

# Disaster Preparedness and Sustainable Risk Management in Metropolitan Cities in Nigeria

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**Abstract:-** Globally, it is believed that people's preparedness to immediately recover from disaster is a panacea to a sustainable risk management, considering the increase level of disaster hazards as well as breakthrough in scientific and technological advancements. Disaster impacts and risks can be reduced along with increasing peoples' preparedness towards hazards however the extent of this cannot be ascertained in metropolitan cities in Nigeria. In this regard therefore, this study evaluates the level of disaster preparedness as measures to sustainable risk management in metropolitan cities in selected North-Central states in Nigeria, that are highly flood-prone as a result of Rivers Benue and Niger. In achieving this, a qualitative approach with use of field observations and data obtained through responses to questionnaires were utilized. The results of the study reveals that there is a low level of disaster preparedness to flood risks management and the factors responsible are the low level of communities' social capital; risks knowledge capacities and; the reduced involvement of local and state governments' institutions. This study therefore concludes that communities' preparedness played key roles in reducing flood disasters and improving sustainable risks management. It is therefore recommended that governments' institutions charged with environmental issues should orient the flood prone communities on how to prepare for flood disasters in areas of responses, resilience and recovery.

**Keywords:-** Disaster preparedness, community, flood disaster, risk management.

## I. INTRODUCTION

Globally, it is believed that people's preparedness to immediately recover from disaster is a panacea to a sustainable risk management, considering the increase level of disaster hazards as well as breakthrough in scientific and technological advancements (Michal, Moricova & Sedlialcova 2020). There have been several discussions about the possibilities of disaster risk management to achieving the direct goals of sustainable development (Munsamy, 2019). This is so because there are threats that could affect the realization of the said goals in specific disasters like flooding. A well-detailed disaster risk management approach which is targeted at reducing the risks should be able to prevent the events and threats, reduce the chances or likelihood of their possible occurrences, provide an effective preparations and responses to the potential adverse impacts, as well as ensuring an effective recovery after the disaster (Deria, Ghannad & Lee 2020). Sustainability is a feature that ensures the implementation and

development of not only in the presentation conditions, but also those conditions that have the tendency to change in future. In this case therefore, flooding which is climate change-related disaster and its negative effects are expected to fluctuate in intensity and frequency (Muricho, Otieno, Oluoch-Kosura & Jirström 2019; Trifan, Gociman & Ochinciuc 2019).

Flooding as a form of disaster has several negative externalities and costs in terms of the lives lost and other damages to the economic, social and environmental assets of the nation (Shapira, Aharonson-Daniel & Bar-Dayyan 2018; Bustillos, Evers & Ribbe 2017). In this regard therefore, a prudent approach to addressing flooding would include a range of early adaptation interventions before the onset of the flooding crisis. Combined with well-articulated responses' measures, this will ensure the society's recovery and support more effective damage control, management and recovery. Each level of preparedness of the flood disaster management cycle will decrease the associated risks in the future and support the building of a resilient society and its development (Islam, Wahab & Benson 2020; Benson, 2016). The approach that includes the society (communities' stakeholders and people) in the flood prevention, control and recovery is proven to be very effective. Also the important roles of the public are emphasized in the framework of building a vulnerability-reducing or resilient society flood disaster management (Antronico, De Pascale, Coscarelli & Gullà 2020; Petrović, Bošnjak & Nedeljković 2017).

Nigerian communities especially those around coastal regions experience regular annual flooding as result of release of water bodies and rainfall. Rivers Niger and Benue run through major cities across the North Central States of Nigeria such as Niger, Kogi and Benue in particular, as result, coastal communities across these states often experience flooding during the down pour or the release of water bodies from Kainji Dam or Cameroon Dam. It is against this backdrop, that this study considers the level of preparedness of coastal communities in North Central Nigeria for flood disaster as it affects their sustainable risk management.

