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ANALYSIS OF THE EFFECT OF FLOODING AND THE COPING STRATEGIES AMONG THE ARTISANAL FISHERS COMMUNITY IN KOTON KARFE LOCAL GOVERNMENT AREA OF KOGI STATE, NIGERIA

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ABSTRACT

The study investigated the effect of flooding and the coping strategies among the artisanal fishers community in Koton Karfe Local Government area of Kogi State, Nigeria. Multi stage random sampling technique was used to obtain data from the respondents. The first stage involved random sampling of three major fishing communities in the study area (Akpasu, Chikara North and Chikara), the next stage involved random selection of forty (40) artisanal fishers from each of the three fishing communities to obtain a total sample size of one hundred and twenty respondents (120), structured questionnaire were administered to the respondents. Data obtained were analyzed through frequency counts and percentages (descriptive) and Chi square (inferential) statistics. Majority (60.1%) of the respondents were male, 47% are between 26-30 years, 47.7% were single, 37.6% had Senior School Certificate, 37.6% have house hold size of 5-10 persons with 35.9% fishing experience of 6-10 years and 43.4% earned between #5,000 to #10,000 per week. Flood impacted household livelihood through reduction in income (49.1%). Significant relationship existed between gender, age, marital status, income and coping strategies among the artisanal fishers. The study concluded that artisanal fishers' income reduced whenever there is flooding while migration to other fishing areas was the major coping strategy. The study recommended that the Government through the Extension agents and Fisheries Officers should provide platform for capacity building for the artisanal fishers on various coping strategies during flood.

Kew word: Artisanal, Coping, Gear, Fishers, Flooding

INTRODUCTION

Climate change is rapidly contributing to more threats and also emasculating human security and livelihoods of less adaptive and vulnerable communities in Africa and other parts of the world. Climate change can be an accelerant of instability that could exacerbate human security and undermine the livelihoods of vulnerable communities in fragile regions and hotspots where poverty, social insecurity, terrorism, and forced displacement are rampant (Scheffran *et al.*, 2019). United Nations Office for Disaster Risk Reduction reported that floods is responsible for more than 40% of all the globally recorded disasters which took place between 1998 and 2017 (Nguyen *et al.*, 2023). Despite the fact that flood occurrence is difficult to prevent, predicting these catastrophic events requires appropriate methods and analysis (Isiaka *et al.*, 2023; Mentis *et al.*, 2019; Ozulu *et al.*, 2021). Floods occurrence can result in threats of changes that can affect the temporal and spatial configuration of human life, property loss, and have negative impacts on agriculture and the environment. The occurrences of flooding have risen greatly over the years and require an effective and complete analysis of its impacts to enable an informed response and alleviate the

damaging consequences. Disaster spatial and temporal patterns can be influenced by human activities in developing countries, including the uncontrolled construction of buildings, rapid growth of unplanned residential areas, major land- use changes, and in developing countries, many factors are responsible for flooding problems ranging from improper land-use practice, poor infrastructure, urbanization, topography, poverty and climate change (Isiaka *et al.*, 2023).

Nigeria is facing the issue of floods that have impacted food and animal production particularly in affected areas. Many communities in the country have at one time or the other experienced flood disaster often majorly caused by heavy rainfall (Danjibo *et al.*, 2019). Rapid population growth, poor governance, inadequate drainage facilities, decaying infrastructure, lack of proper environmental planning and management strategies, irresponsible waste disposal practices and climate change are persistent factors that can be attributed to menace of flooding in Nigeria (Ogunrinde *et al.*, 2022). When flowing water submerges land areas not usually subjected to inundation an environmental challenge typically occur (Alves *et al.*, 2020). Flooding is caused by both natural and human factors, with human activities such as agricultural

practices, deforestation, and poor urban drainage systems contributing majorly to flooding (Emerhirhi *et al.*, 2024). Flood type that occurs depends on the location. Coastal areas, especially those along the plains, are susceptible to coastal flooding, which results from the overflow of rivers in low-lying belts of mangrove and freshwater swamps (Croitoru *et al.*, 2020).

