

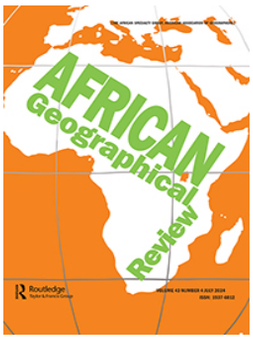
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To live or to die: cultural and social factors influencing flood preparedness in Nigerian cities

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ABSTRACT

There is an array of studies documenting community preparedness to flooding in towns and cities, particularly those in countries of the developing global south. However, fewer studies have investigated how cultural and social factors influence flood preparedness. In this article, we discuss the role of cultural and social attributes and how these can influence a community's preparedness to extreme flood events, with a focus on selected urban communities in Nigeria. Study revealed that despite, the effects of floods on the urban poor residents, they are actively involved and engaged in finding ways to build their adaptive capacity and resilience against flood events by deploying different strategies inspired through cultural and social attributes.

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Culture; flood preparedness; risk perception; social norms; Nigeria

1. Introduction

Flooding remains one of the main environmental problems across the world, accounting for one-third of all global geophysical hazards (Kreibich et al., 2017; Saharia et al., 2021). In Nigeria alone, flooding has caused an average of more than US$5 billion annually in damage across communities, towns, and cities since 2000 (DAT, 2021). It was also reported that between 2000 and 2021, more than 5,000 people lost their lives and about 40,000 families have been left homeless and traumatized (DAT, 2021). Studies have predicted that more intense flood will occur in the future, and areas that are at risk from floods are required to be defined (Komolafe et al., 2020; Olorunfemi et al., 2020). This necessitates the need for long-term flood preparedness intervention in the country.

Extant studies on flood risk reduction in the countries of global south and north posit that the potential impacts of flood and its cascading impacts on people and properties could be mitigated through adequate and prompt preparedness (Mabuku et al., 2018; Nojang & Jensen, 2020; Hashim et al., 2021 Zinda et al., 2021). According to Mabuku et al. (2018), flood preparedness comprises activities designed to enhance actions and capacities of individuals, community groups, private and government organizations to adequately and effectively prepare, respond to and recover from the current, likely or imminent impacts of flood events or conditions. As noted by Atreya et al. (2017), investing in flood preparedness can cost effective and can help mitigate the negative impacts of the flood catastrophe occurrence over time. Effective flood preparedness activities are mainly characterized with enhancing individual or community capacity to monitor, predict, and adequately

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strengthen preparedness to reduce potential threats and respond to emergencies in order to rescue and provide assistance to those who have been adversely affected by flood (Shah et al., 2020).

However, preparedness activities are often influenced by several factors. As opined by Han et al. (2021), level of preparedness can be determined by the level of participation of individuals, community groups, government and non-government organizations in preparedness activities. The study of Hashim et al. (2021) also stated that hazard knowledge, risk perception, previous experience, government preparedness and assistance, and community or people's social and economic characteristics greatly influence engagement in disaster preparedness activities. Besides, knowledge about possible disasters and cultural values, attitudes, and place attachment are likely to affect disaster preparedness (Mishra et al., 2010). Scholars such as Cheema et al. (2014), Salami et al. (2017) and Ayeb-Karlsson et al. (2019a) have also argued that disaster perceptions and decisions are strongly related to people's social, cultural, and religious value systems. It is in this context that this article examines cultural and social factors influencing flood preparedness in communities of global south.

Over the years, social and cultural norms of disaster preparedness have received little or no attention with policy making and academia in countries of global south and north (Ayeb-Karlsson et al., 2019a; Krüger et al., 2015). The reason for this could be that religious beliefs and social values about hazards have traditionally been perceived as sensitive, hence their impacts have been avoided by academia and policymakers (Ayeb-karlsson et al., 2019b; McGeehan & Baker, 2017). Consequently, many international organizations vastly underestimate such beliefs in their disaster risk reduction approaches. Therefore, this study seeks to investigate how social and cultural factors affect flood preparedness in selected communities of Nigeria.

2. State of art on disaster preparedness

An essential component of disaster risk reduction process is disaster preparedness (Paton, 2019), which refers to the process of encouraging and facilitating the availability of resources to cope with potential impacts of disasters and to improve the competency of managing these resources (Jiang et al., 2019). The extent of disaster management process largely depends on the level of preparedness embarked upon by the relevant stakeholders (Okunola, 2021). According to Okunola (2019), disaster preparedness activities in disaster risk reduction cycle are key for inventory, identification, and evaluation of all precautionary measures and actions to be prepared for all types of disasters in a given area. The author further stated that the key indicators for measuring level of disaster preparedness include: prediction, monitoring, and warning for potential impacts of disasters; training and public awareness and emergency preparedness (for monitoring, alerting and evacuation of disaster victims, setting up of medical operations for immediate disaster assistance, distribution of disaster supplies and equipment and deployment of search and rescue teams). Similarly, Nojang and Jensen (2020) argued that fully prepared communities or households are expected to understand the potential impacts of hazards and take adequate precautionary measures about them, engage and educate people in the communities on the need to participate in activities that will minimize loss from hazards, sustain themselves in the face of hazards, and evacuate from disaster prone communities.

