



Stakeholders' Engagement for Flood Risk Management in Katsina Urban Area, Katsina State, Nigeria

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Abstract

This paper examined the engagement of stakeholders in Flood Risk Management (FRM) by identifying their interventions, synergy, and barriers to effective collaboration in Katsina Urban Area. Purposive sampling was utilized in the selection of Community-based Organizations (CBOs) and Institutional FRM stakeholders. Focus Group Discussions (FGDs) were used to collect data from them and Recursive Abstraction was utilized to analyze the data obtained through FGDs. Conversely, Yamane's formula was used to obtain the sample size of households in Wakilin Arewa "B" (369) and Wakilin Kudu "III" (353) wards of the study area. Furthermore, Systematic random sampling was conducted in each of the eight flood-prone areas, and structured questionnaires were administered to the most senior person available in each household. Households' data were analyzed using descriptive statistics. The results indicated that, 30.19% of the households' respondents got external support from stakeholders while 69.81% never did. However, 77.52% of the support came from CBOs and 22.48% from institutional stakeholders. All the institutional stakeholders cited inadequate funding, public negligence, and dumping of refuse on waterways as the challenges of FRM in the study area. They also indicated that poor institutional transparency, bureaucracy, and time-lag between information decimation and action were the main barriers to effective synergy. It was also revealed that stakeholder's synergy was inefficient and ineffective and that institutional dominance pervaded and slowed FRM efforts in the study area. The adoption of Flood Risk Assessment (FRA), partnership working, and creating a unified FRM guidance document for the study area were recommended.

1. Introduction

The rate of flooding occurrence in recent times has been unprecedented. About 70 million people globally are exposed to flooding every year, and more than 800 million living in flood-prone areas [1]. [2] Examined the involvement of stakeholders and the public in Flood Risk Management (FRM) and concluded that, as the risk governance principles touched aspects related to the public, their involvement is indirectly increased.

In Nigeria, flooding and means of addressing its challenges are critical issues [3]. The country has experienced devastating floods which affected millions of people and caused financial losses amounting to billions of US dollars. These hazards were generally linked to poor urban planning and

climate change which increase the frequency and intensity of rainfall [4]. In 2012, Nigeria experienced the worst flooding in more than 40 years as a result of heavy rainfall which lasted for many days. The incidence affected 32 states with 24 considered severely affected [5]. The floods extended from July to October 2012 and affected 7.7 million people with more than 2 million others reckoned as internally displaced (IDPs), over 5000 people were physically injured and about 5900 houses were destroyed [5]. However, various levels of government, the community, and other stakeholders have been active with measures to tackle flooding in Nigeria [6]. These measures have been criticized as ad-hoc and not well established [3].

The principles of risk-based decision making and integrative management, stakeholder engagement and public participation are seen as central to effective FRM, and appear prominently in most related policy statements and management frameworks. The principles of risk-based decision making and integrative management, stakeholder engagement and public participation are seen as central to effective FRM, and appear prominently in most related policy statements and management frameworks. According to [29], Stakeholders in this context are individuals and groups that have an interest in flood protection, flood safety and development. Stakeholders and communities recognized the importance of climate information, but local communities have limited access to it than professionals and institutional stakeholders [30].

Authors [7,8] believed that it is vital to integrate structural and nonstructural measures to reduce the impacts of flooding on social systems and to achieve the key requirements in risk management which are prevention, mitigation, preparedness, emergency response, recovery, and lessons learned. [3] Discovered the absence of a well-articulated, organized institutional structure to coordinate response activities during emergency conditions in Nigeria. However, Taiwo [9] assessed Nigeria's Institutional Capacity in Disaster Management. The work in the National Emergency Management Agency (NEMA), in 2010, came up with the National Disaster Management Framework (NDMF). The framework was designed among other reasons, to provide jurisdictional responsibilities, promote efficiency and build institutional capacity among the various stakeholders in the area of disaster management. This gave way to; State Emergency Management Agencies (SEMAs) at the state level, and Local Emergency Management Agencies (LEMAs) at the local government level. Other stakeholders include Neighborhood associations, schools, Community-Based Organizations (CBOs), Faith-Based Organizations (FBOs), and Disaster Reduction Groups (DRUs). The overall function of these groups is to provide support for emergency management activities at the grass-root level. Regarding FRM, NEMA and SEMA play a vital role in early warning, response, and recovery, while the Nigeria Hydrological Services among other things provide timely information on water-related hazards through forecasting [9]. While infrastructural and engineering solutions may improve flood resilience short-term, the long-term sustainability of flood Mitigation and adaptation regimes requires citizens' participation at community and government levels [10].

