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# COMMUNITY FLOOD DISASTER PREPAREDNESS IN FLOOD-PRONE RURAL AND URBAN COMMUNITIES IN KADUNA STATE, NIGERIA

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## ABSTRACT

Flood is a common disaster globally with devastating impact. Community flood disaster preparedness is neglected in developing countries, Nigeria inclusive, especially in the rural areas. This study assessed and compared the level of community flood disaster preparedness in flood-prone rural and urban communities in Kaduna State. A mixed method comparative cross-sectional study design and multistage sampling technique and data obtained from 202 household heads in each study group (rural and urban communities) using pretested structured questionnaires, focus group discussions (FGDs), key informant interviews (KIIs) and observational checklist. Multistage sampling technique was used to select the household heads for the quantitative study. Purposive sampling was used to select the community members for the FGDs, the community leaders and staff of Kaduna State Emergency Management Agency (SEMA) for the KIIs. The quantitative data was analyzed using SPSS version 23.0. The qualitative data was analysed using content analysis. Majority of both the rural (99.0%) and urban (86.1%) communities were not prepared for flood disaster; 34% and 10% of the rural and urban communities respectively had flood disaster plans. Only 19.3% in the urban communities compared with 1% in the rural communities had early warning systems. There was statistically significant difference on community flood disaster preparedness between the urban and rural communities (p =0.001). Overall, the flood preparedness in both rural and urban communities was very poor, though slightly better in the urban communities. There is need for training of the communities by the relevant stakeholder such as SEMA on flood disaster preparedness.

**Keywords:** *Flood, Flood disaster preparedness, Kaduna, Rural communities, Urban communities*

## INTRODUCTION

Flood is a natural global hazard that affects both developed and developing countries. Globally, an estimated US$ 150 billion loss and 9000 deaths is caused by 820 natural disasters annually (Yin *et al*., 2021); and flood has been highlighted as the deadliest natural disaster in 2019 (CRED, 2019). In 2021, several European countries including Germany, Belgium and the Netherlands were affected by catastrophic floods, causing deaths and widespread damage (IPCC, 2021).

In Africa, flood is the most common natural hazard with very significant negative impact (Cilliers, 2019). West Africa experienced the worst floods over the past 30 years and it could be a major hindrance to sustainable development in countries affected as governments, individuals, households and communities bear so many losses from it (Yin *et al*., 2021).

The concept of community preparedness is gaining attention in disaster management because disasters primarily affect local communities; they become the first responders to the event (Gaillard and Mercer, 2013). Therefore, it is crucial for communities to be proactive. Between 1985 and 2014, flooding in Nigeria affected more than 11 million lives with a total of 1100 deaths and property damage exceeding US$17 billion (Nkwunonwo, 2016). Also, flood disasters accounted for about 38% of all the federally declared natural disasters between 1995 and 2005 in Nigeria (Obeta, 2009). National Emergency Management Agency (NEMA) reported that the 2012 flood affected 7,705,378 people; 2,157,419 were displaced, 5,800 injured and 431 died (NEMA, 2021). Thirty two of the 36 states in the country were affected and it was described as the most devastating flood in the last 40 years (NEMA, 2021). The causes of flooding include natural factors and man-made factors such as settlement in flood plains, extensive urbanization, poor waste management and climate change, among others.

The impacts of floods in Nigeria include mortality, physical injuries, widespread infection and vector-borne diseases, social disorders, homelessness, food insecurity, economic losses (mainly through destruction of farmlands, social and urban infrastructure) and economic disruption (Ologunorisa and Adejumo, 2005).

In disaster management, the concept of community preparedness is critical, because disasters are events that primarily affect local communities (Mabuku, 2019). Therefore, no one is more interested in reducing flood disaster risk than the affected locals, whose survival and well-being is at stake. In addition, as local people are those immediately affected when disasters occur, they become the first responders to the event. Therefore, it is crucial for communities to be prepared.

In Nigeria, there are weaknesses in institutional frameworks for flood disaster management, which was found to contribute to the magnitude and severity of the 2010 to 2012 flooding in Nigeria (Obeta, 2009; NEMA, 2021). Government agencies for flood management have not been effective in the prevention and management of the current flood disasters in Nigeria due to bureaucratic bottlenecks, inadequate funding and low institutional capacity (Oni and Ayegba, 2022).

