STRENTHENING COMMUNITY RESILIENCE FOR FLOOD PREPAREDNESS: HUMAN SECURITY AND MEDIA ENGAGEMENT ROLE IN SELANGOR

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Abstract. Rapid urbanisation and increasing flood risks have exposed weaknesses in disaster preparedness in Selangor, particularly following the December 2021 floods. This study examines how human security, community resilience and media engagement can strengthen flood preparedness through coordinated governance and community participation. Employing a qualitative approach, semi-structured interviews were conducted with six informants representing government agencies, local authorities, community members, first responders, media and academia. Thematic analysis identified three interconnected barriers: complacency and dependence on external assistance, psychological challenges including fear and trauma, and limitations in coordination, training and resources. Findings highlight the role of community leaders in building trust, mobilising grassroots participation and communicating local needs to government agencies. Community networks and social cohesion support preparedness, while simulation exercises and accessible equipment remain important areas for improvement. Traditional and social media complement one another by disseminating warnings, facilitating real-time communication and connecting residents with assistance; however, misinformation can undermine public confidence and coordinated responses. Integrating the Two-Step Flow Theory with the Knowledge, Attitudes and Practices framework emphasises the importance of trusted opinion leaders in translating information into preparedness actions. The study recommends inclusive governance, sustained community training, improved resource coordination and accurate communication to enhance flood resilience in Selangor.
Keywords: *community resilience, flood preparedness, human security, media engagement, Selangor*

Introduction

The December 2021 floods in Taman Sri Muda revealed severe gaps in preparedness and response strategies. Despite efforts by the Selangor state government to mitigate flood risks, challenges persist in interagency coordination, community engagement and the dissemination of reliable information. Urban flooding has exposed weaknesses in top-down disaster management approaches, as power and authority issues among local authorities often hinder the effective implementation of flood management plans (Mukherjee, 2024). Misinformation and limited access to accurate updates during disasters also evoke confusion and anxiety, leaving many communities inadequately prepared (Phengsuwan et al., 2021). Overall, the floods highlighted the need for stronger coordination, community engagement and more effective information dissemination to improve disaster preparedness and response. Research highlights that community resilience is critical for mitigating the impacts of disasters, as it involves the ability of communities to adapt, recover and thrive amid adversity (Prashar et al., 2023). Studies by Shariff and Hamidi (2019) and Que et al. (2022) emphasise the benefits of community-based approaches in flood management, where involving local communities enhances preparedness and ensures that interventions are relevant and effective. Media

engagement also plays a crucial role in shaping community perceptions and behaviours related to flood preparedness. Zahari et al. (2022) found that effective communication strategies can enhance public awareness and encourage proactive measures. Together, these studies show that community involvement and effective communication strengthen flood preparedness, but misinformation and limited resources continue to constrain progress (Azhar et al., 2022).

Literature review

Annual monsoon seasons bring persistent flood challenges, making these principles essential for resilience and preparedness. Tragically, Selangor state had one of the worst floods in 2021, forcing an estimated 400,000 people to evacuate and causing an estimated RM6.1 billion in total financial losses (Rahman, 2022). Selangor, one of the most densely populated states in Malaysia, faces significant flood risks due to rapid urbanisation and its proximity to major rivers, including the Sungai Klang and Sungai Langat (Chakraborty et al., 2023). The December 2021 floods in Taman Sri Muda highlighted these vulnerabilities, with unprecedented rainfall that caused severe flooding, submerged homes and displaced thousands of residents (Tugi et al., 2023). Extensive research conducted in the aftermath revealed the need to promote sustainable living and enhance community resilience. According to Bernama (2023), the Selangor State Government identified 97 flood hotspots, a 45% increase from the 52 hotspots reported in 2022 (Mohamed, 2022). These areas include Klang, Sepang, Hulu Langat, Gombak, Petaling, Kuala Langat, Kuala Selangor, Sabak Bernam and Hulu Selangor raising significant concerns among residents about the state’s growing flood risks (Musa, 2022). Addressing Selangor's growing flood risks requires proactive measures to enhance community resilience and promote sustainable living, particularly in identified flood hotspots.

Flood preparedness: Lessons from Selangor

In December 2024, the Sultan of Selangor called on the state government to devise a comprehensive flood management plan, stressing the importance of meticulous planning by local authorities (PBT) to address the issue effectively (Mohamed, 2024). While the state government has faced criticism for its inability to fully resolve flooding problems, officials have taken steps to ensure government aid is ready to function during the monsoon season (Jeevendran, 2024; Adhar, 2024). Community-led initiatives in areas such as Taman Sri Muda, Sungai Lui and Taman Sri Nanding have revealed both strengths and gaps in preparedness strategies. For instance, the operation of tidal control gates during the 2021 floods may have inadvertently prolonged inundation instead of mitigating it (Yasmin et al., 2022). This emphasises the need for disaster planning that prioritises localised solutions and community engagement to address urban challenges and build resilient cities (Chen et al., 2024). Developing a comprehensive flood management plan that integrates localised solutions and community engagement is crucial for addressing Selangor's flood challenges and building resilient urban communities.