Taiwo [11] Highlighted citizen participation in flood management in South-west Nigeria, the work identified defects in the top-down, agency-driven approaches to flood management. It discovered that affected communities, before the flood incidents of 2011 and 2012 did not have concrete and functional mitigation plans aside from the conventional monthly environmental

sanitation exercise which was optional. Besides the absence of a well-planned mitigation framework, it was discovered that the level of interaction between government agencies and citizens as it relates to flood management is low in the study areas. However, the study of Rigasa *et al.* [10] proposed a framework for community and government based flood management regime in Nigeria in three Stages; Flood Risk Assessment (FRA), Community-Based Citizens Flood Management Committee (CFMC), and Flood Management Offices (FMOs) at Federal, State, and Local Governments levels. Their research recommended the integration of CFMCs into the current national flood management plan, which is predicted to help the proper integration of stakeholder effort, drive best practice, and set standards for flood mitigation and adaptation and in Nigeria. Yet, [12] in a review of the challenges and opportunities of FRM identified the lack of a robust integrated FRM system which resulted from inadequate inter-agency coordination, low literacy level, high urban poverty, and weak institutions across many Nigerian cities.

The study of Abaje *et al.* [13] showed that most of the flood occurrences in Katsina State owe their reasons not only to high torrential rainfall but also improper physical planning, blockage of drainage channels, deforestation, and the erection of structures in areas of high risk. It was also noted that flood disasters triggered vulnerability factors as they left many people and communities in precarious conditions, depriving them of the most basic goods. Asanarimam *et al.* [14] Assessed Flood Hazard Responses among the Residents of Katsina Metropolis, Katsina State, Nigeria, and recommended bottom-up participation and synergy between stakeholders to properly manage flood risks. Similarly, Mashi *et al.* [15] in a study titled "Community perception, response and adaptation strategies towards flood risk in a traditional African city" recommended the need for proper synergy of stakeholders, effective urban governance; including harnessing of local social capital, and increased community collaborative actions.

2. Study Area and Methodology

2.1 Study Area

Katsina urban area is the capital city of Katsina State. It lies from latitude 12° 41'N to 13°9'N and longitudes 7°22'E to 7°52'E (Figure 1), with a total land area of about 2,448km² [16]. Katsina urban area is located at the centre of Hausa plains at the extreme northern part of Nigeria 30km from Nigeria-Niger border.

It is bounded with Kaita from the north, Jibia to the west, Batagarawa from the south, and Rimi Local Government Area to the east [16]. The climate of the study area has a single mode of rainfall pattern which is received between the months of June to September, with annual average of 700mm. It has reported high temperature in most part of the year, with maximum day temperature of about 41°C in the months of March, April and May and the minimum day temperature of about 22°C or a bit lower in the months of December and January. The relative humidity is 20-25% usually in the months of February and March, and higher with 70-80% in August when the highest amount of rainfall received during the year [17]. Katsina Urban Area is drained by two main rivers (Ginzo and Tille) with a confluence point at Abdallawa River. Ginzo basin occupied the southern part of Katsina town and stretches from east to west cutting across the walled city, while Tille basin occupied the northern part [16].