### A. Problem Statement

In order to develop a sustainable environment, it is of utmost importance to create living condition that is not exposed to disaster risks since certain environment conditions and even changes have the tendency of resulting in flooding typically of communities in flood prone areas. This situation has resulted in the need for preparedness of the communities with the view to enhancing knowledge, awareness, prevention and control capacity of the

communities against flooding. In the conditions of the North Central region of Nigeria, there is an obvious gap concerning society engagement as regard preparedness flooding-related risks. The inclusion of the communities' stakeholders and public in flood disaster management is not clear and it requires citizens' initiatives and perspectives. This gap in knowledge needs to be contextualized by evaluating the factual state of people's preparedness for flood disaster management as a way of developing environment sustainability.

### B. Research Objectives

In this study, the aim is to evaluate the level of disaster preparedness towards sustainable risk management with focus on flooding disaster among coastal communities in selected states (Niger, Kogi and Benue) of North-Central States of Nigeria.

However, in specifics, the objectives of this study are:

- To evaluate the communities' level of awareness of flood disaster management in North Central region of Nigeria
- To analysis the communities' prevention capacity of flood disaster in North Central region of Nigeria
- To find out the extent of flood disaster control capacity of communities in North Central region of Nigeria.

## II. LITERATURE REVIEW

### A. Flood Disaster

According to National Institute of Disaster Management (NIDM, 2015), a disaster is described as an unexpected calamitous event that adversely disrupts the natural functioning of a society or community resulting in human, economic and material or environmental losses that exceed the society's or community's ability to immediately cope with the using of its own resources. In this regard therefore, flooding disaster resulting from natural processes overflow of water above and across its bank, results in property damage or even loss of life, and typically leaves some economic damage at its wake. The severity of a flood disaster depends on the level of its adverse effect while its impact depends on the affected population's resilience, or the ability for the affected communities to recover (Bormudoi & Nagai 2017).

### B. Disaster Preparedness

Disaster preparedness, according to the International Federation of Red Cross (IFRC) (2020), refers to all the measures taken to prepare for a disaster and/or to reduce the environmental, social and economic consequences of disasters. It is otherwise considered as the anticipation and, where possible, prevention of disasters, mitigating against their impact on vulnerable communities and populations, and providing the necessary response to their impacts. In conditions of the flood disaster preparedness, it means theoretical the knowledge, practical skills and attitudes of the protecting oneself, communities and society (Teo, Goonetilleke, Ahankoob, Deilami & Lawie 2018). Kitagawa (2019) defines preparedness (for a range of entities: governments, state administrations, environmental-based organizations, communities and individuals) as: "the knowledge and capacities developed by mentioned subjects

to efficiently and effectively anticipate, respond to and recover from the negative impacts of disasters". It is observed from the definitions of IFRC and others that the objective aspect of preparedness emphasizes also the importance of the subjective aspects of preparedness (such as knowledge, protection habits).

However, according to this study, disaster preparedness is the ability and capabilities of communities and people to protect themselves and to prevent and/or mitigate against the impact of crises by their own resources and forces, and to also able to provide help to those communities or people who in need help under same circumstance. Disaster preparedness is operationalized in this study to include structural, planning and survival preparedness (Michal, Moricova & Sedlialcova 2020; Sarabia, Kägi, Davison, Banwell, Montes, Aebischer & Hostettler, 2020). Structural aspects involve adopting the hard measures which include protective physical structures, technologies, etc. Planning aspects involve preparing the soft measures such as plans, policies, instructions, communication strategies etc. Survival aspects involve supplies and resources of all and any kind that can control the flood such as sandbags, water pumps, evacuation/aggregates capacities, financial reserves, information sources etc.