Nigeria's National Disaster Framework captures disaster preparedness and flood disasters is critical for communities. Flood disaster preparedness will empower communities to respond effectively to hazards and it provides relevant information for community and local authorities for action. Households who are members of communities need to be aware of early warning signs, muster points, evacuation routes in the community and information on Community Emergency Response Team (CERT) where they exist, among others, but many remain unprepared. Rural

and urban communities have different characteristics which influence the levels of flood disaster preparedness and the impact.

Kaduna State has experienced a number of floods with various degrees of impact (Ibrahim and Abdullahi, 2015; Ijigah and Akinyemi, 2016; Sule *et al*., 2016). The likelihood of experiencing more floods in future in the state is high. This study, therefore assessed community flood disaster preparedness in flood-prone rural and urban communities in the State.

## METHODOLOGY

### Study area

Kaduna State is located between latitude 10o31" N and longitude 7o26' 25" E, and is bordered by Katsina, Zamfara, Kano, Niger, Bauchi, Plateau States and Abuja. The State has 23 Local Government Areas (LGAs), 255 wards and a projected population of 8,446,317 in 2018 (NPC, 2012). Rainfall in the State ranges between 1600mm in the southern fringes to1100mm per annum in the northern fringes. The rains are spread over a period from mid-May to mid-October and it is heaviest between mid-August and mid-September (Waheed and Agunwamba, 2010). Fourteen out of the 23 LGAs in the state are classified as flood-prone LGAs (SEMA, 2017); those in the rural are Jaba, Kachia, Kudan, Kauru, Lere, Sanga and Soba; while those for the urban are Birnin Gwari, Chikun, Jema'a, Kaduna north and Kaduna south, Sabon Gari and Zaria (SEMA, 2017). National Water Research Institute, Mando and Centre for Disaster Risk Management and Development Studies, Ahmadu Bello University, Zaria are relevant institutions in the state that are involved in capacity building on disaster management.

### Study Design

A comparative descriptive study with quantitative and qualitative components was conducted between September and November, 2019.

### Study Population

For the quantitative component, the study population comprised household heads that were 18 years and above and have been living in the selected flood-prone communities for at least 1 year. That for the qualitative component were members of the communities (males and females), community leaders in the six selected communities (one in each community) and the monitoring and evaluation (M & E) officer of SEMA. Residents that were seriously ill or having mental challenge during the study were excluded.

The desired minimum sample size for the quantitative component was calculated using formula for comparative study (Arif *et al*., 2014).

$$n=\frac{2(Z\alpha+Z\beta)^2[P_1(1-P_1)+P_2(1-P_2)]}{(P_1-P_2)} \quad \text{- - - - - - -} \quad \textbf{Equation 1}$$

Where n= desired minimum sample size; Zα = Standard normal deviate at 95% confidence interval = 1.96; Zβ= Standard deviate at 80% power = 0.84; P1 = Flood disaster preparedness in an urban area=24.4 % (Ashenefe *et al*., 2017); P2 = Food disaster preparedness in a rural area= 9 % (Mukanganisa, 2011).

The calculated minimum sample size (n) was 184 and with inclusion of 10% non-response rate, it became 184 + 18= 202 per arm. That is minimum of 202 heads of households in the flood-prone rural communities and 202 heads of households in the flood-prone urban communities in Kaduna State were administered the household questionnaire.

**Sampling technique**

A multistage sampling technique was used to select the participants for the quantitative component.

**Stage I -** Selection of Local Government Areas: The identified flood-prone LGAs in the state were compiled and classified into rural and urban. Simple random sampling using balloting was used to select one from the seven rural LGAs in which Soba was selected. Kaduna North was selected from the list of the 7 urban LGAs by balloting too.

**Stage II** – Selection of communities: From the list of the 6 communities in Soba LGA, 3 communities were selected by balloting, namely Garu, Takalafiya and Soba police station communities. Similarly, from the list of the 6 communities in Kaduna North LGA, three communities were selected using simple random sampling by balloting in which Ungwan Rimi, Kabala and Abubakar Kigo New Extension were selected.

**Stage III** – Selection of houses: Selection of houses in the respective communities in both the selected rural and urban communities was done using systematic sampling after generating the sampling frame from the number of houses in the communities, and calculation of the sampling interval. The houses in the selected rural and urban communities were separately listed and numbered to create the sampling frames for the respective rural and urban communities.

