Influence of Flood Risk Awareness Information on the Adaptive Behaviour of Residents in Flood Prone Areas in Southeast Nigeria

Gideon Uchechukwu Nwafor PhD

Department of Mass Communication, Chukwuemeka Odumegwu Ojukwu University Igbariam, Anambra State, Nigeria

Abstract: **Within the past decade, flood disaster had had a devastating effect on Nigerian communities destroying lives and property and displacing thousands of people. The aftermath of every flood disaster left marks to show that Nigeria has not put adequate mechanism in place to prevent and manage flood disaster occurrences especially in the flood prone areas. One major approach that can enhance proper mitigation of flood disasters is risk and behavioural change communication. This study, therefore, evaluated the influence of flood risk awareness information on the adaptive behavior of people living in flood prone areas in southeastern Nigeria. The main objective of the study was to ascertain if there is availability of flood risk awareness information, major source of information, influence of accessibility on diffusion, relationship between awareness, adoption, and adaptive behavior. Anchored on Reasoned Action Approach, Habermas' Theory of Communicative Action and Media Synchronicity Theory, the researcher adopted the survey design in carrying out the study with a projected population of 21,298,033 and a sample size of 384 drawn using Krejcie and Morgan sample size determination table. Findings revealed that there is availability of flood risk awareness information which majority access mainly through radio/TV in form of early warning but limited or uneasy access to sources of flood risk awareness information hampers its diffusion which results to low adoption and affect their adaptive behavior. The researcher, therefore, recommended that community-based communication process using communication forms such as interpersonal, seminar; town hall meeting should be maximally utilized in creating disaster awareness and to complement effort of the TV and radio stations being used presently.**

Keywords**: Influence, Flood Risk, Awareness Information, Adaptive Behaviour, Flood-Prone Areas**

I. INTRODUCTION

There are rarely comprehensive plans against natural disasters, though some countries, especially in the West have established mechanisms to manage the consequences of incidences such as floods, tornadoes, earthquakes and hurricanes. Public education and information (risk communication) have been acknowledged as a veritable way of helping citizens to adopt appropriate behaviours before, during and after a natural disaster, to mitigate its impact (Olawuyi & Adiamoh, 2015). There has been continuous attention in the use of warnings to prevent hazardous circumstances (Mileti, Bandy, Bourque, Johnson, Kano, Peek, Sutton and Wood, 2006). However, most third world countries especially, Nigeria still struggle with management and prevention of flood disasters as a result of so many human factors like funding, poverty, illiteracy, poor drainage system, etc and environmental factors like climate change and variability.

Conversely, there is an agreement in the literature that risk communication cannot be effective unless the audience receives the message, appropriately interprets it and acts accordingly. There is also an agreement among scholars (Molinari and Handmer, 2011) that there exist wavering amounts of socio-psychological procedures which the audience experience before arriving at a decision. These include confirmation of threat, perceived risk severity and threat personalization or perceived vulnerability.

Laughery and Hammond (1999) believe that effective risk communication benefits from factors such as communication (source, message and media/channel) and audience (information processing) characteristics. They assume a situation whereby there is palpable concern about public safety and where rules and regulations are guiding public safety. In such situations, there are government boards and agencies that oversee safety issues and issue warnings at appropriate times such as National Emergency Management Agency (NEMA), National Orientation Agency (NOA) and Nigerian Meteorological Agency (NIMET). This is largely true of many Western countries like Britain, USA, Germany, France etc.

On the contrary, most developing countries still struggle to scale up capacity to handle or manage disasters. Nigeria has experienced deadly floods in its history. There are documented shreds of evidence that chronicle how the flood has affected Nigerian cities, starting from the 1980 Ogunpa (Ibadan) floods. It is instructive to note that flood is the most common environmental hazard in Nigeria, causing damage to lives and properties (Olajuyigbe, Rotowa and Durojaye, 2012).

Explicitly, floods have been acknowledged as the most communal of all-natural disasters and are liable for more than half of all the mortalities, and a third of total economic losses from natural disasters (Adelekan and Asiyanbi, 2016). In Nigeria, floods continue to be the most common and major natural disaster, and according to Onwuka, Ikekpeazu, and Onuoha (2015), floods create a major environmental problem

in some parts of the country like Abia, Anambra, Ebonyi, Enugu and Imo states in the southeastern part of Nigeria as more than 30% of the state's population live in riverine areas with fishing and agriculture as their main sources of livelihood.

Since the past decade, flood disaster had had a devastating effect on many Nigerian communities destroying lives and property and displacing thousands of people. National Emergency Management Agency, recorded that in the year 2012, about 363 people were killed, 2.1 million displaced and seven million people in 30 of the 36 states of the country affected in many ways putting the economic losses at N2.5 trillion. Also, Nigeria Hydrological Services Agency (2013) asserts that among the 30 states that were affected, the five southeastern states of Abia, Anambra, Ebonyi, Enugu and Imo had the bitter experience of the flood. The aftermath of every flood disaster left marks to show that Nigeria has not put an adequate mechanism in place to prevent and manage flood disaster especially in the flood-prone areas. In 2013, heavy rains and floods, which started in mid-July, affected more than 81,500 people across Nigeria and about 8,000 people were displaced and more than 6,500 homes were damaged. One major approach that can enhance the proper mitigation of flood disasters is risk and behavioural change communication.

Several studies have emphasized the significant role communication could play in risk situations. For instance, Kievik and Gutteling (2011) observe that people who have access to information about flood risks are more probable to take precautionary measures. For them, a certain level of risk awareness (or threat) is necessary to motivate the general public to engage in self-protective behaviour. Hence, strategies aimed at mitigating disaster risks must be holistic. This, according to Ahmad, Kazmi and Pervez (2011, p. 519), implies that the "development of policies, strategies and plans to combat the risks associated with natural disasters should be based on a comprehensive risk assessment."

Many studies on flooding in Nigeria have highlighted the damage that trails each flooding experience. For instance, Olajuyigbe et al (2012) investigated the impact of flood in a Nigerian city. Aderogba's (2012) study on the consequence of poor urban physical planning provides a strong correlation to flooding while Etuonovbe (2011) also studies the devastation caused by floods. None of the studies carried out on flooding experience in Nigeria has examined how risk-based disaster planning like mock flood exercises and early warning communication could be used to prepare people of the possibility of flooding, flood path and desirable behaviour to avert or minimize damages.

Similarly, there is a dearth of empirical data on how people in flood-prone areas in Southeastern Nigeria use flood risk information they receive. The significance of flood risk information and its utilization as an early warning strategy to avert the incidence of floods cannot be underestimated. Hence, on the one hand, relevant government agencies such as ministries of Environment, Urban and Physical Planning units, the Nigeria Meteorological Agency (NIMET) and the National Emergency Management Authority (NEMA) are expected to disseminate flood risk information to warn people of the possibility of flooding, flood path and desirable behaviour to avert or minimize damages. And on the other hand, people who live in flood-prone areas are also expected to utilize this information to behave responsibly to mitigate the impact of floods.