A diverse group of scholars have established that tangible disaster preparedness actions are enhanced by social cohesion, specifically 'collective problem solving,' 'sense of community' and community members, as well as the development of cognitive abilities that can reduce vulnerability and enhance preparedness (Prior & Eriksen, 2013; Staples 2012). Grogg (2015) likewise stressed that effective local actors coordination, strengthening community capacity, social capital investment and imparting scholarly information automatically lead to awareness and determining factors for successful disaster preparedness. Thus, embracing community-based disaster preparedness is imperative to enhance effective disaster risk reduction as it can leverage already established connections in the community. Nevertheless, people's preparedness in the face of risk goes beyond community capacity, social capital, and scientific information about disasters. It involves how this information is perceived through expectations, previous experiences, and beliefs derived from their economic, cultural, social, and political

context (Ayeb-karlsson et al., 2019b; Okunola, 2019; Van Manen et al., 2015). The present study, however, focuses on social and cultural factors influencing disaster preparedness using case studies from Nigeria.

2.1 Social and cultural factors in disaster preparedness

There is no doubt that social and cultural norms profoundly affect disaster response in the sense that they influence how individuals, communities, and households perceive, define, and manage risks and disasters, as well as what actions are taken toward disaster prevention (Teo et al., 2019). Social factor in this study is defined as organization or structure of a society as a result of political and economic systems engaged in control, ownership, distribution, and welfare. On the other hand, cultural factor refers to a system or belief such as society's customs, attitudes, perceptions, ethnicity, ideas, and values. In terms of social factors, Himes-Cornell et al. (2018)) opined that when seeking to comprehend preparedness measures, it is critical to account for societal impacts on how risks connected with hazards such as floods are seen and interpreted, as well as how this informs what individuals do to cope with them. In a study conducted by Mabuku et al. (2018) in Mwandi district of Zambia and Eastern Zambezi Region of Namibia, the study concluded that feeling of worry about the risk, high responsibility for self and others, sense of community positive outcome expectancy are associated with high level of household flood preparedness. In a study conducted by Teo et al. (2019), the authors affirmed that social construction of the risk paradigm that has been widely adopted within disaster risk reduction is greatly influenced by social differences, such as gender, age, status, class, and ethnicity.

Furthermore, socio-economic factors such as occupation, income, household size and education status are also often significant factors. They are inherent to the social construction of the risk paradigm that has been widely adopted within disaster risk reduction cycle. As noted by Działek et al. (2016) and Oulahen et al. (2015), income level is particularly critical as even relatively small economic losses can have grave consequences, especially if the individual cannot afford to purchase new property or obtain insurance. In addition, unemployment and low education level are often cited as determinants of vulnerability. This was also emphasized by Cutter (2003) and Onuma et al. (2017) who wrote that low levels increase income and education increase vulnerability to disasters, by limiting access to information and the means to understand it is connected to a lower likelihood to prepare for disasters.

People's risk perceptions and willingness to heed warnings are influenced not only by social factors but also by various factors, including cultural and economic factors. Studies have postulated that cultural factors such as ethnicity, society's customs, attitudes, perceptions, ideas, and values may influence both behavioral adaptation and risk perception of people or communities (Suárez-Orozco et al., 2018; Teo et al., 2019). For instance, Lucini (2014) opined that people from some ethnic backgrounds are more vulnerable in disaster situations as a result of interrelated factors such as cultural differences leading to variations in opinion and understanding of disaster risk (Teo et al., 2019); language barriers, resulting to social and linguistic isolation (Howard et al., 2018); informal sources of information reliance (Teo et al., 2018); and limited access to disaster warnings and distrust of warning messages as a result of low literacy level. The issue of ethnicity was also emphasized by Cox and Kim (2018), which found that a significant difference in the level of preparedness between White, Black, and Hispanic elders in the United States was due to lack of access to resources, cultural differences, social, economic, and political marginalization. Another study in North Eastern Carolina found that Latino migrants had low levels of disaster preparedness which can be attributed to language difficulties, lack of disaster knowledge, economic difficulties, and apathy (Burke et al., 2012). In Nigeria, Olokesusi et al. (2015) noted that poor financial conditions, lack of government support and religious beliefs are significant factors influencing household disaster preparedness. Similarly, Appleby-Arnold et al. (2018) argued that fatalistic attitudes have been identified as a significant determinant influencing citizens' perceptions of the ineffectiveness of government institutions and distrust of authorities which also control disaster preparedness.