The 202 houses selected in three selected rural communities were proportionately allotted depending on the size of each community. The sampling interval was calculated by dividing the total number of houses in the communities by 202. The index house was selected using random number table from numbers within the sampling interval. The next was obtained by addition of the sampling interval to the index house number, and this continued until the required sample size was attained.

In the selected houses, all the household heads were identified and those who met the eligibility criteria were recruited into the study. Where there was more than one eligible household head in a house, one of them was selected for interview using balloting.

The study instruments were questionnaire for the quantitative survey, and observational checklist, FGD and KII guides were for the qualitative component.

For the qualitative component, eight female and eight male community members were purposively selected in each of the six selected communities for the female and male FGDs respectively, making a total of 12 FGDs. For the KII, the community leader in each of the six selected communities (3 rural and 3 urban) and the M & E officer of SEMA were interviewed, making a total of 7 KIIs conducted.

The questionnaire was structured, interviewer-administered and contained mainly closed-ended questions adapted from other studies (Ashenefe *et al*., 2017; Mabuku, 2019) to fit the objectives of the study. The elements used to assess the community flood disaster preparedness included availability of community flood disaster plan, muster point, community emergency response team, health facility in the community, emergency shelter, emergency fund, participation in disaster simulations, early warning system and someone in the community trained on first aid, among others.

In order to ascertain the validity and reliability, relevant adjustment of the data collection instruments, 10% of the sample size was pretested in Sabon Gari and Giwa LGAs of Kaduna representing urban and rural LGAs respectively. The questionnaire and checklist were conscripted into Open Data Kit (ODK version 1.8.1) software adapted from open data kit training guide.

Interview guides were used for the FGD and KII. Both guides were designed by the researchers and pretested in Sabon Gari and Giwa LGAs. The FGD and KII were complementary.

The male and female participants for the FGD were those living in their respective flood affected communities. Their general characteristics included living there for at least one year, could communicate in Hausa or English. The community leaders for the KII were those saddled with leadership responsibilities and have been staying there for not less than 1 year, could communicate in Hausa or English. The M and E officer from Kaduna SEMA has been in that position for about 3 years and a graduate.

A total of 12 FGDs were conducted in the 6 selected communities (in each community, one male and one female FGD was conducted). Each session lasted 45-60 minutes and the language for the discussion were English and Hausa depending on the community. The principal researcher was the moderator of the sessions while 2 others served as the note taker and operator of the digital recorder after permission was obtained for the discussions to be recorded. In each case, the venues for the FGDs were collectively decided by the participants and the researchers. The FGDs were subsequently transcribed.

Six KIIs for the community leaders in the 6 selected communities and one KII for the monitoring and evaluation officer of SEMA were conducted. The developed pre-tested KII guides were used.

**Measurement of Community flood disaster preparedness**

This was assessed using 15 questions, that had the options of Yes, No and Don't know. Correct responses awarded 1 point, No and Don't know awarded 0 point. The minimum and maximum scores were 0 and 15 respectively. Each respondent's score was converted to a percentage and the scores were categorized as<49.9% (not prepared), 50- 69.9% (partially prepared) and ≥70% (very prepared) (Moses, 2013).

## DATA ANALYSES

**Quantitative data**

Data was imported into Statistical Package for Social Sciences (SPSS) version 23 (SPSS Inc., Chicago, Illinois USA) and analyzed. Univariate analysis was carried out for the quantitative data. For bivariate analysis Chi-square square test was used to examine the association between dependent (community flood disaster preparedness) and independent (flood-prone rural and urban communities) categorical variables. Statistical significance was set at p value of <0.05.

**Qualitative data**

The audio recordings of the FGD and KII (Qualitative data) interviews were transcribed and then translated from Hausa to the English language. Content analysis of the transcripts was done along thematic lines. All texts were read several times and then condensed to identify statements that related to the topic of analysis. The condensed statements were categorized based on the content. The findings were then presented in narrative form as prose. The quantitative and qualitative data were triangulated.

**Ethical considerations**

Ethical approval to carry out the study was sought and obtained from the Health and Research Ethics Committees of Kaduna State Ministry of Health (MOH/ADM/744/Vol. 1/718). Permissions were also obtained from the LGAs and the community leaders. The benefits of the research to the communities and the state at large were explained to the respondents and they were assured that the study will not have any harmful effects and no member of the communities will be excluded based on his/her social status. Written informed consent was obtained from the participants and they were informed of their rights to withdraw from the study at any time. Confidentiality was also observed.