The floods in Selangor have also brought attention to broader issues regarding Malaysia’s preparedness for climate change. Experts argue that the country is not adequately equipped to manage the growing impacts of climate change, as demonstrated by floods in the Lembah Klang (Bernama, 2021). Challenges include gaps in early

warning systems, unplanned urban development, environmental degradation and ineffective disaster response and coordination. Addressing these issues, raising public awareness and implementing preventive measures are essential to enhance Malaysia's resilience to future climate-related risks (Bernama, 2021). Addressing preparedness gaps and prioritising preventive measures are critical steps to strengthen Malaysia's resilience to the escalating impacts of climate change. The psychological toll of the floods has also been significant. Many residents expressed fear and trauma, particularly when water levels rise, as it evokes memories of past disasters (Azhar et al., 2022). Some victims, having suffered significant losses during the 2021 floods, took proactive measures such as relocating belongings to higher ground to mitigate future impacts (Zain, 2022; Noh, 2022). However, recurring trauma and rising water levels have led some residents to question the effectiveness of ongoing flood mitigation projects, including the drain expansion initiative in Taman Sri Muda (Abdullah, 2022). Furthermore, the psychological impact, which includes trauma, stress disorders and emotional distress, highlights the need for effective mental health support to help victims recover (Selangor Journal, 2021). Balanced assistance that addresses physical needs, such as food and shelter, alongside emotional recovery is critical for fostering resilience and aiding recovery.

Recognising these challenges, the Selangor government has also taken steps to improve flood management strategies. Floods are usually reported by the Selangor Irrigation and Drainage Department (JPS) and district offices, but recent efforts have incorporated data from local councils to map flood-prone areas more comprehensively (Dzulkifly, 2024). Additionally, the state has proposed an underground tunnel system with an RM6 billion ($1.36 billion) investment to channel rainwater runoff and reduce the risk of flooding in key areas (Bandhakavi, 2024). The Selangor State Disaster Management Unit and local authorities have been directed to use the 2021 floods as a parameter in preparing for future disasters, including full preparations during the monsoon transition period (Bernama, 2024). The Selangor government's enhanced flood management strategies, including comprehensive mapping and infrastructure investments, demonstrate a proactive approach to mitigating future flood risks and improving disaster preparedness. In its 2025 budget, the Selangor state government allocated RM34.27 million for flood mitigation projects, focusing on key river basins to address flash floods and monsoon-related flooding driven by urban development (Nehru, 2024). Menteri Besar Datuk Seri Amirudin Shari stated that all relevant agencies remain on standby, with measures such as activating pump systems and closely monitoring rainfall and river levels to mitigate potential flooding (Bernama, 2022). State Executive Councillor Izham Hashim further noted that while flood mitigation projects are progressing, minor challenges, such as utility relocations and highway authority approvals, have caused delays at some sites (Fathil, 2024).

Human security as the foundation of flood preparedness

The United Nations Development Programme (UNDP) introduced the concept of human security in its 1994 Human Development Report, calling for a shift from territorial security to people's security, emphasising sustainable human development. This represented a significant transformation in the security sector, moving away from nation-state-focused views to prioritising the well-being of individuals (Tadjbakhsh and Chenoy, 2007). Human security, as Stottlemyre (2024) highlights, addresses diverse threats to human well-being, including political repression, poverty, disease,

environmental challenges and armed conflict, emphasising a holistic approach to protecting and empowering people. According to the Human Security Handbook (United Nations, 2016), this shift is essential for fostering sustainable and equitable growth by empowering communities and addressing the root causes of insecurity, thereby aligning with global development goals. This understanding acknowledges that security is not just about protecting borders or national interests but also about ensuring the safety, well-being and prosperity of all individuals and their communities. This evolution in security thinking provides the foundation for understanding current challenges posed by climate change and disasters. Climate change and the increased frequency of natural disasters heighten the ongoing threats to human security, and according to Yusmah et al. (2020), over the past two decades, hydro-meteorological disasters have become more frequent across Asia, including Southeast Asia. It was further identified by Prashar et al. (2023) that, among natural disasters, floods topped the list as the costliest due to their frequency and the significant losses they cause to communities, the economy and the environment. Due to the destructive power and widespread impact of natural disasters, governments and organisations must implement disaster preparedness and risk reduction measures to mitigate their effects and protect society. Hence, the government must implement a comprehensive strategy that facilitates coordination among local organisations and stakeholders to formulate effective flood risk management and ensure efficient disaster response (Mukherjee, 2024). It is therefore important to implement an effective disaster risk management strategy to mitigate the impact of natural disasters and reduce associated losses in the future (*Figure 1*).

