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Social amplification and attenuation of flood risk perception by broadcast media risk messages during the 2022 floods in selected Southern states in Nigeria

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Abstract This study examined if the flood risk messages in broadcast media in Southeast and South-South Nigeria effectively amplified risk perception that influenced community response during the 2022 flood in Southern Nigeria. Consistent with the assumptions of the social amplification and attenuation of risk framework, this study looked at the frequency of the flood risk communications, gauged whether the flood risk messages were considered credible and trusted by the communities, and ascertained the extent to which the messages increased public worries and provoked a sense of threat and response to the flood hazards. The data were gathered from 380 flood victims in four communities in Anambra (Southeast) and Delta (South-South) States using a descriptive survey method. The study found that the broadcast media information and warnings were credible and increased public concerns but the amplification of flood risk perception in the broadcast media was not effective as the risk communication did not start in time and the impact of the messages was moderated by institutional, social, economic and psychological variables that affected how the communities perceived, managed, and responded to the flood risk messages. The study concludes that flood risk messages should be timely, emphasise the severity of the threat of an impending flood, and sufficiently dramatize the message and the threat.

Keywords: Disaster Management; Floods; Risk Communication; Risk Perception; Social Amplification and Attenuation of Risk, Sustainable Development Goals (SDGs)

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1. INTRODUCTION

Flood hazard is a serious threat everywhere in the world, and there is an indication that it is likely to worsen globally. Research shows that flooding is the third most damaging natural hazard globally in terms of the number of people exposed to it, economic implications, and fatalities (Loucks, 2015). It is estimated that about 800 million people live in flood-prone areas, and about 70 million of those people are exposed to floods each year (Kundzewicz et al., 2019; United Nations Office for Disaster Risk Reduction (UNDRR), 2015). One study projects that the global number of people exposed to flood will reach 1.3 million by 2050 (Rentschler et al., 2022). Economic losses caused by floods are always millions of dollars each year, with the worst in recent history being the 2011 floods that accounted for a total loss of $US70 billion worldwide (Fernando et al., 2022). Evidence shows that between 1900 and 2015, there were more than 4,500 incidences of floods, accounting for about 90 million homeless people and 7 million deaths (Zhao et al., 2022).

There is a consensus in the literature that it is not possible to prevent all flooding, but it is possible to minimize the damage caused by future floods and people's vulnerability to them through targeted risk communication and mitigation strategies (Kittipongvises et al., 2022; Ekoh et al., 2022). To achieve this, collaboration is important between the research communities, the government, local stakeholders, non-governmental organisations, and the media. The media's role is very prominent because they have been found to influence the flow of information to help people become aware of the risk features and make decisions to avert or reduce the severity of threats (Salem & Nor, 2020; Meechang et al., 2020).

Bodies of evidence have shown that the media's alert to the risk of flood does not guarantee that people will react to it (World Meteorological Organization, 2015) or that they will perceive the risk in a certain way. This is because people go through a multi-step process that involves listening, understanding, evaluating the level of risk conveyed, taking the risk as their own or others, confirming the alert, and responding to it (Parker et al., 2008). More so, risk perception is not simple; it is a process in which risk signals interact with social, psychological, institutional, and cultural processes in ways that intensify or attenuate the way that risk situations are perceived, managed, and responded to (Renn, 2011). Reports indicate that even minor events can lead to significant changes in awareness or responses if the risk signal is amplified by individuals, social groups, or the media (Kasperson et al., 2003).

However, according to the social amplification and amplification of risk framework, for the media to effectively shape risk perception or elicit reaction toward a targeted flood risk communication message, it must provide coherent, consistent, timely, and large quantities of information regarding the risks. Additionally, the information must be considered, trusted, credible, and must convey a given level of certainty to the population. The information must also be frequently provided and sufficient enough to increase public concern towards the hazards (Kasperson et al., 1988; Rooke & Burgess, 2022). More so, the media messages must

increase public worries and provoke a sense of threat towards the hazards of the impending flood, and help them to decide whether to avert or reduce the severity of the threats (Maran & Begotti, 2021). All of these determine the perception and acceptance of the risk, and the extent to which people are prepared, and know how to act before, during, and after the flood and help them to respond more effectively to the risk.

In 2022, Nigeria experienced the worst flooding since 2012 (Maclean, 2022). The consequences of the flood have been great and costly: it was estimated that 603 people died, more than 2,400 were injured, over 1.4 million persons were displaced by floods which affected many parts of the country, 332,327 hectares of land had also been affected, and an estimated 110,000 hectares of agricultural land were destroyed (Oguntola, 2022). As of October, over 200,000 homes were completely or partially destroyed by the floods. It was reported that on 7 October, a boat carrying people fleeing the floods capsized on the Niger River causing 76 deaths. More so, supplies of fuel were disrupted by the floods, prices of food inflated by 23%, and 14.7 million children were at risk of malnutrition. Floods have been recurrent in Nigeria over the years: before the 2022 floods, the 2012 flood in Nigeria was considered the worst flooding in over 40 years (Nkwunonwo, 2016).

