PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 22 ISSUE 6 (2024), Page 249 – 260

CATASTROPHIC FLOODING IN PAHANG, MALAYSIA: WHAT WENT WRONG WITH THE FLOOD RESPONSE?

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Abstract

This study aims to critically analyse the flood response in Pahang, Malaysia, focusing on identifying the issues and challenges from the perspectives of responsible agencies. Using qualitative research methods, including face-to-face interviews with 30 officers from various emergency response agencies, the study adopted thematic analysis to identify key issues. Findings indicated significant challenges, such as acute manpower shortages, severe deficiencies in logistical assets, substantial communication barriers, and coordination problems between agencies. The study underscored the need for improved resource allocation, enhanced communication technologies, better logistical planning, and stronger inter-agency cooperation to enhance flood response efficiency and effectiveness. Recommendations include adopting more robust communication technologies, comprehensive logistical asset management, proactive federal support, and a thorough overhaul of current emergency response protocols. This research highlights the urgent need for a more resilient and efficient disaster management framework to mitigate the impact of future floods.

Keywords: Flood, Flood Response, Climate Change, Pahang

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INTRODUCTION

Flooding is one of the most devastating natural disasters, causing significant damage to property, loss of lives, and disruption of daily activities (Amin & Hashim, 2014; Ata et al., 2023). Pahang, a state in Malaysia, has repeatedly experienced some of the worst floods in its history, affecting thousands of residents and causing widespread destruction. The intensity of flooding in Pahang was severe, with floodwaters rising rapidly, inundating homes and infrastructure, and leaving residents stranded and in desperate need of assistance. The severity of these floods led to panic buying and emptying store shelves as residents braced for the worst (Malek, 2021). Historical records highlight five major floods in Pahang, with the most significant displacing over 39,000 people and resulting in twenty fatalities (Rahman, 2021; Razali, 2021). Furthermore, residents in Pahang have described the 2021 floods as the worst since 1971 (Bernama, 2021).

Despite the presence of early warning systems and established evacuation protocols, the response to the floods in Pahang was marred by significant delays and operational inefficiencies, aggravating the impact on affected communities (Mabahwi et al., 2020; Mabahwi & Nakamura, 2020). The cumulative effect of these floods has highlighted the critical need for robust infrastructure and comprehensive disaster preparedness plans to protect vulnerable communities. The December 2021 floods serve as a grim reminder of the necessity for improved flood management and mitigation strategies to prevent future disasters.

Climate change is exacerbating the frequency and intensity of such flooding events, making it imperative to adopt more resilient strategies. Studies have shown that climate change significantly increases the risk of severe flooding due to more intense and frequent rainfall events (Guldberg et al., 2018; Trenberth, 2011). Given these escalating risks, it is crucial to implement effective flood response strategies to mitigate the impact of future floods, as emphasised by Wu et al. (2019). This study aims to critically analyse the flood response in Pahang, focusing on what went wrong and why from the perspectives of responsible agencies. By understanding these issues, the study plans to suggest improvements for future flood response efforts, ensuring that the lessons learned from Pahang's experience can inform better practices and policies.

LITERATURE REVIEW

Urban flood disaster management requires both structural and non-structural measures. Structural measures include the construction of dams and river dikes, while non-structural measures involve flood forecasting, public participation, and institutional arrangements. In developing countries, flood disaster management is often reactive, focusing on emergency response and recovery. However, a shift towards proactive disaster management, which involves preparedness, readiness, emergency response, and recovery, is recommended. This proactive approach

requires greater participation from government, non-governmental, and private agencies, as well as the public (Tingsanchali, 2012).

Emergency response, particularly in the context of natural disasters such as floods, involves a complex interplay of coordination, communication, and resource management. Flood response and management are critical focus areas for various stakeholders, including government agencies, non-governmental organisations, and local communities. Therefore, the literature on flood response and evacuation is extensive, covering multiple aspects of disaster management, communication, and logistical planning. In Malaysia, flood response follows a top-down approach where the government is the primary actor (Mabahwi et al., 2020). This top-down approach means that authority is centralised (Huntjens et al., 2010). Responders, who are at the forefront of these operations, face a myriad of challenges that can significantly impact the effectiveness of their actions. Previous studies have highlighted that these agencies faced many issues and challenges, particularly in the phase of flood response (Mabahwi et al., 2020).