Studies by authors such as Yari et al. (2019) and Aksa (2020) stated that fatalistic attitudes related to explanations of natural hazards in some Muslim countries are a significant obstacle to disaster risk prevention, to the extent that citizens disregard building standards, community education programs and evacuation during disaster situations. McClure (2017) likewise stressed that the people's religion might lead them to believe that the earthquake is God's order and that God determines the earthquake's location. Furthermore, diverse group of scholars have argued that people's perceptions of the causes of disasters are strongly linked to their cultural, religious, and social understanding of the world (Mercer et al., 2009; Cheema et al., 2014). For example, despite several people receiving early warnings about Cyclone Sidr in Bangladesh, they still remained at home, owing to cultural and religious beliefs (Ayeb-Karlsson et al., 2019a). However, studies have shown that there has been considerable success in increasing disaster preparedness and response in countries dominated by Muslims (Lumbroso et al., 2017; Islam et al., 2021). For instance, Lumbroso et al. (2017) noted that disaster preparedness and response has improved in Bangladesh despite an increase of almost 50% in the number of people exposed to hazards. They posited that how risk posed by cyclones and coastal surges is communicated to isolated and vulnerable communities, as well as, improving warnings and evacuation/shelters and high level of trust between citizens and governments at all levels contribute significantly to disaster preparedness in the country. Similarly, the study of Chester et al. (2012) assessed how volcanic risk perception in Italy is shaped by religious and cultural factors and found that despite the fact that citizens in religious South Italy (Mount Etna region) were taking part in activities that are believed to help miracles take place, they also participated in evacuation and relocation activities. From these submissions, it can be inferred that cultural factors such as religious belief and ethnicity or trust in authorities and perception of the causes of disasters affect disaster preparedness, but the respective effects may differ substantially based on the specific local context. This necessitates examining cultural and social factors influencing flood preparedness in selected communities of different cultural settings in Nigeria.

3. Materials and methods

The study was conducted in Isheri (Lagos), Oyigbo (Port Harcourt) and Unguwan Dosa (Kaduna), Nigeria. The choice of these communities was informed by three main criteria: annual experience of floods, different cultural settings, as well as geographical settings. Isheri, a community bordering Ogun River and Lagos state, along Lagos-Ibadan expressway (Figure 1). The area falls within Ogun State, with close proximity to Lagos Metropolis, the industrial capital of Nigeria. Isheri area constitutes a substantial portion of the first Ogun State Property & Investment Corporation (OPIC) acquisition with a focus on the residential, commercial, and industrial real estate hubs in the peri-urban areas. Occupants in the area include the cattle and ram dealers on the bank of the Ogun River The community is mainly occupied by a high proportion of low-income people and a few middle-income groups. Oyigbo is a community in Port Harcourt Metropolis, River state; it lies between latitudes 4° 52′ 41.268″ and 4° 52′ 30.39″, and Longitudes 7° 07′ 26.695″ and 7° 07′ 45″. The area has a high proportion of low-income households, and a smaller group of middle-income people living in squatter settlements and neighborhoods. Unguwan Dosa is a low-income community located in the central Kaduna north region and lies between Latitude: 10.5696° or 10° 34' 10.7"north. Longitude: 7.4524° or 7° 27' 8.8" east. The community is densely populated and dominated by indigenous Hausa people from all social groups and parts of Northern Nigeria. Fieldwork for this study was carried out from May to November 2018.

The study used a mixed method that combined qualitative and quantitative analysis to provide an in-depth understanding of the various social and cultural factors influencing household disaster preparedness in the communities. In-depth interviews and surveys were conducted with household heads who have been living in the communities for a minimum of 10 years. This could be attributed to the fact that a person who has stayed in an environment for a long period of years would have more detailed experience of the environment than a new resident (Okunola, 2021). In the case of storey buildings, respondents were selected from the first household on the ground floor. Subsequently, a total of 443 questionnaires (Isheri = 187; Oyigbo = 158; Unguwan Dosa = 98) were administered by 12 trained