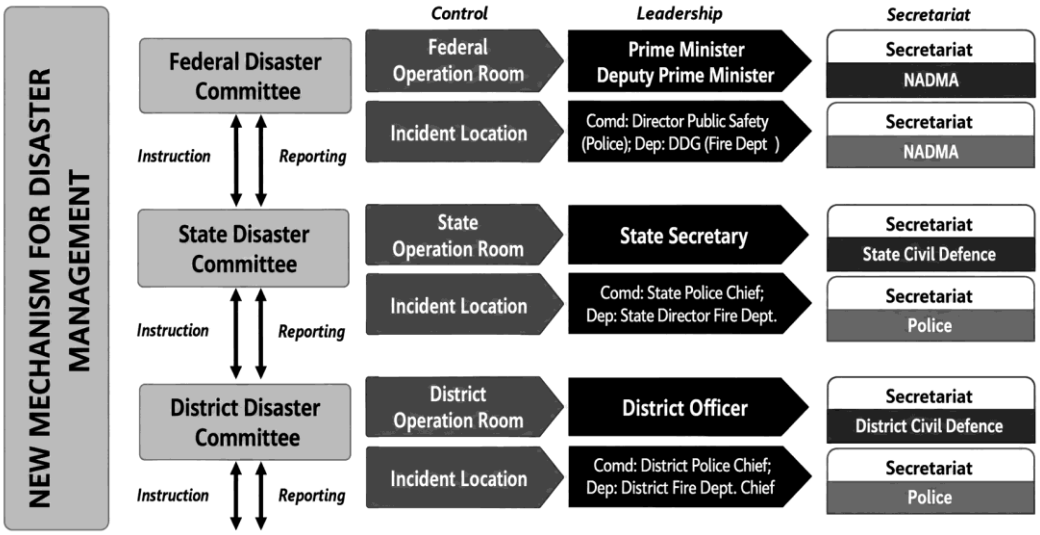


Figure 1. *Malaysia's disaster management framework.*

Against this backdrop of rising disaster risks, effective national coordination is vital to safeguarding communities and ensuring robust preparedness. The National Disaster Management Agency (NADMA) was established in 2015 and serves as Malaysia's central disaster management coordination body following the country's greatest monsoon disaster in December 2014 (Mageswari, 2022). NADMA plays a crucial role in Malaysia's disaster management by issuing operational guidelines to state and district disaster management centres, ensuring local agencies are prepared and coordinated for

flood responses (Yusoff et al., 2018). This was further supported by Mukherjee (2024), who stated that disaster management plans created at the national, state and district levels must acknowledge the importance of integrating disaster risk reduction strategies into their overall planning and operations. In NADMA Annual Report, NADMA has emphasised the importance of improving preparedness through initiatives such as training exercises and simulations for disaster response teams that involve multiple stakeholders, including district members. This focus highlights the need for agencies and responders to be well-prepared to handle emergencies. This approach also resonates with the Sendai Framework (United Nations, 2015), which advocates a culture of collaboration and accountability to support effective disaster risk reduction and resilience-building efforts.

Overcoming psychological barriers to community resilience

The observation of human security through the lens of community resilience in flood preparedness can be exemplified through various international success stories. According to Azhar et al. (2022), these success stories highlight the connection between adaptive capacity, social cohesion and psychological factors. For instance, Siawsh et al. (2022) reported that in Japan, recovery efforts following the 2011 Tohoku earthquake and tsunami demonstrated that strong social networks and community engagement significantly enhanced the resilience of a people-centric strategy. Residents organised themselves to share resources and information, thereby improving their adaptive capacity and fostering a sense of solidarity and trust within the community (Yip et al., 2021). Communities utilised their social cohesion to mobilise resources and implement effective disaster risk reduction strategies, demonstrating how psychological readiness and community participation can lead to successful outcomes (Ashraf, 2024). These examples demonstrate that effective community resilience is deeply ingrained in the social and psychological fabric of communities, where adaptivity, social cohesion and psychological factors combine to build strong systems capable of efficiently managing flood threats. Grassroots efforts and community-led initiatives across Malaysia have been instrumental in enhancing flood preparedness, particularly in flood-prone areas. One prominent initiative is the "Disaster Resilience Rural Community" program, which empowers local communities to engage in flood risk management through education and resource sharing (Chong and Kamarudin, 2023). Psychological factors, including trust in local leaders and a shared belief in the community's ability to cope with floods, further bolster engagement and resilience (Ridzuan et al., 2024). Documented outcomes from these community-based programs indicate improvements in local awareness and preparedness levels, with evaluations showing that communities that actively participate in resilience planning report better recovery outcomes and reduced vulnerabilities during flood events (Muzamil et al., 2022). These initiatives illustrate how integrating cultural and psychological dimensions into flood preparedness can lead to more robust community resilience in Malaysia.

Despite these positive developments, significant obstacles remain, especially psychological barriers such as denial, fear and risk aversion, which can undermine even the most well-organised community efforts. Many individuals underestimate the severity of flood risks based on past experiences that resulted in minimal damage, leading to a false sense of security and reduced preparedness (Sardi et al., 2019). Kwok et al. (2019) further emphasise that community members may engage in avoidance behaviours, such as avoiding important conversations or preparation, due to dread of the

unknown or worry about possible flooding. To overcome these barriers, it is essential to enhance risk communication, foster trust in local authorities and promote participatory approaches that encourage active involvement. Strategies such as leveraging trusted opinion leaders and delivering clear, actionable information can empower communities to address these psychological challenges, build collective efficacy and adopt proactive measures (Mukherjee, 2024; Karki, 2020). By addressing these barriers holistically, community-led programs can better foster a positive attitude toward flood preparedness, ultimately enhancing the sustainability and effectiveness of resilience-building efforts.

