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Factors that influence farmers' preparedness for floods in the Upper East Region, Ghana

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ABSTRACT

Globally, and in Ghana, flooding is recognised as one of the extreme weather conditions that affect lives and property. As a result, there is increasing apprehension about the effects of climate change induced flooding on farmers and society in general. This notwithstanding, very little is known about the factors influencing farmers to prepare for flood hazards. This paper explores the factors influencing flood preparedness among farmers in the Upper East Region. A total of 343 respondents, mainly farmers were drawn randomly from flood-prone communities within the Talensi and Bulsa South districts in the Upper East Region. Data were collected using a questionnaire, interview guide and focus group discussion guide. Descriptive statistics, Chi-square test and thematic analysis were used to analyse the data. The findings revealed that in general, income, education, age, experience, and sex are the main factors influencing flood preparedness among farmers in the selected communities. This paper concludes by discussing the policy implications of the results, offering recommendations for policy and practice.

1. Introduction

In the past three decades, natural disasters have increased significantly, with 47% of all-weather associated disasters from 1995-2015 attributed to floods, affecting about 2.3 billion persons, and killing 157,000 people in 2015 (United Nations International Strategy for Disaster Reduction, 2015). Floods can upset farmers and can also present a health risk for people and animals. Floods become disastrous when they cause extensive human, physical, or ecological fatalities beyond the capacity of the affected community to withstand using its own possessions (World Bank, 2006). After a flood disaster, poor households that were previously stressed usually are trapped in poverty since they have less possession and source of income (Vatsa, 2004). The United Nations Environment Programme (2012) defined floods as the increase in the amount of discharge causing overflowing of any body of water onto spaces or areas not usually inundated. One of the dominant causes of floods is a heavy rainfall that leads to the rise of the volume of water in the river above the banks and overflowing. Other factors contributing to floods are the melting of snow and deforestation leading to soil exposure to agents of erosion (World Bank, 2006).

According to the World Meteorological Organization (WMO, 2011) severe weather and flood events in climatic regions cause the weather patterns to change. Apart from climate and weather, human associated happenings such as the degradation of the environment, loss of plantation cover and poor land use and management also aggravate floods (World Bank, 2006). Olayinka, Nwilo, and Adzandeh, (2013) forecast that in the ensuing years, flooding is expected to increase and be more forceful in several regions largely in lowland sites or in precincts that are presently distress because of increased rainfall. Preparing for flood may help to reduce some of the damage it causes. Ojigi, et al (2013) indicated that the obliteration triggered by rural floods chiefly on families, in most instances, is typically a replication of their absence of readiness.

About 80 percent of the population in Africa, Asia and Latin America are affected by floods each year (World Resource Institute, 2015). In Ghana, floods have posed extensive challenges to the economy (ActionAid International, 2006; World Bank, 2010). Flooding has become a seasonal worry to communities as well as the government. Some communities experience periodic flood disasters of varying scale and intensity whenever there is a downpour across the country. In June 2001, heavy rains triggered pervasive flooding in Ghana and mainly in Accra, killing 20 people and rendering over 100,000 people homeless (Karley, 2009). As of July 2010, floods in Ghana had affected nearly 23,000 hectares of farmlands, with up to 15,000 people displaced and some living in provisional shelters and 36 dead (ONCHA, 2010). Additionally, the 2010, floods affected education, crop production, health, water and sanitation of many districts, towns and communities in Ghana and killed a total of 57 people constituting 33 children, 13 women and 11men (Amidu, 2010).

Farmers in the Upper East Region of Ghana, depend heavily on climate related activities for their livelihoods. Most of the people dwell in rural areas where crop production, is their main source of livelihood. The Talensi and Builsa South Districts of the Upper East Region, which are the focus of this paper, have fewer natural resources and depend on crop production, with their per capita income being lower than the national average (Catholic Relief Services [CRS], 2014). Floods in the region cause significant damage to food crops or cause the destruction of seed stores at homes and hence seed supply of farmers in the next crop season is affected. Whichever way, the deficiency of seed supply for successive planting season contributes to food security challenges in the districts. Farmers' capacity to buy seed is also affected by floods which creates another reinforcing effect on their household income. Nonetheless, in the Talensi and Builsa South Districts in the Upper East Region, farmer's preparedness for floods is not robust enough to effectively respond to the impacts of floods. The Region could be ranked as one of the most unprepared and vulnerable regions in Ghana with respect to flood impacts (Yaro, 2010).