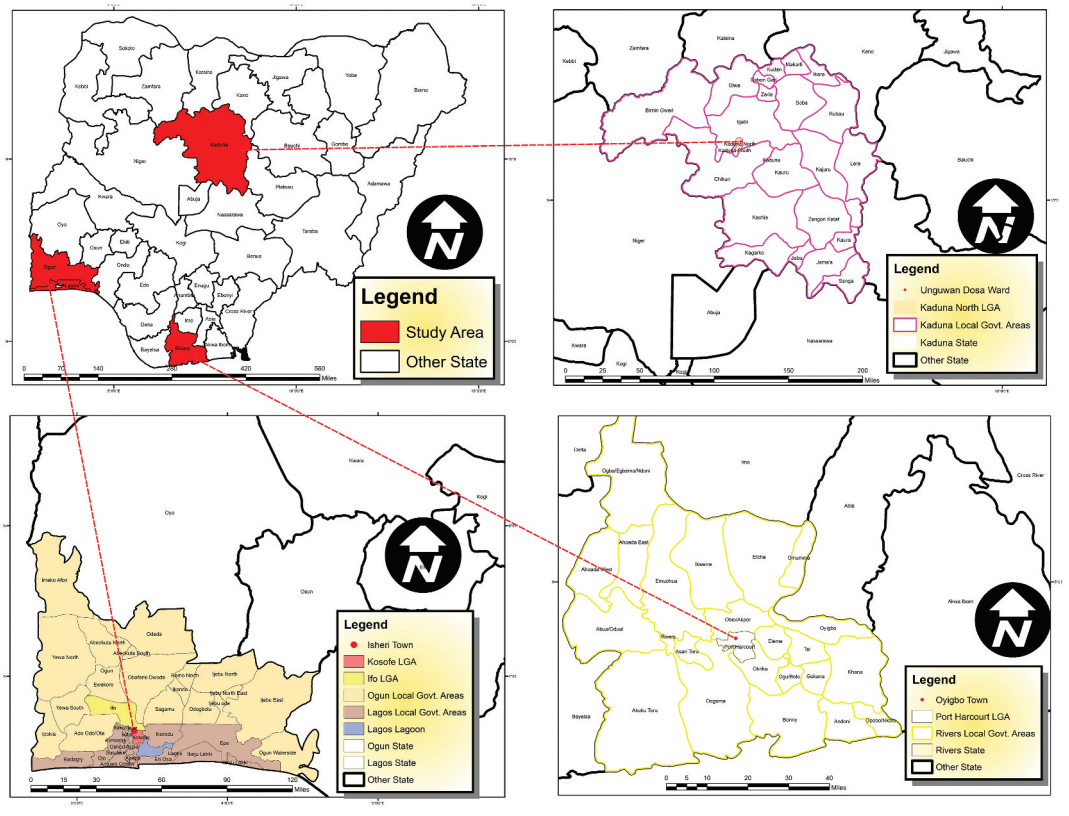


Figure 1. Map of Nigeria and the study sites. Source: Cartography Unit (2022), School of Geography and Environmental Studies, University of Witwatersrand, South Africa.

enumerators who randomly selected household heads in every ten houses in the study areas. Respondents were between the ages of 20 and 70 years.

In order to determine the variations in factors influencing flood preparedness among people of different cultural backgrounds, socio-economic and demographic data, such as gender, age, educational status, tribe, income, religion, house tenure in the area among others were sought. Furthermore, variables to determine level of effectiveness of flood preparedness activities in the communities were measured on five point Likert scale (1 = not at all effective, 2 = slightly effective, 3 = somewhat effective, 4 = moderately effective and 5 = very effective) to examine residents perception on various preparedness activities.

For qualitative data, a total of 74 in-depth interviews were conducted in the study. In the three communities, participants (household heads, religious and community leaders) were chosen by using a purposive sampling method based on the need to collect information from those who would most benefit from the study. Leedy and Ormrod (2005) provided rationale for this approach by asserting that it is imperative for researchers to choose respondents who can provide the most relevant information for the study (both in terms of quality and quantity). Informed consent was used for all interviews.

Each interview lasted an average of 45 minutes. In order to accurately reflect respondents' views, the interviews were tape recorded and transcribed verbatim. NVivo 9 qualitative software was used to conduct more in-depth analysis of the data in order to identify important patterns and common themes, as well as to deepen the understanding of relationships identified. All 74 interviews were coded on the same coding scheme to identify differences and similarities among participants on cultural and social factors influencing flood preparedness in the communities.

4. Findings

4.1 Socio-economic, cultural, and housing attributes of residents

The study considered the socio-economic, cultural and housing characteristics that can influence flood preparedness practices of residents in the selected communities. These were gender, age, education, tribe, income, religion and residents' house tenure. Findings revealed representation of the two categories of gender in the three communities. In all, 53.3% of the respondents were male while 47.7% were female. This representation of both gender will afford the study to have opinions on flood preparedness based on gender differentials. Also, more than half of the respondents (53.7%) were between the ages of 40 and 59 years, 28.7% of the respondents were between the ages of 20 and 39 years while only 17.6% were above 60 years. Further findings indicated that the minimum age was 20 years and the maximum age of the sampled respondents was 69 years with mean age of 45 years. This implied that the respondents were of age to give detailed experience on flood preparedness activities in their communities. Findings also revealed that 43.6% of the respondents sampled had secondary education while 27.9% and 23.0% had primary and tertiary education, respectively. This indicated that larger percentage of the respondents (94.6%) had access to formal education.

However, there was variation in respondents religion and ethnic backgrounds. For instance, it was revealed that all respondents in Unguwan Dosa were Muslims while 88.5% and 52.4% were Christians in Oyigbo and Isheri, respectively. These are the two major religions in Nigeria; the third being the traditional religion. In a similar vein, all the respondents in Unguwan Dosa were Hausa (100%), as expected since it is an Hausa community. However, 67.9% of respondents in Isheri were Yoruba while 51.9% of respondents in Oyigbo were Ikwerre tribes. Investigation was also made into the house tenure of the residents to know whether the houses were owner occupier or rented. This is because it is considered to be a major factor influencing individual level of preparedness to disasters (Okunola, 2019). It was discovered that 66.6% of respondents were owners of the houses they occupied while 33.4% rented their houses.

Monthly income of respondents were divided into three categories: low, medium, and high. Monthly income below N50,000 (US$1 = N 415.09 [Central Bank of Nigeria 2022]) was categorized as low. The medium monthly income was categorized from N50,000 to N100,000 while residents earning above N100,000 were categorized as high-income earners. Based on this categorization, 33.4% of the respondents were low-income earners (less than N50,000); 45.6% were of medium income (N50,000–N100,000); and 21.2% were of high income (above N100,000) in the city. Across the three communities, however, there was variation in the categories of income of the respondents. For instance, the minimum income was N19,500 while the maximum was N250,000. The average median income of the sampled residents in the study area was N94,720. This indicated that the residents were mainly of the middle-income earning.