Statement of the Problem

The chronological evidence of flood disasters in Nigeria shows that it is a serious problem in the country and southeast zone in particular and there seems to be no comprehensive strategy to prevent and manage its effect as well as reduce the number of casualties and damages it causes. At every point of its occurrences, lives were lost, properties were destroyed and many people were displaced. Information about flood disaster occurrences seem not to available and accessible through appropriate channels to create alertness among the public or there seems to be an unwillingness in the part of the people to adopt the flood risk awareness information provided to them by government agencies through early warnings about imminent flood disasters. It is, therefore, unclear whether there is the availability of flood risk awareness information to people living in a flood-prone area in Southeast Nigeria. Again, it not known whether flood risk awareness information is accessible to people living in flood-prone areas in the region. There is also no empirical evidence showing that availability and accessibility of flood risk awareness information influence the adaptive behaviour of people living in flood-prone areas in southeast Nigeria.

Objectives of the Study

The general objective of this study is to evaluate the influence of flood risk awareness information on the adaptive behaviour of people living in flood-prone areas. The specific objectives were:

1. To find out if flood risk awareness information is available to the respondents.
2. To ascertain the major source of flood risk awareness information among the respondents.
3. To find out how the accessibility of sources of flood risk awareness information influences the diffusion of message among respondents.
4. To find out if there is a relationship between flood risk awareness information and respondents' adoption of positive behaviours.
5. To find out if there is a relationship between the adoption of flood risk awareness information and respondents' adaptive behaviour.

Research Questions

The following objectives will be adopted for the study:

1. Is flood risk awareness information available to the respondents?

2. Which is the major source of flood risk awareness information among the respondents?
3. How does accessibility of sources of flood risk awareness information influence diffusion of the message among respondents?
4. Is there a relationship between flood risk awareness information and respondents' adoption of positive behaviours?
5. Is there a relationship between the adoption of flood risk awareness information and respondents' adaptive behaviour?

Research Hypothesis

The researcher tested the following hypotheses for the study:

H_1 Accessibility of sources of flood risk information influences the diffusion of the message among the respondents.

H_2 There is a relationship between flood risk awareness information and respondents' adoption of positive behaviours.

H_3 There is a relationship between the adoption of flood risk awareness information and respondents' adaptive behaviour

Theoretical Framework

The theories adopted for this study were the Reasoned Action Approach, Habermas' Theory of Communicative Action and Media Synchronicity Theory.

Reasoned Action Approach

The Reasoned Action Approach was propounded by Fishbein and Ajzen (2010) merging the components of the Theory of Reasoned Action and the Theory of Planned Behavior. As seen in Figure 3, the Reasoned Action Approach encompasses all of the apparatuses recommended by earlier models (e.g., attitudes toward the behaviour, subjective norms, perceived behavioural control, and intentions), while also including additional factors such as actual control, defined as skills, abilities, and environmental factors that influence one's ability to enact target behaviour.

A sequence of meta-analyses and evaluations examining the use of the reasoned action approach to risk communication have now been published, comprising those focusing on natural disasters like flooding, tornadoes, earthquakes, hurricanes etc. (McEachan, Conner, Taylor, and Lawton, 2011) and those focusing on particular behaviours (e.g., exercise: Hagger, Chatzisarantis, and Biddle, 2002; condom use: Albarracín, Johnson, Fishbein, & Muellerleile, 2001). Such assessments have shown that the reasoned action approach is comparatively a successful prognosticator of health intentions and behaviour, explaining 32-44% of the modification in intentions and 15-41% of the behaviour modification.

The relevance of this theory to the current study lies in the fact that as attitudes and beliefs be significant in people's choice of action, the reasoned action approach is relevant to behaviour change towards response to flood risk communication. Thus, the application of this model in this study is based on the assumption that if the attitudes of the those who live in flood-prone areas in Southeast Nigeria towards flood risk information response behaviours are shaped in particular directions and their perceived vulnerability and risk factors are reinforced; it will then be possible to change behaviour in them that will likely result to a positive response towards flood risk information by taking up the right behaviour to respond to flood disasters.

Habermas' Theory of Communicative Action

Habermas' Theory of Communicative Action (Habermas, 1984) belongs to the social theories which deal with theories of social action. He argues that dialogue fails if the participating social actors have different ideas of what is being discussed and even how 'agreement' is being defined whereas it succeeds when the actors are motivated to reach an agreement and believe that an agreement, in principle, can be reached. The principles of making such agreements are embedded in the norms, values and beliefs of the society.

In summary, according to Habermas, communication between social actors is fundamentally shaped by their mutual desire to reach understanding or agreement wherein the philosophies of making such agreements are embedded in the norms, morals and opinions of the society. Habermas contends that a suggestion or claim by a social actor should pass the test of 'rationality' and 'reflexivity' for it to be recognized as a valid statement, and that communicative action as a non-coercive discourse facilitates the development of shared understanding between actors. Thus, communicative action provides the space for social actors to interact to reach agreements and advance a shared understanding of a variety of issues through information transfer using various media.

This theory is relevant to the study because Habermas' Theory of Communicative Action calls for communication to pass the tests of 'rationality' and 'reflexivity' for the ultimate aim of the development of shared understanding between social actors like NEMA, NiMET, NOA and the media to have a collaborative action towards flood disaster prevention and management in Nigeria to be able to agree on a communication model that will result to behavioural change toward flood risk communication among those living in flood-prone areas.

Media Synchronicity Theory

Media Synchronicity Theory was propounded by Dennis, Fuller, and Valacich, (2008). This has a high degree of congruence with Habermas's proposition that the very logic of communication is that agreement can be reached and that social actors engage in communication with a mutual desire to reach understanding and agreement. The theory argues that "communication performance comes from the matching of media capabilities to the communication processes required to accomplish a task, not to the overall task itself". It proposes

that media synchronicity may differ from person to person and over time (Dennis et al. 2008).

Media Synchronicity Theory is relevant to this study because 'flood risk awareness' task is analogous to the development of knowledge, generating understanding and building a mental model. The task of 'flood risk warning' is analogous to transmitting short messages so that the recipients can relate this information to their knowledge or mental models and arrive at a shared meaning or make sense of the information. It also aligns well with both the aspects of a communication task as proposed by this theory: conveyance (transmission of new information to generate shared understanding or create a mental model for flood awareness) and convergence (transmission of short messages to generate shared meaning for flood warning).

