

LOCAL COMMUNITY WISDOM IN FLOOD DISASTER MITIGATION IN KUALA LUMPUR, MALAYSIA: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Floods are among the most frequent hydrometeorological disasters in Kuala Lumpur due to high rainfall intensity, rapid urbanization, and land-use change. Although flood mitigation studies in Malaysia have increased, research synthesizing the role of local wisdom in metropolitan flood governance remains limited. This study aims to analyze the construction and transformation of local wisdom in flood disaster mitigation in Kuala Lumpur, Malaysia. A Systematic Literature Review (SLR) following the PRISMA 2020 guidelines was employed. Literature searches were conducted using Scopus and Google Scholar databases through Publish or Perish, covering publications from 2020 to 2025. A total of 25 articles were selected through identification, screening, eligibility assessment, and thematic synthesis processes. The findings reveal that quantitative surveys, case studies, and policy analyses dominate flood mitigation research in Malaysia, while community resilience, social capital, risk perception, and adaptation strategies emerge as major themes. Local wisdom is reflected in strengthened social capital, community leadership, collective risk perception, household adaptation practices, and the integration of local knowledge with meteorological information. The study proposes that local wisdom in metropolitan areas functions as a dynamic social learning system that evolves through interactions between community experience, institutional arrangements, and disaster-related technologies.

Keywords: *climate change; disasters mitigation; flood; local wisdom; natural disasters*

INTRODUCTION

Natural disasters have shown an increasing global trend over the past two decades and are predominantly dominated by hydrometeorological events (Alimonti & Mariani, 2024; Kaur & Sood, 2020). Data from the Emergency Events Database (EM-DAT),

managed by the Centre for Research on the Epidemiology of Disasters, recorded more than 3,600 hydrometeorological disaster events between 2000 and 2019, with floods representing the most frequent disaster type compared to others. Meanwhile, the World Disasters



Report 2023 published by the International Federation of Red Cross and Red Crescent Societies reported that more than 1.7 billion people worldwide were affected by floods over the last two decades, with global economic losses reaching hundreds of billions of USD annually. The increasing exposure of urban populations to such risks is closely associated with urban growth, population density, and land-use changes that influence surface runoff patterns (Swain et al., 2020; Xu et al., 2020).

The Asia-Pacific region accounts for the largest proportion of flood events globally (Kimuli et al., 2021). The Asia-Pacific Disaster Report 2022 issued by the United Nations Economic and Social Commission for Asia and the Pacific indicates that more than 40% of disasters in the region consist of floods and tropical storms, with estimated annual economic losses of approximately USD 57 billion. Climate variability, increasing intensity of extreme rainfall, and the expansion of built-up areas have intensified pressure on urban drainage systems and river networks (Alhasaani et al., 2025; Kumar et al., 2022; Cea & Costabile, 2022). These conditions demonstrate the interconnection between physical environmental dynamics and

social structures in shaping levels of flood vulnerability.

Malaysia is among the countries highly exposed to flooding due to the influence of the Northeast Monsoon and annual rainfall distribution exceeding 2,400 mm in several regions (Fakaruddin et al., 2020). The 2023 Annual Report of the Department of Irrigation and Drainage Malaysia recorded more than 4,000 flood-prone locations nationwide. The major flood event in December 2021–January 2022 displaced more than 125,000 residents and resulted in economic losses exceeding RM 6.1 billion. These data illustrate the recurrent nature of floods in Malaysia and their extensive impacts on settlements, infrastructure, and economic activities (Saad et al., 2024).

The Klang Valley region, including Kuala Lumpur, faces intense urbanization pressures (Shafie et al., 2022). Statistics from the 2024 report of the Department of Statistics Malaysia show that Kuala Lumpur's population density exceeds 8,000 persons per square kilometer. Such density correlates with increased exposure of assets and populations to flood hazards. Land-use changes driven by commercial and high-rise residential development have also



influenced soil infiltration capacity and surface runoff patterns (Yasin et al., 2022). These urban dynamics interact with hydrometeorological factors in shaping flood risk in the capital city.

