Community-based intervention in reducing flood impacts in Gambia

A Jonga¹, E Meilianda²-⁴*, and Nizamuddin⁴
¹Graduate Program, School of Disaster Science, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia
²Tsunami and Disaster Mitigation Research Centre (TDMRC), Universitas Syiah Kuala, Banda Aceh 23111, Indonesia
³Civil Engineering Department, Engineering Faculty, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia
⁴Informatics Department, Mathematics and Natural Science Faculty, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia

*Corresponding author’s e-mail: ella_meilianda@unsyiah.ac.id

Abstract. Flood has caused significant damage to the agricultural sector, which results in low productivity and causes famine in Kaba-kama community of Basse in the Upper river region of the Gambia. This study analyses the potential role of the community’s mitigation efforts to reduce the flood impact in the Gambia. The objective is to determine the influence of community-based intervention activities in reducing the flood impact at the community level. The primary data are obtained in this study from own previous experience by participating in the community work (“Te-setto”) to mitigate the impact of flood, and interviews in a form of questionnaires to the members of the VDC in Kaba-kama community. Literature reviews from journals, books, and the final report about the disaster in 2018 by NDMA has served as a secondary source of data for the study. Notifiable, the community-based organization (Village Development Committee -VDC), is the key pioneer of the initiative. This study exemplifies the successful collective efforts by the communities and government in different regions and the country at large in practicing flood adaptive and mitigation strategies, which has potential to be implemented elsewhere in other famine-prone countries in the world.

1. Introduction

Globally, millions of people are vulnerable to flood impacts, which has cause the affected people to gain recovery complication due to the high rate of the flood hazard [1]. The types of flooding in Africa are: flash flood; inundated flooding; flooding from major rivers; and coastal flooding [2]. However, little empirical evidence indicates that floods have resulted in damages to infrastructure, economy, agriculture and deteriorating to environmental hazard in the Sahel zone.

The magnitude of natural hazards is increasing globally. According to [3], states that the Gambia has faced a severe national flood which occur in 2003 and 2016. Flood in the Gambia, mostly occurred during the rainy season which normally result to crop failure and poor-quality harvest, in which rural communities are mostly affected indicating that their incomes depend on agricultural activities and that they did not have sufficient income from other sources [4]. Therefore, this paper provides the
information about the status of activities of the Village Development Committee (VDC) in the Gambia, in concern to Disaster Risk Reduction. The VDC is a unique organization, which is form at the community level and has a sub-committee, which act as the coordinating body at the community level for any development projects. The VDC ventures into many activities (“Te-setto”) such as constructing contour bonds, gully boards, dikes, and identification of potentials hazard at the community level.

According to [5], viewed that Community participation is a technique to move towards social change. Trust is the core of community participation, which can build up community networks. Through community network, it can produce and preserve collective action, which can enhance mutuality and co-operation among community people. For this reason, local-based organization (e.g.) Village Development Committee (VDC), should work together to build up networks among community members to participate in disaster risk reduction. This paper intends, to determine the influence of community-based intervention activities in mitigating the flood impacts in the Kaba-Kama community of Basse in the URR of the Gambia.

2. Materials and Methods
2.1. Sample Size of the Study
The study adopted a random sampling technique for selecting a sample size for the study. The random sampling selection was focus on areas that are more vulnerable to flood within the communities of Basse in the URR of the Gambia. The population of 10 respondent from the community of Kaba-kama was determined as the quota for the study. Most of respondents were at the youth aged of 20 to 29, they have the basic knowledge about the flood risk reduction initiatives by the VDC, and majority of respondents were literate having attained basic education.

2.2. Source of Data
The method used in collecting the data for the study was influenced based on both Primary and Secondary data. The utilization of primary and secondary data has help to describe and compare the perceptions of people regarding flood and climatic variability, prevention of flood, as well as local adaptation and coping strategies in diminishing the flood impacts in the study area, which has a relation to the objective of the study.

2.3. Data Analysis
The collected information was analysed based on previous experienced during in the participation of the community work (“Te-setto”), to determine the influential role of the community people in the diminishing of flood impacts. According to [6], Likert scale is used to measure the scale of the variables of the questions, which is to determine the level of effectiveness and influence of the activities that are undertaken by the VDC in the study area. The quantitative approach was used to emphasize the objective measurements and the statistical and numerical analysis of data collected. For a more organized and accurate conclusion, the data will be quantified and accumulated in a frequency table for easy interpretation and analysed by drawing a Bar chart.

3. Results and Discussion
The findings indicate that 98% of the VDC activities was effectively implemented and has an influence in mitigating the impacts of flood in the study area. The measurement of the variables of the questions are interpreted in a scale as 5 - Very Effective, 4 – Effective, 3 – Fairly Effective, 2 – Poorly Effective, and 1 – Not Effective. The scoring values of the activities was based on the activities that are frequently done or carry out by the community people and has an influence in mitigating the impact of flood. The variables are also represented in an alphabetic form with some picture illustration to show below: A= Mobilizing resources and people to response to flood. B= Construction of gully board to reduce erosion as a result flash flood. C= Constructing contour bonds and dikes to prevent flood. D= Filling sand bag and place them at compound gate to prevent the flash flood getting into compounds during the rainy season. E= Identifying and avoiding settlement in an inundated area at the community level. F= Creating
a diversion e.g. waterway canal to shift the direction of the running water because of heavy rain. G=
Constructing local bridges as a walking path in an inundated area.