Combating misinformation through strategic media engagement

The spread of misinformation during floods can significantly undermine community resilience by creating confusion and panic among residents. When inaccurate information circulates, it can lead to misinformed decisions, such as unnecessary evacuations or ignoring critical safety measures, which ultimately hampers effective response efforts (Schoch-Spana et al., 2021). For instance, during Hurricane Katrina, conflicting reports about the severity of the storm and the safety of evacuation routes contributed to chaos and distrust, resulting in delayed responses and increased casualties (Algahtani et al., 2024). Similarly, misinformation about flood risks and safety protocols during the 2010 Pakistan floods led to public hesitancy to follow evacuation orders, exacerbating the disaster's impact (Gupta et al., 2020). These examples exemplify the detrimental effects of misinformation on public awareness and community actions, highlighting the need for clear, accurate communication from reliable sources to foster trust and cooperation during emergencies (Bavel et al., 2020). Addressing misinformation proactively is essential for enhancing community preparedness and resilience in the face of flooding events. Given the dangers posed by misinformation, it is crucial to explore how proactive media strategies can counteract these threats, enhance public awareness and encourage preparedness behaviours during flood events. Utilising a mix of media platforms, including social media, traditional media and community-based channels, can effectively disseminate critical information and engage the public in resilience-building activities (Dahal et al., 2021). Social media allows for real-time updates and interactive communication, fostering a sense of community and shared responsibility among residents (Anshori et al., 2022). Traditional media, such as television and radio can reach broader audiences, ensuring that vital information is accessible to those who may not use digital platforms (Hazarika et al., 2021). Clear, actionable messaging is paramount for reinforcing public trust and cooperation during emergencies, as it helps eliminate confusion and empowers individuals to take appropriate action (Khan and Ahmed, 2023). Implementing diverse and effective media strategies is crucial for fostering public engagement, building trust and enhancing community resilience during flood events.

Building on the impact of strategic media use, it becomes clear that strong media engagement not only spreads information but also shapes public perception and community readiness for floods. Effective communication through various media platforms plays a vital role in disseminating timely and accurate information, which is crucial for enhancing public awareness and preparedness behaviours (Aksa and Sinulingga, 2022). For example, during the 2014 floods in Malaysia, local media outlets provided critical updates and safety information that helped residents make informed decisions, ultimately reducing panic and confusion. Furthermore, case studies demonstrate that communities with strong media engagement are better equipped to

respond effectively and recover from floods, as informed citizens are more likely to participate in preparedness initiatives and follow safety protocols (Soetanto et al., 2022). The connection between informed communities and their ability to respond effectively emphasises the importance of consistent, accurate messaging in fostering public trust and cooperation during emergencies, both of which are essential for building long-term resilience against flooding (Cvetković and Ivković, 2022). Strong media engagement is essential for fostering informed and resilient communities, underscoring the importance of timely, accurate communication in enhancing preparedness and response during flood events.

Key constructs and conceptual framework

Integrating the Two-Step Flow Theory and the Knowledge, Attitudes and Practices (KAP) Framework provides a robust foundation for enhancing flood preparedness and community resilience in the face of increasing flooding events. The Two-Step Flow Theory explains how information flows from mass media to opinion leaders, who then interpret and disseminate it to the broader community. This highlights the pivotal role of opinion leaders in shaping public perceptions and behaviours. In the context of flood preparedness, this theory stresses the need to identify and engage trusted local leaders who can effectively communicate critical information on flood risks and preparedness strategies in ways that resonate with their communities. Over the decades, the Two-Step Flow Theory has evolved to accommodate new communication technologies and social dynamics. Research has shown that opinion leaders in digital spaces, such as social media influencers, play a critical role in shaping public discourse and behaviour, particularly during significant events like the COVID-19 pandemic (Munoz et al., 2022; Agbese, 2022). The theory's relevance persists as it provides a framework for understanding how information is disseminated in contemporary contexts, where opinion leaders can emerge from various platforms, influencing their audiences in ways that traditional media cannot (Kim and Chakraborty, 2024). Applications of the Two-Step Flow Theory can be seen in marketing, public health campaigns and political communication, where understanding the role of opinion leaders can enhance the effectiveness of information dissemination strategies (Kong and Osman, 2024; Su, 2019). The KAP Theory Model focuses on understanding how individuals' knowledge, attitudes and practices influence their preparedness for specific challenges. In the case of flood preparedness, assessing existing knowledge about risks, attitudes towards mitigation measures and current practices within communities can help stakeholders pinpoint gaps and design interventions that address specific needs. For instance, if knowledge gaps are identified, educational initiatives can be developed to improve understanding and encourage proactive actions. By integrating these two theories, a comprehensive approach to flood preparedness emerges. Mass media serves as the primary source of information dissemination, while the Two-Step Flow Theory ensures that this information reaches the community through trusted opinion leaders, who contextualise it to local needs. This method enhances the effectiveness of communication, making it more relatable and actionable for community members (*Figure 2*).