Considering the magnitude of the consequences of the 2022 flood in 33 out of 36 states in Nigeria, especially in some worst-hit states such as Delta and Anambra States, it is important to appraise the targeted flood risk communication and mitigation strategies of the broadcast media before and during the flood. Broadcast media, by their characteristics, have often been noted as the most suitable mainstream media for rural and semi-urban populations. Nigeria has the most vibrant broadcast media in Africa (Anyanwu, Ejem & Nwokeocha, 2015), and that puts the Nigerian broadcast media in perspective to make dominant contributions to alerting people of the risks of natural disasters, shaping their risk perceptions and helping them to make decisions to avert or reduce the severity of the threats. To what extent did they achieve that?

The study evaluated the frequency of risk communication on broadcast media about the floods; the extent to which the risk communication was considered credible, timely, and consistent with other information sources; the degree to which the messages were dramatized to increase public worries about the impending floods; the extent to which the communication triggered reactions towards the impending floods; and factors that affected media's effectiveness as social amplification stations during the flood.

2. LITERATURE REVIEW

2.1 Flood Risk

Risk is the expected loss (of lives, injuries to persons, damage to property, and disruption of economic activity) as a result of a particular hazard for a given area and a reference period (United Nations, 1992; Salman & Li, 2018). Most academic literature for flood risk assessment

has looked at risk as the product of hazard and vulnerability (Baky et al., 2020; Akter et al., 2019), and a combination of probability and consequences (Wilson et al., 2019; Gye et al. 2019). Flood risk, in particular, has been conceptualized by researchers as the result of vulnerability to flooding multiplied by the sum of the value of assets at risk of flooding (Salman & Li, 2018). Flood risk has also been looked at in terms of expected annual damage expressed in monetary terms (Hall et al., 2003). In basic terms, flood risk is the sum of the chance that floods will happen in an area and the consequences of their occurrence. There is evidence that 70 million people globally are exposed to flooding every year, and more than 800 million live in flood-prone areas (Kundzewicz et al., 2019). Also, 1.47 billion people, or 19% of the world population, are directly exposed to substantial risks during 1-in-100-year flood events (Rentschler & Salhab, 2020).

Flood risks in developing countries account for the interactions between climate change, excessive precipitation, building on waterways, sea-level rise, soil moisture regime, rising groundwater, canals, overwhelmed sewers and drainage systems, artificial sources, and dam operations, especially along borders. Others include uncontrolled rapid population growth, inadequate preparedness, and lack of political will (Berghuijs et al., 2019; Koop & van Leeuwen, 2017; Ebele & Emodi, 2016; Nkwunonwo et al., 2016; Marengo & Espinoza, 2016).

2.1.1 Flood Risk Communication

Risk communication means the "flow of information and risk evaluations back and forth" between stakeholders such as academic experts, interest groups, regulatory practitioners, and the general public (Leiss 1996, p. 86). Communicating risks is a mutual process of understanding the risk among stakeholders, thus representing a measure to integrate "lay knowledge into measures to prevent, mitigate and deal" with risk (Intrieri et al., 2020 p. 1). However, what counts as good risk communication is still relative and debatable. There have, however, been various models and rationales of 'good' risk communication in the literature. Some standpoints imply that risk communication is a one-way process of information transfer from experts to lay public and policy-makers (Demeritt & Nobert, 2014), whereas others view risk communication as a two-way dialogue that facilitates citizen participation (Ejem et al., 2023; Demeritt & Nobert, 2014). This rationale will enable facilitators to feedback on the insights from the communities and citizens to the government and relevant agencies (Ejem et al., 2023), and help to ultimately redefine risk communication. Other rationales cited in the literature include the instrumental rationales which see risk communication as a way to influence the attitudes and behavior of others in ways desired by those sending the message (Leiss & Larkin, 2019), and the substantive rationales which highlight its potential to improve the quality of risk assessment, the processes of risk management, and/or the outcomes that result for all those involved (Leiss & Larkin, 2019; Kammerbauer & Minnery, 2019).

Flood risk communication involves relating the risk of flooding to stakeholders, especially the vulnerable (de Fonseca & Garcias, 2020). It is a sort of communication that takes place in the face of incoming flood events and serves as an efficient means to reduce risk, especially by

reducing people's exposure to flooding (Intrieri et al., 2020). There is consensus that communicating flood risks involves two phases, namely, identifying areas at risk of flooding and, then, letting those at risk know when the flood is expected to happen (Rollason et al., 2018). The objective of flood risk communication would then be to help those at risk to prepare for, anticipate, and act to reduce the impact of the flood events on their lives, health, and homes, and lessen the longer-term impacts of the flood in at-risk communities. Researchers have also looked at the role that flood risk communication plays in both transmitting information and altering behavior (Ndela &Ndlela, 2019), and how it is founded on the assumption that the public has an indiscriminate right to be informed about risks and hazards, and the information made available will enable them to make an informed decision regarding the risk situation (Reynolds & Seeger, 2005; Wogalter et al., 1999).

2.1.2 Floods in Nigeria

Nigeria has witnessed several floods in recent times. The year 2012 had the highest number of flood occurrences in the country within the last decade, with 18 incidences, closely followed by years 2015 and 2017 with 17 incidences each, and next is 2018 and 2019 with 12 incidences each (Umar & Gray, 2022). Between the years 2011–2020, Nigeria recorded about 1,187 deaths connected to flooding, representing 15% of Africa's deaths by flooding within the same period. The cost of damage to properties was $904.5 million, which comprised 21% of property damage in Africa from flooding (Umar & Gray, 2022; Luu et al., 2019). However, the most recent floods in Nigeria which occurred in 2022 and affected 33 States with debilitating impacts have been considered by several sources as the worst flooding in Nigeria since 2012 (Maclean, 2022). The flood, which started in February, continued through November in states like Anambra, Delta, Bayelsa, Rivers, and Cross River States.