Heavy rainfall on 15 October 2024 triggered floods and landslides in the Klang Valley area. Field reports in 2025 from the International Federation of Red Cross and Red Crescent Societies recorded seven fatalities due to flooding in Malaysia as of March 2025, while a 2022 report noted four fatalities in the Ampang area resulting from floods and landslides.

The annual frequency of such events and the spatial distribution of affected locations indicate that flood risk in metropolitan areas is not concentrated in a single point but dispersed across multiple districts with varying social and physical characteristics (Ahmada et al., 2025). Structural flood control measures have been implemented by Dewan Bandaraya Kuala Lumpur through improvements to drainage systems along several major urban corridors (Massam et al., 2023). These infrastructures are designed to reduce inundation in economic centers and densely populated residential areas. The 2023 national disaster policy evaluation highlights the

relationship between infrastructure effectiveness and the level of citizen participation in environmental management.

According to Warsihna et al. (2020), local wisdom is understood as knowledge, values, and social practices that evolve within communities through historical experiences in responding to environmental dynamics, thereby shaping collective response patterns to natural hazards.

Several previous studies have examined the role of local knowledge and community participation in flood mitigation in Malaysia. Kamarudin et al. (2022) demonstrate that community involvement correlates with higher levels of household preparedness in the East Coast region of Malaysia. The study identifies a relationship between social capital, collective experience, and flood adaptation strategies. Meanwhile, Abid et al. (2024) analyze the implementation of Community-Based Flood Management and identify variations in adaptive capacity influenced by institutional support and public participation across different regions of Malaysia.

Although these studies provide empirical insights into the role of communities,



their regional focus and analytical approaches do not specifically address the dynamics of local wisdom within densely populated metropolitan areas such as Kuala Lumpur. Kamarudin et al. (2022) focus on semi-urban areas in the East Coast region, while Abid et al. (2024) emphasize policy evaluation and public participation at the national scale. Both studies contribute to mapping community roles in flood mitigation but do not explicitly elaborate on the characteristics of local wisdom in dense metropolitan.

Research examining the construction of local values, norms, and social practices within the urban environment of the capital city remains relatively limited in the scientific literature. These limitations indicate that the dimension of local wisdom in flood mitigation within metropolitan regions has not received proportional scholarly attention, particularly in relation to urban spatial transformation, population density, and evolving social structures. Kuala Lumpur's dynamics as the national administrative and economic center present characteristics distinct from semi-urban or rural areas.

Therefore, this study aims to examine local wisdom and flood mitigation in

Malaysia with a specific emphasis on the Kuala Lumpur metropolitan area. The review focuses on identifying the dominant themes and research trends in studies related to local wisdom and flood mitigation in Malaysia, synthesizing the forms and dimensions of local wisdom embedded in community-based flood mitigation practices, and examining the transformation of these practices in response to urbanization, institutional arrangements, and the increasing use of disaster-related technologies in metropolitan areas.

MATERIALS AND METHODS

This study employs a Systematic Literature Review (SLR) approach to identify, evaluate, and synthesize scientific publications concerning local wisdom in flood mitigation in Malaysia. The literature review process follows the selection and reporting flow outlined in the PRISMA 2020 Statement developed by Page et al. (2021), ensuring that the stages of identification, screening, eligibility, and inclusion are conducted in a structured and transparent manner.

The literature search was conducted using Harzing's Publish or Perish software by accessing online databases such as Scopus, PubMed, and Google



Scholar. The search strategy was formulated using combinations of keywords in English and Malay, including “local wisdom,” “community knowledge,” “community-based flood management,” “flood mitigation,” “urban flood Malaysia,” “Kuala Lumpur flood,” and “kearifan tempatan.” The literature search was conducted in January 2026 using Harzing's Publish or Perish software by accessing Scopus,

Google Scholar, and PubMed databases. The initial search identified 167 records consisting of 42 articles from Scopus, 108 articles from Google Scholar, and 17 articles from PubMed based on keyword relevance and publication criteria. A selection process was then carried out using predefined inclusion and exclusion criteria to maintain consistency and relevance to the research focus, as presented in **Table 1**.

Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Published between 2020–2025	Published before 2020
Peer-reviewed journal articles or indexed conference proceedings	Articles from blogs, opinion pieces, news reports, or popular publications
Discusses local wisdom, community participation, or flood mitigation in Malaysia	Does not address flood mitigation or is not relevant to Malaysia
Written in Indonesian or English	Written in languages other than Indonesian or English
Available in full-text and fully accessible	Available only as abstract or preview
Empirical research (qualitative, quantitative, or mixed-method)	Editorials, scholarly opinions, or conceptual reviews without empirical data

Source: Processed by the author, 2026

The first-stage screening was conducted through title and abstract review to determine topical relevance. The second stage involved full-text reading to ensure substantive relevance, research location suitability, and alignment with the variables of local wisdom and flood mitigation. A further filtering stage was conducted to ensure conformity with the main focus of the study, namely the identification of local wisdom dimensions, community-based flood

mitigation practices, and the transformation of adaptive strategies in the metropolitan context of Kuala Lumpur. Based on this process, 25 final articles met all inclusion criteria and were deemed eligible for further analysis. The complete literature identification, screening, eligibility assessment, and inclusion process following the PRISMA 2020 guidelines is presented in **Figure 1**.



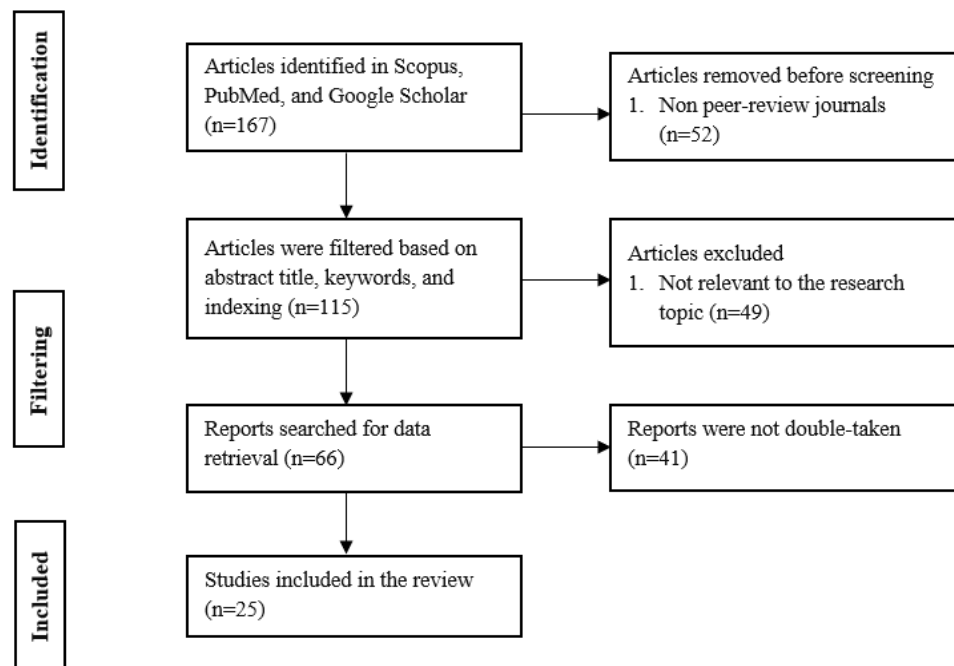


Figure 1. PRISMA diagram

Source: Adapted from Page et al. (2021) and processed by the authors (2026).

The selected articles were analyzed using thematic synthesis techniques to identify recurring concepts, patterns, and relationships related to local wisdom and flood mitigation. Data extraction focused on publication characteristics, study location, research methods, major findings, and forms of local wisdom reported in each study. Similar concepts and findings were subsequently grouped into broader analytical categories through an iterative coding process. This procedure resulted in the identification of major themes, including social capital, local knowledge, community leadership, collective risk perception, household adaptation practices, and the integration

of local knowledge with formal information systems. The thematic synthesis further enabled the examination of transformations in local wisdom practices within the context of metropolitan flood governance in Kuala Lumpur.

RESULTS AND DISCUSSION

1. Research Result

Based on the literature identification and screening process using the PRISMA method, 25 articles were identified that met the inclusion criteria and were relevant to the study's focus on local wisdom, community participation, and

flood mitigation in Malaysia. These findings are summarized in **Table 2**.