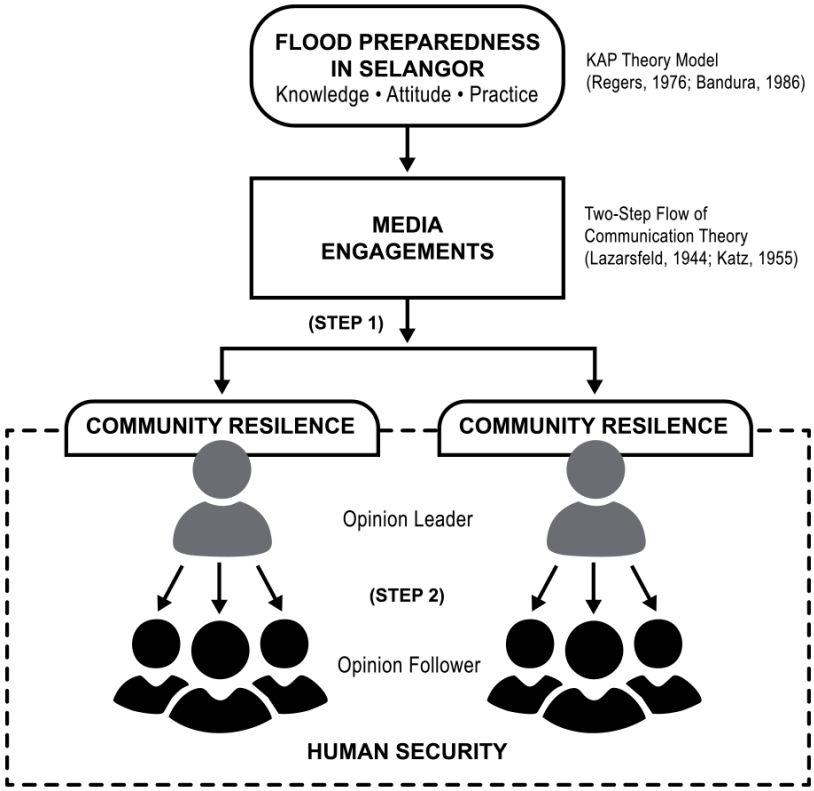


Figure 2. *Conceptual framework for community resilience in flood preparedness.*

Furthermore, KAP theory has evolved to address diverse health contexts and emerging public health challenges. The use of KAP surveys has expanded significantly, particularly during global health crises such as the COVID-19 pandemic, where understanding the public's knowledge, attitudes and practices is crucial for effective communication and intervention strategies (Cheng et al., 2024; Kambayashi et al., 2021). Recent research has highlighted the role of KAP in shaping health behaviours related to infectious diseases, chronic conditions and preventive health measures (Wakui et al., 2022; Hajj et al., 2019). The theory has been instrumental in designing targeted health education programs, as evidenced by studies showing that knowledge enhancement can lead to improved attitudes and practices regarding health behaviours, such as vaccination uptake and adherence to preventive measures (Nathavitharana et al., 2021; Hajj et al., 2019). Thus, KAP theory remains a vital tool in public health, guiding interventions that aim to foster healthier communities through informed and engaged populations. Simultaneously, KAP assessments can provide insights into community members' perceptions, attitudes and behaviours. These insights can guide the development of tailored communication strategies that address misconceptions, reinforce positive attitudes and highlight the benefits of preparedness practices. For example, sharing success stories and evidence of effective preparedness measures can help overcome scepticism and foster greater community engagement. Combining the Two-Step Flow Theory with the KAP Theory Model creates a synergistic strategy for improving flood preparedness and resilience. This integrated approach leverages the influence of opinion leaders while addressing gaps in knowledge, attitudes and practices, empowering communities to take proactive measures. By employing this holistic model, stakeholders can better navigate the complex challenges of flood

preparedness and equip communities to respond effectively to the increasing risks posed by climate change and natural disasters.

Materials and Methods

This study employs a qualitative research design to investigate community engagement and resilience in the context of flood preparedness in Selangor. The qualitative approach is particularly effective for understanding the complex social dynamics and individual experiences related to flood risks, as it allows for an in-depth exploration of participants' perceptions, beliefs, and behaviours. The research design is structured around semi-structured interviews with a diverse range of participants, including community members, local government officials and representatives from relevant disaster management agencies. This method facilitates a flexible yet focused dialogue, enabling participants to share their insights and experiences regarding flood risks and preparedness measures. The semi-structured format allows the interviewer to probe more deeply into specific topics while also giving participants the freedom to express their thoughts and concerns in their own words. To ensure a comprehensive understanding of community engagement, the study will utilise purposive sampling to select participants who have direct experience with flood events or are actively involved in flood preparedness initiatives. This targeted approach will help capture a wide array of perspectives, particularly from those who may possess valuable local knowledge about vulnerabilities and resources within the community. Thus, a purposive sampling strategy will be employed to select participants with relevant experience or knowledge of flood risks and preparedness in Selangor. This will include community members who have lived through flood events, local government officials involved in disaster management and representatives from organisations focused on community resilience. By targeting individuals with direct experience or expertise, the study aims to gather diverse perspectives that reflect the community's unique challenges and strengths. For this study, 9 informants were approached, of whom 6 agreed to participate in the interviews. According to Udechukwu et al. (2024), a sample size of approximately 6 to 8 participants can achieve data saturation, particularly when employing semi-structured interviews that enable comprehensive exploration of participants' perspectives. Below are the sampling details (*Table 1*).

