



PLANNING MALAYSIA:

Journal of the Malaysian Institute of Planners

VOLUME 19 ISSUE 2 (2021), Page 199 – 212

AGENCIES' MANAGEMENT PREPARATIONS AND PROPOSED EVACUATION ROUTES FOR FLOOD DISASTER: A CASE STUDY OF MELAKA

**Muhammad Rijal Mohamad¹, Syahriah Bachok², Mohammad Zarif Mohd
Zahari³, Oladejo Aliu Olabayonle⁴ & Nur Afiqah M. Zulkifli⁵**

*¹ Department of Built Environment Studies & Technology, Faculty of
Architecture, Planning and Surveying*

UNIVERSITI TEKNOLOGI MARA, PERAK BRANCH, MALAYSIA

^{1,2,3,4,5} Kulliyah of Architecture and Environmental Design (KAED)

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

Abstract

The research focuses on the flooding event in Melaka. Flooding has been occurring so frequently in Melaka that assessing the management and preparation for flooding needs to be undertaken. Alor Gajah, Melaka has been selected as a case study because frequent flooding events in the district affected many people. Using FGD as a data collection method, the result showed there is no management structure of flooding events beyond the district level and a proper training for the community is required before the structure can be developed. The original hierarchy and functions under Directive 20 should be maintained. This research suggested a proper institutionalisation of flood management and flood rehabilitation structure for Alor Gajah's district.

Keywords: Agencies, flood disaster, Melaka, preparation

¹ Lecturer at Universiti Teknologi MARA Perak Branch. Email: rijalmohamad@uitm.edu.my

INTRODUCTION

Natural disasters such as floods threaten the lives and valuable assets of thousands of people every year (Liu & Lim, 2016; McEntire & Myers, 2004) and widespread destruction, economic loss, and loss of life. The National Disaster Management and Relief Committee (NDMRC) of Malaysia is responsible for regulating all relief activities before, during, and after the disaster (Chong & Kamarudin, 2018; Muda et al., 2020). Meanwhile, policies and directives were set by the Prime Minister's Department, known as the National Security Council (Majlis Keselamatan Negara, MKN) and executed by the National Disaster Management Agency (NADMA) (Mohd et al., 2018; Zahari et al., 2020).

The concerns regarding flooding or other disasters are the search and rescue activities, coordinating the assembly of crowds and relocating victims, and ensuring the well-being, welfare and revival of the population following the calamity's impacts. Preparing for disaster is currently responsible for agencies with designation and roles under the law (McEntire & Myers, 2004). However, the public or local community's participation would minimise coordination effort and increase relocation effectiveness (Mohd et al., 2018; Zahari et al., 2020). Identification of access points and rescue centres is essential for the routes or pathways connecting these places. Roads, pathways, or any transportation channels must not be disrupted. Intersections or junctions must not be obstructed. The paving conditions must not be degraded so much that movement or flow cannot pass smoothly. Assistance must be transported and timely rendered so that victims receive the help and necessities to increase probabilities of revival lives as expected, just like before the disaster struck. Mitigation measures must be appropriately strategies to improve and protect the areas from the recurring and extended negative impacts of the disaster (Handmer & Dovers, 1996; Zeithaml et al., 1996). Thus, this present paper aims to assess the management and preparation for flooding in Melaka and identify the alternative routes for the evacuation of the victims.

RESEARCH BACKGROUND

Melaka is located above the state of Johor, the most southern tip of the Asian continent. Melaka is the second smallest state in Peninsular Malaysia, with an area size of 1658 km². The estimated (2020) population of nearly 932,000 is governed under three district authorities: Melaka Tengah, Alor Gajah, and Jasin. They are further divided into 81 administrations divisions known as *mukims*. It is strategically located, an hour and a half travel time south from Kuala Lumpur and three hours north from Singapore. The state is accessible by the North-South PLUS highway through three major exits, namely Simpang Ampat, Ayer Keroh and Jasin interchanges.

Alor Gajah is 660 km² (Sukor, 2017). Among the primary public facilities and infrastructure provided in the district are stated as follows; a government hospital, ten health clinics, ninety-seven schools, one district police headquarter, twelve police stations and five police huts, and two fire stations). Additionally, forty flood evacuation centres are identified under the state gazette consisting of twenty-seven schools, twelve neighbourhood halls and a large community hall.