II. LITERATURE REVIEW

Understanding Flood Risk Communication

Höppner, Buchecker and Bründl. (2010, p.45) see risk communication as a social process which depends on the characteristics of the message, the sender, the audience, the social context of the communication, the characteristics of the hazard itself and also on the mode/channel in which it is delivered. One important characteristic of risk communication that is not included in this definition is that it deals with uncertain outcomes and the likelihood or probability of impacts occurring, rather than with events whose nature and reach are known in advance.

In the case of flooding, risk communication is intended to make people aware of and prepared for flooding to prevent or reduce the harm or damage it could potentially cause. Referring to this purposive nature of risk communication, Woods et al. (2012, p.2) clarify that 'it typically involves transmitting information about the level and significance of risks as well as decisions, actions, or policies to manage them'. Being able to link information to action is critical to effectively manage risk. However, it has become increasingly clear that there is no direct causal relationship between 'transmitting information' about risks and people taking individual or collective decisions or action to manage them.

Several approaches have been developed to explain how this translation happens or fails to happen and the factors that make risk communication 'successful'. Examples include:

- understanding communications in the context of 'knowledge systems' which shape how people process, interpret and react to messages (Waylen et al. 2011, p.7)
- a recognition that people, as individuals and collectively as communities, are active receptors of risk information and therefore need to be seen as 'initiators and creators of alternative schemes rather than be expected to be mere receptors of experts' plans' (Speller 2005, p.25).

Understanding risk communication as a two-way process, in which those receiving the communications play an active part in interpreting and responding, changes the focus on risk communication. The new emphasis is on the values and needs of the individual, group or community to whom the communication is directed, and the importance of adjusting communications to these. This enables people to judge their risk situation and make informed decisions based on factors such as levels of preparedness (Renn 2005, p.55). This is summed up effectively by Höppner et al. (2010) thus:

> '…we understand risk communication as both a one-way transfer of hazard and risk-related information and their management and as a two-way exchange of related information, knowledge, attitudes and/or values. We see risk communication as a preventive activity that prepares communicating actors for hazard events, that enables them to better cope with hazard events and which helps to reduce adverse impacts on people and social systems.' (p.7)

To have a good understanding and engagement with flood risk, it is imperative to looks closely at the relationship between flood risk communication and response. The term 'understanding' is used here to describe the whole process – going from awareness to consideration of the need to take action and possible options, to taking action. On the other hand, the term 'engaging' is used to cover the part of the process that starts with an individual considering action and which includes:

- thinking about possible responses (response perception)
- deciding whether or not to act
- acting on the decision

This broadens the concept of 'understanding flood risk' from a largely information-based process to one that encompasses the deliberation and action or inaction that follow on from information or awareness.

The model of the process of understanding the risk shown in Figure 2 highlights the different stages in this process. The model represents the way that understanding flood risk is used in this review. Engaging with flood risk is considered to be what happens from Box 2 (Consider action) to Box 3 (Act/Decide not to act). Key decision points within this linear model depend on the perceptions of risk and response. The theory proposes that both understanding of, and engagement with, flood risk can lead to a decision to act or not to act. People weigh up several factors in making decisions on whether and how to engage with flood risk, and flood risk communication is just one of these factors. In practice, there may be many iterations of steps within the process as people come across new prompts to engage with or act on flood risk.

Understanding how individuals and communities become aware and make sense of risks, and why and how they think about possible responses, has become more sophisticated over time. The idea that the goal of flood risk communication is to

provide 'more and better information' is now seen as insufficient (O'Sullivan et al. 2012, p.2271). There is considerable evidence that the provision of information alone is not sufficient to bring about behavioural change. For example, Waylen et al. (2011) found that:

> 'The majority of respondents felt that they were not prepared for flooding. Current preparedness levels were found to be related to previous flood experience. Those who have been flooded previously often have a higher level of preparedness than those without flood experience. Interestingly, the perception of living in a flood risk area was found to not influence preparedness levels within this sample. This indicates that increasing awareness about flood risk may not affect the public being prepared' (p.61).

Nevertheless, much risk communication continues to emphasize information and awareness-raising. Recognizing the many dimensions of flood risk communications should encourage those responsible for it to understand that communications approach (including messages, modes and techniques) will work differently in different contexts. Being clear about the goals of communication, whether implicit or explicit, in a particular context, is essential.

Most of these objectives refer to pre-emergency situations, though numbers 5 and 6 are primarily focused on current or 'live' risks. Höppner et al (2010) further suggest that flood risk communications can be divided into three broad contexts, defined by their objectives:

- preparation – information
- prevention
- warning

These contexts cannot be considered in isolation. The way that individuals and communities respond to communications in one context is likely to be influenced by previous communications about, or experience of, flooding. According to Environment Agency (2015), there are two different contexts for communicating about flood risk namely; static risk and live risk. The term 'static risk' is used in fields such as psychology and insurance to refer to factors that contribute to risk such as long-term conditions which do not change and which increase risk (for example, an individual's medical condition which increases their risk of certain illnesses). In the context of flooding, static risk factors include:

- living in an area of flood risk
- whether or not the property has ever actually been flooded

But while the concept of static risk factors may be useful in understanding the different elements that subsidize risk, talking about 'static risk contexts' is misleading. Physical conditions such as rainfall, sea tides and saturation of the ground don't change suddenly to create a new situation of heightened risk, so it may be difficult to say at what point 'static' risk ends and 'live' risk begins. Some conditions that heighten the risk of flooding may be imperceptible – properties affected by groundwater flooding may not seem to be at risk until the water comes up through the floor.

However, there is a difference between communicating risk when the hazard is immediate and palpable, and when it is a possible future situation. Höppner et al (2010) note that in the latter situation, the focus of risk communication is on information and preparation.

> 'We see risk communication as a preventive activity that prepares communicating actors for hazard events, that enables them to better cope with hazard events and which helps to reduce adverse impacts on people and social systems. Thus, we distinguish risk communication from disaster, crisis and emergency communication that tend to focus on communication activities during and in the immediate aftermath of hazard events.' (Höppner et al. 2010, p.7).

Communication when a hazard situation is unfolding aims to:

- provide a warning of imminent danger
- encourage action to prevent or reduce damage to the individual and community and to the infrastructure and services on which they depend

It is important to recognize the differences between communicating in conditions of immediate hazard and those in which the hazard is more distant. Nevertheless, there is a close relationship between these situations as to how people respond to warnings will be affected by their preparedness. Rather than treat these as different situations or contexts, or even as opposite poles on a continuum, this report looks at the immediacy of the flood risk as one of the factors affecting communication.

Another element that is increasingly being taken into account in communications in general, and risk communication in particular, are the differences in people's response to messages or information and the factors that determine these. It is suggested that the public, or audiences for communications about flood risk, are made up of people with different attitudes and values which shape their response to risk communications. If this is the case, it should be possible to increase the effectiveness of flood risk communications by:

- identifying specific audiences
- describing their attitudes, interests, values and concerns
- targeting communications to appeal to these

Apart from being an important tool for sustainable flood risk management, as has been explained above, flood risk communication also forms part of the people's right to be informed of the risks to them and possessions. The Aarhus Convention 19981 establishes the public's rights to information, to be heard and to have those interests properly considered (Green & Penning-Rowsell 2010). This societal objective – the right to be informed – highlights the importance of flood risk communication within sustainable

flood risk management and therefore within adaptive governance of flood risk management.