Table 1. *Sampling and selection of informants.*

No	Nvivo label and thesis	Role
1	IF01	Senior Government Official
2	IF02	Community Member
3	IF03	First Responder
4	IF04	Media Representative
5	IF05	Academician
6	IF06	Local Authority

On top of that, thematic analysis techniques are employed to identify recurring themes and patterns related to community resilience, knowledge levels and preparedness measures. This analytical approach facilitates the extraction of meaningful insights to inform the development of strategies aimed at enhancing flood preparedness and resilience in Selangor. The six-step thematic analysis framework developed by Braun and Clarke (2006) is a widely recognised method for analysing qualitative data.

This structured approach enables researchers to systematically identify, analyse and report themes within qualitative datasets. The six-steps of thematic analysis are familiarisation with the data; generating initial codes; searching for themes; reviewing themes; defining and naming themes; and producing the report (Dapaah and Addo, 2023; Hansen et al., 2021; Ejegi-Memeh et al., 2021). Braun and Clarke (2006) six-step thematic analysis is particularly valuable in qualitative research because it provides a systematic and transparent approach to data analysis. Adhering to these steps ensures that findings are grounded in the data and reflect the complexities of participants' experiences. This method has been widely adopted across various fields, including health research, education and social sciences, which demonstrate its versatility and effectiveness in qualitative inquiry.

Results and Discussion

The analysis identified three primary barriers that hinder community resilience in Selangor. The first barrier is the safety-and-preparedness mindset, in which overreliance on external aid and complacency prevent individuals from taking proactive measures. The second is community network responses, such as fear, trauma and denial, which often impede timely and effective disaster responses. Lastly, coordination and resource limitations, including the lack of tools, transportation, and training, constrain effective participation in disaster preparedness activities. Addressing these barriers requires a multifaceted approach. This includes efforts to shift community attitudes toward self-reliance and preparedness, the implementation of emotional support frameworks to mitigate psychological barriers and the targeted allocation of resources to ensure all communities have the tools and knowledge needed to respond effectively to floods. The data in *Table 2* highlights the influence of local governance and community leadership on residents' perceptions of safety and preparedness during flood events. Agency leadership in this context refers to government agencies, including NADMA, APM, JPS, JKM, PDRM and Armed Forces, while community leadership includes JKKK, Ketua Kampung and religious leaders. Community leadership is evident in themes such as "Community Resilience" (8) and "Local Leadership" (8), emphasising its role in fostering trust, social cohesion and localised preparedness. These findings determine the importance of community leaders' direct engagement with residents and their ability to mobilise local resources effectively. The statement was reaffirmed by several informants that community leaders play a crucial role in the community:

> "*Community leaders are like 'sandwich', they act as intermediaries, connecting residents' needs with agencies. Their active role in disseminating information and mobilizing resources ensures timely and effective responses during crises*." IF05

> "*Field training exercises involving village leaders in East Coast have shown positive results, increasing readiness and trust among community members in their leadership's capacity to manage disasters*." IF01

> "*Community leaders are vital as intermediaries, connecting residents' needs with agencies and ensuring resources reach the community effectively. They also boost morale and resilience*." IF06

***Table 2**. Comparative contributions of agencies and community leadership.*

Themes	A : Agency leadership	B : Community Leadership
1 : Community Resilience	1	8
2 : Local Leadership	1	8
3 : Social Cohesion	0	4
4 : Community-Based Programs	3	3
5 : Evacuation Planning	0	3
6 : Simulation Exercises	3	1
7 : Policy Implementation	13	0
8 : Resource Allocation	1	0
9 : Trust in Leadership	8	9

Agency leadership, in contrast, makes its greatest contribution in "Policy Implementation" (6), reflecting its responsibility for formalising and executing flood preparedness measures. Following the interview sessions with the informants, they shared that proactive initiatives by local authorities helped build the community's confidence in disaster risk reduction measures:

> "*Proactive initiatives by local authorities, such as the introduction of flood readiness squads in Selangor, have shown promise in improving safety measures and fostering trust among residents*." IF04

> "*Regular simulation exercises and resilience training from NADMA have significantly improved inter-agency and community coordination. Programs like Community-Based Disaster Risk Management (CBDRM) aim to empower communities to act as first responders*." IF05

> "*Selangor has established a disaster response centre since 2017. Initially, it was known as Smart Selangor Command Centre and in 2021, we became Smart Selangor Operation Centre (SSOC). These efforts include training programs and resource allocation, reflecting the state's proactive stance*." IF06

The proactive stance of the Agency and Community leaders in raising awareness of community resilience and flood preparedness is attributed to the theme "Trust in Leadership". This illustrates the shared importance of building trust to reinforce perceptions of safety and preparedness. Despite these contributions, the absence of focus on "Simulation Exercises" (0) and "Resource Allocation" (0) across both leadership types of signal areas needs improvement to strengthen residents' confidence in their leaders. The act of building trust in leadership can be observed through the following statement:

> "Local leaders in Taman Seri Muda played a key role during the 2021 floods by organizing neighbourhood patrols and helping identify families in need of immediate aid." IF02

> "Field training exercises (FTX) conducted with village leaders have shown the importance of knowledge and preparedness in ensuring community safety. Engaging local leaders has proven effective in creating risk reduction plans." IF01

However, as stated below, trust is built on mutual understanding and commitment among all relevant stakeholders. In one of the interviews, the informant highlighted that efforts need to be consistent and sincere:

"*Communities require consistent awareness campaigns focusing on flood-related health risks and preparedness strategies to improve resilience and trust in leadership*." IF04

In a separate interview, another informant shares that trust in leadership also comes with adequate allocation of resources and assistance from the government, such as safety kits and life jackets:

"*Residents expressed confidence in their community's ability to handle floods, provided additional equipment and consistent training sessions are introduced. Tools like life jackets, first-aid kits, and boats were seen as essential*." IF02

Community networks and grassroots initiatives for flood preparedness

Table 3 highlights the central role of community networks and grassroots initiatives in flood preparedness, showing that active participation, community involvement, and innovative approaches work together to advance preparedness. Social cohesion stands out as the dominant theme, with seven (7) references to participation and four (4) to engaged communities, underscoring solidarity and collective action in managing flood risks effectively. Community-driven solutions appear only once (1), yet they still point to locally driven strategies that can enhance preparedness.

"*During flood season, village leaders and youth groups patrol the village to monitor conditions and help vulnerable households, such as those with bedridden individuals. This proactive approach reflects the strength of grassroots networks and local leadership in organizing and supporting communities during disasters*." IF02

Table 3*. Community participation and grassroots flood preparedness.*

Themes	A : Participation	B : Engaged Communities	C : Community-Driven Solutions
1 : Local Leadership	0	1	0
2 : Social Cohesion	7	4	1
3 : Grassroots Action	2	4	0

Grassroots initiatives further showcase their influence with four (4) references to engaged communities and two (2) to participation, emphasising their ability to unify and mobilise residents. One of the respondents who frequently volunteered with NGOs shared that grassroots movements are one of the essential programs to help support government initiatives in disaster risk reduction:

"*MERCY Malaysia has implemented Community-Based Disaster Risk Management (CBDRM) programs in flood-prone areas like Hulu Langat. These programs include hazard mapping, identifying safe zones, and educating residents on emergency preparedness. Grassroots efforts in these areas have built a strong sense of resilience among community members*." IF05

Local leadership makes a modest contribution, with one (1) reference to engaged communities, but shows limited impact in areas such as participation and innovation. Overall, these findings emphasise the need to strengthen community engagement and empower grassroots efforts to improve flood resilience and preparedness.

> "*We collaborated with the Japan International Cooperation Agency (JICA) on a community program lasting four years, from 2018 to 2023. This program aimed to enhance community resilience and awareness, teaching residents to be self-reliant during disasters. Participants learned not to wait for rescue but to know where to go and how to save themselves in emergencies*." IF06

An informant indicated that religious institutions, such as mosques, can support emergency response efforts by broadcasting alerts or evacuation announcements. This approach demonstrates community resourcefulness in addressing challenges, particularly in rural areas where residents must travel across dispersed locations. The following excerpt exemplifies this innovative solution:

> "*In flood-prone regions, mosques can also function as evacuation centres or coordination points, as they are centrally located and easily accessible to the community*." IF06

Media engagement for resource coordination and leadership transparency

The media plays a vital role in enhancing community awareness and fostering engagement during flood events in Selangor (*Table 4*). Both traditional media, such as television, radio and newspapers, and social media platforms, including WhatsApp, Facebook and Twitter, significantly contribute to information sharing. Traditional media is critical for broadcasting official updates, promoting awareness campaigns and delivering in-depth analysis, while social media complements this by enabling real-time community discussions and interactions. The use of social media enhances community communication, as evidenced by references to "Community Dynamics" (3 references) and "Information Dissemination" (7 references). These platforms stimulate dialogue, encourage collaboration and ensure the timely distribution of critical information. Additionally, traditional media ensures inclusivity by broadcasting region-specific flood warnings and educational content in local languages. Together, both media types enhance situational awareness and empower communities to make informed decisions.

> "*WhatsApp Group is the most important channel for disseminating information during floods. It plays an important role in coordinating assistance and sharing updates*." IF02

> "*Media's ability to share live, accurate updates on risks and mitigation strategies is indispensable. Platforms like Facebook and WhatsApp provide localised, immediate information, increasing community awareness and response capabilities*." IF04

> "*Social media platforms, especially Twitter, served as a vital communication tool. People directly tagged authorities to request help, share updates and express grievances*." IF05

***Table 4**. Influence of media on community awareness and preparedness for floods.*

Themes	A : Community Dynamics	B : Information Dissemination
1 : Community Communication	3	7
2 : Platform Utility	4	6
3 : Real-Time Updates	2	6

The chart shows that Information Dissemination consistently exerts greater influence than Community Dynamics across all three areas (*Figure 3*). This shows that during floods, the media's key responsibility is to provide accurate, timely updates and ensure the availability of resources, rather than to stimulate community connection. During floods, social and traditional media work together to raise awareness, share updates, and help people make informed decisions. The media serves as a bridge for communities, enhancing their ability to access critical information and to engage with each other and with authorities. By combining traditional and social media, Selangor has strengthened its capacity for communication and collaboration during flood events, ensuring community resilience and preparedness.