4.2 Residents perception on causes of floods in the communities

Interviews conducted explored types and causes of flood in the areas by asking respondents to reflect on the causes of floods in the selected communities. It was affirmed from respondents interviewed in the three communities that coastal and fluvial flooding are the major types of flood experienced by the residents and these flooding incidents usually occur in Isheri and Oyigbo. In Unguwan Dosa (Kaduna), it was reported that river or fluvial flooding was the major type of flood affecting the people living in the community. Relatedly, about 70% of respondents in Isheri community said there are many causes of flood in the cities ranging from overpopulation which has significant impacts on the amount of waste generated and dumped on the streets, and also, in the drains. It was also noted that the impacts of overpopulation reflected on the level of encroachment of structures and buildings on prohibited places such as drainage channel.

> Well, from my own perspective, I think it's rapid or overpopulation as a result of unplanned urban spread or unplanned development, where people are not suppose to build, they build there. . .. because when you look at the rate of flood occurrence in the cities over the years, you discover that it is as a result of people violating safety measures. For instance, you are building on a floodplain or you are dumping refuse in drainage and whenever there is rain the water will always find its course or way. **Interviewee 7**

> Isheri is widely known as flood-prone community and this is as a result of people building along waterways, improper drainage facility in the metropolise and there is also an issue of refuse dumping along waterways by the residents. **Interviewee 11**

Cultural belief was also mentioned by five of the respondents as one of the reasons why Isheri was experiencing recurrent flooding. For instance, failure to give sacrifice every year was said to have angered the gods. People living in flood prone areas were expected to make sacrifices every year to appease the gods. In the words of two interviewees:

> As the chief priest of this community, I have warned them several times that it is very important to appease the gods by making sacrifices every year in order to prevent the occurrence of flood that has been affecting the community over years. For the past three years, we have been experiencing serious flooding which shows that gods are angry. **Interviewee 4: older adult**

> People in this community have been committing serious crimes in recent years ranging from robbery to adultery and dumping of garbage on the community river. All these acts angered Yeye Oluweri (the gods) and these are the reasons we have been experiencing persistent flooding in the community. **Interviewee 14: older adult**

These responses indicated that some certain set of people attributed persistent flood occurrence in Isheri to contravening social norms which subsequently angered the gods. In a similar vein, some of the respondents interviewed in Unguwan Dosa believed that persistent flood is an act of God and there is nothing anyone can do to prevent its occurrence. However, more significant percentage of respondents (74%) claimed that flood in Oyigbo community is as a result of refuse dumped in the river and drainages by people living in the area. From this submission, it can be inferred that there were diverse opinions on causes of flood in the communities.

4.3 Flood preparedness activities in the communities

Respondents were asked to rate the level of preparedness to flood disaster in their communities. Findings revealed that the mean values were 2.98, 3.11, and 2.81 in Isheri, Oyigbo, and Unguwan Dosa, respectively. This indicated that residents perceived the effectiveness of flood preparedness activities in the selected communities as very weak. For instance, listening to flood awareness programs on radio and television, construction of embankments or levees, provision of safety nets which include cash, in-kind transfers and provision of food and clothing for flood affected people and members of communities helping each other during a flood response emerged with satisfactory levels of preparedness across the three communities. This was also confirmed by all the in-depth interviews conducted which revealed that state governments of the selected communities forecast, plan, and raise level of awareness of flood occurrence through media channels and invest on construction of embankments and drainage. However, other activities such as implementation of standard building codes for construction, active participation of disaster risk reduction committee and flood monitoring mechanisms were perceived to be least flood preparedness activities across the three communities.

Flood preparedness perceived to be more effective by respondents in Isheri was construction of embarkment, levees, and drainage (MD = 1.23). The preparedness with least PRI was the presence of standard building codes used for construction (MD = −0.47). Contrarily, in Oyigbo and Unguwan Dosa, listening to radio or TV messages on flood awareness were perceived as the most effective flood preparedness with respective mean score of 4.34 and 4.01. However, members of the communities being aware of evacuation plans and routes (MD = −1.10) and participation in flood awareness campaigns (MD = −0.94) were ranked as the least effective flood preparedness methods in Oyigbo and Unguwan Dosa, respectively.