Meanwhile, farmers' preparedness action for floods is closely related to how individuals perceive and act on exposure information (Tierney, 2001). Alertness procedures entail the benefit of resolving the root causes and dynamic burdens aside from the indicators in a structure (Enenkel, 2010). A flood preparedness plan (FPP) for farmers is the act of adopting suitable measures for an effective floods' response. This is central to flood adversity control which is mostly ignored in Africa (Enenkel, 2010). There is a propensity to depend heavily on what the governments will do whilst abandoning self-help preferences.

Previous studies on flood incidence in the Upper East Region focused on the impact of floods on livelihoods and vulnerability of natural resources (Armah, et al., 2010); adaptation strategies of farmers to floods (Yaro, 2012); an analysis of precipitation pattern and its repercussion on flood occurrence (Molua & Lambi, 2006); and food security and climate alteration in savanna regions of Ghana (Armah, et al., 2010). Osei-Owusu, et al. (2012) evaluated the adaptation measures smallholder farmers' advance to mitigate climate alteration and agro-biodiversity losses. However, studies on flood risk perception and farmers' preparedness strategies for floods in the Upper East Region are quite limited. Therefore, with an increased incidence of floods in the study area, more empirical studies are required to provide insights into the factors that influence preparedness for floods and how farmers prepare for floods. Understanding the preparedness strategies of farmers against floods in the region is consequently decisive for refining the response measures associated with flood uncertainty and poverty reduction in the Upper East Region. Therefore, the purpose of this article is to identify the factors that influence farmers' preparedness for floods and how they prepare for floods in the Upper East Region.

2. Theoretical and empirical perspectives of flood preparedness

Several theories including the Protective Action Decision Theory (PADT) and the Protective Motivation Theory (PMT), have been applied to envisage flood adversity alertness, (Ejeta, and Ardalan, 2015; Paton, 2013). These theories have revealed how individual-level factors, such as risk assessment, prior knowledge, education, age and income can influence people's intents to organise and their real alertness preceding the incidence of adversity. For instance, Siegrist and Gutscher (2008) recommended that the adverse desires associated with prior experiences with flooding directly affects readiness (Keller & Siegrist, 2006). If utmost alertness activities take place preceding real events, the query is, whether effects of floods play an analogous part in situations in which people have not had hazard knowledge.

In line with Sendai Framework for disaster risk reduction, the strategy and application of flood alertness approaches ought to be grounded on a complete understanding of hazards in all its proportions, comprising helplessness, adoptive capacity, exposure of persons and assets, threat features, and the environment (UNISDR, 2015). By way of this varying prominence, research concentration has moved from technical responses to disasters, and scrutinises what makes societies perilous. Part of this complication arises from the fact that there is no unanimity on the definition of vulnerability or what should be included in its assessment.

2.1 Flood risk management

Flood risk management approaches consider various operational and non-operational methods to avert deluges or lessen their dangers (Heidari, 2009). Operational avoidance actions mostly are about putting up structures that are intended to be protective in the occurrence of a deluge (Hendel, 2010) while non-operational methods mostly centre on human activities (Hendel, 2010; Blackett et al., 2010). Dams, channels, drains, and diversions are mostly practical risk declining approaches against flooding. However, whilst they propose some degree of defence, they do not guarantee comprehensive protection against calamitous floods (Faisal et al., 1999; Heidari, 2009). Moreover, some of these intrusions may only reallocate threats rather than decreasing the overall damage (Lebel et al., 2008; Manuta et al., 2006; Molle, 2007). Furthermore, due to deficiency of resources to engage operational methods, low-income countries mostly spend less on operational flood protection (Scussolini et al., 2015); this shows that managing flood risk is about restraining the apprehensions of flood via alertness activities by members of a household or community.