A study by Beamon (2004), for example, reveals the challenges in coordinating relief supplies between agencies during disasters. Meanwhile, Shahid et al. (2014) claim that the challenge of inter-agency coordination during disasters is well-known on the ground but is a neglected area of research. Salmon et al. (2011) argue that disaster agencies face challenges due to unpredictable outcomes, massive casualty numbers, resource shortages, lingering side effects, disruption of public service, collapsed infrastructure, enormous time pressures, high stakes, highly interdependent tasks, and communication breakdowns. In addition to these challenges, Malalgoda et al. (2016) stated that disaster management agencies in Sri Lanka face issues of an inadequate legal framework, limited authority, outdated ordinances to support disaster risk reduction, lack of adequate tools, techniques, and guidelines, human resource constraints, funding constraints, and weaknesses in internal and external systems. These conditions are further aggravated by personal or organisational conflicts regarding authority, interests, and motives.

Case studies from various regions underscore the practical implications of these challenges. The response to Hurricane Katrina in 2005 revealed significant coordination and communication failures, leading to widespread criticism and calls for reform (Comfort et al., 2011). Studies have also shown that effective flood response requires timely and accurate communication, robust infrastructure, and well-coordinated emergency services (Cutter et al., 2010). Conversely, the effective response to the 2011 Brisbane floods demonstrated the benefits of well-coordinated efforts and robust communication systems (King et al., 2016). Additionally, research by Kuller et al. (2021) outlines that successful flood response requires timely and accurate information dissemination, robust infrastructure, and well-prepared emergency services.

These examples highlight the variability in emergency response effectiveness and the critical role of addressing the identified issues. However, gaps in existing research highlight the need for case-specific analyses to understand the unique challenges faced by different regions (Tierney, 2007). In the context of Pahang, there is limited research on operational failures during flood events, necessitating a detailed examination of the recent flood response.

Issues in Emergency Response from the Perspectives of Responders

Understanding the challenges faced by responders is crucial for improving disaster management practices. These challenges are multifaceted, encompassing coordination, communication, training, resource management, and the psychological and physical strain on responders. Addressing these issues is essential for enhancing the overall effectiveness and efficiency of flood response efforts (Smith, 2013). The following are issues synthesised from previous studies:

Coordination Challenges

Coordination between various agencies and stakeholders is a fundamental aspect of effective emergency response. However, literature indicates that coordination often falls short due to bureaucratic inertia and inter-agency rivalries. Alexander et al. (2016) notes that hierarchical structures and rigid protocols can hinder swift decision-making and adaptive responses. Similarly, Moynihan (2009) highlights that the Incident Command System (ICS), while effective in theory, often struggles with real-world implementation due to the complexity of integrating diverse agencies with differing mandates and operational cultures.

Communication Barriers

Effective communication is crucial in ensuring timely and accurate information dissemination during emergencies. However, responders frequently encounter significant communication barriers. According to Kapucu (2006), these barriers can arise from technological failures, such as the breakdown of communication networks and human factors, including language differences and unclear messaging. William et al. (2006) emphasise that the lack of standardised communication protocols can lead to confusion and delays, exacerbating the challenges faced by responders.

Training and Preparedness

Training and preparedness are vital components of emergency response, yet they are often inadequately addressed. Alexander (2015) argues that insufficient training programmes fail to equip responders with the necessary skills and knowledge to handle complex disaster scenarios. Additionally, Naser and Saleem (2018) point out that periodic drills and simulations are essential for maintaining

a high level of preparedness, but these are often neglected due to budget constraints and complacency.

Resource Allocation and Management

Resource allocation and management pose significant challenges during emergency response. Comfort et al. (2004) identify that the uneven distribution of resources can lead to critical shortages in affected areas, undermining the overall response effort. Meyer et al. (2019) add that logistical issues, such as transportation bottlenecks and supply chain disruptions, further complicate the effective deployment of resources. Responders often find themselves working with limited resources, which hampers their ability to provide timely and adequate assistance.