However, women were not allowed to participate in flood preparedness activities in Kaduna due to cultural and religious reasons. In some of the communities, women generally stay at home and are not allowed to work or participate in any communal activities. As two interviewees stated:

> We are refrained from doing anything outside our shelter. It is extremely prohibited for women to hold meetings, contribute money or participate in any activities beyond the house. Our opinions are neither valid nor counted despite the fact that women are mostly affected by flood occurrence. **Interviewee 6: young female**

> Women actions toward flood reduction in this part of the country are restricted to cleaning of compound and praying to Almighty Allah to prevent any form of flood disaster. I personally save small amount of money and preserve food in case of emergency. **Interviewee 12: older female**

4.4 Factors influencing disaster preparedness

Respondents were further asked reasons for living in flood prone communities despite state governments level of awareness on flood in various media channels. Some of the respondents (72%) in Isheri stated that they stay in the area because of affordable rent and closeness to place of work. Further, more than half of respondents (64%) stated that failure of government to fulfill promises of relocating the affected people has led to mistrust and miscommunication with residents of the community. As one interviewee noted:

> Lagos state government cannot be trusted as many people who their houses have been submerged by flood in the past are still homeless. I prefer to stay here and suffer the flood consequences than to trust the government and be homeless. **Interviewee 2: older adult**

Furthermore, about 82% of respondents in Isheri claimed that citizens were not involved in the formulation and implementation of flood preparedness strategies in the state which further reinforced residents' belief not to trust the government on all the promises made to relocate them from the community. Similarly, most of the respondents (85%) in Oyigbo stated that the main reasons for living in the area is affordable rent and closeness to work as house rent is on the high side in Port Harcourt metropolis. Some of the respondents (55%) also stated that their means of livelihood is situated in the community. Consequently, they prefer to die than leaving the community. As captured by two interviewees:

> I have stayed in this community for more than 40 years. This is where I got married, raised my children and the money that I used to send them to school. So, I cannot survive a day living in another community. **Interviewee 19: older adult**

> I have invested a lot in this community in terms of landed properties and other valuable assets and this is where I work. I am about 70 years and I really don't know where and how I will cope in another location. If you remove the roof above my head, you do not need to kill me, I am already dead. **Interviewee 24: older adult**

In Unguwan Dosa, a fishing and farming-dependent community, people received warning alerts about flood but opted not to leave the community as a result of religious factor. Some of the respondents (75%) stated that religion accorded people a framework on what to do, where to be and how to survive the consequences of flood. This belief has kept people safe and eliminated their fears. In the words of two interviewees:

> The only reason my family and I survived the recent flood occurrence in this community is just Almighty Allah. Despite the fact that two of my children were pulled away by flood and drown, Allah kept them safe and looked after them. **Interviewee 13: young adult**

> Why do I need to evacuate from this community when Almighty Allah has promised to protect his servants from any disastrous events. If Allah wants to take me, he could easily do so. We belong to Allah and truly to Him we shall return. Since the flood has destroyed my property, there is no where to go. No matter what happened, you still have to keep your faith in Allah and wait for the floods patiently in your room and pray for Allah's safety on your family. **Interviewee 17: older adult**

Another major factor influencing disaster preparedness mentioned by respondents in Unguwan Dosa was people involving in occupations that increase the probability of flood risks in the area. For instance, herders or stockbreeders must take their livestock for grazing across the river where they are in danger of flooding.

5. Discussion

The study illustrates how social and cultural factors can influence flood preparedness in communities of different cultural settings in Nigeria. Findings established how people perceived the causes of floods and level of preparedness in ways that make conventional flood risk reduction interventions difficult. It was discovered that the major causes of flood in the communities were overpopulation and outright absence of basic infrastructure and poor environmental sanitation, where people dump refuse in rivers and drainages. This further substantiated earlier assertions by the UN Habitat report (2017) that most cities in Nigeria have undergone urban decay because of lack of or breakdown in basic services, such as affordable housing, road systems and waste disposal systems. This is an indication that residents of these cities are faced with serious infrastructural shortage. As a result, people are forced to live in informal settlements that are prone to various types of disasters.

Another major finding is the linkage of cultural beliefs as one of the major reasons for incessant flood occurrence in the cities. This was attributed to constant committing of serious crimes and failure to make sacrifice to the gods in some parts of the study area. In line with this, religion was also used to explain why the Unguwan Dosa was experiencing repeated floods. This instills a feeling of trust and surrendering to God without having to try and prepare for disaster. This clearly showed that religious belief and cultural perception play important roles in flood preparedness among residents of the study area. This finding corroborated the earlier assertion by Ayeb-karlsson et al. (2019b) that folklore, cultural beliefs, and religious conviction are major factors limiting disaster preparedness in developing countries. This also implied that socio-economic and technical approaches are not the only factors influencing non-evacuation behavior among residents in disaster prone communities.

The study also found that flood preparedness practices by the people of the communities are mainly centered on construction of embankments/levees and drainages, and distribution of relief materials to flood victims in the study area. Residents interviewed opined that government spend billions of naira (about US$3 million) in the region in purchasing relief items in form of food, warm clothes, medicine, and temporal shelter but this materials hardly get to disaster victims as relief materials are being diverted by the officials in charge for their personal use. Another major preparedness activity in the study area was early warning system through radio and television mediums. However, the early warning was reported to be ineffective as residents mistrust government agencies judgments due to failure to fulfill previous promises of relocating previous disaster victims. This finding confirms the findings of previous studies such as Rana et al. (2021) that community preparedness against flooding is usually poor due to limited understanding of early warning system, mistrust in local institutions, and lack of participation in flood risk reduction measures. It was also established that women in Kaduna were not allowed to participate in flood preparedness activities due to religion and cultural factors. This implied that women played little or no role toward flood preparedness in Kaduna due to what is regarded as contravention of social norms and teachings of Islam. These results agree with the findings of Krüger et al. (2015) and Hamidazada et al. (2019) that women are vulnerable to the impacts of disasters as they are often neglected and restricted in disaster preparedness activities due to cultural and religious factors.