**RESULTS**

The mean age of the household heads in the rural communities was 39.4±12.9 years and urban in the urban communities 43.7±13.9 years. The majority of the respondents in the rural 195 (96.5%) and urban 144 (71.3%) communities were males.

Approximately 34% and 10% of the rural and urban communities had flood disaster plans (p=0.001). Similarly, only about 1/3 of the households in the urban communities had lists of important contacts of first responders in disaster management (p=0.001). Only 19.3% in the urban communities compared with 1% in the rural communities had early warning systems (p=0.001). The ratio of the respondents in the rural and urban communities that had undertaken mitigation actions such as clearing of drainages was approximately 2:1 (p=0.001). Only 16% of the urban communities had community emergency response team compared with less than 1% in the rural communities (p=0.001). A small proportion of the members in both rural and urban communities took part in decisions relating to their environment and development (p=0.401) (Table 1).

Table 2 below shows a significant proportion of both the rural and urban communities were not prepared for flood disaster and a small proportion of the urban communities were partially prepared for flood. There was statistically significant difference on community flood disaster preparedness between the urban and rural communities.

## Results from FGDs and KII

A male respondent from Kigo new extension said, “We are not aware of SEMA and LEMC, but few have heard of SEMA which they believe are not functional” (Urban, FGD4). Another male respondent from Kabala said, “We know SEMA, but we do not know anything about LEMC. SEMA provide small relief materials after flooding occurred in the community, but they have never carried out awareness and education on flood disaster here” (Urban, FGD3). A male respondent from Ungwan Rimi said, “The community is aware of SEMA, but we are not impressed with its activities because they are not proactive but rather reactive, by giving only little relief materials when disasters have occurred” (Urban, FGD5).

During a key informant interview, the SEMA staff said that “all the households and communities were prepared against flood disaster because SEMA has done more than enough in terms of enlightenment, dissemination of early warning information, mobilization of community and religious leaders and training in the communities”. And that “they have setup CERTs in the communities” (SEMA staff, KII).

**Table 1:** Assessment of community flood disaster preparedness among respondents in rural and urban communities in Kaduna State

| Indices | Rural N=202 Frequency (%) | Urban N=202 Frequency (%) | Test statistics $\chi^2$ P value |
|---|---|---|---|
| Availability of community flood disaster mitigation measures | 68 (33.7) | 20 (9.9) | 33.473 0.001 |
| Availability of community safe meeting (muster) point | 9 (4.5) | 43 (21.3) | 25.515 0.001 |
| Availability of community emergency shelter for flood victims | 2 (1.0) | 16 (7.9) | 11.397 0.001 |
| Availability of community emergency fund for flood victims | 10 (5.0) | 11 (5.4) | 0.050 0.823 |
| Having disaster simulation ever conducted in the community | 2 (1.0) | 10 (5.0) | 5.497 0.019 |
| Availability of someone in the community trained on first aid | 59 (29.2) | 68 (33.7) | 0.930 0.335 |
| Availability of phone number(s)for emergency services | 0 (0.0) | 65 (32.2) | 102.650 0.001 |
| Community has any early warning system | 2 (1.0) | 39 (19.3) | 37.162 0.001 |
| Community has undertaken flood preventive actions | 153 (75.7) | 73 (36.1) | 64.274 0.001 |
| Members of the community participate in decision making affecting the environment and general development | 27 (13.4) | 33 (16.3) | 0.705 0.401 |
| Community has a community response emergency team (CERT) | 1 (0.5) | 33 (16.3) | 32.885 0.001 |
| Community participates on flood awareness and education program | 2 (1.0) | 59 (29.2) | 62.735 0.001 |
| SEMA conducts a vulnerability and capacity analysis in the community | 1 (0.5) | 34 (16.8) | 34.066 0.001 |
| Community has health facility | 142 (70.3) | 145 (71.3) | 0.108 0.742 |
| Community has health personnel resident in the community | 114 (56.4) | 130 (64.4) | 2.649 0.104 |

