FLOOD PREPAREDNESS AMONG AGENCIES IN SEGAMAT, JOHOR

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Abstract. Within the southern region of Peninsular Malaysia, Johor has experienced the most severe flood disasters with almost 9,000 evacuees between the year 2012 to 2017, which the locals attributed to poor flood management and administration. Eight main responding agencies identified based on NSC Directive No. 20 were surveyed in Segamat, Johor, in order to assess current perception and practices, as well as ascertain aspects of flood management that need improvement. A self-administered questionnaire was used which focused on the agencies’ flood response capabilities, and five key determinants towards effective disaster response namely collaboration, predisposition, information sharing, coordination among agencies, and preparedness. Results from the survey among 80 respondents found that responding agencies in Segamat have a positive perception of their planning and responding capabilities. Based on a checklist of preparedness measures, the majority of respondents were found to have a high level of flood preparedness, particularly for emergency coping and restoration works. However, while the findings showed that the agencies have high confidence in responding to flood individually, there are opportunities for improvements in their capabilities to work and respond cohesively with each other and with the local communities.

Keywords: Flood preparedness; agencies preparedness; disaster management.

1. Introduction

Flood can be defined as a general or temporary condition where a normally dry land is partially or completely inundated by overflowed surface water or runoff. Malaysia has experienced over a dozen major flood events throughout the last century, such as the Bah Merah in 1926 which flood the entirety of Peninsular Malaysia, or the Bah Kuning in 2014 which displaced over 200,000 households across West Malaysia. Bah Kuning which flooded five states (Kelantan, Terengganu, Pahang, Johor and Perak) from mid-December 2014 to early January 2015 caused various damages ranging from damages to buildings and infrastructures, to destruction of crop and disruptions of economic activities. For the state of Johor, its most recent flooding occurred on January 2017, whereby Johor was one of six states affected [1]. In Johor, Segamat and Kota Tinggi were the two districts that were most severely affected by the flood. A total of 8,974 flood evacuees were recorded across eleven districts in Johor from 2012 to 2017, and Segamat alone had a total of 3,434 evacuees throughout the five years. The highest number recorded for Segamat was 2,885 in 2017.

In the case of Segamat’s flood in 2017, the locals believed that incompetent government agencies and inefficient management was the main cause for the flood, in spite of structural and non-structural mitigation measures in-place such as early warning systems, land use zoning regulations and river maintenance works [2]. This perception is supported by previous studies on flood management in Segamat, which found that the government was lacking in several aspects such as poor coordination between disaster management committees, ineffective early warning dissemination, and inept evacuation and rescue operations [3], [4]. Hence, this study was conducted with the aim to assess current practices and level of preparedness among government agencies in Segamat, Johor. This is also done in order to identify areas of flood management at the district level that may require improvements in the near future.

2. Literature Review

In responding to emergencies, the operations rely heavily on the responding agencies’ awareness and comprehension of their roles and responsibilities as stipulated not only by their respective or individual...
standard operating procedures (SOPs), but also the National Security Council (NSC) Directive No. 20. Furthermore, due to the dynamic nature of disasters, cooperative effort among the many agencies and various stakeholders involved (be it the assisting or affected parties) may prove imperative in alleviating adverse impacts and preventing further damages and/or losses from the disaster. Multiple shortcomings have been identified through studies done following past flood disasters. These include lack of information sharing among agencies, confusion on interorganisational dynamics, overlapping roles, shortage of rescue personnel and equipment, mismanagement of resources, and ineffective flood warning system, among others [3], [5]. In addressing these weaknesses, several determinants stood out in terms of their influence towards effective emergency response. These determinants are collaboration, predisposition, information sharing, and coordination among agencies [6], [7], [8].

Collaboration refers to a process of sharing norms and interactions to mutually benefit one another. In disaster management, interdisciplinary collaboration takes place as different professionals with unique knowledge, skills, organisational perspectives and personal attributes engage in coordinated problem solving [9]. As disasters become more and more complex, interdisciplinary collaboration at multiple levels and settings particularly through identification and sharing of resources also becomes highly important in ensuring the effectiveness of disaster response strategies. Next is predisposition, which refers to the enduring, internal affection or evaluation that may have causal influence on behaviour. In disaster response, predisposition can be specifically defined as the initial tendencies of an agency towards another. This determinant helps identify the capacity of agencies, which may or may not have worked together in the past, in working together to solve complex problems that may arise during disasters [10].

Another valuable asset during disaster response is information, which is produced, retrieved, processed, enriched, validated, consumed and distributed intra- and interagency [11]. As disaster events are generally complicated, dynamic and in constant change, information sharing is vital in minimising failures and casualties, as well as preventing the crisis escalation. Information sharing as a determinant also indicates the adequacy of access other organisation has towards information relevant to the success of collaborative efforts during disaster response. In relation to the complex nature of disasters, its response also relies heavily on coordination and the shared responsibility among different levels and sectors of administration. Good coordination can eliminate gaps and duplication in service through proper distribution of responsibility, and the establishment of frameworks for information sharing, policy agreements, collaboration and joint planning [12]. Interagency coordination is further enhanced when it is participatory (active involvement of all parties), impartial, and transparent with all parties involved working to achieve a common goal without bias towards any particular agency.