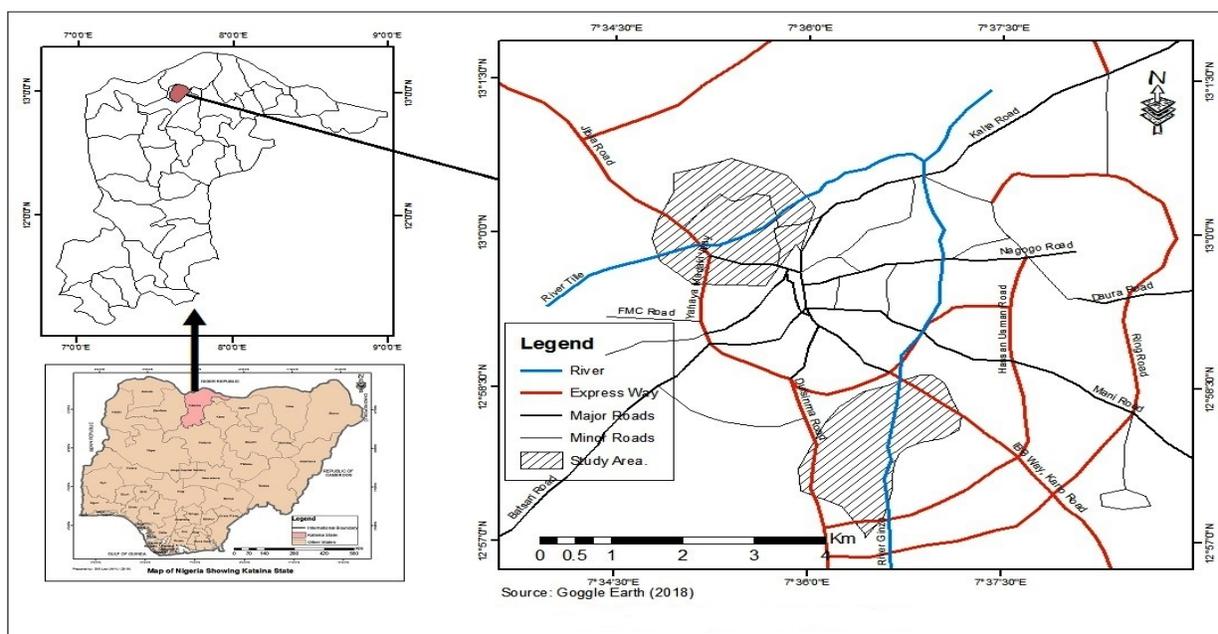


Figure 1: Katsina Urban Area Showing Wakilin Arewa (North) and Wakilin Kudu (South)

2.2 Methodology

The primary data were obtained from the field survey conducted at the study area as well as Focus Group Discussions (FGDs) to relevant Katsina state government agencies and Community-Based Organizations (CBOs). The household sample locations in the study area were; *Dabinai*, *Tudun Yanlihidda*, *Lambobi*, *Unguwar Dan Mada*, and *Malali* all in Wakilin Arewa “B” ward. *Kofar Kaura*, *Tudun Matawalle* and *Sabuwar Unguwar* in Wakilin Kudu “III” ward. These locations were obtained from Katsina State Emergency Management Agency (SEMA) and Katsina State Environmental Protection Agency (SEPA), during a reconnaissance survey and were identified as high flood-prone locations where flooding is recorded annually.

The total household populations in the study area were obtained from Katsina Local Government Primary Health Care Department master list of settlements (2019). A total of 722 households were obtained using Yamane’s formula; that is 369 in Wakilin Arewa “B” (WA “B”) ward and 353 in Wakilin Kudu “III” (WK “III”) ward. Structured questionnaires were administered to the most senior person available in each household within the selected areas. Systematic random sampling was conducted in each sample location with the sampling interval of 13 for WA “B” ward and 9 for WK “III” ward. Data from households were analyzed using descriptive statistics.