RESEARCH METHODOLOGY

This study adopted a qualitative method that used thematic analysis. This is a suitable interpretation method that allows the researcher to gain an insider's view of the topic under investigation (Braun & Clarke, 2006). Qualitative methods are used to answer questions about experience, meaning, and perspective, usually from the standpoint of the research subject or participant (Hammarberg et al., 2016). Qualitative thematic analysis is a method for identifying, analysing, and reporting themes within a text and is useful for theorising across many cases and for finding common patterns among research participants (Fereday & Muir-Cochrane, 2006; Mohamed et al., 2016; Riessman, 2005). This technique enables the researcher to understand the meanings behind respondents' statements according to their contexts (Joffe & Yardley, 2004; Mohamed et al., 2016). The qualitative approach adopted in this study allowed for a comprehensive understanding of flood response.

The interview data were analysed and classified to establish relevant themes for further discussion. The results were considered reliable because general consistency was found across the stakeholder responses. This research technique is in the family of qualitative thematic analysis and is used to assess the existence of certain words or themes in texts or text collections. Researchers measure and examine the existence, meanings, and relationships of specific terms and concepts and then draw inferences regarding the messages within texts and the author(s), audiences, communities, and time of which they are a part (Colorado University, 2004).

Face-to-face interviews were conducted with 30 officers involved in flood response in Pahang. For each agency, interviews were conducted with officers from the State level (Pahang main branch) and District level. The agencies involved in this study were the Fire and Rescue Department (nine officers), the Royal Malaysian Police (four officers), the Malaysia Civil Defence Force (six officers), the Department of Social Welfare (four officers), National

Disaster Management Agency (NADMA) (four officers), and Local Authorities (three officers). The interviews were conducted using an unstructured questionnaire because it provides a more in-depth understanding of participants' perceptions, motivations, and emotions (McCombes, 2019).

FINDINGS

Table 1: Summary of the challenges

Challenges in flood response	Agencies
Shortage of manpower	All agencies
Shortage of logistical assets	All agencies
Communication breakdown	Fire and Rescue Department, Royal Malaysian Police, Malaysia Civil Defence Force, Department of Social Welfare,
Lack of coordination and cooperation	Fire and Rescue Department, Malaysia Civil Defence Force

Source: Authors, 2024

In the thematic analysis of the interviews with the respondents, several critical themes emerged, including manpower, assets issues, communication, and lack of coordination and cooperation. These themes highlight the multifaceted challenges faced during flood response efforts from the perspectives of responsible agencies (refer to Table 1). One of the significant challenges faced during the flood response was the acute shortage of manpower. Despite mandates requiring all flood-response agencies to be on duty at the state and district levels, many staff members were flood victims themselves, leading to a critical lack of available personnel. This issue was particularly pronounced at the district level, where resources are inherently more limited. The Civil Defence Force and the Fire and Rescue Department faced severe staff shortages, hampering their ability to perform their response and rescue duties effectively. All interviewed agency personnel highlighted this manpower shortage as a primary obstacle during disaster response efforts.

In addition to manpower issues, the flood response was severely hindered by a significant shortage of logistical assets. Emergency services faced considerable challenges accessing affected areas due to flooded roads and damaged infrastructure. The absence of boats and other essential equipment further delayed rescue operations, leaving many residents stranded for extended periods. During interviews conducted for this study, it was revealed that, at the district Civil Defence Force office, only one boat was functional while the majority were broken and unusable. This critical shortage of operational boats led to substantial delays in operations when Temerloh and Mentakab were isolated due to severe flooding in 2021 and 2022. Consequently, responders were unable

to deliver food to flood victims in evacuation centres, resulting in food shortages and starvation among the evacuees. Interviewees from various flood-related agencies consistently reported a critical shortage of transportation assets, which posed significant logistical challenges for humanitarian operations. This shortage was identified as a major impediment to effective disaster response, particularly during the preparedness and response phases.

Effective communication is vital during flood response operations, yet significant issues have been identified with the current systems in place. The primary communication tool used by responders is the Government Integrated Radio Network (GIRN), which is the standard for all government agencies involved in disaster response. However, GIRN frequently becomes overloaded during flood events, causing substantial delays in inter-agency communication and hindering response efforts. This instability and the lack of reliable communication channels underscore a critical gap in the flood communication plan, potentially leading to failures in disaster management. Enhancing the communication capacity among agencies is essential to minimise chaos and ensure smooth coordination during flood events. Additionally, WhatsApp is utilised by responders for communication between agencies. However, this platform's dependency on a stable internet connection presents significant limitations. Major flooding and continuous heavy rain in Pahang led to a major electricity blackout, as Malaysia's primary electricity supply provider shuts off supply when water levels become dangerously high (Sean, 2013). This situation exacerbates communication challenges, as WhatsApp requires electricity and internet access, both of which become unreliable during such conditions. Interviews revealed that officers on flood response duty in Pahang frequently encounter severe communication challenges due to these blackouts and internet slowdowns during heavy rain, which further delay response efforts. The reliance on WhatsApp is critically flawed, as it fails to provide a reliable communication channel during emergencies when internet connectivity is compromised.