The comments and feedback gathered also suggest that affordable rent and closeness to place of work influenced residents' decisions not to relocate from the flood prone communities. This narrative bear testament to the fact that these communities serve as source of livelihood for some residents that engage in fish and farming activities despite the increasing intensity and impacts of floods in the communities. Questions that therefore need to be asked about the effectiveness of state policies to restrict people from living in life-threatening areas. It is worthy of note that Nigeria has well-documented policies to check buildings in unauthorized and dangerous places. However, gaps in

the implementation of these policies have contributed greatly to the annual incidence of flooding in the communities. Worthy of note is that the problem of ineffectiveness of state policies is not only peculiar to institutions in Nigeria. Studies such as Danso and Addo (2017) and Amoako et al. (2021) also confirmed that weak implementation of national policies contributes to the flooding problem in most developing countries of the world. Another major factor highlighted by respondents in the study area was religion beliefs as residents see extreme flood event as an 'act of God.' Some of the respondents in Unguwan Dosa community believe that God would watch over them no matter where they were. Consequently, people prefer to die of flood than relocating from the community. This implied that faith plays a prominent role in the way in which communities interpret disaster events and the strategies they employ to prepare for and/or mitigate hazard risk.

Another major factor found to be fundamental in flood preparedness activities in the study area was lack of trust in government because of government not fulfilling previous promises and noninvolvement of residents in policy formulation and implementation in the communities. This implied that residents trust in government largely depends on satisfactory performance in meeting community demands and inclusiveness in disaster preparedness. This argument was also shared by Shin and Hyun (2022), who wrote that collective action process ultimately strengthens social capital and trust as participating citizens bond strongly and gain a sense of control by influencing the post-crisis policy-making process. Such participation may also enhance social cohesion and trust, which constitute a significant disaster resilience factor.

6. Conclusion and recommendations

Improving flood preparedness for people, particularly those who live in areas with high exposure to flood, is a key concern for policymakers. These concerns are even more intense with people whose means of livelihood are sourced from the flood-prone areas. Previous research has shown that these population groups are more likely to be vulnerable during a disaster event, because of several factors including hazard knowledge, risk perception, previous experience and people's social and economic characteristics. This study focused on social and cultural factors and explained how people with different socio-economic backgrounds prepare for disaster. This study found that disaster preparedness differed significantly in the case study locations based on social, economic and cultural beliefs. These findings support that individuals with diverse socio-economic and cultural backgrounds show different reactions toward disaster preparedness.

Therefore, greater involvement of residents in flood plans and early warning system with the help of religious actors in DRR endeavors is critical in preparing local communities for flood. This will encourage community participation in effective flood adaptation and reduction practices. Community participation will also strengthen social cohesion and cooperation within the community and society and provide opportunities for integrating disaster management into the local development planning processes and systems. Besides, collaboration between religious leaders and government at all levels and other stakeholders will play vital roles in creating awareness on the active participation of women and women's organizations in disaster preparedness, education, and training. Such empowerment will also contribute to the resilience of the affected communities and increase projects sustainability. Equally important is the need for proper relocation plans by government institutions for victims of flood disasters. This will instill trust in residents as regards government plans and promises. Trust is a valuable mechanism in risk management as it enhances citizens chances to take official information and warnings seriously. Hence, trust can be used as a resource in early warning systems to communicate the importance of self-responsibility.

Furthermore, provision of critical infrastructure such as, roads and drainage systems by various level of governments in the communities is essential to strengthen the community level of preparedness for flood. Also, state governments in Nigeria should ensure that there are operative and effective master plans to guide against haphazard development in flood-prone communities. Relatedly, there should be strict enforcement of existing legislation on physical development and road use in urban settlements to guide

building standards and encourage a responsible use of space. This would go a long way in preventing substandard developments along infrastructure easements, drainage canals, flood plains, and other disaster-prone areas.

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Appendices

Table A1. Profile of the respondents in the three communities.