There was data collection using purposive sampling from institutional stakeholders such as; SEMA, Katsina State Ministry of Environment, SEPA and Katsina State Urban and Regional Planning Board (URPB). Similar method was used for *Rahamawa* Youth Development Association *Malali*, *Yan Kaji* Youth Association *Gobarau*, *Tudun yanlihidda* Youth Forum, *Sabuwar Unguwa* Youth Development Association, and *Zamani* Youth Association, *Tudun Matawalle* who are the community stakeholders. The data collected was related to FRM, its challenges and barriers to

effective synergy. Focus Group Discussions (FGDs) were conducted with 76 participants within the institutional agencies (four groups) and community based-organizations (five groups). Generally, the number of participants in each focus group ranges from 8 to 10, the ideal size suggested by [18]. Recursive abstraction was used to analyze the information gotten from the FGDs that was conducted. The six steps of Questioning, Tabulation, Paraphrasing, Combination, Coding and Validation were involved. The answers were recorded and transferred into a table, paraphrased to make them more concise. Common links were found through the combination of themes and data condensing after coding the responses for each group. Finally, validation was done with the original transcript to make sure responses have not been changed.

3. Results and Discussion

3.1 Households' Responses on Support Received from Stakeholders

Table 1 shows that 14.10% of respondents from WA “B” ward received external intervention from stakeholders and 85.90% of respondents said no intervention reached at all. On the other hand, 47% of respondents in WK “III” ward have received assistance or support from the stakeholders, while 53% never did.

Table 1: Households' Responses on Support from FRM Stakeholders

WA “B” ward	Frequency and Percentage				Locations in	
	Yes	%	No	%	Total	%
<i>Dabinai</i>	3	10.71	25	89.29	28	100
<i>Tudun</i>	16	14.55	94	85.45	110	100
						<i>Yanlihidida</i>
<i>Lambobi</i>	14	11.11	112	88.89	126	100
<i>Unguwar</i>	7	15.22	39	84.78	46	100
						<i>Danmada</i>
<i>Malali</i>	12	20.34	47	79.66	59	100
Subtotal	52(14.10%)		317(85.90%)		369	100
						Locations in WK “III” ward
<i>Kofar Kaura</i>	62	62.62	37	37.38	99	100
<i>Sabuwar</i>	23	32.40	48	67.60	71	100
						<i>Unguwa</i>
<i>Tudun</i>	81	44.26	102	55.74	183	100
						<i>Matawalle</i>
Subtotal	166(47.00%)		187(53.00%)		353	100
Grand total	218(30.19%)		504(69.81%)		722	100

Kofar Kaura in WK “III” seem to have more stakeholders intervention with 62.62% of respondents confirming it, while in *Tudun Matawalle*; WA “B”, 44.26% of respondents acknowledged the provision of external support by stakeholders even though it is more affected by

flood. However, 30.19% of the entire respondents got stakeholders support, while 69.81% of the respondents indicated to have not gotten such support (Table 1). This is pointing to the fact that efforts are being made by stakeholders to manage floods in the study area, but more needs to be done.

3.2. FRM Stakeholders as Support Providers

From Table 2, 1.38% of the respondents in the study area got support from SEMA at one or multiple times, but URPB never intervened in any way. Katsina state ministry of Environment only intervened in *Kofar Kaura* in WK “III” with 19% of the ward’s respondents attesting to that. About 15.60% of the respondents in the study area got support from SEPA. WA “B” ward seem to have the most support by SEPA with 25% of the ward’s respondents benefited as against 12.65% in WK “III” ward. Conversely, 77.52% of the entire study area’s respondents got support from CBOs who provided tremendous help. This is why a paradigm that is more democratic is imperative to the engagement of communities and their stakeholders in the development of partnership working [19]. Proper engagement is needed, which should be embedded into policy and practice through a combination of top-down and bottom-up processes.