Table 2. Results of Analysis of 25 Articles

No	Title & Authors	Objective	Theme	Method	Main Findings
1	Assessing Community Resilience to Flood Disasters: A Case Study of Temerloh, Pahang (Rameli et al., 2024)	To measure the level of community resilience to floods in Temerloh, Pahang	Community resilience	Quantitative survey and resilience index analysis	Community resilience is influenced by social capital, access to information, and household preparedness. Households with prior flood experience demonstrate higher adaptive capacity.
2	Local Community Knowledge for Flood Resilience: A Case Study from East Coast Malaysia (Kamarudin et al., 2022)	To identify the role of local knowledge in responding to floods	Local knowledge and resilience	Qualitative case study (interviews and observation)	Local knowledge shapes adaptation strategies based on collective experience. Intergenerational social practices contribute to rapid response during floods. Community participation enhances coordination between local government and affected residents.
3	Community-based Flood Mitigation in Malaysia: Enhancing Public Participation and Policy Effectiveness for Sustainable Resilience (Abid et al., 2024)	To evaluate the effectiveness of community-based flood mitigation and public participation	Community participation and policy	Policy analysis and empirical study	Areas with active community involvement show more structured mitigation effectiveness. Community empowerment strengthens preparedness and early response.
4	Community-Based Flood Risk Management: Empowering Local Responses: A Case Study in Meru, Klang (Jailani et al., 2024)	To assess community empowerment in flood risk management	Community-based risk management	Case study and field survey	Communities with local organizational structures reduce material losses more effectively.
5	Assessing Community Perception, Preparedness, and Adaptation to Urban Flood Risks in Malaysia (Kumaresen et al., 2025)	To analyze risk perception and adaptive capacity in urban communities	Risk perception and preparedness	Quantitative survey and statistical analysis	High risk perception correlates with increased household preparedness. Adaptive capacity is influenced by education level and access to weather information.
6	Public Perception of Flood Risks in Klang Valley, Malaysia: A Case Study (Sapawi et al., 2023)	To examine public perception of flood threats in urban areas	Urban risk perception	Survey and descriptive analysis	Previous flood experience influences risk awareness. Respondents who experienced floods show greater



No	Title & Authors	Objective	Theme	Method	Main Findings
					anticipatory actions.
7	Human-Based Adaptive Actions in Flood Disaster Risk Management: A Review of Malaysian Case Events (Azhar et al., 2025)	To review adaptive actions in flood events	Human-based adaptation	Systematic literature review	Individual and community adaptive actions are key components of flood risk reduction, including short-term strategies and long-term behavioral adjustments. Effective strategies integrate structural and non-structural approaches. Community involvement strengthens policy implementation.
8	Urban Flash Floods: Global Strategies for Effective Mitigation (Jihin et al., 2025)	To identify mitigation strategies for urban flash floods	Urban flood mitigation	Comparative review and policy analysis	Perceived flood severity influences migration intentions. Response efficacy mediates the relationship between risk perception and mobility decisions.
9	Perceived Flood Risk Severity and Response Efficacy Affect Migration Intentions in Flood-prone Regions of Klang Valley in Malaysia (Mamun et al., 2025)	To analyze the relationship between flood risk perception and migration intentions	Flood risk and social dynamics	Quantitative survey and Structural Equation Modeling (SEM)	Perceived flood severity influences migration intentions. Response efficacy mediates the relationship between risk perception and mobility decisions.
10	Persepsi Komuniti Kampus Terhadap Risiko Banjir Kilat: Satu Kajian Kes di Kuala Lumpur: Community Perceptions on Flash Flood Risks at Universiti Malaya Campus (Nordin & Hua, 2025)	To examine flash flood risk perception in a campus environment	Risk perception and preparedness	Quantitative survey	Risk awareness varies among campus respondents. Prior experience increases individual preparedness.
11	Reviewing Challenges of Flood Risk Management in Malaysia (Rosmadi et al., 2023)	To identify challenges in flood risk management	Governance and risk management	Systematic review and policy analysis	Inter-agency coordination and fragmented authority remain major obstacles. Integration of structural and non-structural policies is inconsistent.
12	An Indicator-Based Approach for Micro-Scale Assessment of Physical Flood Vulnerability of Individual Buildings (Kaoje et al., 2021)	To develop a physical vulnerability index for buildings	Physical vulnerability	Indicator-based approach and spatial analysis	Elevation, building materials, and distance from rivers significantly influence vulnerability. Micro-scale analysis provides detailed insights.
13	The Relationship of Community Risk Perception of Climatic Disaster Towards the	To analyze the relationship between risk perception and	Risk perception and participation	Quantitative survey and SEM	Higher risk perception positively correlates with participation in flood prevention.