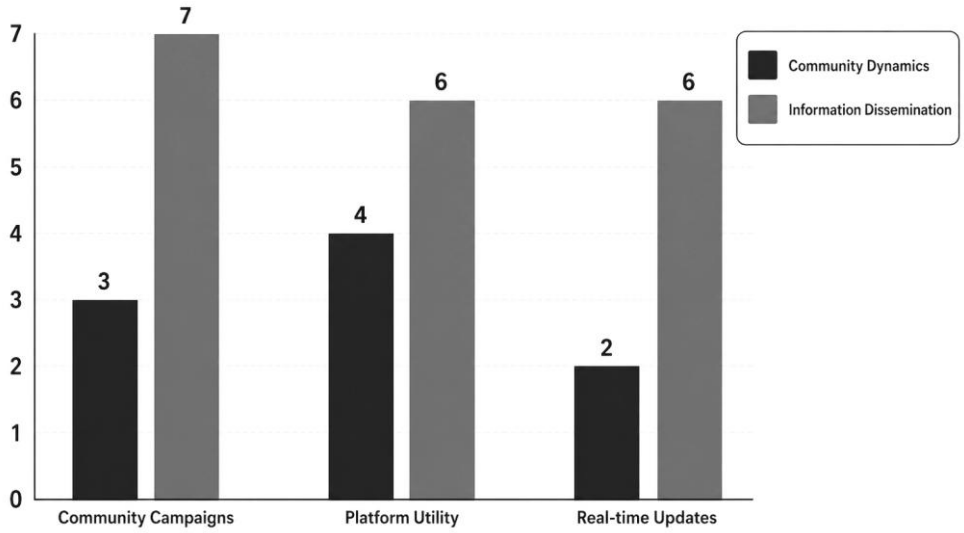


***Figure 3.** Matrix coding results for community dynamics and information dissemination.*

Conclusion

This research emphasises the vital need to integrate governance, community resilience and media engagement to improve flood preparedness in Selangor, protecting both lives and livelihoods. Selangor's vulnerabilities, exacerbated by its rapid urbanisation and complex socio-environmental dynamics, highlight the necessity for a multidimensional approach to disaster management. The findings indicate that trust in leadership, grassroots participation, and clear, actionable communication are pivotal to strengthening community resilience and addressing the multifaceted challenges posed by frequent flooding. Effective governance plays a foundational role in disaster preparedness. However, in Selangor, gaps in resource allocation, fragmented decision-making and limited coordination among agencies present significant obstacles. Strengthening governance requires not only structural reforms but also a commitment to inclusive decision-making processes that prioritise local voices and insights. Community members, when actively involved in disaster management planning and

implementation, bring unique knowledge of local vulnerabilities and resources, which can significantly enhance the relevance and effectiveness of preparedness strategies.

To fully address these governance challenges and leverage local knowledge, the active participation of resilient communities is indispensable to effective disaster management in Selangor. While there are promising examples of community-based programs in Selangor, their impact is often constrained by inconsistent funding, inadequate training and a lack of long-term support. Empowering communities requires sustained investment in programs that build adaptive capacities, foster collaboration, and provide essential tools and training. This empowerment must go beyond physical resources to address psychological factors such as trust, cooperation, and collective responsibility, which are essential for effective flood preparedness and recovery. Media engagement, often underestimated in disaster management, emerges as a powerful tool for shaping public perceptions and mobilising communities. Timely, accurate and context-sensitive communication can guide behaviour during crises, ensure the dissemination of reliable information and strengthen public trust in authorities. However, Selangor faces significant challenges in this area, particularly due to the prevalence of misinformation, which creates confusion and hampers coordinated responses. To address this, it is essential to develop partnerships between media outlets, government agencies and community leaders to ensure consistent and accurate messaging. Training for media personnel to enhance their understanding of disaster communication can further strengthen this effort.

Building on governance and community resilience, applying theoretical frameworks clarifies how information flows and leadership dynamics drive proactive flood preparedness. The Two-Step Flow Theory and KAP Theory Model together illustrate the roles of mass media and opinion leaders in this holistic strategy. Mass media provides the knowledge base by disseminating technical updates and preparedness strategies. Opinion leaders, as intermediaries, foster positive attitudes by contextualising this information and building trust. These attitudes then translate into practical actions, ensuring communities are proactive and well-prepared. By intertwining these elements, Selangor's flood preparedness strategy underscores the importance of a collaborative, integrated approach to disaster management. Continued efforts to address existing gaps in resource allocation, community participation and misinformation will be crucial to building a resilient and well-prepared society. The integrated approach recommended here serves not only as a roadmap for addressing Selangor's specific challenges but also as a potential model for other regions facing similar threats. By prioritising governance reform, community empowerment and media engagement, Selangor can build a resilient, adaptive and well-prepared society capable of navigating the complexities of an increasingly uncertain future.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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