2.2 Flood preparedness

Paton (2008) argued that to comprehend preparedness activities, one must appreciate how social threat is related to sporadic and possible challenging events; how they are professed and constructed, informs the action people will take to deal with it. The expressive networks that grow amongst individuals of a locality (e.g., level of interaction among them and the community they belong to) upsurges the prospects of flood alertness (Perkins, et al, 2002 & Norris, et al, 2008). Wood, et al. (2012) disclosed that the sturdiest instigator to initiate preparedness activities has to do with individuals who will bring out and share with others what they have done to prepare for floods. Likewise, Paton and Buergelt (2008) demonstrated how deliberations concerning threats provided

insight into reducing risks. Based on numerous flood preparedness flyers and webpages, Mishra and Suar (2007) developed 20 flood preparedness strategies to study flood alertness behaviour in Orissa, India. Similarly, Mishra and Suar (2012) found out that knowing what to do preceding flood moderately mediates the adverse impact of apprehension on flood preparedness. Also, Said et al. (2015) found out that farmers' flood experiences in poorer communities in rural Punjab influenced their preparedness actions.

To appreciate the resistance of climate-associated disasters such as tornadoes and riverine floods, Joerin et al. (2012) compared two communities in Chennai, India. One of the restrictions they studied was whether household had an emergency supply kit. It was revealed that whereas households with adversity knowledge were vigorously taking part in community centred organisations, they were not prepared for such disasters, as few households controlled enough rudimentary emergency paraphernalia.

Also, many studies have stressed the need for early warning systems (EWS) in line with global determinations to decrease the damages connected to disasters (Fakhruddin et al., 2015; Jibiki et al., 2016). In the 2010 flood in Pakistan, 640 households were affected; Turner et al. (2014) projected the outcome of initial caveats to the probability of farmers initiating measures to alleviate injuries. They found that information on flood warnings through neighbours, church announcements, government official were more real than television and radio in stimulating mitigation actions.

3. Methodology

3.1 Study setting

The Talensi and Builsa South Districts in the Upper East Region constitute the study areas. These districts were selected based on their susceptibility to annual flooding (National Disaster Management Organisation [NADMO], 2008). The Talensi District has a population of 81,194 representing 7.8 percent of the region's total population, with an annual growth rate of 1.7% (GSS 2013). About 90 percent of the population derive their livelihood from crop production. The Builsa South District has a population of 36, 541 representing 3.5 per cent of the region's total population, with an annual growth rate of 1.7% (GSS 2013), and about 81.0 percent of the population attain their livelihood from crop production (GSS 2015). Both districts are entirely rural (GSS 2013), indicating that crop production in the districts is largely a rural phenomenon.

3.2 Research design

A mixed-methods research approach was used for the study (Creswell, 2003; Zohrabi2013). The strategy permitted using several methods in answering research questions instead of limiting researcher's choices (Johnson & Onwuegbuzie, 2004), which serves as the incentive for its use. Additionally, it permits the merger of approaches to improve the validity and reliability of the data and their explanation (Zohrabi, 2013). As a result, earlier studies (Handa et al., 2013; Mutambara, 2011) employed this approach. Concerning the study design, a cross-sectional study was used to select a collection of respondents from the distinct population who were contacted at a single point in time (Babbie, 2004). Based on the subjects' information, they were then classified as having or not having the attribute of interest which included the frequency of flooding, the specific exposure, and any other risk-related event.

3.3 Sampling

The study population includes farmers in the Talensi and Builsa South districts, two agricultural extension officers and two NADMO coordinators from the two districts. Across both districts, the total population of the farmers who constituted the sampling frame for the study was 2,419. It was obtained from the Department of Agriculture of the District Assemblies comprising 1,113, from Talensi and 1,306 from the Builsa South District. The sample size of 343 farmers was arrived at via Yamane's (1967) statistical method, which is: n= N/(1+N (e)2 where n is the desired sample size; N is the population size (2,419); and e is the acceptable sampling error (0.05).