Flooding in Melaka is the result of two possibilities. First, the heavy and high-volume rain pouring over a long period. While Melaka is generally located in the Peninsular lowland areas, it has two water dams, with the primary purposes of water retention and domestic supplies. However, the bordering areas in the neighbouring states are generally hilly areas nearing the backbone of Malaysian peninsular, known as *Banjaran Titiwangsa*. Water flows into Alor Gajah district from the southern part of the state. Many villages are in this area and new neighbourhoods and small townships are rapidly developing. Second, the straits' massive tidal flow into Melaka River and its tributaries where these villages are situated along it may occur outside regular intervals. Jus and Durian Tunggal dams rarely overflow, except when these two phenomena are coinciding. Figure 1 depicts the flood-prone areas in Melaka. The list of villages (kampung) under these state legislative areas is tabulated in Table 1 below:

Table 1: List of villages prone to floods

No	State Legislative Areas	Village (Kampung)
1.	Kuala Linggi	1. Kampung Nelayan 2. Kampung Man Lok
2.	Tanjung Bidara	1. Kampung Pulau 2. Kampung Sri Jeram 3. Taman Bidara Emas
3.	Taboh Naning	1. Kampung Cherana Puteh 2. Kampung Taboh Naning 3. Kampung Orang Asli
4.	Rembia	1. Pekan Alor Gajah 2. Kampung Pengkalan 3. Taman Sri Bayu 4. Pekan Rembia
5.	Gadek	1. Kampung Gadek Dalam 2. Sungai Batang Melaka
6.	Machap	1. Kampung Baru Menggong Gen2 2. Kampung Tebong Stesyen
7.	Durian Tunggal	1. Kampung Belimbing Dalam

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2. Taman Angkasa Nuri
 3. Kampung Pulau
 4. Kampung Gangsa
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Source: Land and District office of Alor Gajah

National Agency for Disaster Management (Figures 2 and 3), working under the purview of Directive 20 of a National Security Council, is the agency responsible for all disaster management at the Federal level. It has a branch in all Malaysian states. Various disasters require specialised organisational institutions to manage the respective disaster. Pertaining to health issues, for example, National Crisis Preparedness and Emergency Response Centre (CPRC), the lead agency is the Health Ministry. Similarly, the state and district committees for flood management are set up in the event of flooding.

The district committee for flood management is chaired by the District Officer (Figure 4). The secretariat is the district Civil Defence Force. The members of the district disaster management committee included the district police chief, head (YDP) of the municipal council, head of district fire and rescue department, district medical officer, director of the district hospital, district engineer of public works department, district community welfare department, district education department, director of district meteorological department, assistant engineer of district irrigation and drainage department and RELA district officer. The community is also part of this committee (nine penghulu or village leaders in Alor Gajah state assembly, ninety-seven Majlis Pengurusan Komuniti Kampung (MPKK) and six Majlis Pengurusan Komuniti Kampung Baru (MPKKB) leaders).