3. Methods
Despite having more than a dozen agencies and departments involved in disaster response under the NSC Directive No. 20, eight agencies identified as the main responders for flood disasters were included in this study. As mentioned in section 1 (Introduction), Segamat was selected for this study as it recorded the highest number of flood evacuees in the state of Johor between 2012 – 2017 (3,434 persons out of 8,974 persons state total) [13]. In addition, the district has been identified as a flood prone area according to the Malaysian Department of Irrigation and Drainage (DID) [14]. Figure 1 shows the flood hazard map for Johor as adapted from DID, and the flood prone area for Segamat district [15]. The eight agencies/departments studied in Segamat, Johor are the Royal Malaysia Police (RMP), Fire and Rescue Department of Malaysia (FRDM), Malaysian Civil Defence Force (APM), Malaysian Armed Forces (MAF), State Health Department (JKN), Department of Social Welfare (JKM), Department of Irrigation and Drainage (DID) and the district office (DO). A total of 80 respondents with experience in responding to flood disasters were sampled in the district, with ten respondents representing each government agencies/ministries.

The study used a self-administered questionnaire as the main data collection instrument. Respondents were first requested to do a self-assessment on their respective agencies’ capability in managing flood
disasters. Subsequently, five (5) key determinants for effective disaster response as ascertained from literature study were assessed for the respondents (and their agencies) as follows:

i. collaboration – measured via five dimensions namely governance, administration, autonomy, mutuality and norms [9];

ii. predisposition – measured using seven statements and 5-point Likert scale [9];

iii. information sharing – measured using five dimensions i.e. incentive mechanism, supporting information, communication system with other agencies, within agencies, and at the individual level [12];

iv. coordination among agencies – five items were measured using a 5-point Likert scale revolving around the agencies’ will, means, and trained personnel [12]; and,

v. preparedness – measured using a checklist of safety actions concerning seven dimensions, namely hazard knowledge, management direction and coordination, response agreements, supportive resources, life-saving, emergency coping, and restoration and initiation of recovery [16].

All data collected were then analysed via SPSS using descriptive analysis in order for value changes and patterns to be identified. Since the five-point scale was used in the questionnaire, any score of above 4.00 is considered categorically as high, while a score of 3.00 is considered as moderate, and anything in between as moderately high. In contrast, any score of 2.50 or less is considered as low.

4. Results and Discussion

Respondents in Segamat were found to have a moderately high overall perception of their respective agencies’ capabilities (Mean, M = 3.84, Standard deviation, SD = 0.621), particularly in terms of planning (M = 4.21), community service (M = 4.06), and compatibility between different agencies (M = 4.201). However, they also had lower perceived capabilities in terms of disaster funding allocation (M = 3.47) and surge capacity (M = 3.64). The agencies in Segamat also have a moderately high collaborative aptitude (M = 3.77, SD = 0.398), especially in terms of mutuality and governance. This proved that the agencies believe in the importance of sharing resources and information, respecting others’ opinions, and a working partnership to solve problems faced during disasters. Predisposition was found to have a higher score (M = 4.34, SD = 0.488), as agencies in Segamat are positively receptive towards collaborative planning, decision-making and response in order to meet their objectives. The overall score for information sharing was also found to be moderately high at M = 3.79, and SD = 0.517. The findings reflect the perception among respondents that communication system between agencies is the most important for a successful emergency response operation, followed by effective information sharing within one’s own agencies, and provision of information by other responding agencies.
Coordination among agencies during a flood disaster is perceived as quite important ($M = 3.95$, $SD = 0.578$), whereby provision of liaison officers at the operations coordination centre (OCC) ($M = 4.11$), centralised communication controls at the OCC ($M = 4.04$), regularly scheduled meetings ($M = 4.03$), interagency communications ($M = 3.98$), and joint strategic planning ($M = 3.94$) were considered as the critical criteria and/or necessities. Out of 80 personnel surveyed, a little more than half scored high on the flood preparedness checklist (54%), while 19% scored moderate and about a quarter (27%) scored low. The agencies were found to be most prepared in terms of emergency coping and restoration (93%), management direction and coordination (88%), as well as hazard knowledge (80%). Preparation of a written disaster response plan, and participation in interagency or city-wide drills remained low at 56% and 59%, respectively.

5. Conclusion

Based on the results of the survey, the capability and overall preparedness of responding agencies in Segamat were found to be moderately high. The agencies were found to be capable of operating and performing in response to flood emergencies as an individual organisation. Each agency is knowledgeable in flood hazard, planning, and executing their respective response operations. However, there are certainly rooms for improvement among the agencies responding towards flood disasters, or any kind of emergencies, as a unified task force. Collaborative efforts, while welcomed and perceived as important by all agencies involved, remained low especially during the preparedness phase of the disaster life cycle. A localised, community-based response plan that is developed with the support of expertise and resources of local authorities or agencies is highly recommended to further improve flood disaster preparedness among agencies and communities alike in Segamat, Johor. This response plan should function as a protocol that addresses interagency communication, information sharing mechanism, operability, and tasks allocation for all local stakeholders. When properly executed, this response plan will also serve as a solution for the detachment that local communities felt towards responding agencies and local authorities in relation to flood management, as evident from previous flood events and studies [4]. Interagency drills and emergency response exercises should also be conducted annually to refine and enhance interagency coordination. Furthermore, the exercises and flood response plan development can also be utilised as a platform to identify training needs to further enhanced flood disaster preparedness among emergency responders.

6. References

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