The second objective of risk communication can be stated to be facilitating flows of information and dialogue at all stages of risk governance. International Risk Governance Council's (IRGC) Risk Governance Framework was originally proposed by Renn (2008) and it argued that risk communication holds a central position in risk governance by interlinking and facilitating flows of information and dialogue between the other four elements of risk governance: Pre-assessment, Appraisal, Characterisation/Evaluation and Management.

It has been contended that risk communication helps in eradicating knowledge insufficiencies. Providing information on hazards produces greater information-seeking behaviours while longer exposure to risk information leads to stronger risk perception (Keller et al. 2006). There is a contention that increased awareness leads to better preparedness; increased circulation of information motivates people to partake in the risk dialogue and helps in building trust and the credibility of the communicator. Thus, it can be seen that apart from promoting dialogue with the public, raising awareness of flood risk and issuing flood warnings can be stated to be two major tasks for media communications, especially when the flood risk communication is between a communicator agency and general public. Thus, 'flood risk awareness' and 'flood risk warning' are the two subtasks of the overall task of 'communicating flood risk'.

Creating awareness and promoting action to prepare for warnings: Individual-level theories which emphasize the importance of individual attitudes and perspectives in determining responses to risk information suggest that it is possible to:

- create a typology of attitudes and perspectives
- model how people in the different groups or types will respond to risk communications

For example, a model presented in Höppner et al. (2010) shows how differentiation of groups within a community according to their risk attitudes (the groups are given names such as: 'risk manager' and 'risk denier') can be used to develop a strategy for raising risk awareness and changing risk-related behaviours through communication. The model, shown in Figure 3, is specific to the context of flooding at the community level in Australia but can be transferred to a Nigerian context.

This model shows the progression of a flood risk communication strategy over time. It begins with the 'participative phase' that targets those audiences who are more likely to engage with their flood risk early. These may be local champions who are willing to invest time and energy into flood preparedness measures. Lessons are learnt from this process and used in the face-to-face and social marketing phases to target early adopters (responsive) and the early majority (distracted); these groups are aware of the risks and engage in some form of flood risk preparation.

Up to this point in time, the audiences have received flood-specific and non-hazard- specific messages and have chosen to willingly engage with their flood risk. The remaining audience now consists of the late majority (resistant) and the laggards and skeptics (very resistant). Engagement is limited with this audience and the goal may only be for them to obey emergency directions and is delivered by the authority of the responsible agency.

While useful in describing different attitudes to flood risk information and the responses likely to be associated with these, this model is limited by its lack of flexibility as it assumes that the audience remains in one of the five categories throughout the process. It does not allow individuals to move between categories (that is, the early majority to late majority) nor does it include unique events that might shape the audience's perceptions of flood risk (for example, a flood event part way through the program may result in a decrease in risk deniers and an increase in early adopters). Despite these limitations, the model does not highlight the differences within audiences and the implications of these for a response.

III. METHODOLOGY

The researcher adopted a survey research design in carrying out this study. The essence of using this method for the study was because it lends itself to the application of samples as a way of studying very large populations. It was chosen also because it provides a useful source of information on attitudes, population distribution and behaviour about one or more groups of people by asking respondents question and summarizing their responses with percentages, frequencies, or counts and then drawing inferences and conclusions. A survey was utilized due to its capability of reaching a wider audience. This study was carried out in the five (5) southeastern Nigeria namely: Abia, Anambra, Ebonyi, Enugu and Imo States. The researcher chose to study the entire southeast because they have all suffered flood disasters in different magnitude and so, it became pertinent to evaluate awareness levels and how the dissemination of flood risk information is carried out to prepare the residents. The population of the study was drawn for the five southeastern states. According to National Population Census (2006), the population of Abia State is 2,833,999; Anambra has 4,182,032; Ebony has 2,173,501; Enugu has 3,257,298 while Imo has 3,934,899 making it a total of 16,381,729. However, it is expected that this population has increased since the last census exercise which took place 13 years ago. In this situation, the researcher adopted the UNDP annual increase rate of 2.28% to obtain the new projected population figure which is 21,298,033; this is the population that was adopted for this study.

A sample of 384 was selected using Krejcie & Morgan sample size determination table. The table provides that when a given population is from 1000,000 and above, the corresponding sample size should be 384. A multistage sampling approach with a combination of probability and nonprobability sampling was adopted.

Stage1: The researcher purposely selected the southeast out of the five geopolitical zones in Nigeria. This is because the researcher chose to study this area as a matter of interest. These include Abia, Anambra, Ebonyi, Enugu and Imo states.

Stage2: The researcher used purposive sampling technique to select one Local Government Area that has suffered from flood disaster from 2012 to 2019. In all, five LGAs were selected from the five states. This is because flood disaster does not occur in every part of the states, there are flood-prone areas and only those who have experienced this disaster were judgmentally selected. These LGAs include Aba South LGA for Abia State, Ogbaru LGA for Anambra State, Ikwo LGA for Ebonyi State, Udi LGA for Enugu State and Orlu LGA for Imo State.

Stage 3: The researcher used simple random sampling to select one community each from selected five local government areas of the five states. In this stage, the researcher wrote down the names of all the communities that have suffered from flood disaster in each LGA in a piece of paper and put them in five different bags with one bag representing one LGA in the five states. Using random sampling without replacement, the researcher selected one community each from the five LGA of the selected states. In the end, five communities were selected to represent each state. These are Akoli-Ohazu Community in Abia State, Atani Community in Anambra State, Ndufu-Echara Community in Ebonyi State, Ngwo Community in Enugu State and Uzoubi-Umuna Community in Imo State. Each community was drawn from the selected LGAs of the five states.

Stage 4: The researcher used purposive sampling technique to administer the copies of the questionnaire to the respondents for the survey. This was to ensure that those sampled meet the requirements for the survey.

IV. DATA PRESENTATION

Table 1: Questionnaire Distribution and Return Rate

States	No. Distributed	No. Returned	Percentage
Abia	66	64	96.00
Anambra	98	95	97.00
Ebonyi	51	50	98.00
Enugu	77	73	95.00
Imo	92	90	98.00
Total	**384**	**372**	**97.00**

A total of 384 copies of the questionnaire were distributed by the researcher to the respondents in the study areas. Out of this number, 372 copies were filled, returned and found usable, yielding 97% response rate and 3% mortality rate. Therefore, the analysis for the study was based on the 372 (97%) respondents which the researcher considered significant for adequate data analysis.