No	Title & Authors	Objective	Theme	Method	Main Findings
	Intention to Participate in Flood Prevention Activities (Adlina et al., 2025)	participation intention			Previous flood experience strengthens this relationship.
14	Characterizing the Flood Hazard Risk Zones Using ArcGIS Pro Software: A Case Study of Baling Kedah, Malaysia (Azri et al., 2024)	To identify flood hazard zones in Baling, Kedah	Hazard mapping	GIS and spatial analysis	High-risk zones are concentrated in lowland and river-adjacent areas. Spatial modeling highlights the need for land-use control.
15	Flood Risk Assessment in the Sungai Senggarang Catchment Using InfoWorks ICM (Rahmat & Rahmi, 2025)	To assess flood risk using hydrodynamic modeling	Hydrological analysis	InfoWorks ICM modeling	Extreme rainfall increases runoff volume significantly. Existing drainage systems are insufficient for peak discharge.
16	Assessing Flood Risks and the Coping Strategy: a Community Adaptation in Floodplain Areas at Beaufort District in East Malaysia (Adi et al., 2022)	To examine community adaptation strategies in Beaufort	Community adaptation	Qualitative case study	Communities rely on experience-based adaptive strategies. Social support accelerates post-flood recovery.
17	Community-Based Adaptation Strategies to Flood: Settling the Issue of Sustainable Urbanisation in Ringim (Danraka et al., 2025)	To analyze community-based adaptation strategies in Ringim	Adaptation and urbanization	Policy analysis and survey	Urbanization increases pressure on drainage and spatial systems. Local adaptation strategies emerge in response to environmental change.
18	Projection Floods Under Future Climate in the Kelantan River Basin, Malaysia (Armain et al., 2025)	To project flood events under climate change scenarios	Climate change and projection	Climate and hydrological modeling	Future climate scenarios indicate increased frequency of extreme floods. Seasonal rainfall intensity is projected to rise in coming decades.
19	Prediction on Flood Risk in Batu Pahat using Spatial Analysis Approach (Ruzlan et al., 2025)	To predict flood risk using spatial analysis	Risk prediction	GIS and spatial modeling	Topography and land use are dominant risk factors. Spatial models identify priority mitigation zones.
20	Daya Tahan Komuniti Terhadap Bencana Banjir di Mukim Dengkil, Sepang (Afandi et al., 2023)	To assess community resilience levels	Social resilience	Survey and resilience index	Social capital and local leadership contribute to resilience. Access to information enhances preparedness.
21	Penilaian Keberkesanan Terowong SMART Kuala Lumpur dalam Menghalang Banjir Kilat (Assessing	To evaluate the effectiveness of the SMART Tunnel	Mitigation infrastructure	Policy analysis and operational data	The SMART Tunnel effectively reduces flash floods in the city center. Integration of transport and flood control functions