The Nigeria Hydrological Services Agency in Ogege et al. (2016), defines the major causes of flooding in Nigeria as soil moisture, extreme weather conditions owing to climate change, how dams are functioning, especially those close to the country's borders, and topography. Other causes identified by Nigeria researchers include changes in land use, such as urbanisation, as a trigger to urban flooding, extreme precipitation, inadequate drainage, dumping of refuse on waterways, building on waterways, and river/dam overflow (Umar & Gray, 2022), encroachment, climate change and anthropogenic activities (Ebele & Emodi, 2016) such as broken water pipes and dam overflow (Anabaraonye et al., 2022).

2.2 Theoretical Framework

### 2.2.1 Flood Risk and the Social Amplification of Risk Framework

The Social Amplification of Risk Framework (SARF) offers insight into how flood risk perception is shaped through the interaction of social, institutional, psychological, and cultural communication processes. The underlying assumption of the framework is that public responses to risk events in terms of how it is perceived intensify or attenuate according to various amplification stations such as the media, social institutions, social media, and

interpersonal networks (Kasperson et al., 2003; Kasperson, 1992; Hill, 2001). The framework posits that risk perception is a process in which risk signals interact with social, psychological, institutional, and cultural processes in ways that intensify or attenuate the way that risk situations are perceived and their manageability, and shape our reaction to the risk event (Renn, 1991). Certain hazards and events that experts assess as relatively low in risk can become a particular focus of concern and socio-political activity within a society (risk amplification), whereas other hazards that experts judge to be more serious receive comparatively less attention from society (risk attenuation) (Kasperson et al., 2022; Fellenor et al., 2018).

Figure 1 illustrates that signals about risk and risk events are both transmitted and processed by individuals and social entities such as news media, a cultural group, or an interpersonal network. Signals can also arise through direct personal experience with a risk object. The perceived amplified risk may lead to behavioural responses that can result in ripple effects. Social amplification may qualitatively and quantitatively increase not only signals about the risk but also perceptions of risk, behaviours related to the risk, as well as the risk itself and its consequences (Funtowicz and Ravetz 1990; Kasperson et al. 1988).

Fig 1: Social amplification of risk framework (Renn et al. 1992)

The key amplification stages include filtering signals (only a fraction of all incoming
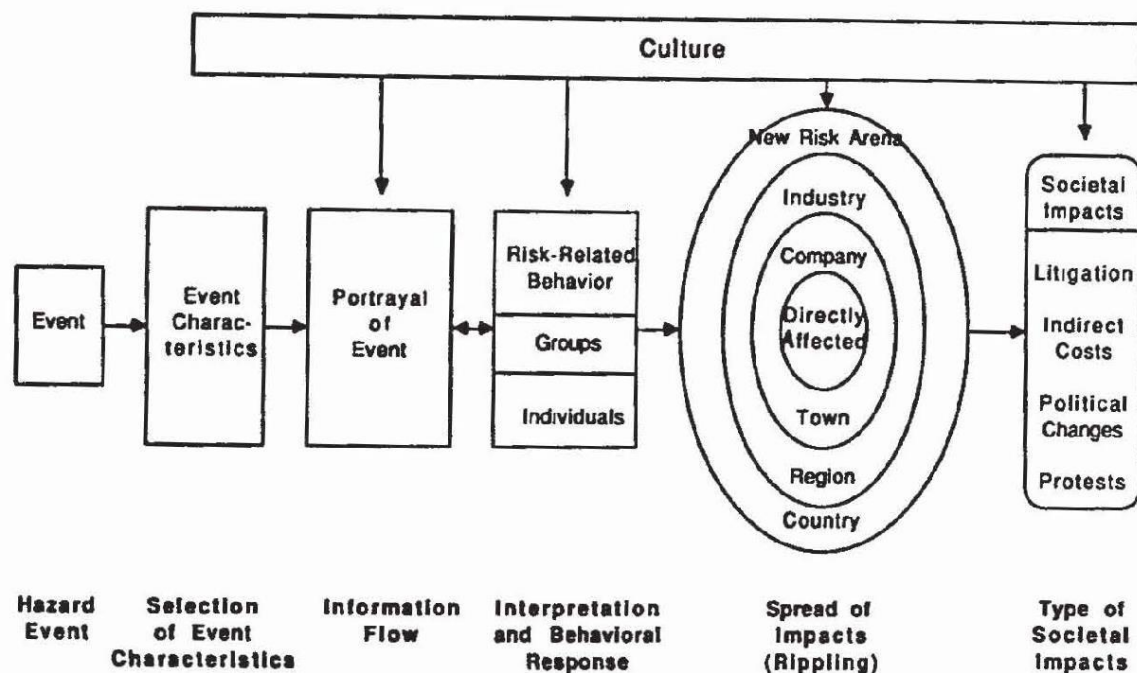
information is processed); decoding and reframing the signals; processing risk information (e.g., drawing inferences); attaching social values to information as a basis for drawing implications for management and policy; and behavioural change of individuals and institutions (Kasperson et al. 2022; Rooke 2020). The societal information system – known as the amplification stations – may amplify hazard events in two major ways: by intensifying or weakening signals that are part of the information that individuals and social groups receive about the hazard or by

filtering the multitude of signals concerning the attributes of the hazard and their importance (Renn, 2011; Renn et al., 1992).

