

Disaster Resilience Assessment Of Community: Development Of Disaster Preparedness Curriculum For Training Of NGO And Community

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Abstract

In recent years, community disaster resilience has been identified as one of the most important mitigation processes and advocated as an approach to disaster risk management. More actions should be taken to achieve resiliency towards disaster, and factors associated with it should be identified. Each community is unique, and different approaches should be implemented to fit the needs and respective cultures. A cross-sectional community-based study was carried out in Gua Musang, Kelantan, in villages where flooding occurs yearly. Convenience sampling was chosen to maximize the responses from the participants. 400 participants aged 18 and above who understood Bahasa Malaysia were recruited for the face-to-face guided interview using a modified translated questionnaire. The questionnaire covers four dimensions of community resilience: connectedness, risk/vulnerability, available resources, and planning and procedures. Results showed that the majority of the participants scored falls in the caution zone for connectedness (54%), risk/vulnerability (82.9%), procedure (50%), resources (69.3%) and overall scores (97.5%). Chi-square test results reflected that there were significant differences in overall resilience level within a race ($p=0.033$), occupation (0.048), education level ($p=0.001$) and age ($p=0.001$) but not significant for gender, income and marital status ($p>0.05$). The resilience level in the studied population was found to be moderate, and a suitable educational programme should be implemented to increase the level of disaster resiliency regarding the identified factors.

Keywords: community resilience, community level, flood-prone area.

Introduction

Floods are a normal occurrence that occurs annually in Malaysia. The wet season occurs for a long period (about four months) and covers an approximate area of 29,800 km², causing massive damage to properties [1]. The tragic 2014-2015 floods are considered the worse in Malaysian history. The changing pattern of floods in Malaysia results from

several factors, such as climate change, continuous rain, land use, and the expansion of urban and human activities in flood-related areas [2]. According to the Department of Irrigation and Drainage Malaysia, approximately 22% of Malaysia's population lives in flood-prone regions [3]. The deadly flood has resulted in the loss of many lives, destruction of property, and created panic

situations in the States of Kelantan, Sabah, Sarawak and Selangor [4]. Based on the research done by the Department of Statistics Malaysia, the total amount of losses caused by the floods that took place in several states in the country from the end-2021 until early 2022 amounted to RM6.1 billion [5].

In recent years the topic of community disaster resilience has emerged as one of the most heavily supported and advocated approaches to disaster risk management. However, its application has been influenced by the lack of assessment tools. In Asia, community disaster resilience study is not well documented and very little focus is being put on this despite the increasing number of disasters [6]. The growing number of flood events in Malaysia requires a better understanding of the factors that make communities vulnerable to disasters and how to decrease those vulnerabilities [7]. A study by Abid (2021) showed that vulnerability reduction and emergency preparedness could reduce flood damages and fatalities whereby they suggested innovative technologies to reduce the vulnerabilities. The National Security Council (MKN) director-general, Datuk Rodzi Md Saad, said that based on observations after the week of floods that hit the country, it would be timely for the people's resilience or "community resilience" to be strengthened [3]. The development of a tool tailored to the Malaysian communities' needs is needed to determine the resilience to floods [8]. Therefore, this study aimed to conduct a disaster resilience assessment at a community that had frequent occurrence of floods to ascertain the factors that are lacking to obtain a higher level of disaster resilience in the community. This study would also assist in developing an initial community resilience model for communities in Kelantan and test the questionnaire applicability for usage in other studies.

Methodology

A cross-sectional community-based study was carried out in Gua Musang, Kelantan, Malaysia, in villages annually impacted by the flood. The sampling method targeted adults aged 18 and above who lived in the villages that had experienced flooding. The villages were chosen at convenience as they received assistance from an NGO group during the great flood of 2014 and to maximize the responses from the participants. The villages were Kampung Kerinting, Kampung Bertam Lama, Kampung Kuala Betis, Kampung Pasir Tumbuh, Kampung Dabong, Kampung Kemubu, dan Kampung Limau Kasturi.

Using the Raosoft sample size calculator at a 5% margin of error, confidence interval of 95%, with a response distribution of 50% on a total population of 50,000, the recommended sample size is 382. A total of 400 participants aged 18 and above who could understand Bahasa Malaysia were recruited for the face-to-face guided interview using a modified and translated questionnaire. The period of data collection was

A structured questionnaire adapted from research by [9][10] was translated to Bahasa Malaysia. The questionnaire covers four dimensions of community resilience: connectedness, risk/vulnerability, available resources & planning and procedures. Each dimension consists of four to six questions with one to five scoring units. The total scores were divided into three categories (red zone, caution zone, and going well).

This questionnaire was tested on 100 participants in a disaster preparedness seminar in October 2019.

Results and Discussion

The sociodemographic distribution is shown in table 1, whereby there were almost equal female and male respondents; the majority were

Malays (74%), 51% received education at the secondary level, 41% were self-employed with

66% earning at or below RM 1000 per month, and 82% were married.