**Table 2:** Comparison of community flood disaster preparedness among households in flood-prone rural and urban communities in Kaduna State

| Community flood disaster preparedness | Rural Frequency (%) | Urban Frequency (%) | Total |
|---|---|---|---|
| Not prepared | 200 (99.0) | 174 (86.1) | 374 (92.6) |
| Partially prepared | 2 (1.0) | 23 (11.4) | 25 (6.2) |
| Very prepared | 0 (100.0) | 5 (2.5) | 5 (1.2) |
| Test statistics | Fisher exact = 20.092 | p =0.001 | |

## DISCUSSION

Overall, only the urban communities were very prepared against flood disaster, majority in both communities were not prepared in this study. This finding is similar to the studies in Oyo and Rivers States in Nigeria that showed lack of preparation against flood in the communities (Salami *et al*., 2017; Brown and Chikagbum, 2015). Studies in Ethiopia (24.4%) and Japan (32.4%) also showed insufficient disaster preparedness both at household and community levels, with no complementary household and community disaster preparedness (Ashenefe *et al*., 2017; Kapucu, 2008). The public health implication of this is that the impacts of flood in both communities will likely be serious because of the documented associations between community flood disaster preparedness and its effects. However, the small proportion (2.5%) in the urban communities that were very prepared will be far better in an event of flood disaster. In terms of assistance, because the rural communities are geographically isolated and Local Emergency Management Committee (LEMC) are almost non-functional in the local government areas, it may take days before outside assistance and additional resources reaches such remote communities. Rural communities have the disadvantage of higher percentage of people living in poverty and lower per capita income, poor presence of disaster agencies which are among the factors that influence flood disaster preparedness (Tomio *et al*., 2014). Some male respondents in Taka lafiya (a rural community) reported that they do not know about State Emergency Management Agency and LEMC because they have never come across them in their communities. The case of some disadvantaged urban communities, the growth and development of such areas may be rapid with no commensurate infrastructural and non-structural development that may affect assistance in the event of flood disaster also (Prelog and Miller, 2013). In addition, they may not observe the paradigm shift from reactive to proactive Disaster Risk Reduction and Management, establishment of CERT, land use pattern, evacuation routes, river protection and resilient housing, among others.

A study in Langsa city in Indonesia, showed low level of community flood disaster preparedness (Afrian *et al*., 2018), similar to our study; and some of the reasons included poor public awareness, poor disaster risk reduction such as building in flood prone areas, blockage of drainage, poor disaster warning system, poverty and level of education (Afrian *et al*., 2018).

There were differences between the rural and urban communities in the individual indices used to assess the community flood disaster preparedness. Of the 15 indices used, 13 were better in the urban communities compared to those in the rural communities. The two better indices among the rural communities compared to the urban were flood disaster mitigation and preventive measures and the differences were statistically significant (p= 0.001; p=0.001).

Communal efforts and cohesion are known to be better in rural areas because of their smaller size, among others which could be responsible.

The other indices such as availability of safe meeting point (muster point), emergency shelter, emergency fund, conduct of disaster simulation drills, first aider in the community, phone number of any emergency responder, early warning system, participation in decision making pertaining flood disaster in the community, CERT, community flood awareness and education and conduct of vulnerability and capacity assessment in the communities were generally poor but still better in the urban communities.

Various reasons could be responsible for the above findings such as lack of knowledge of the importance of such facilities, awareness and education for the communities, training by the relevant disaster agency at the state level (SEMA) and local government level (LEMC), and lack of information on the importance of flood profiling of the communities and CERT, among others. Reactive instead of proactive, top-bottom flood disaster management could also be a factor too. Proactive disaster management requires more community participation from various governments, non-governmental and private agencies (Tingsanchali, 2012; Sheriff and Hamidi, 2019). Community participation is the most effective element to achieving sustainability in dealing with natural disaster risks (Saidul-Huq, 2016). A study demonstrated that a bottom–up approach or community-based preparedness plan is an effective approach for flood management (Saidul-Huq, 2016).

Community emergency response team is an important element of community disaster preparedness. It is a program that is rapidly gaining in importance as the need for trained civilians, often the first responders to their own local disasters, becomes more vital in an effort to make disaster management as effective and safe as possible for survivors and rescuers alike (Scanlon, 2015). It ensures that the community members are professionally trained in order to provide relief and assistance to disaster survivors without the compromise of their safety (Scanlon, 2015). All the communities except Ungwan Rimi had no CERT. The implication is that in an event of a flood the response is likely to be slow and the impact more serious in the communities with no CERT compared to Ungwan Rimi community because of the important roles CERT play as first responders among others. CERT programme training syllabus covers disaster preparedness, disaster fire suppression, disaster medical operations, light search and rescue, disaster psychology and team organization and disaster simulation exercise.