Flooding in Koton Karfe are resultant effects of climate change, indiscriminate waste disposal, improper drainage, dam failure, water released from dam particularly from Cameroun (Danibo *et al.*, 2019). Specifically, flooding in the community is attributed to heavy rainfall which is a product of sea tidal surges, thunder storm and global warming (Oyekola, Azubuike & Obianeri, 2022). Raining seasons are generally characterized by gusts of wind caused by tropical storms resulting in torrential rains and its attendant flash floods. Koton Karfe is vulnerable to this yearly event that raises water table and levels of water bodies (Danibo *et al.*, 2019). Therefore, the study aimed at the assessment effects of flooding and the coping strategies among the artisanal fishers community in Koton Karfe Local Government Area Kogi State, Nigeria. The objectives of the study are to: i. identify the socio-economic characteristics of the fishers ii. examine the perception of the artisanal fishers on flood and the targeted fish species iii. investigate the impacts of flood on the livelihood of the respondents iv. identify the coping strategies of the artisanal fishers

METHODOLOGY

This study was carried out in Koton Karfe Local Aovernment area (LGA) of Kogi state located between latitude 7° 40' 00" N- 8° 30' 00" N and longitude 6° 40' 00" E - 7° 00' 00" E, sharing close border with Lokoja LGA, the capital of Kogi State with its East and West borders formed along the tributaries of the Benue and Niger river, respectively. The people of this area are best known for their agrarian practices which range from fish farming to crop planting owing to the very accommodating climate system in the area as well as hunting. The area is recognized to often experience bi-climate seasons; the dry season which spans from November to March and the wet season which begins from April to October. The area covers over 1500 sq. km with an average elevation between 19m and 400m above sea level (Isiaka *et al.*, 2023). River Niger and Benue flow through its boundary and form a confluence in the state capital, this proximity between Lokoja and Koton Karfe has made the area as vulnerable to flooding as the state capital in any case of increased water level in the two rivers (Oyedele *et al.*, 2022).

Multi stage random sampling technique was used to obtain data from the respondents. The first stage involved

random sampling of three major fishing communities in the study area. (Akpasu, Chikara North and Chikara), the next stage involved random selection of forty (40) artisanal fishers from each of the three fishing communities to obtain a total sample size of one hundred and twenty respondents (120), structured questionnaire were administered to the respondents and scheduled interview. Data obtained were analyzed through frequency counts and percentages (inferential) and Chi square (Inferential) statistics to test the level of significant relationship among the variables.

RESULTS AND DISCUSSION

Table 1 indicated that 60.1% of the artisanal fishers were male, 47% are between 26-30 years, 47.7% were single, 37.6% had Senior School Certificate, 37.6% have house hold size of 5-10 persons with 35.9% fishing experience of 6-10 years and 43.4% earned between #5,000 to #10,000 per week. Gender is important in artisanal profession as it determines types of gear usage. The dominance of male among the artisanal fishers could be attributed to the nature of the profession in times of operational activities such as paddling canoe, operating outboard engine and hauling of gear. Igejongbo (2024) and Magego (2021) also reported that male dominated artisanal fishers in Igbokoda, Ondo State and Lake Victoria in Kenya. The age group of young adults from the study was an indication of energetic and good entrepreneurial tendencies which could result to high productivity, the younger the fishers the more energetic. The implication of more single fishers showed that more labour would be hired compared to the usual family labours that are engaged in fishing. However, Anyawu *et al.*, (2022) and Mohammed *et al.*, (2023) reported more married artisanal fishers in Adonai Local Government of Rivers and Borgu Local Government of Niger States respectively. High literacy level is a sign of advancement in fishing because technology application involves ability to read, understand and correctly interpret manuals and guides which are generally written in English language. Low income in artisanal fishing could be attributed to the input used such as gear type, outboard engine et cetera apart from the occurrence of natural disaster. Mohammed *et al.* (2023) opined that literate artisanal fishers would have basic knowledge in the fishing operations and would be easier for them to adopt innovations from extension agents and research institutes for efficient productivity. Fishing experience of six years and above will place the artisanal fishers at an advantage because such would have gained experience compared to new entrants that are amateur. Large family size among artisanal fishers is expected to be a cheap such of labour either in fishing on water bodies through padding, gear setting, hauling, fish processing or marketing.