A multi-stage sampling technique was applied to select the farmers. The first stage of the sampling was based on political and administrative demarcation. The districts are divided into area and town councils: these town councils were further sub-grouped into communities used for the study. The Talensi District had 96 communities out of which, five were purposively selected because they were flood-prone communities and the Builsa South had 43 out of which five were purposively selected because they were also flood-prone, making ten severe flood-prone communities that were always totally submerged by floods every year (NADMO, 2016). Simple random sampling was used to select the farmers for the study (Table 1). Here, arbitrary numbers were assigned to farmers and picked at random till the required number was reached. To ensure fairness, a proportional representation of farmers of the communities within each district was selected. Two agricultural officers and two coordinators of the National Disaster Management Organisation in the two Districts were also purposively selected for the study. These key respondents were selected because they had information on flood preparedness and agriculture production. In addition, two focus group discussions, one in each district, were conducted among farmers.

3.4 Data collection instruments

Data were collected using questionnaire, interview guide and focus group discussion guide. The questionnaire, which was administered to the farmers, captured issues on knowledge and interpretation of floods, frequency of floods, factors of flood affecting preparedness and strategies for flood preparedness. The interview guide was semi-structured and covered questions on determinants of flood preparedness and strategies of flood preparedness. It was conducted to the key informants (agricultural extension officers and NADMO coordinators). The focus group discussion guide was used for the two groups (male and female) in the two districts. There were 8 to 12 participants in each group with two facilitators one as the moderator and the other, as a note-taker.

Table 1: Categories of population and sample size

Name of district	Names of sampled communities	Total number of farmers	Sampled farmers per community
Talensi			
	Pwalugu	187	26
	Yindure	269	39
	Vuvu-kawale	193	27
	Sangteg	265	38
	Yamiriga	199	28
Builsa South			
	Chaansa	191	27
	Fumbisi	226	32
	Kanjarga	174	25
	Uwesi	502	71
	Doniga	213	30
Total	10	2,419	343

Source: Field Survey, 2017

3.5 Data processing and analysis

Both quantitative and qualitative data were collected. The quantitative data was edited, coded, and inputted into the Statistical Product and Service Solution (SPSS) version 21 and cleaned before analysis were undertaken. Quantitative data analysis involved descriptive statistics and the chi-square (χ^2) statistic was used to measure the difference between household's socio-demographic and economic variables and their preparedness to floods. The analysis of the data from the interview guide and FGDs were done manually using thematic analysis. There was an integration of both the quantitative and qualitative analysis to give a general picture of the analysed data.

4. Results and discussion

This section is organised under the following subsections: knowledge and interpretation of floods, frequency of floods, determinants of farmers' preparedness to floods, and preparedness strategies in response to floods.

4.1 Farmers' knowledge and interpretation of floods

Table 2 highlights respondents' varied interpretations of floods which include natural hazard and acts of God. Of all the respondents, 58.3 percent noted that floods were a natural hazard which causes destruction of crops. About a quarter (24.5%) of the farmers were of the view that floods were a high flow of water which oversteps the natural channel provided for run off, while (2.6%) of the farmers simply understood flood to be an act of God. The results revealed that more than (95%) of the answers given for floods were correct indicating that farmers were knowledgeable about the nature and causes of floods. These findings concur with those of Amir Faisal et al. (2014), who discovered that farmers are not oblivious of flood problems.

Table 2: Knowledge on floods interpretation

Responses	Frequency	Percentage
The natural hazard which causes a lot of destruction	200	58.3
High flow oversteps the natural channel provided for runoff	84	24.5
Natural responses of river	39	11.4
Excess water found on dry land	11	3.2
An act of God	9	2.6
Total	343	100

Source: Authors' Field survey (2017)

Figure 1 presented the number of years respondents experienced floods in the area. The results revealed that (43.7%) of respondents in the Talensi District and (17.4%) in the Builsa South District had 11 years of flood experienced. However, in the Builsa South District, (43%) had 6 to 10 years of flood experience as against (28.7%) for Talensi. This indicates that many of the respondents had experienced flooding and had a higher understanding of the risk of flooding.

4.2 Frequency of floods

Knowledge of the magnitude and frequency of recurrence of floods is necessary for proper preparation for floods (Dalrymple, 2007). Table 3 presents respondents' response to a question on the frequency of floods in the study area within the past ten years; it was revealed that 69.1 percent of the respondents believed that floods in the study area occurred more often compared to ten years ago. This implies that respondents had no choice but to always put in place preparatory measures to lessen the difficulties of the floods in the study area. The observations made by majority of the respondents were consistent with findings from the studies carried out by Udosen (2012), who indicated that floods were globally becoming more frequent because of climate change. From the Districts perspective, 91.2 percent of the respondents from the Talensi District and 47.1 percent from Builsa South District indicated that flood events occurred more often now.