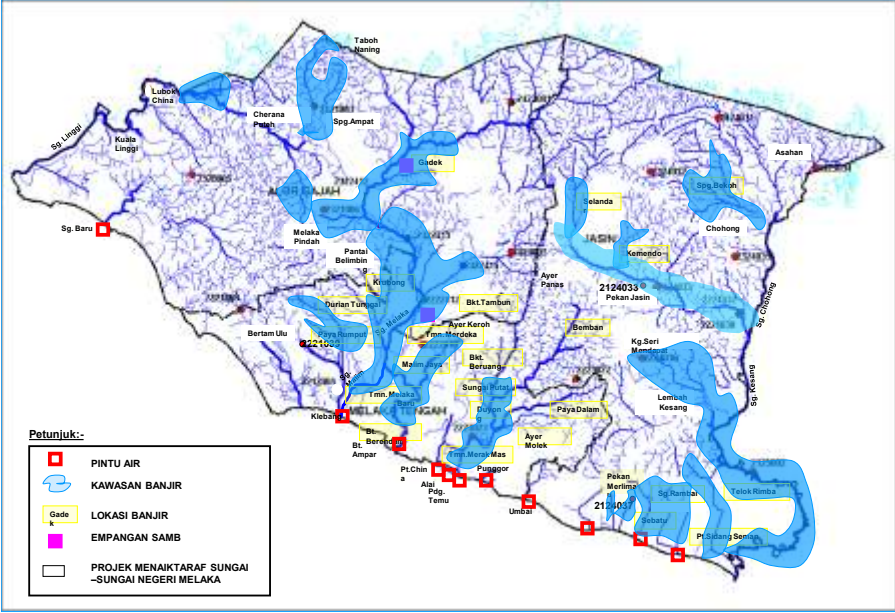


Figure 1: Map of high flood risk areas in Alor Gajah district
Source: Land and District office of Alor Gajah