3.3 The Kinds of Support Received from Stakeholders

Clearing of waterways tops the chart of interventions received from Table 3 with 63.76% of respondents in the study area attesting to it. It is then followed by evacuation from flooded areas with 17.43% which was majorly done in WK “III”. About 13.30% of respondents claimed to have received flood awareness, while 3.21% of the entire respondents in both wards claimed that flooded areas have at one time been rehabilitated. The stakeholders provided building materials only in *Tudun Yanlihidida* and *Lambobi* in WA “B” with 5.77% of the ward’s respondents confirming it. However, nothing was provided for WK “III” ward, because not a single respondent claimed to have received any material or equipment as assistance. In *Kofar Kaura* (WK “III”), 3.23% of respondents got flood warnings as public enlightenment through the radio and no respondent from WA “B” ward claimed to have received such warnings. Clearly, flood warning has the least responses within the interventions received for the entire study area with 0.92% (Table 3).

This is a clear indication that the help being rendered is mostly done before flood event which are; de-silting drainages and clearing gutters. There is a partial corroboration with the study of [20] which identified clearance of waste from drainage channels as the main measure adopted by the residents of Yola Metropolis to control and mitigate floods. It further shows that, more needs to be done during and after flood events so as to provide succor to victims. It has been further observed that no respondent mentioned development control as a major taken to avert flooding by preventing people from building on waterways and thus, adhering to other building laws despite the efforts of URPB. This is despite the stakeholders claims of carrying out massive awareness. Sensitization exercises must be re-designed.

3.4 Flood Management Strategies of Stakeholders and the Synergy in the Area

Flooding is a systematic risk with a multi-dimensional nature [21], which is embedded in our socio-economic services and environmental systems [22]. It is shrouded with uncertainties that call for a holistic and integrated approach to ensure efficiency and effective management [21, 23].

Table 2 Households' Responses on FRM Stakeholders as Support Providers

WA "B" ward	Locations in						Frequency and Percentage					
	SEMA	%	SEPA	%	URPB	%	Katsina State Min. of Environment	%	CBOs	%	Total	%
<i>Dabinai</i>	--	--	--	--	--	--	--	--	3	100	3	100
<i>Tudun</i>	1	6.25	5	31.25	--	--	--	--	10	62.50	16	100
												<i>Yanlihidda</i>
<i>Lambobi</i>	2	14.29	3	21.43	--	--	--	--	9	64.28	14	100
<i>Unguwar</i>	--	--	2	28.60	--	--	--	--	5	71.40	7	100
												<i>Danmada</i>
<i>Malali</i>	--	--	3	25.00	--	--	--	--	9	75.00	12	100
Subtotal	3		13		--	--	--	--	36		52	100%
	(5.77%)		(25.00%)						(69.23%)			
												Locations in WK "III" ward
<i>Kofar Kaura</i>	--	--	17	27.42	--	--	12	19.35	33	53.23	62	100
<i>Sabuwar</i>	--	--	4	17.39	--	--	--	--	19	82.61	23	100
												<i>Unguwa</i>
<i>Tudun</i>	--	--	--	--	--	--	--	--	81	100	81	100
												<i>Matawalle</i>
Subtotal	--	--	21		--	--	12		133		166	100%
			(12.65%)				(7.23%)		(80.12%)			
Grand total	3		34		--	--	12		169		218	100%
	(1.38%)		(15.60%)				(5.50%)		(77.52%)			