4.3 Determinants of farmers' preparedness to floods

Usually, the first people to respond to natural adversities such as flood are the immediate people affected. Their intense preparation could be efficient and effective response (WMO, 2008). By predicting and taking cautionary procedures and actions before a flood, individuals would be able to adjust effectively and guarantee speedy recovery (Frieman et al., 2011; Austin, 2010; Perry and Lindell, 2003; Kent, 2004**).**

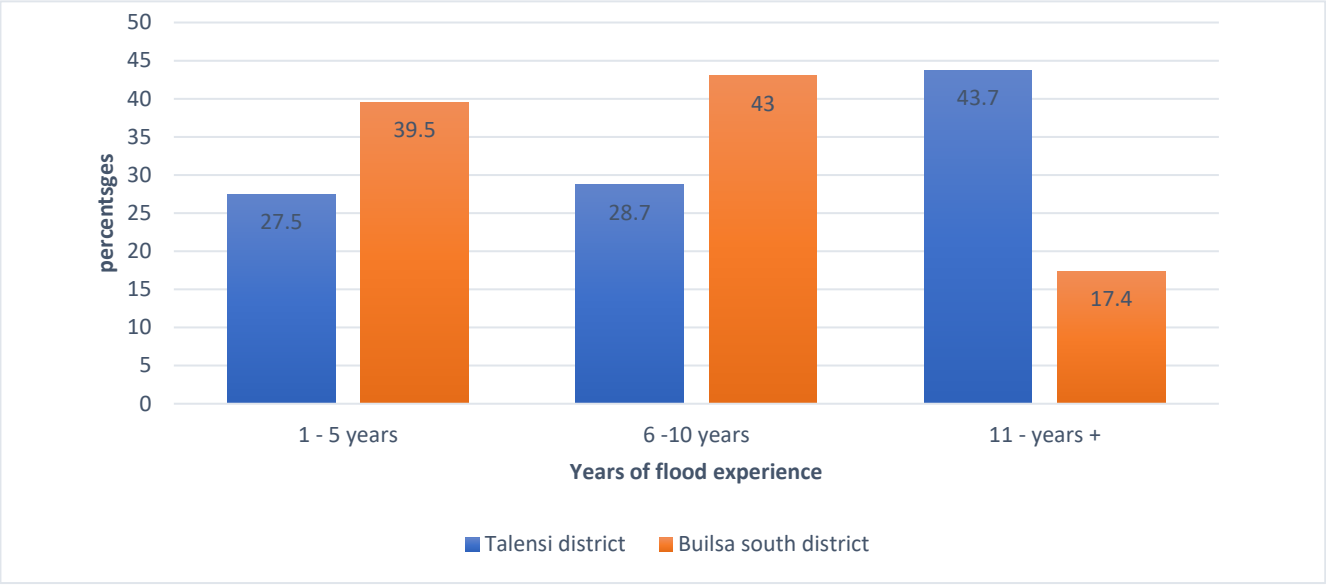

Figure 1: Years of flood experience
Source: Field survey (2017)

Since disaster preparedness is basically the act of keenness to confront it when it occurs (Frieman et al., 2011); equally, one can say that flood preparedness is the degree to which individuals are prepared to act and take preliminary action preceding to a flood threat (Frieman et al., 2011; Schmidlin, 2010).