Michal, Moricova and Sedlialcova (2020) present results from the assessment of preparedness for disasters with emphases on changing environment and climate. The research which was based on questionnaire survey aimed at investigating the level of preparedness and preventive proactive behaviour against the disasters. It was revealed that disaster risk awareness and overall disaster preparedness level is poor and the population is rather inactive. Petrović, Bošnjak and Nedeljković (2017) posit that the pro-active attitude of community members against disasters is partly affected by their socio-economic characteristics; especially, the younger members are more inclined towards adopting and applying the control measures. It was however posited that the negative disasters' experiences witnessed by certain communities' population have also influenced their level preparedness. From the literature reviewed attention were not focused on flooding disaster preparedness from the perspectives of communities' stakeholders and individuals of flood prone regions of North Central Nigeria.

## III. METHODOLOGY

This study used a survey research method to gather data from key environmentalists and communities' stakeholders living around flood prone and coastal areas in Niger, Kogi and Benue States. The study purposively selected a sample size of four hundred and fifty (450) as distributed in table 1, as such, 450 respondents were selected for this study. The study conducted a pilot survey using selected flood prone communities from Taraba State which revealed a reliability value of 0.77 (on a scale of 1) before the field survey of this study. The collected data from the case study areas were encoded and analyzed using descriptive statistics to determine the communities' level of awareness; prevention capacity and; the extent of flood

disaster control capacity of communities in North Central region of Nigeria.

States	Items	Samples distributed	Samples returned
Niger	Communities' Stakeholders	100	95
	Environmentalists	50	40
Kogi	Communities' Stakeholders	100	90
	Environmentalists	50	45
Benue	Communities' Stakeholders	100	92
	Environmentalists	50	38
Total		450	400

Table 1: Sample Distribution

This study focused on the frequency and means of the responses to determine the positions of the community stakeholders and environmentalists from the State Ministries (concerned with environmental issues) on communities' level of awareness; prevention capacity and; the extent of flood disaster control capacity of communities in North Central region of Nigeria. The finding of this study is therefore premised on the empirical analysis of the responses from the respondents.

#### IV. RESULTS AND DISCUSSION

Out of the 450 questionnaires administered by this study, 400 representing (88.9%) were validly filled and returned, which were considered for results analysis as presented in table 2. The responses are recorded with the following codes: Yes = 1; No = 0; and cut-off score (mean =  $\bar{x}$ ) to achieve the objectives is valued at 0.5.

S	Measurement	Yes	No	Mean
<b>1</b>	<b>Communities' level of flood awareness</b>			
	Flood disaster knowledge	315	85	0.779 > $\bar{x}$
	Flood disaster experience	283	117	0.707 > $\bar{x}$
	Flood disaster presence	225	175	0.562 > $\bar{x}$
	Knowledge of protection options	103	297	0.257 < $\bar{x}$
<b>Average</b>				<b>0.576 &gt; <math>\bar{x}</math></b>
<b>2</b>	<b>Communities' flood prevention capacity</b>			
	Availability of flood preventive options	86	314	0.215 < $\bar{x}$
	Communities deploy flood preventive instrument	112	282	0.280 < $\bar{x}$
	Preventive options are effective	62	338	0.155 < $\bar{x}$
	High level of readiness for flooding	23	377	0.058 < $\bar{x}$
	Communities are not threatened by flood	17	383	0.043 < $\bar{x}$
<b>Average</b>				<b>0.150 &lt; <math>\bar{x}</math></b>
<b>3</b>	<b>Communities' flood disaster control capacity</b>			
	Communities are capable to control flood	34	366	0.085 < $\bar{x}$
	Supports from environmental agencies	74	326	0.185 < $\bar{x}$
	Reduction in Flooding disaster across communities	25	375	0.063 < $\bar{x}$
	Communities expansion	86	314	0.215 < $\bar{x}$
<b>Average</b>				<b>0.137 &lt; <math>\bar{x}</math></b>

