dyeing. The sample for the study was taken from fisher folk within New Bussa and its environs. Five fishing villages were randomly selected and 16 structured questionnaires was administered to each village using a snow ball technique to give a total of 80 respondents. Descriptive and inferential statistics were used for the analysis.

RESULTS AND DISCUSSION

The socio-economic characteristic of the respondents on the fisher folk response to climate change revealed the following.

In Table 1, majority (70%) of the respondents were male while 30% were female. This implies that men are more involved in fish business than their female counterpart. The majority (57.5%) of the respondents were between the age ranges of 21-40 while 42.5% of them were between 41-60 years. This implies that majority of the respondent are in their youthful age and are more likely to be more energetic to work than their older respondents and they fall within productive age

Table 1: Distribution of socio-economic characteristics of the respondents

Socio-economic characteristics	Frequency (F)	Percentage
Sex		
Male	56	70.0
Female	24	30.0
Age		
21-40	46	57.5
41-60	34	42.5
Above 60	0	0.0
Marital status		
Single	21	38.8
Married	49	61.2
Education background		
Primary education	6	7.5
Secondary education	25	32.3
HND/University	49	61.2
Family size		
1-3	12	15.0
4-7	50	62.5
8-10	11	13.8
Above 10	7	8.7
Ethnic group		
Yoruba	45	56.3
Hausa	7	8.7
Igbo	16	20.0
Others	12	15.0
Business type		
Breeding	25	31.3
Rearing	45	56.2
Processing	6	7.5
Marketing	4	5.0

Source: Field work (2012)

in agricultural production. Majority (61.2%) of the respondents are married while 38.8% are single. This implies that most of the respondents have a subordinate to assist them in decision making and source of labour in fisheries activities.

The study revealed that majority (61.2%) of the respondents was literate having HND/University education, while 7.5% had primary education. This implies the level of education may increase the knowledge of the implication of climate change and also take precaution on the sensitive program put in place to elude climate change hazards.

Furthermore, majority (62.5%) of the respondents had 4-7 people living with them in their household. This implies that most of the respondents in the area had more people to cater for and veritable labour source. On ethnic group, majority (56.3%) of the respondents were Yoruba, 20% were Igbo and 8.7% were Hausa while 15% came from other tribes. On the various fisheries activities involved in, majority (56.2%) of the respondents were rearing fish, 31.3% were breeders, more so 7.5% were processors while 5% were marketers.

Table 2 shows the awareness level of respondents on climate change. Majority 56.3, 51.3 and 60% of the respondents were aware of the following changes in water temperature, rainfall pattern and water shortage, respectively. This implies that most of the respondents due to their literacy

Table 2: Awareness level on climate change among the respondents

Awareness	High		Moderate		Low	
	F	%	F	%	F	%
Change in water temperature	45	56.3	31	38.7	4	5.0
Change in rainfall pattern	41	51.3	19	23.7	20	25.0
Water shortage	48	60.0	25	31.3	7	8.7
Change in water quality	30	37.5	43	53.7	7	8.8
Increased damage to aquatic habitat	21	26.3	25	31.2	34	42.5
Change in fish available for capture	11	13.8	28	35.0	41	51.2
Increased incidents of drought	25	31.3	36	45.0	19	23.7
Change in soil topography	20	25.0	32	40.0	28	35.0
Increased incidents of flooding	16	20.0	25	31.3	39	48.7

Source: Field work (2012)

Table 3: Distribution of human activities affecting the environment of respondents

Human activities	High		Moderate		Low	
	F	%	F	%	F	%
Multiple responses						
Incidence of deforestation	52	65.0	16	20.0	12	15
Charcoal production	44	55.0	25	31.3	11	13.7
Fuel wood as a source of energy	46	57.5	24	30.0	10	12.5
Poor land use practices	19	23.7	36	45.0	25	31.3
Rudimentary irrigation	13	16.3	30	37.5	37	46.2
Bush burning	38	47.5	28	35.0	12	15.0
Sand mining	8	10.0	20	25.0	52	65.0

Source: Field work (2012)

level but may have little or no knowledge on the cause of variation in weather and fluctuation in the availability of aquatic resources. This result corroborates the statement of (FAO, 1995) that fish resources are declining due to enormous danger and crises in world fisheries.

Table 3 highlights the various human activities that may have effects on the environment. Majority 65, 55, 57.5 and 47.5% of the respondents were involved in incidence of deforestation, charcoal production, fuel wood and bush burning, respectively. This implies that the activities within and around the area may also be contributory factors to change in climate which also expose the people to some hazards and endangering their primary livelihood activities.

Table 4 revealed the effects of some of the identified contributory factors to climate change on the environment/livelihood activities. Majority 61.3, 62.5, 73.8, 48.8, 47.5, 67.5, 70 and 48.8% of the respondents were severely faced with reduced water volume, declining surface water quality, drying up of water sources due to increased evapotranspiration, uncertain future supply of water, reduction in fish sizes, reduced income generation, lack of savings and lack of insurance, respectively. This implies that the respondents may have low output and recorded loss due to these effects subsequently increasing environmental hazards as a result of more human activities in order to cope with the effects. This result may pose serious threat to food security among the people in the study area. The result corroborates the statement of (Coe and Foely, 2001; Brander, 2007) that inland fisheries are threatened by extreme water cases that make the lake, waterways and water surfaces to disappear due to evapotranspiration.