Research Question One

Is flood risk awareness information available to the respondents?

Table 2: Respondents views on the Availability of Flood Risk Awareness Information

State	Response	Frequency	Percentage
Abia	Available	59	92.00
	Not available	5	8.00
	Can't Say	0	0.00
	Total	**64**	**100.00**
Anambra	Available	88	93.00
	Not available	5	5.00
	Can't Say	2	2.00
	Total	**95**	**100.00**
Ebonyi	Available	18	36.00
	Not available	20	40.00
	Can't Say	12	24.00
	Total	**50**	**100.00**
Enugu	Available	70	96.00
	Not available	3	4.00
	Can't Say	0	0.00
	Total	**73**	**100.00**
Imo	Available	77	86.00
	Not available	10	11.00
	Can't Say	3	3.00
	Total	**90**	**100.00**
Total		**372**	**100.00**

Table 2 shows respondents' responses to research question one according to their state. Data reveals that overall majority of the respondents in the five states under study Abia, Anambra, Ebonyi, Enugu and Imo states accounting 83.5% (n=312) indicated that flood risk awareness information is available in their areas, 11.5% (n=43) said there is no availability of flood risk awareness information in their areas while 5% (n=17) indicated can't say meaning that they do not know if flood risk awareness information is available in their areas or not. Data on Table 2 imply that the majority of the respondents agree that flood risk awareness information is available in their localities except in Ebonyi state where the majority indicated not available.

Research Question Two

Which is the major source of flood risk awareness information among the respondents?

Table 3: Respondents Major Source of Flood Risk Awareness Information

State	Response	Frequency	Percentage
Abia	Radio/TV	32	50.00
	Newspaper/Magazines	18	28.00
	Social Media	11	17.00
	Sensitization Seminars	3	5.00
	Total	**64**	**100.00**
Anambra	Radio/TV	34	36.00
	Newspaper/Magazines	19	20.00
	Social Media	34	36.00
	Sensitization Programmes	8	8.00
	Total	**95**	**100.00**
Ebonyi	Radio/TV	33	66.00
	Newspaper/Magazines	5	10.00
	Social Media	12	24.00
	Sensitization Programmes	0	0.00
	Total	**50**	**100.00**

Enugu	Radio/TV	41	56.00
	Newspaper/Magazines	8	11.00
	Social Media	18	25.00
	Sensitization Programmes	6	8.00
	Total	**73**	**100.00**
Imo	Radio/TV	41	46.00
	Newspaper/Magazines	19	21.00
	Social Media	30	33.00
	Sensitization Programmes	0	0.00
	Total	**90**	**100.00**
Total		**372**	**100.00**

Table 3 shows respondents' responses to research question two according to their state. Data reveals that overall majority of the respondents in the five states under study accounting 49% (n=181) indicated that their major source of flood risk awareness information Radio/TV even though the percentage varied according to the states. Also, 17% (n=63) said that their major source of flood risk awareness information is Newspaper/Magazine as a result of their literacy levels. Also, 28% (n=105) indicated that social media platforms like Facebook, Twitter, Instagram, WhatsApp etc. were their major source of flood risk awareness information. Those in this category were predominantly youths whose social media usage is higher than that of older respondents. Lastly, 6% (n=17) of the respondents said their major source of flood risk awareness information is sensitization seminars carried out periodically by National Emergency Management Agency (NEMA) as they do not have access to radio/TV, Newspaper/Magazine and the social media. Data on Table 3 imply that the major source of flood risk awareness information varies according to the respondents' location, media accessibility, literacy level and media exposures. However, the majority access information on flood through radio and television followed by social media and then newspaper and magazine.

Research Question Three

How does the accessibility of sources of flood risk awareness information influence the diffusion of message among respondents?

Table 4: Respondents views on the influence of accessibility of sources on Diffusion

State	Response	Frequency	Percentage
Abia	Aids fast circulation	8	13.00
	Wide coverage	11	17.00
	Increases awareness	7	11.00
	All of the above	38	59.00
	Total	**64**	**100.00**
Anambra	Aids fast circulation	6	6.00
	Wide coverage	5	5.00
	Increases awareness	15	16.00
	All of the above	69	73.00
	Total	**95**	**100.00**
Ebonyi	Aids fast circulation	6	12.00
	Wide coverage	8	16.00
	Increases awareness	10	20.00
	All of the above	26	52.00
	Total	**50**	**100.00**
Enugu	Aids fast circulation	3	4.00
	Wide coverage	6	8.00
	Increases awareness	9	12.00
	All of the above	55	75.00
	Total	**73**	**100.00**
Imo	Aids fast circulation	9	10.00
	Wide coverage	5	6.00
	Increases awareness	18	20.00
	All of the above	58	64.00
	Total	**90**	**100.00**
Total		**372**	**100.00**

Table 4 shows the respondents' responses to research question three. Data reveals that overall majority of the respondents in the five states under study accounting 66% (n=246) indicated that easy access to sources of flood risk awareness information influences diffusion by aiding fast circulation, wide coverage and increases awareness levels. Data on Table 4 imply that limited or uneasy access to sources of flood risk awareness information hampers its diffusion which will result in low adoption and affect their adaptive behaviour. In other words, when information of flood risk properly circulates and diffuses among people living in flood-prone areas, awareness level that will propel adoption and enhance adaptive behaviour will be created.

Research Question Four

Is there a relationship between flood risk awareness information and respondents' adoption of positive behaviours?

Table 5: Relationship between awareness adoptions of positive behaviours

State	Response	Percentage	Frequency
Abia	Yes, Awareness enhances preparedness	59	92.00
	No, there is no relationship	5	8.00
	Can't Say	0	0.00
	Total	**64**	**100.00**
Anambra	Yes, Awareness enhances preparedness	68	72.00
	No, there is no relationship	19	20.00
	Can't Say	8	8.00
	Total	**95**	**100.00**
Ebonyi	Yes, Awareness enhances preparedness	39	78.00
	No, there is no relationship	11	22.00
	Can't Say	0	0.00
	Total	**50**	**100.00**
Enugu	Yes, Awareness enhances preparedness	66	90.00
	No, there is no relationship	7	10.00
	Can't Say	0	0.00
	Total	**73**	**100.00**
Imo	Yes, Awareness enhances preparedness	78	92.00
	No, there is no relationship	10	8.00
	Can't Say	2	0.00
	Total	**90**	**100.00**
Total		**372**	**100.00**

Table 5 shows respondents' responses to research question four by their states. Data reveals that overall majority of the

respondents in the five states under study Abia, Anambra, Ebonyi, Enugu and Imo states accounting 83% (n=310) indicated that there is a relationship as flood risk awareness information enhances preparedness (positive behaviour) towards flood disasters. Also, 14% (n=52) said there is no relationship between flood risk awareness information and adoption of positive behaviour meaning that awareness does not enhance preparedness while 3% (n=10) indicated can't say meaning that they do not know if there is a relationship between flood risk awareness information and adoption of positive behaviour (preparedness) or not. Data on Table 5 imply that the majority of the respondents agree that there is a relationship between flood risk awareness information and adoption positive behaviour by people living in flood-prone areas by giving the consciousness to prepare for imminent flood disaster and/or equip them to manage flood occurrences. This means that awareness enhances preparedness in flooding incidences.