Table1: sociodemographic data

| GENDER | | |
|-----------------------|-----|-----|
| Male | 196 | 49% |
| Female | 204 | 51% |
| RACE | | |
| Malay | 297 | 74% |
| Non-Malay | 103 | 26% |
| EDUCATION | | |
| No Formal Education | 56 | 14% |
| Primary School | 92 | 23% |
| Secondary School | 202 | 51% |
| Tertiary Education | 50 | 13% |
| OCCUPATION | | |
| Unemployed | 138 | 35% |
| Self-employed | 162 | 41% |
| Gov/private sector | 100 | 25% |
| INCOME | | |
| <=RM1000 | 262 | 66% |
| >1000<=2000 | 96 | 24% |
| >2000 | 42 | 11% |
| MARITAL STATUS | | |
| Single | 40 | 10% |
| Married | 328 | 82% |
| Was married | 32 | 8% |

In table 2, the results showed that the majority of the participants scored in the caution zone for connectedness (54.5%), risk/vulnerability (83%), procedure (51.5%), resources (69.5%) and overall scores (64.63%).

Chi-square test showed that there were significant differences in overall resilience level within a race ($p=0.033$), occupation ($p=0.048$), education level ($p=0.001$) and age

($p=0.001$) but not significant for gender, income and marital status ($p>0.05$) as shown in Table 3

Results show that most village communities in Gua Musang were still in the red zone (26.3%) and caution zone (64.6%). Efforts should be made to advance into the green zone, which was only 12%.

The lowest score for the "going well" category (<10%) were for PROCEDURES and RESOURCES dimensions. It shows that the emergency response plan is not yet in place and fully understood. In addition, it meant that the infrastructure, preparedness, education and other resources (food, water, fuel) were still at low levels.

A study by Norsyuhada (2020) found that the study sites that were vulnerable to flood disasters were making efforts to combat future floods. Households have agreed to either build a safe house for emergency evacuation during the rainy season or build raft houses to stay in when floodwater rises [9].

Community connectedness and level of risk and vulnerability did not receive a good score. Engagement among the residents is not very encouraging in terms of planning the emergency response plan as a community. In his presentation at the 8th Victorian Flood Conference (2013), Neil Dufty identified four ways social capital could be formed to assist in flood resilience [10]. This included:

- 1) Increasing the relationships between emergency managers, communities and individuals through community development and strengthening activities at the state and local levels.
- 2) Include in engagement and education activities, learning about forming and using social capital (e.g. helping neighbours, vulnerable people, working through clubs) for before, during and after flood events.
- 3) Further developing information exchange and online self-help networks through interactions between floodplains, emergency managers, and social media users.
- 4) Considering urban design conducive to social capital formation in future development in floodplains.

From the results, we found that more respondents were aware of flood risks and hazards, but they still needed guidance and assistance regarding coordinated planning.

Table 2: Zone Clasification

| | RED ZONE | | CAUTION ZONE | | GOING WELL | |
|--------------------|------------|---------------|--------------|---------------|------------|--------------|
| Connectedness | 136 | 34.00% | 218 | 54.50% | 46 | 11.50% |
| Risk/Vulnerability | 20 | 5.00% | 332 | 83.00% | 48 | 12.00% |
| Procedure | 174 | 43.50% | 206 | 51.50% | 20 | 5.00% |
| Resources | 90 | 22.50% | 278 | 69.50% | 32 | 8.00% |
| TOTAL SCORE | 420 | 26.25% | 1034 | 64.63% | 146 | 9.13% |

Recommendations

Following findings from this study, SIX modules were developed to educate the community in disaster preparedness, thus increasing their resilience to floods. This

module consisted of Six identified clusters of health, logistics, communication, nutrition, water/sanitation/hygiene (WASH) and shelter. The modules were developed through 2 brainstorming workshops. The first workshop was conducted on the 24 February 2020 with

NGO participants to discuss the module's content. After the first draft was done, the second workshop was carried out on the 10 December 2021 with the participants from government agencies to refine the module's content. The module was first introduced to NGOs as they are also community members on 26 June, 2nd and 3rd July 2022. An evaluation form was distributed to all 20 participants to get feedback about the content and overall programme. All 20 participants agreed that this training module was very useful, increased their knowledge, and fulfilled the objectives and expectations. As such, the participants would recommend this training to others and were willing to disseminate the knowledge to the community whenever possible.

Following the workshop, two meetings were held with the National Disaster Agency (NADMA) to obtain the endorsement of the curriculum and funding for the project and one meeting with ALPHA to discuss collaboration in disseminating information to the community.

The presentations by invited speakers who were subject experts in the six areas were compiled. Participants' input was documented to be applied in the planned community-based training program in September-October 2022. The first community-based program was conducted for secondary students on 29 September 2022 at Sekolah Menengah Tengku Idris in Kapar, Selangor. Infographics were distributed, and facilitators innovated creative ways for students to remember the information. Students worked in groups going in rotation to each station which had a variety of activities such as role play, simulation, demonstration and quizzes.

Conclusion

In conclusion, the resilience level in the studied population is still low to moderate. A suitable program should be implemented to increase

disaster resiliency in the identified dimensions and factors. Government/private agencies and NGOs should provide the community with adequate knowledge and resources. When a disaster occurs, the community leaders know exactly what to do (get to safe ground, assess the health of people, access to food and water); how to communicate with the community and disaster relief agencies; who to liaise with; when to activate the disaster warning signal and everybody responds without hesitation.

The development of the six modules on disaster preparedness based on this study's findings would assist NGOs in assisting communities in preparing for disaster.

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