**Figure 1.** Gully board.

**Figure 2.** Placement of sand bag.

**Figure 3.** Waterway diversion canal.
From Table 1, it shows that all the activities, which are conducted by the community people, are well implemented, and has help to reduce the impacts of flood in the community. The 98% of the respondent has choose the measurement scale of 5 and 4, which denotes as very effective and effective. It symbolizes that the activities undertaken by the VDC of the study area has an influence in mitigating the impacts of flood at the community level.

The study confirmed the argument by [7] state that flood disaster struck communities in their local setting and hence commanded a lion’s share as planners, implementers, partners, and leaders of disaster risk management built on the interests of the most vulnerable community members. However, VDC as a local based organization were involved in beneficiary activities through community committees constituted in the presence of the administrators of the Local Government Authority, to be responsible for all the programs to be implemented at the village level.

Table 2 shows the percentage of the scale that are been chosen by the community people in relation to the activities which are implemented in the study area. It is confirmed that, the most effective activity which is conducted by the community people is the: Construction of local bridges as a walking path in inundated areas at the community level, which is represented as letter “G” and has a percentage of 22.2%. Furthermore, all activities are measure within the scale range of 5 and 4, which determine that all the activities which are been done by the VDC in mitigating the impacts of flood had been effectively implemented.

The findings confirmed that community participation played a very significant role in mitigating the impacts of flood at the community level and in the Gambia as a whole. In addition, the findings result has showcase the objective of the study and the respondent pointed out that, as Government and donor-funded projects could not continue giving the same benefits thus; the community people mobilize themselves to resolve some of the mitigation efforts in reducing the impacts of flood.

**Table 1. Frequency number of the activities.**

| Activities | 5 | 4 | 3 | 2 | 1 |
|------------|---|---|---|---|---|
| A          | 4 | 6 | 0 | 0 | 0 |
| B          | 6 | 4 | 0 | 0 | 0 |
| C          | 5 | 5 | 0 | 0 | 0 |
| D          | 5 | 5 | 0 | 0 | 0 |
| E          | 7 | 3 | 0 | 0 | 0 |
| F          | 6 | 4 | 0 | 0 | 0 |
| G          | 2 | 8 | 0 | 0 | 0 |
| **Total**  | **35** | **35** | **0** | **0** | **0** |
Table 2. Percentage scale for the community activities.

| Activities | 5  | %  | 4  | %  |
|------------|----|----|----|----|
| A          | 4÷35×100% | 11.4 | 6÷36×100% | 16.7 |
| B          | 6÷35×100% | 17.1 | 4÷36×100% | 11.1 |
| C          | 5÷35×100% | 14.3 | 5÷36×100% | 13.9 |
| D          | 5÷35×100% | 14.3 | 5÷36×100% | 13.9 |
| E          | 7÷35×100% | 20   | 3÷36×100% | 8.3  |
| F          | 6÷35×100% | 17.1 | 4÷36×100% | 11.1 |
| G          | 2÷35×100% | 5.7  | 8÷36×100% | 22.2 |
| **Total**  |     | **99.9** |       | **97.2** |

Figure 5. The scale of the activities.

From the chart above, all the activities that are implemented by the community people of the study area, shows that the scale of measurement are above the average level, which notify that all the activities are effectively done and has an influence in mitigating the impacts of flood in the community. From my previous experienced point of view. It can be concluded that the VDC activities at the community level has an influence in reducing the impacts of flood, because the people in the community believes that the work they are rendering is for their own good. Therefore, they take it seriously upon themselves to make sure the right thing is done in the right way, even without external support.

4. Conclusions
Role of community participation in flood risk management is very important to the success and sustainability of the nation initiatives. The people and the community organizations inhabiting a particular local setup must be involved in considering their interests, appreciating the damages and the shocks caused by flood. Local community should be steadfast in controlling their interventions since it was rational to give control of affairs and decisions to the people who are mostly affected.

References
[1] Kundzewicz Z W, Kanae S, Seneviratne S I, Handmer J, Nicholls N, Peduzzi P, Mechler R, Bouwer L M, Arnell N, Mach K, Muir-Wood R, Brakenridge G R, Kron W, Benito G, Honda Y, Takahashi K and Shershyukov B 2014 *Hydrol. Sci. J.* 59 (1) 1-28.
[2] Shah A A, Ye J, Abid M, Khan J and Amir S M 2018 *Natural Hazards* 93 147-165.
[3] Jallow B P, Barrow M K A and Leatherman S P 1996 Climate Res. 6 (2) 165-177.
[4] Brown C 2008 Agricultural Water Management and Climate Risk, Report to the Bill and Melinda Gates Foundation, IRI Tech. Rep.
[5] Karim M R and Thiel A 2017 Climate Risk Manage. 17 92-103.
[6] McLeod S 2019 Likert Scale Definition, Examples and Analysis, Simply Psychology.
[7] World Bank 2011 Innovation in Disaster Risk Financing for Developing Countries: Public and Private Contributions, The World Bank.