Research Question Five

Is there a relationship between the adoption of flood risk awareness information and respondents' adaptive behaviour?

Table 6: Relationship between Adoption and Adaptive Behaviours?

State	Response	Frequency Percentage	
Abia	Yes, adoption promotes adaptive behaviours	55	85.00
	No, There no relationship	7	8.00
	Can't Say	2	0.00
	Total	64	**100.00**
Anambra	Yes, adoption promotes adaptive behaviours	77	81.00
	No, There no relationship	15	16.00
	Can't Say	3	3.00
	Total	**95**	**100.00**
Ebonyi	Yes, adoption promotes adaptive behaviours	33	66.00
	No, There no relationship	15	30.00
	Can't Say	2	4.00
	Total	**50**	**100.00**
Enugu	Yes, adoption promotes adaptive behaviours	63	86.00
	No, There no relationship	8	11.00
	Can't Say	2	3.00
	Total	**73**	**100.00**
Imo	Yes, adoption promotes adaptive behaviours	79	88.00
	No, There no relationship	9	10.00
	Can't Say	2	2.00
	Total	**90**	**100.00**
Total		**372**	**100.00**

Table 6 shows respondents' responses to research question five by their states. Data reveals that overall majority of the respondents in the five states under study accounting 82% (n=307) indicated that there is a relationship between adoption of flood risk awareness information and respondents' adaptive behaviour meaning that adoption promotes adaptive behaviours toward managing flood incidents. Also, 10% (n=39) said there is no relationship between adoption of flood risk awareness information and adaptive behaviour of the respondents meaning that adoption does not promote adaptive behaviour while 3% (n=11) indicated can't say meaning that they do not know if there is a relationship between adaption of flood risk awareness information and adaptive behaviour or not. The implication of data on Table 6 is that majority of the respondents agree that there is a relationship between adoption of flood risk awareness information and adaptive behaviour of people living in flood-prone areas as adherence to instructions on how to mitigate the effect of flood disasters results to victims relocation, clearing flood pathways, clearing of drainage systems etc.

Test of Hypotheses

Hypothesis One

H_1 Accessibility of sources of flood risk information influences the diffusion of the message among the respondents.

Obtained data were analyzed as follows:

Table 7: Influence of information source accessibility of diffusion

Item 15		Response					Total	Mean value X
Access to sources of flood risk awareness information influences message diffusion by aiding fast circulation,	Code	SA=5	A=4	UD=3	D=2	SD=1	15	1374
wide coverage and	Frequency	248	59	5	53	8	373	373
increased awareness	Code value	836 298	96	136	8	1374		3.68
	Result					**X = 3.56**		

The result from the table above shows that the majority of the respondents who accounted for 82.52% were in agreement that accesses to sources of flood risk awareness information influences message diffusion by aiding fast circulation, wide coverage and increased awareness. Those who said they disagree accounted for 16.35% of the respondents or less than one-quarter. Only 1.34% of the respondents did not hold any specific opinion on the matter. It means that the accessibility

of sources of flood risk information influences diffusion of the message among the respondents accounting for 82.52% which is higher than the sum of the other data obtained.

Also, the calculated mean value, X, was 3.56 which was greater than the decision point value of 3.0 by a difference of 0.68. It shows that X = 3.68 > 3.0 hence, the above null hypothesis, H_0, was rejected and its alternative, H_1, was accepted. It implies, therefore that accessibility of sources of flood risk information influences diffusion of the message among people living in flood-prone areas.

Hypothesis Two

H_2 There is a relationship between flood risk awareness information and respondents' adoption of positive behaviours.

Table 8: Test of the relationship between awareness and adoption of positive behaviours

Variables	O-F	Expected	O-E	$(O-E)^2$	$\Sigma(O-E)^2$ E
Yes	310	72.6	69.4	4816.36	66.3410468
No	52	72.6	-28.6	817.96	11.2666667
Can't Say	10	72.6	-54.6	2981.16	41.0628099
Total	373				118.6698125

Obtained value for X^2= 118.6698125

X^2=1-x, K-1 is X^2 0.95-9.49 DF – 4

The X^2 tabulated is 9.49 at 5% level of significance on the degree of freedom of 4. From this test, the calculated value X^2 is greater than the table X^2, therefore, H_0 which is the null hypothesis is rejected and the alternative H_2 is accepted. This implies that there is a significant relationship between flood risk awareness information and respondents' adoption of positive behaviours.

Hypothesis Three

H_3 There is a relationship between the adoption of flood risk awareness information and respondents' adaptive behaviour.

H_0 There is no relationship between the adoption of flood risk awareness information and respondents' adaptive behaviour.

Table 9: Test of the relationship between adoption and adaptive behaviours

Variables	O-F	Expected	O-E	$(O-E)^2$	$\Sigma(O-E)^2$ E
Yes	307	72.6	79.4	4956.39	76.3410468
No	39	72.6	-25.6	655.36	9.02699725
Can't Say	11	72.6	-50.6	2981.16	35.1666667
Total	373				120.53471075

Obtained value for X^2= 120.53471075

X^2=1-x, K-1 is X^2 0.95-11.07 DF – 5

The X^2 tabulated is 11.07 at 5% level of significance on the degree of freedom of 5. From this test, the calculated value X^2 is greater than the table X^2, therefore, the null hypothesis is rejected and the alternative H_1 is accepted. This implies that there is a significant relationship between the adoption of flood risk awareness information and respondents' adaptive behaviour

V. DISCUSSION OF FINDINGS

Research question one was designed to find out if flood risk awareness information is available to the respondents under study. Finding revealed that the majority of the respondents indicated that flood risk awareness information is available in form of early warning. This early warning information was provided by government agencies like the National Emergency Management Agency (NEMA) and the Nigerian Meteorological Agency (NIMET) through various media channels. This finding contradicts the submission of Adelekan and Asiyanbi (2016) who documented low levels of both awareness and preparedness during the 2012 flood disaster in Nigeria. Also, the finding contradicts the assertion of Okonkwo and Onyeizugbe (2017) who revealed that warnings and information broadcasting about the imminent 2012 flooding were not appropriately done and media channels employed for the warning were not accessible to the local population.