Table 3: Frequency of floods

Responses	Talensi District		Builsa South District		Total	
	No.	%	No.	%	No.	%
More often	156	91.2	81	47.1	237	69.1
Less often	10	5.8	56	32.6	66	19.2
Same as always	5	2.9	35	20.3	40	11.7
Total	171	100	172	100	343	100

Source: Authors' Field survey (2017)

It emerged from the study that several indicators have been identified as determinants that influenced preparedness in response to floods in the study area. From Figure 2; education, income, experience, age, and sex has been identified as the determinants that influenced preparedness for floods. Thus, while (3.5%) of the respondents identified sex as the least determinant to influence preparedness for floods, 49 percent of respondents were of the view that income was the main and important determinant that influenced preparedness for floods in the study area. This was followed by experience (29.4%). This implies that the inability of respondents to prepare for the floods could be associated with poverty. Eventually, preparing for floods will mean having money to buy necessary resources such as medical kits, blankets, foodstuff, and other valuables to mitigate the impacts. The study's finding is consistent with that of Digian (2005) who stated that income is one of the most important factors that influenced flood preparedness. Several studies also established that individuals with resources appear to be highly ready and less susceptible before, during and after flood adversities compared to population with less income or resources (Baker, 2011; Rowel et al., 2011; King, 2000). Similarly, Kim and Kang (2010) argued the prominence of resources in a more complex manner; disaster resources may be regarded as one of the vital components in disaster preparedness, which is exceedingly dependent on income level.

4.4 Farmers' preparedness strategies in response to floods

Ngaka (2015) raised anxiety concerning low comprehensive valuation concerning the way individuals reacted to and coped during periods of environmental hassle. Meticulous valuation is required to offer the needed positive information so that people can plan for future occurrences. In this section, farmers' alertness, and the way they respond to flood events are discussed. The common activities that are normally linked to disaster preparedness comprise planning processes to guarantee willingness; developing disaster strategies; stocking the needed resources required for effective response and developing skills and proficiencies to guarantee effective performance of disaster connected tasks.

An improved farmers' decision-making process is based on the provision of early warning system, appropriate and consistent weather and periodic prediction which are important constituents of flood preparation and planning (UISDR, 2015). As far as this study was concerned, most of

the respondents (82%) had early warning information about floods in the study area.

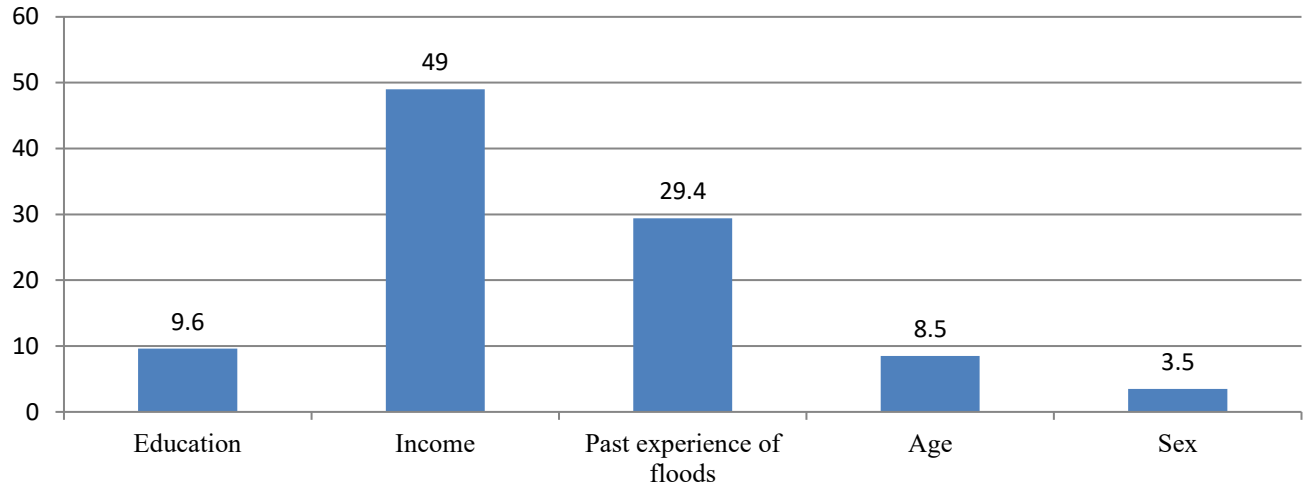

Figure 2: Determinants of farmers' preparedness in response to floods
Source: Field survey (2017)

One key informant indicated that

> *If farmers had prior knowledge or warning on the occurrence of floods, they would prepare their mindset while they wait for the floods to occur. Unexpected floods could weaken their potential to withstand the impact of the floods (Key informant from the Talensi District, 9th December 2017).*

This finding supports UN-ISDR's (2011) position that farmers who receive early warning information on floods occurrence increase their participation in the flood response initiatives.