2.2.3 Broadcast Media as a Flood Risk Message Amplifier

Evidence shows that to effectively manage disaster, the media require the accomplishment of all three social functions (knowledge gap, agenda setting, and cultivation of perceptions); obliging media to assume an active role in every phase of the management process, from prevention and awareness-raising to emergency warnings, to relief measures and restoration (World Meteorological Organization, 2015). The media have also been tipped to make a substantial difference in the shaping of perceptions and reacting to risk events by contributing to the social amplification and attenuation of risk (Sorensen et al., 2016). As has been reviewed above, the social amplification and attenuation of risk connote that risk perception is amplified or attenuated by filters in the communication chain of hazard events in a way that events associated with a relatively low statistical risk gain the utmost attention, while other potentially more serious dangers may even be disregarded (Slovic, 2000).

The media's role in the social amplification and attenuation of risk is important as they constitute one of the most important "stations" of amplification: they have the opportunity (and the responsibility) to select, frame, and disseminate the information to facilitate the task of hazard communication managers towards the population (Sorensen et al., 2016; World Meteorological Organization, 2015). In the context of flood management, researchers have shown that many possibilities exist to benefit from the participation of the media. For instance, when media messages undergo transformations that increase or decrease the volume of information, heighten the salience of certain aspects and weaken others, and reinterpret and elaborate symbols and images, they have more possibility to affect interpretations and responses by the participants (Slovic, 2000).

Scholars have identified features that must be present for the media to effectively perform their role as social amplification stations (Fellenor et al., 2018; Rossmann et al., 2018). The first of these characteristics is volume: large quantities of information may serve as risk amplifiers, as they direct public attention toward particular risk problems and away from competing sources of interest on the one hand, and mobilize latent fears about certain hazards experienced in the past on the other. In the second place, the degree to which the media information is regarded as credible by the population can increase public concern about the hazards and can even lead to doubts about the competence of experts and, sometimes, erode the credibility of official spokespersons. Dramatization, a third attribute, is a powerful cause of risk amplification, in the sense that it can increase public worries about a certain hazard and, in the worst of scenarios, unleash scaremongering. The fourth and final element is the symbolic connotation of the information: specific terms or concepts may have different meanings for varying social and cultural groups, triggering associations (and reactions) independent of those intended (Kasperson et al., 1988; Rooke & Burgess, 2022).

3. MATERIALS AND METHODS

3.1 Research Settings

3.1.1 Anambra State

Anambra is a Nigerian state that is located in the Southeastern region of the country created in 1976. The state has a projected population of 11.4 million residents by the Anambra State Government, making it the eighth most populous state in the country. The state has a population density of 860/km2 and a total land area of 4,844 km2. Anambra was one of the states that were the worst hit by the 2022 floods in Nigeria, which led to serious ecological challenges and other consequences. According to a flood rapid needs assessment by the United Nation's International Organisation for Migration (IOM) (2022a), Anambra state had 35074 persons in 6980 households affected by the floods in 7 local government areas (LGAs); 25,996 persons were registered at the IDP camps, 4,062 houses were affected, and 1,066 houses destroyed. On 7 October, a boat carrying people fleeing the floods in Anambra State capsized on the Niger River causing 76 deaths (The Guardian Nigeria, 2022). In total, it is believed that more than 120 persons died during the flood in the State (The Guardian Nigeria, 2022).

Fig 2: LGAs in Anambra (Uche, 2013)

3.1.2 Delta State

Delta State is located in the South-south political zone in Nigeria, created in 1991. The capital of the state is Asaba, but the economic centres are the towns of Warri and Uvwie. Delta State covers a landmass of about 18.050 km2, 60 percent of which is land, and a population

projected by the state government to be 5,636,100. Delta State was one of the worst-hit states during the 2022 floods in Nigeria. A total of 21 deaths were recorded, 101611 households were rendered homeless, properties worth millions were destroyed and hectares of farmlands were washed away, with 19 out of the 25 LGAs affected in various degrees and a total of 12 IDP camps were set up with 4755 registered persons (Onabu, 2022). However, official records by United Nation's IOM (2022) have the number of LGAs affected as seven, with 78,460 individuals in 12,070 households and 4,692 houses affected (IOM, 2022b).

Fig 3: Map of LGAs in Delta (Adjekukor & Ighere, 2020).

3.2 Research Design

This study adopted a descriptive survey to gather data from communities affected by the floods.

3.3 Sample Size and Sampling Technique

A total of 113534 persons were affected by the flood in Anambra and Delta – 35,074 in Anambra (IOM, 2022a) and 78,460 in Delta (IOM, 2022b). Based on the Krejcie and Morgan Table, the sample size was 383 affected persons.