Research question two was designed to ascertain the major source of flood risk awareness information among the respondents. The finding revealed that a greater percentage of the respondents indicated that Radio/TV is their major source of flood risk awareness information followed by social media. This finding complements the submission of Oke, Adeyinka and Oluseyi (2018) who found that flood disaster information is distributed through radio and television and slight consideration was given to the application of community-based disaster risk management methods that comprise the use of familiar communication canals such as town hall assemblies, community-based conferences. The finding is also an improvement to the earlier finding made by Olanrewaju and Ahmad (2016) who found that only five per cent of population of the social networks assisted as information benefactors, and this incited the need for more vigorous involvement particularly from establishments with expert information.

Research question three was designed for finding out how the accessibility of sources of flood risk awareness information influences the diffusion of message among respondents. The finding revealed that limited or uneasy access to sources of flood risk awareness information hampers its diffusion which will result in low adoption and affect their adaptive behaviour. In other words, when information of flood risk properly circulates and diffuses among people living in flood-prone areas, awareness level that will propel adoption and enhance adaptive behaviour will be created. This was further validated by the result of hypothesis which was tested using an attitudinal scale of point 5-1 whose calculated mean value, X,

was 3.56 greater than the decision point value of 3.0 by a difference of 0.68 showing that X = 3.68 > 3.0 hence, rejecting the null hypothesis and its alternative implying that accessibility of sources of flood risk information influences diffusion of the message among people living in flood-prone areas. This finding supports the assertion of Kittipongvises and Mino (2015) who reported that 95% of residents accessed flood early warning messages from television, while 50% depended on newspaper and internet according to the findings of their study. However, they posit that unpredictability in electrical supply during flooding would deteriorate the efficiency of TV and electronic media once a flood occurrence is already extant thereby restraining access to the audience. This could result to the reduction of the ratio of TV, radio, and internet news consumers and shifting attention to newspaper or word of the month during the flood event.

Research question four was designed to find out if there is a relationship between flood risk awareness information and respondents' adoption of positive behaviours. The finding revealed that there is a relationship between flood risk awareness information and adoption of positive behaviour by people living in flood-prone areas by giving them the consciousness to prepare for imminent flood disaster and/or equip them to manage flood occurrences. This means that awareness enhances preparedness in flooding incidences. This was further validated by the result of hypothesis which was tested using the Chi-Square Goodness of fit which revealed that the calculated value X^2 is greater than the table X^2 resulting to the rejection of the null hypothesis and the acceptance of its alternative which implies that there is a significant relationship between flood risk awareness information and respondents' adoption of positive behaviours towards flood disaster management. The finding agrees with Environment Agency (2015) who avers that communications about flooding have different purposes depending on the context. Information may be provided with of intention of creating awareness of the possibility of a future flood event so that people are prepared, promoting action to prevent or limit the impacts of future flooding, warning people about an imminent flood event and the actions they should take to avoid harm to themselves and others or damage to their property.

Research question five was designed to find out if there is a relationship between the adoption of flood risk awareness information and respondents' adaptive behaviour. The finding revealed that there is a relationship between adoption of flood risk awareness information and adaptive behaviour of people living in flood-prone areas as adherence to instructions on how to mitigate the effect of flood disasters results to victims' relocation, clearing of flood pathways, clearing of drainage systems etc. This finding was further validated by the result of hypothesis which was tested using the Chi-Square Goodness of fit which revealed that the calculated value X^2 is greater than the table X^2 resulting to the rejection of the null hypothesis and the acceptance of its alternative which implies that there is a significant relationship between the adoption of flood risk awareness information and respondents' adaptive behaviour. This finding contradicts the submissions of Ottah (2017) who found that though people of Ibaji were well exposed to flood risk awareness information on radio, the 2012 flood disaster awareness did not create the needed impact on them as the majority of the respondents (45.6%) felt that Radio Kogi should have adopted a communication strategy that would change people's behaviour and attitude.

These findings justify the theories adopted for this study. The findings have shown that the reasoned action approach is relevant to behaviour change towards response to flood risk communication as attitudes and beliefs showed to be significant in people's choice of action. Thus, the assumption that if the attitudes of the those who live in flood-prone areas in Southeast Nigeria towards flood risk information response behaviours are shaped in particular directions and their perceived vulnerability and risk factors are reinforced; it will then be possible to change behaviour in them that will likely result to a positive response towards flood risk information by taking up the right behaviour to respond to flood disasters. Also, the Habermas' Theory of Communicative Action explains that there has to be shared understanding between social actors like NEMA, NiMET, NOA and the media to have a collaborative action towards flood disaster prevention and management in Nigeria and agree on a communication model that will result to behavioural change toward flood risk communication and adaptive behaviour by those living in flood-prone areas. Lastly, Media Synchronicity Theory was justified by the findings since it aligns well with the aspects of a communication task such as conveyance (transmission of new information to generate shared understanding or create a mental model for flood awareness) and convergence (transmission of short messages to generate shared meaning for flood warning).

VI. CONCLUSION

It has been established in this study that flood disaster management cannot be effective without appropriate risk communication approach that will induce behavioural change among people living in flood-prone areas. It has also been established that the availability of flood risk awareness information is not enough to influence adaptive behaviour rather availability must be accompanied with accessibility and comprehensive message content on how to mitigate flood disaster effects. Again, in a converging media landscape, radio/TV has proved not to be the only effective means of flood risk awareness creation but also the social media and interpersonal communication approaches have shown to effectively disseminate the needed information and promote the adoption of positive behaviour towards flood disaster management. The researcher therefore concludes that both the government agencies, media organizations and communities must synergize to form a collaborative front geared towards achieving a robust flood disaster management if the impact will be drastically reduced.

VII. RECOMMENDATIONS

Based on the research findings, the researcher, therefore, made the following recommendations:

1. Community-based communication process using communication forms such as interpersonal, seminar; town hall meeting should be maximally used in creating disaster awareness and to complement the effort of the TV and radio stations being used presently.
2. Media channels that disseminate flood risk awareness information should deliberately be made accessible to people living in flood-prone areas in various formats to enable wider circulation of information on flood disaster management.
3. Government agencies should partner with telecommunication industries in Nigeria to also include Short Messages (SMS) and calls as part of periodical early warning systems currently in use through shortcode formats.
4. Nigeria Emergency Management Agency, as well as her State and Local Government counterparts, should develop community-based disaster risk management that would involve use of informal communication channels such as town hall meetings, community-based seminars etc. this can be in form of mock flood drills.
5. People living in flood-prone areas should strictly adhere to the warning of imminent flood disasters by adopting the messages and do the needful by relocating or taking up a particular behaviour that will aid their survivability when a flood occurs
6. Further studies should be conducted to evaluate the efficacy and effectiveness of interpersonal communication in flood disaster management among people living in a flood-prone area.