Table 1: Socio-economic characteristics of the artisanal fishers

Socio-economic characteristics	Labels	Frequency	Percentage
Gender	Female	144	49.9
	Male	173	60.1
Marital status	Single	137	47.7
	Married	124	43.2
	Widow	9	3.1
	Widower	17	5.9
Age (Yrs)	Less than 20	44	15.3
	26-30	135	47
	31-40	45	15.7
	41-50	42	14.6
	51 and above	21	7.3
Educational level	Primary school cert.	28	9.8
	Secondary school cert.	108	37.6
	NCE/OND	71	24.7
	HND/B.Sc.	62	21.6
	Higher Degree	18	6.2
Income/week (#)	5,000 – 10,000	124	43.2
	11,000 – 15,000	86	30.0
	16,000 – 20,000	23	8.0
	21,000 – 25,000	33	11.5
	26,000 above	21	7.3
Fishing experience (Yrs.)	Less than 5	84	29.3
	6 -10	103	35.9
	11 - 20	47	16.4
	21 – 30	29	10.1
	31 and above	24	8.4
House hold size	1 – 4	92	32.0
	5 – 10	108	37.6
	11 and above	87	30.0

Perception of the artisanal fishers on flood occurrence over the years and targeted fish species

Majority (64.8%) perceived that flood occurrence had increased over the years, 22.3% indicated it reduced while 12.9 showed it has not changed. Only 44.6% indicated all species of fish as targeted while 27.5% fish for Tilapia species Table 2. Perceptions on occurrence of floods are viewed differently depending on fishing ground and years of fishing. Some fishers move to different water bodies which influenced their perception at a point in time or cumulatively over the years. Artisanal fishers target all available fish species in water body usually when a particular species is not abundant or when consumer does not have preference in taste for a particular species of fish. The essence of targeting all available fish species in any water body could also imply that the artisanal fishers wanted to have more income over those that are selective. The

implication of fishing all available species of fish is that the artisanal fishers would use varieties of fishing gear that are passive and active. Tikadar *et al.* (2021) indicated that different fishing gear can catch a large variety of species exist in most fishing grounds. Over fishing can also result by targeting all available species of fish which is a setback to sustainable exploitation of fisheries resources, most likely recruitments are captured instead of matured adults. Tilapia species are mostly available in fresh and brackish water bodies which could be the reason for its high percentage of targeted fish by the artisanal fishers compared to *Clarias* and *Heterobranchus species*. Various species of Tilapia has proven to interbreed with other species outside their ecological range Moses *et al.* (2021). Among the three species of fish *Heterobranchus species* is highly valued monetarily which could account for it as targeted fish species.

Table 2: Perception of the artisanal fishers on flood over the years and targeted fish species

Variables	Frequency	Percentage
Decreased	64	22.3
Increased	186	64.8
No change	37	12.9
Targeted fish species: <i>Clarias gariepinus</i>	35	12.2
<i>Tilapia species</i>	78	27.2
<i>Heterobranchus species</i>	46	16
All species	128	44.6

Effects of flood on the livelihood and income of artisanal fishers over the years

Table 3 showed the impacts of flood on the livelihood and income of artisanal fishers over the years. Only 42.5% of the artisanal fishers indicated increased in fish catch which was a positive one while 41.1% experienced reduction in fish catch. On income earning, 49.1% had loss of income as a result of flood while 44% indicated increase in income. Increased in fish catches was an indication that different species of fish were brought from the upper course of River Niger and other adjoining rivers that empty into the river. Fish cultured from different farms are carried by the flood into the river which accounted for increase in fish caught by the artisanal fishers. Moreover, when there is flood some artisanal fishers migrate to other areas there by reducing their population and the few left definitely

have the tendency of more catches. More catches with increase in demand mean more income to the artisanal fishers all things been equal. However, there was reduction in income which corroborates Emerhirhi *et al.* (2024) that flooding severely impacts the primary source of income for fisher folks in Bayelsa, most likely because of greater dependence on fishing activities and perhaps more extensive flood events or less adaptive infrastructure. Emerhirhi *et al.* (2024) in a similar study in Bayelsa reported that flooding significantly reduces income for fisher folks indicating economic vulnerability. Jimoh and Salami (2019) opined that the impact of flooding increases the level of poverty of the artisanal fishers and that a strong relationship exists between flooding and poverty because of the fact that flooding causes or worsens poverty, whereas poverty increases flood vulnerability.