The results further revealed in Table 4 that 51.9 percent relied on community announcement, while 29.2 percent relied on radio for their sources of early warning information. The results confirmed that of UNISDR (2015) which intimated that community announcement procedures were increasingly viewed as an important element of flood disaster risk reduction. One possible explanation for trusting community announcement could be that it was readily available, precise, and easy to disseminate.

Table 4: Main source of information on flood issues

Source	Frequency	Percentage
Radio	100	29.2
TV	11	3.2
Community announcement	178	51.9
Don't know	54	15.7
Total	343	100

Source: Field survey (2017)

The different sources had diverse ways of conveying flood preparedness information to the farmers. According to ASFPM (2003), early warning information is intended to make people more aware of the flood hazards and protection alternatives; moreover, they are now going one step further to impart knowledge that could change attitudes and behaviour.

Similarly, from the male focus group discussion in the Talensi District, it emerged that farmers received an early warning about floods using information delivery vans or radio announcements indicating the onset of floods and dangers associated with the floods. Additionally, disaster committees in the villages, with the support of the chief, announced to the public on pending floods events. One of the discussants had this to say:

> *There were community-based institutions known as the flood disaster committees whose duty was to educate farmers on floods disaster and ensure that early warning, danger signs and announcement about the floods were done to safeguard human lives and farm produce. This was, however, not effective because of financial constraints and lack of commitment from members of the committees.*

It also emerged during the FGD that one-way farmers prepared for the floods was sowing early and harvesting early before the floods. This was only possible if one could afford a pump for watering the crops before the rains. They asserted that this preparedness strategy was not effective because it requires extra funding.

Table 5 reveals what farmers do before the flood occurrence. It is an important way of assessing farmers' level of preparedness. Surprisingly, over three-quarters of the respondents (77.8%) indicated that they did not do anything before a flood occurrence. Sutton and Tierney (2006) argued that the activities that are frequently linked to flood alertness among farmers comprise the preparation procedures to safeguard keenness, formulating flood plans, storing resources required for effective response and developing skills and competencies to ensure effective performance of flood-related tasks. However, this was not the case in the study area. A male discussant in the Talensi District said this

regarding farmers' inability to prepare adequately for flooding:

> *"Farmers' preparedness to floods in this community was very low because it was always beyond them since it was nature. Thus, the time the floods will come, the crops might not be ready for harvesting hence they have no control over the floods".*

Table 5: Knowledge on what to do before flood event

Responses	Frequency	Percentage
Buying medical kits	28	8.2
Move to high areas	48	14
Don't do anything	267	77.8
Total	343	100

Source: Field survey (2017)

4.5 Effective ways of preparing for floods

From Table 6, 84 percent of the respondents pointed out that an awareness campaign was the most effective measure for preparing for floods. This was followed by building on raised platforms (68.2%) and relocating of residents (54.5%). These findings demonstrated that awareness campaigns could easily play an effective role in providing knowledge to the farmers, which could minimise the loss and damages caused by devastating flood events.

Table 6: Effective ways to prepare for floods

Measures	Percentage scores				Total
	VME	VE	E	FE	
Awareness campaign	38.5	30.9	14.6	16.0	100.0
Construction of wooden bridges	15.5	17.2	14.3	53.1	100.0
Use of concrete embankment	11.7	11.7	18.4	58.3	100.0
Relocation of residence	15.7	16.9	21.9	45.5	100.0
Use of sandbags	12.2	16.0	15.7	56.0	100.0
Temporary accommodation	14.6	13.7	16.9	54.8	100.0
Constructing of water pathways	14.6	12.5	19.2	53.6	100.0
Building on raised platform	26.8	24.8	16.6	31.8	100.0
Appeal to water gods	9.0	14.9	17.5	58.6	100.0
Flood insurance	9,0	14.9	15.7	61.2	100.0

VME = Very much effective VE = Very effective E = Effective FE = Fairly effective
Source: Field survey (2017)

Knowledge is based on an appreciation that floods occur and pre-disaster activities (that is, flood preparedness) were intended to equip the farmers with what to do before, during and after floods.