REFERENCES

[1] Adelekan, I. O. and Asiyanbi, A. P. (2016). Flood risk perception in flood-affected communities in Lagos, Nigeria. *Nat Hazards* 80(1):445–469

[2] Aderogba, K.A (2012). Qualitative Studies of Recent Floods and Sustainable Growth and Development of Cities and Towns in Nigeria. *International Journal of Academic Research in Economics and Management Sciences.* **1**(3), 1-25.

[3] Ahmad, F., Kazmi, S. F, and Pervez, T. (2011). Human response to hydro-meteorological disasters: A case study of the 2010 flash floods in Pakistan. *Journal of Geography and Regional Planning,* 4 (9), 518-524

[4] Albarracín, D., Johnson, B.T., Fishbein, M., & Muellerleile, P.A. (2001). Theories of reasoned action and planned behaviour as models of condom use: A meta-analysis. *Psychological Bulletin*, 127, 142-161.

[5] Dennis, A.R., Fuller, R.M. & Valacich, J.S., (2008). Media, tasks, and communication processes: A theory of media synchronicity. *MIS Quarterly*, 32(3), 575–600.

[6] Etuonovbe, A.K. (2011).The Devastating Effect of Flooding in Nigeria." Hydrography and the Environment. *A paper presented at the FIG Working Week*. Marrakech, Morocco. 18-22

[7] Environment Agency (2015). *Public dialogues on flood risk communication*. Bristol: Environment Agency.

[8] Fishbein, M., and Ajzen, I. (2010). *Predicting and changing behaviour: the reasoned action approach*. New York, NY: Psychology Press.

[9] Green, C., & Penning-Rowsell, E. C., (2010). *Stakeholder Engagement in Flood Risk Management. Flood Risk Science and Management*, 372. Wiley.com

[10] Hagger, M.S., Chatzisarantis, N.L.D., & Biddle, S.J.H. (2002). A meta-analytic review of the theories of reasoned action and planned behaviour in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport and Exercise Psychology*, 24, 3-32.

[11] Habermas, J., (1984). *The Theory of Communicative Action*, Volume I. Boston: Beacon

[12] Höppner, C., Buchecker, M. and Bründl, M., (2010). *Risk communication and natural hazards*. CapHaz-Net WP5 report. Birmensdorf, Switzerland: Swiss Federal Research Institute

[13] Kievik, M., and Guttelin, J.M. (2011). Yes, we can: motivate Dutch citizens to engage in self- protective behaviour with regard to flood risks *Natural Hazards* 59(3):1475-90.

[14] Kittipongvises S. and Mino T. (2015). Perception and communication of flood risk: lessons learned about Thailand's flood crisis of 2011. *Applied Environmental Research*, 37: 57-70.

[15] Laughery, K.R and Hammond, A. (1999). Overview of Warnings and Risk Communication. In Wogalter, M.S., DeJoy, D., & Laughery, K.R. (Eds.) (2005). *Warnings and Risk Communication* (pp 2-12). London: Taylor & Francis.

[16] McEachan, R. R. C., Conner, M., Taylor, N. J., and Lawton, R. J. (2011). Prospective prediction of health-related behaviours with the theory of planned behaviour: A meta-analysis. *Health Psychology Review*, 5(2), 97-144

[17] Mileti, D.S., Bandy, R., Bourque, L.B., Johnson, A., Kano, M., Peek, L., Sutton, J. and Wood, M. (2006). *Annotated Bibliography for Public Risk Communication on Warnings for Public Protective Actions Response and Public Education (Revision 4).* Natural Hazards Centre: University of Colorado at Boulder.

[18] Molinari, D. and Handmer, J. (2011). A behavioural model for quantifying flood warning effectiveness. *Journal of Flood Risk Management*, Vol. 4, No. 1 pp. 23-32

[19] Oke, M.O. Adeyinka, A.T. and Oluseyi, O.G. (2018). Media and disaster management: Analysing communication trends in flood-ravaged communities in Benue State, North Central Nigeria. *Journal of Media and Communication Studies*, Vol. 10(9), pp. 106-112,

[20] Okonkwo, A. U. and Onyeizugbe, R. U. (2017). Disaster Vulnerability, Severity of Flood Losses and Information Dissemination in Ogbaru Local Government Area of Anambra State, Nigeria. *Int'l Journal of Advances in Agricultural & Environmental Engg*. (IJAAEE) Vol. 4, Issue 1, pp. 194 – 198

[21] Olajuyigbe, A.E., Rotowa, O.O., and Durojaye, E. (2012). An Assessment of Flood Hazard in Nigeria: The Case of Mile 12, Lagos. *Mediterranean Journal of Social Sciences.* 3(2), 367-375

[22] Olanrewaju, A. T. and Ahmad, R. (2016). Examining the information dissemination process on social media during the Malaysia 2014 floods using Social Network Analysis (SNA). *Jurnal Teknologi (Sciences &Engineering)* 78: 9–3, pp. 49–55

[23] Olawuyi, E. A and Adiamoh, A. G. (2015). Influence of Flood Risk Information on Perceived Risk Severity and Vulnerability among Inhabitants of Ibadan, South-West Nigeria. *Journal of Communication and Media Research*, Vol. 7 No. 1, pp 106-123

[24] Onwuka, S.U., Ikekpeazu, F.O. and Onuoha, D.C. (2015). Assessment of the Causes of 2012 floods in Aguleri and Umuleri, Anambra East Local Government Area of Anambra State. *British Journal of Environmental Sciences* Vol. 3 No. 1, pp. 44-57.

[25] O'sullivan, J., Bradford, R., Bonaiuto, M. S., Rotko, P., Aaltonen, et al., (2012). Enhancing flood resilience through improved risk communications. *Natural Hazards and Earth System Sciences*,12 (7), 2271-2282.

[26] Ottah, G. A., (2017). Impact of Radio Kogi's Flood Disaster Awareness Campaign on Residents of Ibaji Local Government Area of Kogi State, Nigeria. *International Journal of Arts and Humanities* (IJAH) Ethiopia, Vol. 6(3), S/No 22, PP. 80-97

[27] Renn, O., (2008). *Risk governance: coping with uncertainty in a complex world.* Earthscan.

[28] Speller, G., (2005). *Improving community and citizen engagement in FRM decision- making, delivery and flood response*. Joint Defra/Environment Agency Flood and Coastal Erosion Risk Management R&D Programme, R&D Technical Report SC040033/SR3. Bristol: Environment Agency

[29] Waylen, K., Aaltonen, J., Bonaiuto, M., Booth, P, Bradford, R., Carrus, G., et al., (2011). *URFlood – Understanding uncertainty and risk in communicating about floods.* CRUE Final report II-7. 2nd CRUE Funding Initiative on Flood Resilient Communities.

[30] Woods, M.M., Mileti, D.S., Kano, M., Kelley, M.M., Regan, R. and Bourques, L.B., (2012). Communicating actionable risk for terrorism and other hazards. *Risk Analysis*, 32 (4), 601-615