The lack of coordination among various agencies exacerbated the situation further, leading to inefficient and delayed response efforts. Collaboration and cooperation issues also arise during flood response. For example, the Civil Defence Force works with the Fire and Rescue Department to rescue flood victims. However, cooperation with the Fire and Rescue Department is challenging due to the hierarchical ranking in uniformed units, with Fire and Rescue Department personnel typically holding higher ranks. This disparity in rank creates tension and hampers effective collaboration. Through interviews, both agencies expressed the same problem and dissatisfaction with each other, indicating a significant barrier to effective cooperation. The Fire and Rescue Department personnel expressed dissatisfaction with being led by the Civil Defence Force during flood response operations. This lack of cooperation between agencies during flood response has delayed rescue operations, further

complicating disaster management efforts. Addressing these coordination issues requires a comprehensive review of the hierarchical structures and inter-agency protocols to foster better cooperation and streamline response efforts.

DISCUSSION

The current communication channels used during flood response operations exhibit substantial limitations, underscoring the critical need for the adoption of more robust and reliable communication technologies that can function effectively under disaster conditions. The frequent jamming of the GIRN and the dependency of WhatsApp on a stable internet connection are significant barriers to effective communication. Addressing these issues is imperative to improve the efficiency and timeliness of flood response operations, ensuring that agencies can coordinate more effectively during disasters.

Moreover, the severe lack of logistical assets highlights a critical gap in disaster management capabilities. This underscores the need for improved resource allocation and strategic planning to enhance the efficiency and effectiveness of future flood response efforts. The current state of logistical preparedness clearly demonstrates that the federal government has overlooked the importance of maintaining well-prepared assets and logistics considerations essential for effective flood preparedness and response. The lack of attention to logistical flood emergency planning by relevant stakeholders is a significant oversight. As other scholars have pointed out, the government must play a key role in the logistical preparations necessary for effective disaster response (Leeuw et al., 2009; Moe & Pathranarakul, 2006).

Compounding these issues is the overall lack of support from the federal government. Despite the evident need for additional logistical assets and resources, this lack of federal support indicates a significant flaw in Malaysia's emergency preparedness plans, which fail to adequately consider the logistical demands of a large-scale humanitarian disaster. The persistent shortages of manpower and logistical assets not only impede immediate response efforts but also undermine the overall effectiveness of disaster management strategies.

This gap highlights the urgent need for a comprehensive review and overhaul of current emergency response protocols to ensure a more robust and efficient disaster management framework in the future. A thorough reassessment of resource allocation, strategic planning, and federal support is essential to address these deficiencies. The implementation of enhanced communication technologies, better logistical planning, and stronger inter-agency cooperation are crucial steps toward achieving a more effective and resilient flood response system.

CONCLUSION AND RECOMMENDATIONS

The study identifies several critical challenges that hinder effective flood response operations in Pahang. Key issues include acute manpower shortages, significant deficiencies in logistical assets, substantial communication barriers, and coordination problems among various agencies. The reliance on outdated and unreliable communication technologies exacerbates these challenges. Furthermore, the lack of federal support and inadequate strategic planning severely undermine the overall effectiveness of disaster management strategies in Malaysia. Addressing these issues is crucial for improving the efficiency and timeliness of flood response operations, ensuring better coordination among agencies, and ultimately enhancing the resilience of disaster management frameworks.

To address these challenges, it is essential to adopt more robust and reliable communication technologies, improve logistical planning and asset management, and enhance inter-agency coordination through joint training exercises and clear communication protocols. The federal government must play a more proactive role in disaster preparedness by approving necessary resources and integrating logistics considerations into emergency plans. Overhauling current emergency response protocols to create a more efficient disaster management framework will significantly enhance Malaysia's flood response capabilities, ensuring more effective and timely disaster management and reducing the impact of future flood events on affected communities.

ACKNOWLEDGEMENTS

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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Received: 18th March 2024. Accepted: 17th October 2024