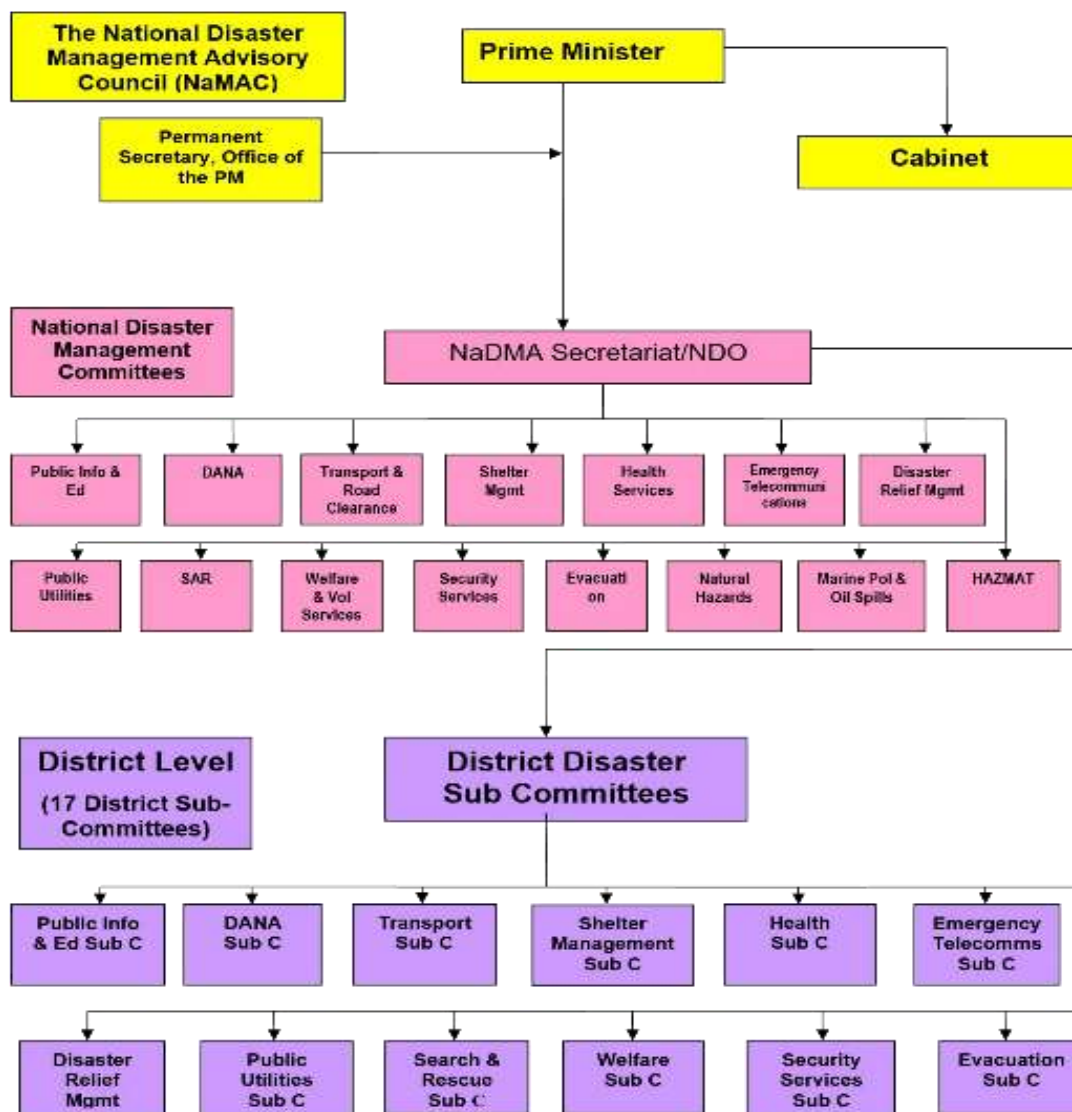


Figure 2: National Agency for Disaster Management (NADMA) council structure
 Source: NADMA Website

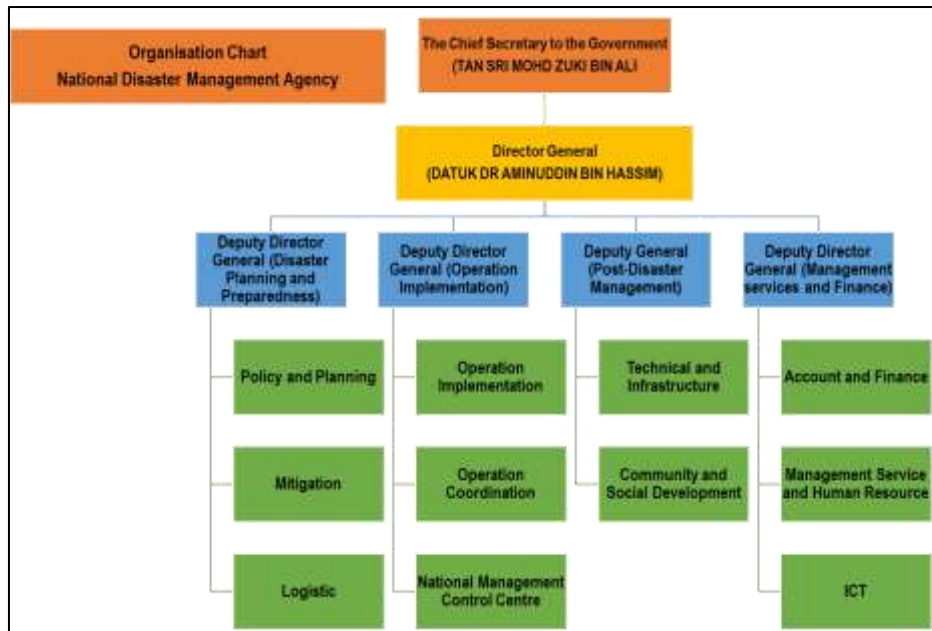


Figure 3: The executive memberships of the national agency for disaster management for 2019
 Source: NADMA Website

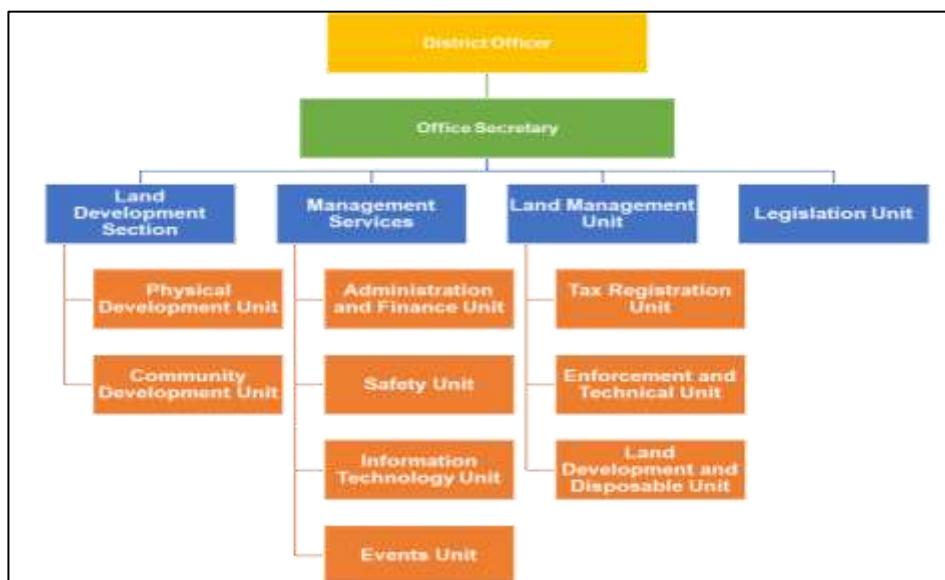


Figure 4: Typical organisational structure at the District Office level.
 Source: Land and District Office of Alor Gajah Website