Studies have shown that farmers who move back after floods subside remain a concern due to their exposure to future events of flooding in the same areas (UN-ISDR, 2011). In the study area, respondents had limited knowledge about flood insurance and did not even consider it an excellent measure to guard against floods.

The results indicate that response to floods alone was not enough to mitigate the growing damages caused to farmers. The commitment to share knowledge could help identify hazards and risks, take action to build safety and resilience, and reduce future flood impacts.

4.6 Relationship between knowledge of flooding and farmer's preparedness

A chi-square test of independence examined whether there was relationship between farmers knowledge of floods and their preparedness to floods. The test was statistically significant at the 0.05 alpha level ($\chi^2 = 32.431$; df = 12; *p*-value = .001), meaning, there were variations in the knowledge of floods and farmers preparedness to floods. The results showed that more respondents who interpreted floods to be a high flow of water which overstep its boundary did nothing to prepare for floods. This implies that respondents in the study area have more knowledge of floods, but they did not prepare for it. This result, however, contradicts Ahile, and Ityavyar, (2014) which revealed that farmers' preparedness against flooding is independent of their knowledge of floods.

Table 7: Knowledge of floods and preparations for it

Knowledge of floods	Ways of preparing for floods									
	Buying medical kits		Move to highlands		Savings		Nothing		Total	
	N	%	N	%	N	%	N	%	N	%
Natural response of a river	3	0.9	4	1.2	00	00	24	7.0	31	9.0
Excess water found on dry land	8	2.3	5	1.5	5	1.5	38	11.1	56	16.3
High flow of water which over step its boundary	10	2.9	18	5.2	7	2.0	173	50.4	208	60.6
Hazard which causes destruction	5	1.5	1	0.3	4	1.2	24	7.0	34	9.9
An act of God	2	0.6	1	0.3	4	1.2	7	2.0	14	4.1
Total	28	8.2	29	8.5	20	5.8	266	77.6	343	100.0

$\chi^2 = 32.431$; df = 12; *p*-value = .001
Source: Field Survey, 2017

5. Conclusion and policy implication

Flooding in the Upper East Region is the most destructive agent as far as lives lost, injuries and economic losses are concerned. Preparedness for floods is usually interpreted to mean the measures taken by diverse entities such as individuals, farmers, households, organisations, and societies to react efficiently and recuperate more speedily when there is an incursion of floods. Preparedness, however, begins with the interpretation of floods, early warning information, the main source of information, indigenous means of forecasting floods and knowledge on what to do before flood events. In this study, floods were interpreted to mean natural hazard which cause much destruction. It was obvious that majority of the respondents had witnessed flooding and had a higher understanding of the risk of flooding.

Flood preparedness in the area was deficient henceforth; reaction to flooding was insufficient, leading to high adverse flood damages. The inability of respondents to prepare for the floods was associated with poverty. Preparing for floods eventually mean having money to buy necessary resources such as medical kits, blankets, foodstuff, and other valuables to mitigate the impacts of floods. It was evident from the study that farmers in the study area did not have the needed capital to secure what was needed to prepare for the floods.
This is because farmers have a fair understanding of the floods in the study area, they should work with the various NADMO coordinators in the districts to develop a comprehensive public information system within their localities to create awareness on the dangers and impacts of floods as a way of preparing themselves for the floods. This information system can ensure that information is brought together from many sources regarding the onset of floods. This could help reduce the farmers' level of vulnerability to floods in the study area Community platforms and forums should be annually organised between July and August to exchange information and ideas on effective flood preparedness, response, and recovery activities.
This could help reshape the structure and flood management operations of most of the farmers in the study area, making them more effective and efficient in meeting the demands of present-day flood management.
Resource mobilisation methods by community leaders towards alleviating the suffering of the flood affected farmers must be strengthened. Timely mobilisation of finances and goods from multi-stakeholders and administering relief to vulnerable farmers at flood disaster sites is crucial in ensuring a well-embraced flood disaster response operation. Therefore, logistics is central and crucial to the effectiveness and speed of response for major humanitarian interventions covering health, food, shelter, water, and sanitation.

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