Table 3 Households' Responses on the Kind of Support Received from Stakeholders

ward	Locations in WA "B"										Frequency and Percentage					
	Clearing Of Water Ways	%	Flood Warning	%	Evacuation of people	%	Development Control	%	Rehabilitation of flooded areas	%	Provision of Building material	%	Awareness	%	Total	%
<i>Dabinai</i>	2	66.67	--	--	--	--	--	--	--	--	--	1	33.33	3	100	
<i>Tudun</i>	10	62.50	--	--	2	12.50	--	--	--	1	6.25	3	18.75	16	100	
																<i>yanlihidda</i>
<i>Lambobi</i>	10	71.42	--	--	--	--	--	--	--	2	14.29	2	14.29	14	100	
<i>Unguwar</i>	6	85.71	--	--	--	--	--	--	--	--	--	1	16.67	7	100	
																<i>Danmada</i>
<i>Malali</i>	7	58.33	--	--	3	25.00	--	--	--	--	--	2	16.67	12	100	
Subtotal	35		--	--	5		--	--	--	3		9		52	100	
	(67.30%)				(9.62%)					(5.77%)		(17.31%)				
Locations in WK"III" ward																
<i>Kofar Kaura</i>	40	64.51	2	3.23	--	--	--	--	7	11.29	--	--	13	20.97	62	100
<i>Sabuwar</i>	15	65.22	--	--	6	26.08	--	--	--	--	--	--	2	8.70	23	100
																<i>Unguwa</i>
<i>Tudun</i>	49	68.00	--	--	27	33.30	--	--	--	--	--	--	5	6.00	81	100
																<i>Matawalle</i>
Subtotal	104		2		33		--	--	7		--	--	20		166	100
	(62.65%)		(1.20%)		(19.88%)				(4.22%)				(12.05%)			
Grand total	139		2		38		--	--	7		3		29		218	100
	(63.76%)		(0.92%)		(17.43%)				(3.21%)		(1.38%)		(13.30%)			

In Katsina urban area, communities and stakeholders make efforts to manage flood risks collaboratively. For instance, the general mandate of all institutional stakeholders is to implement government policies that are in line with the Act of their establishment. Before flood events, they normally conduct sensitization campaigns to educate Katsina Populace through radio programmes on the impending hazard; dangers of flood-prone areas, and the importance of preparedness especially at the beginning of the rainy season. Dredging, de-watering of ponds and fumigation of affected areas are done by SEPA and Katsina State ministry of Environment during and after a flood event. SEMA provides advisory, building materials, mattresses, and blankets to victims of flood after the event, which was only done in two out of the eight locations (table 3). Response from URPB indicated that they normally conduct among other things; damage assessment of flooded areas in Katsina State, it has not been affirmed by any of the CBOs. However, URPB has categorized areas of socio-political and environmental risks into two; (high and low risk areas). Structure demolition is the immediate and short-term measure taken in high risk areas and recommends the construction of drainages as medium to long-term measure. Conversely, consultations with elders, religious and traditional leaders are done in areas of low environmental risks to curtail the erection of structures which may pose risk. It has been noted that any layout prepared not in accordance with the guidelines spelt out in the 2011 building regulation for Katsina state URPB is illegal. But, all the locations in the study area are unplanned. So, the issue is not compliance with building code, rather, laws have been broken, hence the reason why environmental risks are exacerbated thereby making FRM more difficult. In the study area, though, the Katsina coalition of CBOs highlighted that rehabilitation and construction of drainages and culverts have been done by the Ministry of Environment in *Kofar Kaura* and similar projects are ongoing in different areas within Katsina Urban Area. All the institutional stakeholders cited inadequate funding, public negligence, and dumping of refuse on waterways as the challenges of FRM in the study area. They also indicated that poor institutional transparency, bureaucracy, and time-lag between information decimation and action were the main barriers to effective synergy. Therefore, synergy exists among the stakeholders, but it is inefficient and ineffective. For instance, an integrated environmental approach is carried out annually by the institutional stakeholders with the exception of URPB. Usually, annual meetings of stakeholders were held after receiving the report of seasonal rainfall prediction from NiMet. Unfortunately, CBOs were habitually not involved even though they are the first responders to environmental hazards such as flooding. This has been confirmed by the Ministry of Environment and SEPA and was substantiated from the CBOs. However, because SEPA is an agency under the Ministry of Environment, they seem to have a strong partnership working. It was also found that there is an inadequate synergy between URPB and SEPA, while NEMA works separately without proper engagement of other environmental stakeholders and relevant CBOs. This was confirmed by Machi *et al.* [15] who identified that there was an insufficient collaboration between institutional stakeholders responsible for physical planning, environmental sanitation, and emergency management (URPB, SEPA and SEMA) in Katsina metropolis. It is clear that institutional stakeholders see community stakeholders as partners and not as critical stakeholders in FRM. This is because they are only contacted when there is a need for emergency response and are engaged in an ad-hoc manner. Despite the need to move towards more democratized ways of action that enable an integrated approach in management, the technocratic institutional dominance pervades contemporary FRM [24, 25, 19]. This negatively impacts the implementation of more participatory approaches designed to engage vulnerable communities in making a partnership work.