METHODOLOGY

This study adopted qualitative methodologies of research. It has employed the focus group discussion to capture primary data. The instruments utilised were audio and visual recordings of conversation based on focus group discussion conducted on the flood disaster preparation, first-hand experience dealing with flood and mitigation measures following the events. Data was collected between July and December of 2019. Focus group discussion topics were focused on significant flooding events up to December 2018, which fall under Level 1 based on MKN's definition. Flooding on a smaller scale, such as flash flood due to a clogged drainage system, does not carry the weightage required for MKN's Level 1 disaster. Any recurring event beyond this date has not been considered during the focus group discussion sessions. The focus group discussion intends to discuss the readiness of the community in facing a disaster and also to identify if there is a formal or informal set up at the community level. The proposed options for disaster management at the community level also provided to get the opinion from the agencies. Likewise, any preparation, search and rescue actions, as well as mitigation and revival activities beyond December 2018, are not included in the scope of this paper.

In July 2019, a significant flooding event occurred in Alor Gajah. Several policies, strategies and programmes were scheduled, implemented, and enforced by the state and district committees before the event. Following this event, physical and structural rehabilitation have been scheduled as recovery actions. Data collection on these initiatives is conducted through focus group discussion. Invitation to 20 agencies was made, the session carried out in October 2019. The agencies invited are as follows; Alor Gajah Chief Assistant District Officer, District and Land Officer of Alor Gajah; Malaysia Civil Defense Force, Alor Gajah; Fire and Rescue Department, Melaka; Public Work Department, Alor Gajah; Department of Town and Country Planning, Melaka; District Police Officer of Alor Gajah, Melaka; Alor Gajah Municipal Council; Civil Aviation Association of Malaysia; Indah Water Consortium, Melaka; Meteorology Department of Malaysia; Department of Mineral and Geoscience, Melaka and Negeri Sembilan, Malaysia; Department of Survey and Mapping, Melaka Malaysia; Department of Irrigation and Drainage, Alor Gajah, Melaka; Department of Orang Asli Development, Melaka; Department of Environment, Melaka; Department of Social Welfare, Alor Gajah, Melaka; Health District Office of Alor Gajah, Melaka; Syarikat Air Melaka Berhad (Water Supply Agency/Company) in Melaka; Tenaga Nasional Berhad, Melaka (Electricity Supply Agency) and National Disaster Management Agency (NADMA). However, only 11 of the agencies granted the invitation and attended the focus group discussion session. All these agencies invited are according to the Directive 20 of a National Security Council as lead and responsible agencies in disaster

management. Therefore, all agencies were invited to explain their specific roles in disaster management and get their opinion for any improvement and needs to strengthen the current disaster management chain.