The multi-stage sampling technique was employed in the selection of LGAs, communities, households, and individuals to study. First, 2 LGAs that were affected by the flood in each State – Ogbaru and Anambra East from Anambra; Oshimili South and Patani from Delta – were purposively selected, summing up to four LGAs in the two States. Second, one

community from each of the four selected LGAs in the Anambra and Delta states was selected through a simple random technique. All the affected communities in each LGA were written down on a piece of paper as the sampling frame, and one was randomly selected from each LGA (Atani in Ogbaru LGA and Igbariam in Anambra East LGA of Anambra; Oko in Oshimili South LGA and Patani in Patani LGA of Delta State). Third, community heads in the communities were engaged to identify households and individuals that were affected by the floods. A census of all the households that were affected by the floods was taken as the sampling frame. Fourth, households were systematically selected by a skip interval of 3 until the proportionate number assigned to each community was exhausted. Finally, each household appointed a member to complete the questionnaire.

3.4 Research Instrument

A self-designed questionnaire was used to gather data from the population in the affected LGAs. The questionnaire has two sections: one that captured the demography of the respondents, and another that asked questions that related to the research objectives. A pre-test of the questionnaire was carried out using 20 respondents (or 5.2 percent of the sample 9 size). Analysis of their responses showed a Cronbach Alpha coefficient of 0.9, confirming that the instrument was highly reliable.

3.5 Data Collection

The data collection spanned about 2 weeks (between 3rd and 15th January 2023) and was, in most cases difficult, because some of those communities were in remote areas and were not as easily accessible. In each of the communities visited an indigene of the community was recruited to assist with directions around the community. The two enumerators that collected data from Anambra State were Igbo-speaking, so they assisted in interpreting the questions in the Igbo language in (rare) cases where the respondents were non-literates. In Delta State, the indigenes that were recruited to assist with directions around the communities also helped to interpret the questions in vernacular (or, especially, pidgin English) where a respondent was non-literate. In all, a total of 380 or 99 percent (out of the 383 copies of the questionnaire) were returned and certified valid for the analysis.

3.6 Respondents' Demographic Analysis

Table 1: Demographic characteristics of communities

Variable	Categories	Frequency	Percentage
Gender	Male	174	45.8
	Female	206	54.2
Age	Below 18	11	2.9
	18-25	46	12.1
	26-35	87	22.9
	36-45	152	40.0
	46-55	58	15.3
	Above	26	6.8
Education	Primary	77	20.3
	Secondary	232	61.1
	Tertiary	61	16.1
	Non-formal	10	2.6
Marital Status	Single	150	39.5
	Married	204	53.7
	Divorced	3	0.8
	Widowed	23	6.1
Occupation	Unemployed	18	4.7
	Daily earner/Artisan	78	10.0
	Farmer	167	43.9
	Trader	87	33.4
	Civil/Public Servant	30	7.9
Category of Occupants	Owner	168	44.2
	Tenant	193	50.8
	Squatter	12	3.2
	Other	7	1.8
Area	Valley and Riverside	68	17.90
	Lowland Floodable	164	43.20
	Lowland Dry	97	25.50
	Upland	51	13.40
Past Flood experience	Yes	322	84.70
	No	58	15.30
Household structure	Below 4	23	6.10
	4 and 6	146	38.40
	7 and 9	151	39.70
	10 and Above	60	15.80

Data in Table 1 showed that the population in the affected communities is largely young, made up mostly of millennials and generation X, whose worldviews make them highly resourceful, independent, upbeat, self-expressive, and tenacious. However, with only 16.1 per cent attaining tertiary education and a large proportion (61.1 percent) acquiring secondary education, these communities are largely limited in educational attainment and formal learning.

The data indicates that most of the population (43.2 per cent) live in lowland floodable areas, which makes them highly prone to flooding, and this is why the majority (84.7 per cent) of the population have experienced floods in the past. With large household members (counted on average 6.5 members), and the majority of them being farmers (43.9 per cent) and traders (33.4 per cent), they are largely prone to losing their livelihoods and suffering a lot of hardship in the event of flooding.

4. RESULTS

4.1 Frequency and Amount of Broadcast Media Flood Risk Communications

Table 2: Distribution of respondents' exposure to broadcast media risk messages before and during the floods

Variables	Responses	Frequency	Percent
Exposure to broadcast flood risk information	Yes	285	75.0
	No	72	18.9
	Can't say	23	6.1
Regularity of flood risk information on broadcast media	Always	77	20.3
	Often	79	20.8
	Sometimes	94	24.7
	Rarely	59	15.5
	Not at all	71	18.7
Broadcast medium with the most exposure to flood risk communication	Television	137	36.1
	Radio	166	43.7
	Hard to say	7	1.8
	Not in any of them	70	18.4
Quantity of flood risk communication on broadcast media	Excessive/Emergency	91	23.9
	Ample	103	27.1
	Mild	79	20.8
	Can't describe	107	28.2
Preferred and most accessible medium for flood risk communication in the community	Television	38	10.0
	Radio	90	23.7
	Newspaper	24	6.3
	Magazine	2	0.5
	Social media	81	21.3
	Individuals	145	38.2

The data in Table 2 shows that at some point and in one way or the other, the majority (75 per cent) of the members of the communities, were exposed to flood risk information on the broadcast media, especially on the radio (43.7 per cent), and to an extent, on TV (36.1 per cent). The size (18 per cent) of those who did not do so is indicative of the fact that exposure to broadcast flood risk information was not prevalent. This is further stressed by the fact that, even among those who were exposed to the flood risk messages, the majority (24.7 per cent) of them were only exposed to it sometimes, and a sizable percentage (15.5 per cent) rarely were exposed to it. It, however, cannot be ignored that almost half of the population got the broadcast with some level of regularity. The data also shows that the proportions of the 11 broadcast risk messages were mostly just enough and regular (27.1 per cent) but a sizable share of the respondents saw the messages as excessive/emergency. Interestingly, individual sources (38.2 per cent) are the preferred and most accessible media for flood risk communication in the community, and not the broadcast media (Radio, 23.7 per cent; TV, 10 per cent).