Conversely, Community service is the main mandate of all the CBOs met in this study. Public sensitization, clearing of gutters, and filling eroded areas are the works done by them before flood events in their areas and neighboring locations at the beginning of the rainy season. Dredging of flooded areas and evacuation of people and their belongings is done by the CBOs during the event. After a flood event, they usually help with sanitation of affected houses and streets that have been littered with dirt and debris left by the floods in their areas and neighboring locations. All the CBOs cited poor drainages and the lack thereof in all the areas under study, lack of funding, dumping of refuse, and building on waterways as the major challenges of FRM in the study area. Strong synergies exist among the CBOs because under normal circumstances and with the aid of their coalition, help (through the provision of manpower and equipment) is rendered to all areas in need. They also use an integrated approach to problem-solving regarding all the community services done by them and are seen to be more recognized and assisted by SEPA. From the CBOs' perspective, inadequate support from the government, organizational recklessness, leadership instability, and meeting boycotts were the main barriers to effective synergy between stakeholders. Tseng *et al.* [26] Found out that failure to acknowledge and take into account the micro-politics in the engagement process brought about new impediments to participation and power sharing unexpectedly created new barriers. It was highlighted from stakeholder's responses that, proper consultations, reducing administrative bottlenecks, good leadership and institutional and community commitments are some of the ways to surmount the mentioned barriers to effective synergy. Additionally, institutional stakeholders work with and according to their guidelines, so there is no unified FRM guidance document for the study area. Also, none of the stakeholders mentioned the need for Flood Risk Assessment (FRA), even though it is an indispensable method. It should be integrated; because it helps flood delineation of flood-prone areas and identification of flood mitigation measures and advice on actions to be taken before and during a flood.

Generally, institutional stakeholders are doing less than required in terms of proper management which entails; mitigation, through (flood risk assessment, planning, and sensitization), preparedness, response to flood hazard, and recoveries such as rehabilitation and reconstruction. It is through engaging communities that these outcomes can be attained [27]. Loschner *et al.* [28] Also indicated that; it is through changes in the decision-making processes using a collaborative approach and combining various domains of knowledge from all stakeholders that synergy has the potential to create more effective FRM responses [31-33].

Conclusion

The paper has provided an insight into the pattern, issues, and prospects of FRM in Katsina urban area, and has shown that efforts were made but are mostly fragmented and ad-hoc in nature. It was also clear that institutional stakeholders do less than required in terms of proper management of flood risks. The implications of delays and fragmented approaches are making FRM more difficult and expensive, and socio-economic and ecological deterioration is exacerbated by anarchy in social and environmental governance. It has been mentioned that the synergy of stakeholders is the root of integrated flood management. But sustainability is not easy and straight forward. This is because no flood event is a hundred percent similar due to; socio-economic condition, geophysical characteristics, and climatic pattern of the affected areas. As the threat of flooding increases, there is the need to work together to manage the impacts of flooding, with researchers continuing to offer critical perspectives as the relationship develops.

Recommendations

The study recommends;

- i. The adoption of Flood Risk Assessment (FRA) for easy delineation of flood-prone areas; this will help in identifying the flood mitigation measures and actions to be taken before and during a flood.
- ii. The inclusion of community stakeholders in decision-making processes and implementation should be embedded into policy and practice for efficient FRM.
- iii. There should be a unified FRM Guidance Document for Katsina urban area.
- iv. The vigorous pursue of poverty reduction measures by the government; this will tremendously change the results of the dismal efforts made on, development control and environmental enforcements.
- v. The need for further studies especially on how effective synergy can be achieved and sustained between all the FRM stakeholders in Katsina urban area.

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