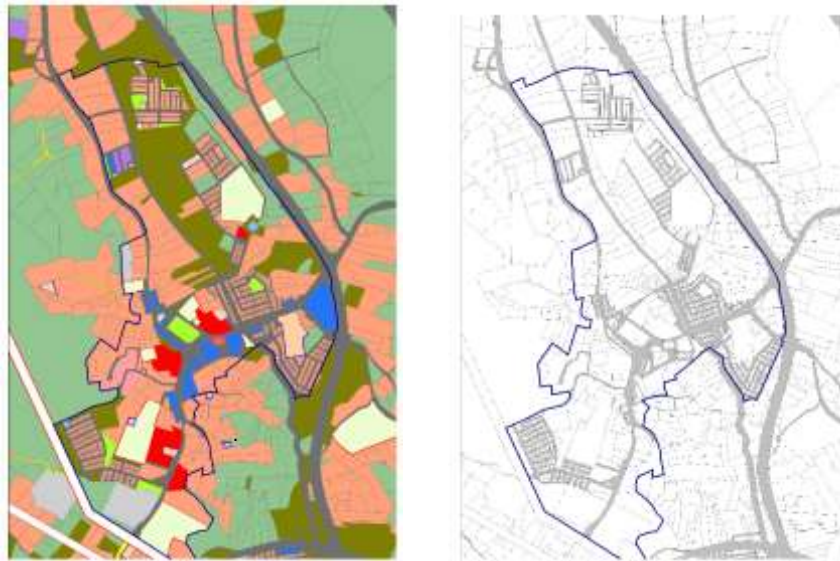


Figure 5: Landuse and road network maps as part of prop used during the data collection session.



Photo 1: Focus group discussion sessions held in Melaka state (2019)

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Figure 6: Proposed organisational structure for Climate Change Division for local authorities, each option headed by a different unit such as Environmental Unit or Slope/Drainage Unit or Enforcement Unit.

Figure 5 and Photo 1 illustrate the materials, members and sessions that were conducted during the focus group discussion (FGD) in Alor Gajah. The unstructured questions raised were the effectiveness level of the current organisational set up at the local hierarchy, whether the communities are prepared to independently in the event of total network inaccessibility, which were the primary and alternative evacuation routes during flooding and which alternative structure was preferred as a new establishment of local disaster management structure. Figures 6 through 7 were presented during the FGD. Members were divided into two groups to discuss their experience and actions during the flood, select their preferred alternatives and present their findings in 20 minutes.

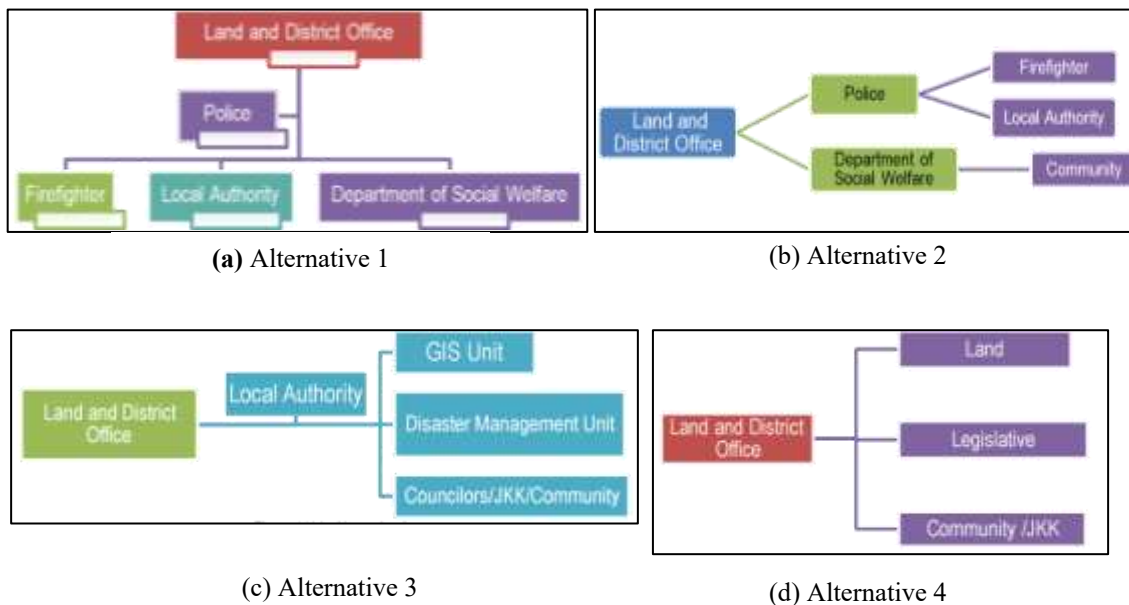


Figure 7: (a), (b), (c), (d): A set of 4 choices of sub-district disaster management organisation for selection by focus group members

FINDINGS AND DISCUSSION

Results from the discussion differed from one group to another. Group A members informed the FGD session that the flood victims were not immediately transferred to evacuation centers directly from their flooded housing area. Two factors would influence such a decision: the severity of the flood and the accessible road network allowing transfers to happen. In some events, the flood may not reach more than 60cm deep, not even reaching the front door, and sometimes roads are blocked due to severe flooding. The members agreed that saving lives was the ultimate objective. Health personnel would prioritise people with a disability or bedridden or pregnant ladies in terms of the hierarchy of transfer facilities and decision-making. They selected alternative 4 (Alor Gajah Municipal Council leading their new establishment) to choose a localised independent community flood management establishment. In their view, community inputs were helpful, especially in mapping and simulating primary or alternative rescue and evacuation routes and evacuation guide leaders.