Table 2: Data Presentation and Analysis

Source: Field Survey, 2022

The analysis in table 2 reveals that the communities have sufficient knowledge, experience and presence flood disaster with the mean scores of 0.779, 0.707 and 0.562 respectively (i.e  $\bar{x}$  > cut-off score). However, there is inadequate knowledge of flood disasters protection options with the mean score of 0.257 which is less than cut-off score. The analysis therefore reveals that the communities' stakeholders have sufficient (57.6%) level of awareness of flood disaster in the regions as it affects sustainable risk management of the areas. This finding of this study agrees with Michal, Moricova and Sedlialcova (2020); Munsamy (2019), Muricho, *et al.*, (2019) and Teo *et al.*, (2018) which also indicate a significant understanding of knowledge and

causes of disaster by the population out of which many have disaster experience.

Furthermore, it is revealed that there are: no availability of flood preventive options (0.215) as such the communities do not deploy flood preventive instrument (0.280) which reveals that flood preventive options are not effective (0.155). In addition, there is very low level of readiness for flooding disasters in the communities (0.058) and hence the communities are threatened by flood disaster (0.043) each time it occurs. The analysis therefore reveals that the communities' have very low (15.0%) flood disaster prevention capacity and as such are very exposed to resultant risks. The assertion of this study is in agreement

with various studies across the globe (Sarabia *et al.*, 2020; Deria, Ghannad and Lee 2020; Islam, Wahab and Benson 2020; Trifan, Gociman and Ochinciuc 2019 and; Shapira, Aharonson-Daniel and Bar-Dayyan 2018) which posit the lack of readiness for disaster management and sustainable development by both communities and states' government/agencies.

Finally, it is revealed from the analysis that: communities have low capability to control flood (0.085); the supports from environmental agencies are considerable minima (0.185) and as such the reduction in flooding disaster across communities is very low (0.063) which has adversely affected communities expansion (0.215) around the coastal regions. The analysis therefore reveals that the communities' have very low (13.7%) flood disaster control capacity and as such suffer the consequences of the resultant risks. The finding of this study is supported by the position of Antronico, *et al.*, (2020); Michal, Moricova and Sedlialcova (2020) and; Trifan, Gociman and Ochinciuc (2019) who also advance the lack of control capacity and instrument by the communities and population who are affected by disasters and as such have challenges in ensuring sustainable environmental development of the areas prone to disaster.

## V. CONCLUSION

The population and communities' preparedness for disaster management is quiet weak and people are less active in increasing their preparedness thereby affecting their sustainable risk management. It is indicated that communities have sufficient awareness of flood disaster and its implication on sustainable development. There is a clear understanding of knowledge and causes of flood disaster by the population especially those with flood disaster experience. However, there is very weak flood disaster prevention capacity and as such most of the communities are very exposed to resultant flood risks. This then portray lack of readiness for disaster management and sustainable development by both communities and states' government/agencies.

The communities lack flood control capacity and instrument as they do not have the required instrument, structures and wherewithal to control flood disaster whenever it happens. In this regard therefore, the communities are faced with challenges (social, economic and physical) in ensuring sustainable environmental development of the areas prone to disaster. One of the challenges is to choose appropriate ways and approaches to achieving greater involvement of the communities' stakeholders.

In order to enhance flood disaster preparedness, there is need for the required change in social behaviour level of the communities' members in the direction of sustainability and increased preparedness for flood disasters. This must be supported by institutional structure and change, changes in legal framework that empowers individuals in such behaviour. Communities are the most vulnerable stakeholders in disaster management. The vulnerable

communities need to be more aware of disasters and negative impacts in which they are exposed to and ensure to take specific action to minimizing the threat of losses or damages.

The governments' authority and agencies should have sufficient knowledge of the flood disaster that communities face during or post disaster. The agencies must be actively involved in the development, designs and maintenance of early warning systems. The agency especially the local authorities should also have such capacity to instruct or engage the local communities in a way to increasing their safety net and reduces their potential to losing dependable resources.

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