Table 3: Impacts of flood on the livelihood and income of artisanal fishers over the years

Livelihood	Frequency	Percentage
Reduction in fish catches	121	41.1
Increased in fish catches	122	42.5
Increase in fish size	17	5.9
Decrease in fish size	11	3.8
Damage to land sites	10	3.4
Damage to boats	0	0
Damage to gear	2	0.7
Loss of live	4	1.4
Income: Reduced	141	49.1
Increased	129	44.9
No effect	17	5.9

Coping strategies of the artisanal fishers on flood

The various impacts of flooding have led the fishermen to adopt different coping strategies such as migrate to other fishing areas (77.7%) which was a temporary relocation, used more gear types (11.5%) and 77.7% got relief in form of cash and kind from the Government as indicated in Table 4. Omitoyin *et al.* (2021) opined that fishers migrate to another place till there is report on good catch and forsook fishing and doing all kinds of work till report on good catch. Magego *et al.* (2021) indicated that some fishermen moved from one fishing zone to another in search of good catches, which was a

cyclical all year round and mostly depend on the type of fish species that were predominant. Some artisanal fishers household migrated with their families, while others moved alone and left households behind to take care of the homestead. There were those who moved to nearby urban centre in search of employment to meet family needs. Ojebiyi *et al.*, (2023) in indicated that artisanal fishers changed from fishing to farming, other non-agricultural activities and temporary relocation as common coping strategies. Relief from Government after occurrence of natural disaster such as flood aimed at sustaining the artisanal fishers pending the time water would subside.

Table 4: Coping strategies of the artisanal fishers on flood

Variables	Frequency	Percentage
Migrate to other fishing areas	223	77.7
Change fishing gear	12	4.2
Use more gear types	33	11.5
Target species	5	1.7
Revert to non-fishing activities	9	3.1
Increased time on fishing grounds	5	1.7
Relief from Government: Yes	223	77.7
No	64	22.3

Relationship between the socio-economic characteristics of the artisanal fishers and the coping strategies

The result for the test of hypothesis on relationship between the socio-economic characteristics of the fishers and the coping strategies of the fishers is presented in Table 5. The findings revealed that gender

(t = 6.31), age (t = 2.13), marital status (t = 2.13) and monthly income (t = 2.13) had a significant relationship among the socio-economic characteristics of the artisanal fishers and the coping strategies in the study area. The implication of gender on coping is based on the fact that male artisanal fishers are resilient and easily adjust to natural disaster compared to female

counterparts. Age is associated with experience, older artisanal fishers have higher tendency of coping because of past experiences either in the profession or life. Household size provide good basis of coping especially if small because the smaller the size the smaller would be the needed necessities of life for

survival. Income is a major determinant of coping as artisanal fisher simply because business can change and movement or relocation becomes easier if there is the means. Abu Samah *et al.* (2023) reported that coping with climate change was significantly affected by the fishing experience, age, and income of the fishers.

Table 5: Relationship between the socio-economic characteristics of the fishers and the coping strategies of the fishers

Hypotheses	Variables	t-value	p-value	Decision (HO)
1a	Gender	6.31	6.65	Accepted
1b	Age	2.13	3.37	Accepted
1c	Marital status	2.13	4.23	Accepted
1d	Education	2.92	2.34	Rejected
1e	Household size	2.92	1.23	Rejected
1f	Monthly income	2.13	5.88	Accepted

CONCLUSION AND RECOMMENDATION

Artisanal fishers’ income reduced whenever there is flooding though the quantity of catches increased possibly because low priced species like Tilapia. Migration to other fishing areas was the major coping strategy apart from relief from the Government. The study recommended that the Government through the Extension agents and Fisheries Officers should provide platform for capacity building for the artisanal fishers on various coping strategies during flood.

REFERENCES

Alves, B., Angnuureng, D. B., Morand, P., and Almar, R. (2020). A review on coastal erosion and flooding risks and best management practices in West Africa: What has been done and should be done. *Journal of Coastal Conservation* 24(3):38

Croituru, L., Miranda, J.J., Khattabi, A. and Lee, J.J. (2020). The cost of coastal Zone degradation in Nigeria: Cross River, Delta and Lagos States. World Bank and Global Programme on Sustainability, World Bank

Danjibo, N. D., Adeoye, A. E., & Ojo, O. S. (2019). Dynamics in the response mechanisms of major stakeholders during flood disasters: A Case Study of Kogi State, Nigeria. *African Journal of Social Sciences and Humanities Research*. Volume 2, Issue 2, pp. 29-42

Emerhirhi, E., Nnadi, F. N., Ukpongson, M. A., Ajaero, J. O. and Okoroma, E. O. 2024.