Table 4: Distribution effects of climate change on environment/livelihood activities of respondents

Environment/livelihood activities	Frequently		Rarely		Not at all	
	F	%	F	%	F	%
Reduced water volume	49	61.3	20	25.0	11	13.7
Declining surface water quality	50	62.5	21	26.3	9	11.2
Drying up of water sources due to increased evapotranspiration	59	73.8	16	20.0	5	6.2
Uncertain future water supply	39	48.8	28	35.0	13	16.2
Conflict of interest on water bodies	20	25.0	48	60.0	12	15.0
Change in life-cycle pattern of fish	15	18.8	52	65.0	13	16.2
Reduced fish catch	24	30.0	26	32.5	30	37.5
Low quality of fish catch	25	31.2	37	46.3	18	22.5
Reduction in fish size	38	47.5	28	35.0	14	17.5
Uncertain future supply of fish meal	6	7.5	24	30.0	50	62.5
Uncertain future supply of fish oil from captured fishes	12	15.0	30	37.5	38	47.5
Reduction in both food and non-food production	15	18.8	29	36.7	36	45.0
Reduced income generation	54	67.5	17	21.3	9	11.2
Lack of savings	56	70.0	12	15.0	12	15.0
Lack of insurance	39	48.8	23	28.7	18	22.5
Lack of alternate livelihood	15	18.7	44	55.0	21	26.3
Increased toxic materials/events	16	20.0	55	68.8	9	11.2
Increased human and animal infections	17	21.2	47	58.8	16	20.0
Increased pattern of plant diseases and pest	20	25.0	29	36.3	31	38.7
Increase in HIV/AIDS prevalence	10	12.5	45	56.3	25	31.2
Increased desert encroachment	15	18.8	43	53.7	22	27.5

Source: Field work (2012)

Table 5: Distribution of respondents according to coping strategies

Coping strategies	Very often		Often		Not at all	
	F	%	F	%	F	%
Involving in traditional practices	7	8.8	23	28.7	50	62.5
Involving in shea butter production	6	7.5	12	15.2	62	77.5
Sand mining/gold mining	3	3.8	13	16.2	64	80.0
Involving in stakeholder meeting	9	11.3	36	45.0	35	43.7
Seeking information from extension agents	9	11.3	52	65.0	19	23.7
Seeking information from neighbouring village	30	37.5	35	43.8	15	18.7
Seeking information from friends or partners	48	60.0	24	30.0	8	10.0
Increased fishing man power	45	56.3	23	28.7	12	15.0
Applying improved managerial skills	50	62.5	23	28.7	7	8.8
Seeking financial and technical support from government	10	12.5	23	28.7	47	58.8
Embarking on livelihood diversification	25	31.3	43	53.7	12	15.0
Migration to other geographical areas	5	6.3	16	20.0	59	73.7
Resource mobilization	4	5.0	23	28.7	53	66.3
Price inflation of fish	9	11.3	40	50.0	31	38.7

Source: Fieldwork (2012)

Various coping strategies embark upon by the respondents were revealed in Table 5. Majority 60, 56.3 and 62.5% of the respondents were able to cope with sourcing information from friends,

Table 6: Results of the hypothesis

Variables	χ^2		Level of significance	Decision
	Calculated value	Tabulated value		
Awareness	13.33	7.815	0.05	Rejected
Human activities	13.02	7.815	0.05	Rejected

Source: Field work (2012)

increasing fishing man power and applying improved managerial skills. This implies that the respondents are depending on themselves to cope and the knowledge they have may not be sufficient for them to survive the effects of climate. The 53.7% embarked livelihood diversification. There are some emerging livelihood activities and among these, some may be inimical to the environment thereby causing more havoc to the people and the immediate natural resources within and outside the area.

Table 6 shows the hypothesis. On hypothesis 1, the calculated $\chi^2 = 13.33$ is greater than tabulated $\chi^2 = 7.815$, therefore, we reject the hypothesis at 0.05 level of significance. It may be concluded that there is a significant relationship between the awareness of climate change and their responses to climate change. This implies that the respondent's level of awareness depends on how they can effectively cope with climate change. Furthermore, on hypothesis 2, the calculated $\chi^2 = 13.02$ is greater than the tabulated $\chi^2 = 7.815$, therefore, we reject hypothesis 2 at 0.05 level of significance. Also, it maybe concluded that there is a significant relationship between the human activities involved in and their response to climate change. This implies a low knowledge on climate change among respondents, this may be the reason fishers embark on various activities that are unfriendly to the environment.

CONCLUSION AND RECOMMENDATION

The study examined fishers responses to climate change in selected fishing communities in Kainji lake basin. It highlighted the awareness level of respondents, the human activities involved in and its implications on the livelihood activities in the study area. It was discovered that awareness was high but this may not have translated to having adequate knowledge on the cause of variation in climate and its effects on the environment and consequences on the livelihood activities of the people. Adequate precautionary measures are required for fishers to maximise the weather condition for their livelihood activities for improved standard of living.

Therefore, the following recommendations are made:

- Workshop/lectures should be organized for the fishers to enhance their knowledge on climate change
- Proper extension service delivery is necessary among fishers to provide solution to problems of rural development
- Government should come up with a policy guiding the forest to reduce the threat of deforestation
- Government should also assist the fishers with grants, loans and incentives for livelihood diversification

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