4.2 Nature of Broadcast Media Flood Risk Communications

Table 3: Distribution of respondents' assessment of the nature, credibility, timeliness, and consistency of flood risk messages

Variables	Responses	Frequency	Percent
Description of flood risk communication on broadcast media	Frightening	86	22.6
	Calming	19	5
	Instructive	168	44.2
	Affable	27	7.1
	None of the above	80	21.1
The flood risk communication was timely	Yes	129	33.9
	No	169	44.5
	Can't Remember	82	21.6
The flood risk communication was trusted	Large extent	105	27.6
	Moderate extent	97	25.5
	Little/No extent	97	25.5
	Don't know	81	21.3
The flood risk communication was timely and credible	Yes	230	60.5
	No	62	16.3
	Can't Remember	88	23.2
The flood risk communication was timely and consistent	Yes	219	57.6
	No	83	21.8
	Can't Remember	78	20.5

The data in Table 3 demonstrates that the majority (44.2 per cent) of the respondents saw the flood risk communication on broadcast media as instructive, but a sizable proportion (22.6 per cent) perceived the communication as frightening. While the majority (44.5 per cent) did not think the communication started in time, most of them felt that the risk communication was trusted to a large extent (27.6 per cent), credible (60.5 per cent), and consistent (57.6 per cent). It is, however, difficult to ignore that a sizable proportion still found the risk communication not trustworthy (25.5 per cent), not credible (16.3 per cent), and inconsistent (21.8 per cent).

4.3 Dramatization of Broadcast Media Flood Risk Communications and Impact on the Sense of Threat

Table 4: Distribution of respondents' perception of broadcast media risk information as dramatized and impact on the sense of threat about the floods

Variables	Responses	Frequency	Percent
The flood risk messages on broadcast media were dramatised	Large extent	27	7.1
	Moderate extent	69	18.2
	Little/No extent	132	34.7
	Don't know	152	40.0
The flood risk messages increased the sense of threat or risk	Large extent	109	28.7
	Moderate extent	110	28.9
	Little/No extent	84	22.1
	Don't know	77	20.3
Flood risk messages on broadcast media increased threat more than other sources	Yes	140	36.8
	No	145	38.2
	Can't Remember	95	25.0
The emphasis of the flood risk messages on broadcast media	Impending risk or threat	66	17.4
	Precautionary measures	48	12.6
	Risk reduction	23	6.1
	A combination of two or all of the above	157	41.3
	None of the above	86	22.6
The flood risk communication attenuated the worries about other issues such as economic status, security, shelter, etc.	Large extent	74	19.5
	Moderate extent	34	8.9
	Little/No extent	97	25.5
	Don't know	175	46.1

Results in Table 4 show that the majority (40 per cent) did not think or were unaware of the extent to which the flood risk messages on broadcast media were dramatised\ by broadcast stations but most of them (28.9 per cent) claimed that the impact of flood risk messages on increasing a sense of threat or risk was moderate, while a substantial percentage (22.1 per cent) did not think the flood risk messages increased their sense of threat or risk about the impending or ongoing floods. The majority (38.2 per cent) of the respondents thought that other sources of flood risk communication increased the sense of threat or risk more than the broadcast media (36.8 per cent). This could be because the media emphasis was not too much on the impending risk or threat (17.4 per cent), but a combination of everything (41.3 per cent), including precautionary measures (12.6 per cent), risk reduction (6.1 per cent), or even none of those emphases (22.6 per cent). Data also shows that the majority (46.1 per cent) of the respondents did not know whether the flood risk communication reduced their worries about other issues such as economic status, security, shelter, etc. However, a large percentage (25.5 per cent) of them are very sure that the flood risk communication did not reduce (or did little to reduce) their worries about other issues such as economic status, security, shelter, etc.

4.4 Symbolic Connotations of The Broadcast Media Flood Risk Information and Ability to Trigger Reactions

Table 5: Distribution of respondents' assessment of implications of flood risk messages

Variables	Responses	Frequency	Percent
The broadcast media flood risk warnings were heeded	Yes	208	54.7
	No	74	19.5
	Can't Remember	98	25.8
The extent that broadcast media flood risk warnings inspired a reaction	Large extent	57	15.0
	Moderate extent	45	11.8
	Little/No extent	146	38.4
	Don't know	132	34.7

Data in Table 5 shows that the majority (54.7 per cent) of the respondents thought that the implications of the broadcast media flood risk warnings were heeded. However, the majority (38.4 per cent) of them said that the broadcast media messages were not responsible for inspiring reactions to the flood risk warnings.