Effects of Coastal Flooding on Crop Farmers, and Artisanal Fisher Folks in South-South Nigeria *International Academic Journal of Agriculture & Agribusiness Research* 8(6): 12 – 24

Igejongbo, T. F. (2024). Socio-economic characteristics of artisanal fisher folks in Igbokoda Ondo State. *Adan Journal Of Agriculture*, 2(1), 146–155

Isiaka, I. O., Ajadi, S. A. , Arowolo, S. A., Mustapha, S. O., Kingsley O. N. and Oluoma, C. C. 2023. Flood Impact Assessment In Koton Karfe Using Sentinel-1 Synthetic Aperture Radar (Sar) Data, *International Journal of Environment and Geo informatics (IJECEO)*, 10(4): 064-076.

Izuagbe, R. I., Fadare, G. O., Ibrahim, A. M., and Kilani O. F. 2024. Impact Assessment of Flooding on Food Security: A Case Study of Koton Karfe in Kogi Local Government Area of Kogi State. *International Journal of Social Science and Humanities Research* 11(3): 74 - 82

Jimoh U. U. and Salami S. H. 2019. Perceived effects of flood on lives and properties of the residents of Lokoja, Kogi State Nigeria *Discovery* 55(284), 441-452

Magego, J. L., Gor, C. O., and Kinaro, Z. 2021. Artisanal Fisheries Socio-Economic Characteristics In Development Planning Strategies *Journal of Humanities And Social Science* 26(4): 1-6

- Menteş, E. N., Şinasi, K. A. Y. A., Tanik, A., Gazioglu, C. (2019). Calculation of flood risk index for Yesilirmak Basin-Turkey International Journal of Environment and Geo informatics, 6(3):288-299
- Mohammed Y. S., Ekundayo, T., Maradun, H. F., Tambari, B. M., Ejezie B. C., Yahaya, M. M. and Ukwenya, I. I.2023. Assessment of Artisanal Fisheries activities among Fisher folks in Borgu Local Government Area, Niger State. Asian Journal of Fisheries and Aquatic Resources 25(6): 9-19
- Moses, M., Chauka, L. J., de Koning, D. J. 2021. Growth performance of five different strains of Nile tilapia (*Oreochromis niloticus*) introduced to Tanzania reared in fresh and brackish waters. *Scientific Reports* 11, 11147 <https://doi.org/10.1038/s41598-021-90505-y> Accessed August, 2024
- Nguyen, T. H., Ricci, S., Piacentini, A., Fatras, C., Kettig, P., Blanchet, G., Baillarin, S. 2023 Assimilation of SAR-derived flood extent observations for improving fluvial flood forecast—A proof-of-concept. IOP Conference Series: Earth and Environmental Science 1136(1): 012018)
- Nwanyawu, S. O., Wilcox, G. I., Okafor, B. B. and Eneyo, C. 2022. Influence of Socioeconomic characteristics on fishing in Adoni Local Government Area Rivers State, Nigeria. *African Journal of Biological and Physical Sciences* 1(1): 8-16
- Nigeria Ghana Journal of Agricultural Science 58 (2), 64 - 74
- Ogunrinde, A.T., Oguntunde, P. G., Akinwumiju, A. S., Fasinmirin, J. T., Olasehinde, D. A., Pham, Q. B., & Anh, D. T. (2022). Impact of climate change and drought attributes in Nigeria. *Atmosphere*, 13(11), 1874
- Omitoyin S. A., Osakuade K. D., Ogungbure A. P. 2021. Coping and Adaptive Approaches of Fisher folks in Ilaje Fishing Communities, Ondo State to Impacts of Climate. *Oceanography Fish Open Access Journal* 14(2): 555882. DOI: 10.19080/OFOAJ.2021.14.555882 Accessed August 2024
- Ozulu, G., Essien, G. P., Akudo, E. O. (2021). Geological and Geospatial Mapping of Vulnerability Areas for Proper Flood Mitigation: Ganaja, Lokoja Metropolis, North-Central Nigeria. *International Journal of Environment and Geo informatics*, 8(3):267-275.
- Scheffran, J., Link, P. M., Schilling, J. (2019). *Climate and conflict in Africa*. Oxford Research Encyclopedia of Climate Science, Oxford University Press 2019
- Tikadar, K. K., Kunda, M. and Mazumder, S. K. 2021. Diversity of fishery resources and catch efficiency of fishing gears in Gorai River, Bangladesh. *Heliyon* 7: 1-13
- Ojebiyi, W. G., Ashimolowo, O. R., Olaoye, O. J. Abdulsalam-Saghir, P. B. and Soetan, O. J. 2023. Adaptation to climate change among artisanal fishers around Lekki Lagoon,