Nevertheless, they insisted that the original hierarchy and functions under Directive 20 should be maintained. Front liners would be the security and rescue personnel such as the Police, the Fire and Rescue Department, the Civil Defense Force, and the Armed Forces. The second liners, such as the Health Department and Social Welfare. Department will be responsible only when the evacuation centres are activated. Mapping and simulation of flooding scenarios should be analysed using data provided by the technical departments, such as water level early warning (Department of Irrigation and Drainage), Unlike the previous group, Group B perceived differently in several matters. This second group argued that the community members were not equipped with the knowledge and experience to manage a localised flood management committee. They do not have the skills and technical know-how in or legal jurisdiction to execute any rescue or transporting activities. The communities should be adequately trained and be categorised into stages of professionalism (20% or 40% or 80% capability to carry out flood management functions). This group selected alternative 2 (the Police and Social Welfare Department to lead their new establishment) to choose a sub-district level flood management committee. The group insisted that the District Office should still lead the flood operation control centre. The group argued that generally, flooding in Alor Gajah was mostly flash flood in nature and seldom would require direct community involvement in planning, management, and recovery.

CONCLUSION AND RECOMMENDATION

According to the focus group discussion input, in the preparation and planning for the disaster, the agencies that participated in the FGD have outlined and proposed several Standard Operating Procedures (SOP) to be strictly followed:

1. The secretariat will be providing administrative services to state/district disaster management committees and other workgroups related to disaster management.
2. Coordinate the management and simulations of comprehensive disaster management, education strategy, training, and awareness to the community.
3. Provide efficient training for the officers and staff at district offices and agencies involved in operating rooms during a disaster.
4. Strengthen and coordinate communication networks between the district and management agencies' rescue zone using existing facilities or technologies.
5. Make sure the practice, understanding and implementation of State Disaster Management mechanisms.
6. Arrange the duties schedule for department relations officers in the state/district movement room.
7. Monitor and coordinate the implementation of disaster risk reduction to prevent or reduce disasters by government agencies.
8. Update the state and district disaster management profile.
9. Prepare and deliver briefing of state/district disaster preparation and management to the Working Secretary (SUK) or District Officer (DO).

Besides that, among the strategies that have been outlined during the disasters are partially operating the State Movement Room and performing monitoring when a disaster situation reaches level 1. The secretariat also outlined the need to advise the Chairman of the State Disaster Management Committee for the state movement room's complete operation when the disaster situation (flood) reaches level 2. Furthermore, the secretariat will be directing all agencies involved and government departments to assign each officer in the state movement room for ease of commands and controls over the situations. Additionally, the secretariat will be coordinating the agencies under the State's Disaster Management Department (JPBN) while updating the status. Report either to be submitted to NADMA (NDCC) or JPAM's Operational Control Center (PKOP). Lastly, the secretariat will be coordinating the up-to-date mission of disaster assistance and reporting from state to state in a systematic network.

Finally, the secretariat will hold a disaster control post-mortem meeting right after a disaster for the post-natural disasters and coordinate the state and district's grant money for financial assistance from KWABBN to fund the vulnerable victims. Therefore, based on this research it can be concluded that, there is no formal or informal set up at the community level and there is a need to form a set up with proper training at the community level. The alternative has been selected by the group based on their experience and consideration. The readiness of the community is one of the main important elements to be considered before the set up in community level can be realized.

ACKNOWLEDGEMENTS

This study is funded by the Malaysian Government, under the Ministry of Higher Education. We want to express our gratitude to the Fundamental Research Grant Scheme for this research's financial support.

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Received: 17th May 2021. Accepted: 9th July 2021