4.5 Factors that Moderated Broadcast Media's Role in the Amplification of Flood Risks

Table 6: Distribution of factors that affected the impact of broadcast media flood risk messages

Variable	Factors	Frequency	Percent
Factors that moderated the impact of or adherence to flood risk communication on broadcast media	My socioeconomic status and occupation	146	38.4
	Properties I would leave behind	19	5.0
	Assurance that I am safe	88	23.2
	Uncertainty about where I was going to	23	6.1
	Procrastination	11	2.9
	The threat wasn't strong enough	14	3.7
	I was ready to die	4	1.1
	Flood risk information not sufficient or trusted	5	1.3
	Other sources were more believable	69	18.2
	Other reasons	1	0.3

Data in Table 6 shows that the majority (38.4 per cent) of the respondents did not react to the flood risk communication on broadcast media because of their economic status (they were poor, their sources of livelihood were on the line, some took a loan to start their businesses and found it difficult to leave, no economic means to relocate, etc). A sizable proportion (23.1 per cent) of the respondents did not heed the flood risk communication on broadcast media because they thought they would be safe in their communities. There were also a lot of people (18.2 per cent) who thought that other sources of flood risk communication were more believable than

the ones on broadcast media. Therefore, where and when there is a conflict of instructions, they adhered to the other sources.

4.6 Regression analysis

Hypothesis 1

H1: There is a significant impact of broadcast media flood risk messages on the sense of threat of the impending flood

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.166ª	.028	.025	.572

ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	70.996	1	70.996	80.811	.000ᵇ
	Residual	332.086	378	.879		
	Total	403.082	379			

Coefficients

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.007	.113		17.720	.000
	Sense of threat	.394	.044	.420	8.990	.000

Broadcast media flood risk messages were regressed on predicting response to flood risk messages. A significant regression equation was found ($F(1,378) = 80.811$, $p < 0.05$), with an R2 of .166, suggesting that 16.6% of the variation was predicted by the independent variable. It was found that the sense of threat ($\beta = .394$, $t = 8.990$, $p = .000$) is positively predicted by broadcast media flood risk messages ($\beta = 2.007$, $t = 17.720$, $p = .000$). This suggests that the sense of threat that the community members have towards the flood is induced by flood risk messages on broadcast media.

Hypothesis 2

H2: There is a significant impact of the sense of threat induced by broadcast risk messages on response to flood risk messages

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.493[a]	.243	.241	.957

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	111.269	1	111.269	121.582	.000[b]
	Residual	345.939	378	.915		
	Total	457.208	379			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.429	.110		31.078	.000
	Response to flood risk messages	-.637	.058	-.493	-11.026	.000

Sense of threat was regressed on predicting response to flood risk messages. A significant regression equation was found ($F(1,378) = 121.582$, $p < 0.05$), with an R2 of .493. However, it was found that response to flood risk messages ($\beta = -.637$, $t = -11.026$, $p = .000$) is not positively predicted by sense of threat ($\beta = 3.429$, $t = 31.078$, $p = .000$). Relating this to Hypothesis One, it has been confirmed that the sense of threat that the community members have about the impending flood is as a result of the flood risk messages by broadcast media, but they do not correspondingly respond to the warnings in those risk messages.

Hypothesis 3

H3: Sense of threat of the impending flood is significantly predicted on timely, consistent, and credible broadcast media flood risk messages

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.763[a]	.582	.577	.714

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	266.045	4	66.511	130.473	.000[b]
	Residual	191.163	375	.510		
	Total	457.208	379			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.172	.119		18.232	.000
	Timely information	1.670	.100	1.119	16.698	.000
	Credible risk messages	-.863	.195	-.657	-4.435	.000
	Consistent risk messages	-.465	.171	-.340	-2.716	.007

Multiple linear regression was calculated to predict a sense of threat based on timely information, consistent risk messages, and credible risk messages. A significant regression equation was found ($F(4,375) = 130.473$, $p < 0.05$), with an R2 of .582, suggesting that 58.2% of the variation was collectively predicted by the independent variables. Looking at the individual contributions of the various predictors, it was found that only timely information (β = 1.670, t = 16.698, p = .000) positively predicts a sense of threat. This suggests that early warning messages have a significant impact on the amplification of flood risk in selected states Southern Nigeria.

5. DISCUSSION

This study finds that most members of the communities affected by flood in Southeast and South-south Nigeria were at some point exposed to flood risk information on the broadcast media, especially on radio and to an extent, on TV; but exposure to broadcast flood risk

messages was not widespread and regular, as there were other more accessible sources of flood risk communication, especially those coming from individuals such as community leaders, NGOs, and government agencies. This does not mean, in any way, that the broadcast media did not regularly provide flood risk warnings and other messages, but the implication is that most people may not regularly access the broadcast media. This finding validates previous research findings that confirm that broadcast media have been major sources of information on flood risk in Nigeria (Ekoh et al., 2022; Ata-Awaji, 2020) but also corroborates the views of researchers (Ben-Enukora et al., 2023; Olanrewaju et al., 2021; Omenesa & Shittu, 2004) who confirm that the problem with the use of broadcast media in communities in Nigeria has always been that of access and relevance of information. Even when people can access the messages, there should be a deliberate effort to ensure an understanding of early warning signals and other flood risk messages for the locals (Chakma et al., 2022).