Variable	Isheri	Oyigbo	Unguwan Dosa	Total
Gender				
Male	96 (51.3)	86 (54.4)	54 (55.1)	236 (53.3)
Female	91 (48.7)	72 (46.6)	44 (45.9)	207 (47.7)
Total	187 (100.0)	158 (100.0)	98 (100.0)	443 (100)
Age Distribution				
20–39	61 (32.6)	49 (31.1)	17 (17.3)	127 (28.7)
40–59	97 (51.9)	89 (56.3)	52 (53.1)	238 (53.7)
60 and above	29 (15.5)	20 (12.7)	29 (29.6)	78 (17.6)
Total	187 (100.0)	158 (100.0)	98 (100.0)	443 (100)
Religion				
Christianity	97 (52.4)	139 (88.5)	—	236 (53.2)
Islam	73 (39.2)	17 (10.8)	98 (100.0)	188 (42.4)
Traditional	18 (9.4)	2 (1.3)	—	20 (4.5)
Total	187 (100.0)	158 (100.0)	98 (100.0)	443 (100)
Average Monthly Income (in Naira)				
<50,000	32 (17.1)	66 (41.7)	50 (51.1)	148 (33.4)
50,000–100,000	85 (45.4)	79 (50)	38 (38.8)	202 (45.6)
≥100,000	70 (37.4)	13 (8.2)	11 (11.2)	94 (21.2)
Total	187 (100.0)	158 (100.0)	98 (100.0)	443 (100)
Educational Qualification				
No formal Education	—	—	24 (24.5)	24 (5.4)
Primary	58 (30.9)	45 (28.5)	41 (41.8)	124 (27.9)
Secondary	68 (36.3)	113 (71.5)	21 (21.4)	193 (43.6)
Tertiary	61 (32.8)	29 (18.4)	12 (12.2)	102 (23.0)
Total	187 (100.0)	158 (100.0)	98 (100.0)	443 (100)
House Tenure				
Owner-occupied	112 (59.9)	99 (62.7)	84 (85.7)	295 (66.6)
Rented	75 (41.1)	59 (37.3)	14 (18.4)	148 (33.4)
Total	187 (100.0)	158 (100.0)	98 (100.0)	443 (100)
Tribe				
Yoruba	127 (67.9)	8 (5.1)	—	135 (30.5)
Hausa	12 (6.4)	2 (1.3)	98 (100.0)	112 (25.2)
Igbo	29 (15.5)	15 (9.5)	—	44 (9.9)
Ikwerre	—	82 (51.9)	—	82 (18.5)
Ijaw	—	39 (24.7)	—	39 (8.8)
Others	19 (10.2)	12 (7.6)	—	31 (6.9)
Total	187 (100.0)	158 (100.0)	98 (100.0)	443 (100)

Table A2. Perception of Flood Preparedness Activities.

	Isheri		Oyigbo		Unguwan Dosa		Study Area	
Flood preparedness variables	PRI	MD	PRI	MD	PRI	MD	PRI	MD
Embankments/levees and drainage construction	4.21	**1.23**	4.23	**1.12**	3.99	**1.18**	4.14	**1.17**
Listens to radio or TV messages on flood awareness	4.19	**1.21**	4.34	**1.23**	4.01	**1.20**	4.18	**1.21**
Safety nets for flood affected people	3.48	**0.50**	4.01	**0.90**	3.91	**1.10**	3.80	**0.83**
Communities help others during a flood response/recovery	3.41	0.43	3.73	0.62	3.96	**1.15**	3.70	**0.73**
Communities relocate from unsafe areas	3.39	0.41	3.79	0.68	2.91	0.10	3.36	0.40
Communities know when to move out of floodplain	3.31	0.33	3.82	0.71	2.79	−0.02	3.31	0.34
Flood awareness reaches most vulnerable community members	3.01	0.03	3.61	0.50	3.91	1.10	3.51	0.54
Community members trained in first aid	2.91	−0.07	3.25	0.14	2.61	−0.20	2.92	−0.04
Communities participates in mock drills/simulations	2.89	−0.09	3.72	0.61	2.71	−0.10	3.11	0.14
Community members trained in search and rescue	2.85	−0.13	3.01	−0.10	2.31	−0.50	2.72	−0.24
Community boats and canoes for crossing flooded rivers	2.83	−0.15	2.98	−0.13	2.12	−0.69	2.64	−0.32
Community emergency food and water	2.81	−0.17	3.21	0.10	3.61	0.80	3.21	0.24
Community warehouse with relief items	2.80	−0.18	3.12	0.01	3.12	0.31	3.01	0.05
Community safe places for shelter during floods	2.80	−0.18	2.98	−0.13	2.11	−0.70	2.63	−0.34
Alternative safe and secure shelter available	2.79	−0.19	2.91	−0.20	2.31	−0.50	2.67	−0.30
Out-of-community contacts in case of flooding	2.78	−0.20	2.72	−0.39	2.34	−0.47	2.61	−0.35
Communities participate in flood awareness campaigns	2.68	−0.30	2.56	−0.55	1.87	−0.94	2.13	−0.35
Communities monitor flood water levels	2.61	−0.37	2.43	−0.68	2.79	−0.02	2.61	−0.36
List of civil protection numbers to be called known by communities	2.60	−0.38	2.62	−0.49	2.61	−0.20	2.62	−0.84
Communities aware of evacuation plans and routes	2.59	−0.39	2.01	−1.10	2.11	−0.70	2.34	−0.63
Flood monitoring mechanisms in place and known	2.54	−0.44	2.21	−0.90	1.99	−0.82	2.25	−0.72
DRR committees active in communities	2.53	−0.45	2.23	−0.85	1.96	−0.85	2.17	−0.80
Standard building codes used for construction	2.51	−0.47	2.31	−0.80	2.63	−0.18	2.62	−0.35
Mean score	**2.98**		**3.11**		**2.81**		**2.97**	