Flood warning systems need to be communicated to the communities at risk by converting forecast information into practice and by sending warning dissemination to people. Success of such a system is closely related to people's knowledge of flood risk and their familiarity with emergency response to incoming floods (Tingsanchali, 2012).

During a KII, the staff of SEMA reported that all the households and communities were prepared against flood disaster and the agency has done more than enough in terms of enlightenment, dissemination of early warning information, mobilization of community and religious leaders, establishment of CERTs and training in the communities. This assertion was contrary to what most focus group discussion respondents and community leaders said. This indicated a disconnection between what the SEMA staff said and what the members of the communities said. This disparity is captured in following responses- Almost all the respondents in rural communities said that they were not aware of SEMA and LEMC, but on the other hand, some of the respondents in the urban communities said they were aware of SEMA and LEMC as agencies, that they mainly distribute relief materials to members of communities in an event of disasters such as flood and fire outbreaks.

During FGDs, some male respondents from Kigo new extension (an urban community) reported that they were not aware of SEMA and LEMC and it is probably because they were not proactive and functional in their communities. While a male respondent from Kabala (an urban community) reported that he was only aware of SEMA but they only provide small relief materials after flooding occurred in the community, but they had never carried out awareness and education on flood disaster in their community.

However, male respondents from Ungwan Rimi (an urban community) reported that they were aware of SEMA but not impressed with the agency activities, because they are not proactive but rather reactive by giving only little relief materials whenever disasters occur.

The impact of flooding is not only on the physical environment, but also on the health status of the members of the communities from emergence of post-flood diseases. Diseases that may arise after flood include Leptospirosis (rat urine), Chikunguya, Dengue Fever, diarrhea, Acute Respiratory Infections, Cholera, Dysentery, Malaria, and yellow fever (Bustami and Baharuddin, 2018). Other consequences include death casualties, damage to health facilities, and health crises (Bustami and Baharuddin, 2018). This stresses the need for the availability of health facilities and health personnel residing in these rural and urban communities. These indices in our study were good in both communities, even slightly better in the urban communities, the differences were not statistically significant ($p>0.05$; $p>0.05$). The public health implication is that in an event of flood disaster the victims could easily have access to medical treatment, which could result in better outcome all things being equal because of the concept of hospital safety in disasters (Joshua *et al*., 2022).

There are various theories and principles which try to explain why some individuals, households and communities prepare against disasters such as flood, while some will not. The protection motivation theory founded by R.W Rogers in 1975 is one of such. It proposes that people protect themselves based on four factors; the perceived severity of a threatening event, the perceived probability of the occurrence or vulnerability, the efficacy of the recommended preventive behavior and the perceived self-efficacy (Shena, 2018). The theory justifies that it is the interaction of the human system with disasters that causes the community to change their attitude and be better prepared for future disaster occurrence.

It is also important to know that in many communities in the developing countries, floods bring new opportunities of livelihood, e.g., flood water brings fishes to fisherman, brings new fertile soil for agriculture (Tingsanchali, 2012). In order for such communities to enjoy such benefits, the community needs to be organized and prepared with the correct information and tools to be effective, since when flood disasters strike, the damage on an unprepared community can be devastating, especially in communities that where the majority of the population are directly and indirectly dependent on rain-fed agriculture. This will also increase poverty and food insecurity in the long run.

## CONCLUSION

Overall, the flood preparedness in both rural and urban communities was very poor, even though slightly better in the urban communities. The elements of the preparedness found deficient in the assessment among both the rural and urban communities were availability of safe meeting point (muster point), community emergency fund, community disaster simulation, early warning system, community emergency response team and vulnerability and capacity assessment.

## RECOMMENDATIONS

The training of the residents in both communities in the various deficient areas and the communities should be encouraged to form community emergency response teams in line with international best practices. There is a need for SEMA and LEMC to organize and execute programs on flood disaster education and training in the communities. The programs should be well planned in such a way that all the identified flood prone communities are covered.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.


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