Another significant finding was that the broadcast media flood risk messages did not do a lot to amplify the severity of the perception of the impending flood risks, and the messages did not start in good time, even though they were largely credible and consistent. Multiple regression analysis shows that the timeliness ($\beta = 1.670$, t = 16.698, p <0.05) of broadcast flood risk messages – and not the credibility of the message ($\beta = -.863$) nor the consistency of the message ($\beta = -.465$) – is a positive contributor to the audience sense of threat of the impending flood. Floods are known to be one of the most predictable georisks, hence it is known ahead of time (Intrieri et al., 2020), giving disaster managers enough time for elaborate up-front planning and support systems (Chiba et al., 2022). Therefore, it is surprising that the broadcast media did not begin the flood risk communication campaign timely enough. It is acknowledged that timely communication is an efficient means to reduce the risk of disasters, particularly by stressing the severity of the danger ahead, helping people to plan, and reducing people's exposure to the disaster. This finding supports Lucas and Bassey's (2022) report that the broadcast media in Nigeria do not set the required agenda in risk communication. As a result, the broadcast media in Nigeria have fallen short of the role of communication in the amplification and attenuation of risk (Ren, 2011; Kasperson, 2017). Lack of early warning communication continues to be an issue in disaster management in Nigeria, as was found in a study of the reaction of a community flood risk warning in Kogi State, Nigeria (Osayomi et al., 2022).

Interestingly, the study establishes that other sources of flood risk communication increased the sense of threat or risk of the impending floods more than the broadcast media did. The most prominent of those sources were word of mouth (interpersonal communication) (38.2%) and social media messages (21.3%). While Hypothesis One found that the sense of threat ($\beta = .394$, $t = 8.990$, $p = .000$) is positively predicted by broadcast media flood risk messages, it is instructive to know that, with an R2 of .166, only 16.6% of the variation in sense of threat was predicted by broadcast media flood risk communication. More so, the broadcast flood risk communication did not effectively attenuate (or did little to attenuate) the people's worries for other issues such as their poor economic status, high cost of living, security challenges, state of their shelter, etc. Studies have shown that socio-demographic variables of a population do

not always explain a lot of their risk perception but rather, they act as amplifiers or attenuators of risk perceptions (Cisternas et al., 2016; Ren, 2011). In Southeast and South-south Nigeria, the people's worries about other issues such as their poor economic status, high cost of living, security challenges, state of their shelter, etc. seemed to have attenuated their risk perceptions.

Besides the increase in flood risk perception, this study also sought to find out the extent to which the risk messages inspired reactions to the messages. The study finds that response to the flood risk messages (β = -.637, t = -11.026, p = .000) was not effectively as a result of the sense of threat that the broadcast media messages may have induced., and that may have informed the low level of adherence to the flood risk warnings and the high level of casualty that was recorded during the flooding. That implies that if there is any increased sense of threat that the broadcast risk messages induced, it did not significantly affect the extent to which the risk messages inspired a response from members of the affected communities. Nevertheless, the casualty in response to the flood risks may have other explanations: there is already a piece of scholarly evidence that people living in flood-prone areas often downplay flood risk and hesitate to respond to awareness-raising campaigns by taking the steps necessary to reduce or avoid the risk of death, injury, or property damage (Demeritt & Nobert, 2014; Bubeck et al., 2012). A study in Rivers State by Ata-Awaji (2022) confirms that residents do not obey flood risk messages from radio stations. These people are often reluctant to heed warnings of an impending disaster, and most of them only do so when the disaster happens (Osayomi et al., 2022).

Furthermore, the study finds that the major reason members of the communities did not significantly and immediately react to the flood risk communication on broadcast media was mostly because of their economic status (they were poor, their sources of livelihood were on the line, some took a loan to start their businesses and found it difficult to leave, no economic means to relocate, etc) and many of them thought they would be safe in their communities. This validates several studies that have shown the importance of some characteristics in the way people react to risk communication. Meanwhile, social class and level of education have been strongly correlated with a better level of flood risk awareness and reaction (Muttarak and Lutz, 2014), and people prefer to think of their homes as intrinsically safe places (Harries, 2013); therefore, some risk messages that threaten the loss of their home or their "ontological security" (de Oliveira 2021, p. 9; Harries, 2013) may lead to inverse responses. These show that some moderating factors can contribute to the number of adaptive measures that people undertake (or refuse to undertake) in risk situations (Tanner & Arvai, 2018; Boamah et al., 2015).

6. CONCLUSION

This study appraised broadcast media's application of the social amplification and attenuation of risk framework by the broadcast media in the management of the 2022 floods in Southeast and South-south, Nigeria. Findings are indicative of the fact that the amplification of flood risk perception in the broadcast media was not effectual as the messages were moderated by institutional, social, economic, and psychological variables that affected how the communities perceived, managed, and responded to the flood risk messages. Therefore, while the broadcast media are capable of amplifying or attenuating flood risk perception, there are a lot of variables that interfered with this role and those moderating factors are the socio-economic, personal experience of the individual, other competing sources of information, and media attitude towards the risk situation.

Based on the findings, the researchers recommend that:

•   The broadcast media should begin a comprehensive flood risk communication very early.

•   The flood risk messages should emphasize the severity of the threat of the impending flood, and sufficiently dramatize the message and the threat.

•   Individual sources seem to be more accessible and preferred by the communities. Development journalism tenets should entail that journalists combine mass communication with visiting rural communities to inform and educate them of impending threats.

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