No	Title & Authors	Objective	Theme	Method	Main Findings
	Effectiveness of Kuala Lumpur SMART Tunnel for Flood Prevention) (Arshad et al., 2020)				improves infrastructure efficiency.
22	The Combination Flood Lake Characteristics and SIH3 (Hydrology, Hydrometeorology, Hydrogeology Information System) to Build and Early Warning Model Framework (Anwar et al., 2025)	To develop a flood early warning model	Early warning system	Model development and information system design	Integration of hydrological data improves flood prediction accuracy. A structured system accelerates disaster response.
23	Mitigating Flood Risk at Shah Alam, Malaysia for Sustainable Development (Leeonis et al., 2024)	To develop mitigation strategies using MCDA	Risk mitigation	AHP and MCDA	High-risk zones identified through multi-criteria weighting. Participatory approaches strengthen mapping validity.
24	Flash Flood Data Compilation and Risk Insights in Peninsular Malaysia: a Data-Driven Analysis (2014–2019) (Maqtan et al., 2025)	To analyze flash flood patterns using historical data	Flood data analysis	Data-driven analysis	Spatial distribution shows concentration in urban areas. Temporal trends indicate increasing frequency over the past decade.
25	Land Subsidence and Coastal Flood Impact Scenarios Based on Remote Sensing in Selangor, Malaysia (Batmanathan et al., 2025)	To examine the impact of land subsidence on coastal flooding	Coastal flooding and remote sensing	Satellite imagery analysis and GIS	Land subsidence increases vulnerability to coastal flooding. Satellite data integration provides more precise risk estimation.

Source: Processed from 25 articles (2020–2025)

Based on the thematic classification presented in **Table 2**, studies on flood mitigation in Malaysia demonstrate a predominance of community-based and social resilience approaches. Several studies, including those by Rameli et al. (2024), Kamarudin et al. (2022), and Abid et al. (2024) position communities as primary actors in flood risk reduction.

Research attention is largely directed toward community resilience, public participation, risk perception, and adaptation strategies grounded in local experience. These findings indicate a consistent pattern in which social capacity, local leadership, and prior flood experience are frequently analyzed

variables in explaining community preparedness.

Other studies emphasize the technical and spatial dimensions of flood risk management. Research by Azri et al. (2024) and Rahmat & Rahmi (2025) examines hazard zone mapping and hydrological modeling to identify high-risk areas. GIS-based approaches, hydrodynamic modeling, and indicator-based analyses constitute dominant methods within this cluster. In addition, research on flood control infrastructure, as discussed by Arshad et al. (2020) highlights attention to the effectiveness of structural systems in reducing urban inundation.

Therefore, the thematic distribution in **Table 2** reflects an integration of social and technical dimensions in flood mitigation studies in Malaysia. Some articles focus on social dynamics such as risk perception and participation intentions, while others develop data-driven approaches, climate modeling, and spatial analysis. This pattern suggests that flood mitigation research has evolved toward a multidisciplinary approach that integrates social, environmental, and technological aspects within a complementary analytical framework.

2. Local Wisdom in Community-Based Flood Mitigation in Kuala Lumpur

A total of 25 articles were analyzed thematically to identify the construction of local wisdom in flood mitigation in Malaysia. A summary of the classification of local wisdom dimensions identified in the literature is presented in **Table 3** as the basis for analytical synthesis.

Social capital emerges as a consistent element in various studies on community-based flood mitigation in Malaysia. Social network structures, neighborhood cohesion, and local leadership shape organized collective responses during flood events. In Mukim Dengkil, community solidarity and the role of local leaders accelerated coordination of assistance and evacuation (Afandi et al., 2023). A similar pattern is evident in the study by Jailani et al. (2024) in Meru, Klang, where community organizations functioned as drivers of resource mobilization during the early phase of disaster. The level of community resilience in Temerloh, as identified by Rameli et al. (2024), is also closely associated with strong social capital and prior flood experience, which structure



household preparedness more foundation of collective action in systematically. These findings indicate responding to floods. that social relationships form the

Table 3. Dimensions of Local Wisdom in Flood Mitigation in Kuala Lumpur

No	Dimension of Local Wisdom	Forms of Social Practice	Focus of Study in the Literature	References
1	Social capital and mutual cooperation	Community collaboration, local solidarity	Community resilience and preparedness	Rameli et al. (2024); Afandi et al. (2023); Jailani et al. (2024)
2	Local knowledge	Intergenerational experience in dealing with floods	Experience-based adaptation strategies	Kamarudin et al. (2022); Adi et al. (2022); Azhar et al. (2025)
3	Local leadership and structure	Role of community leaders and village organizations	Response coordination and community mobilization	Abid et al. (2024); Afandi et al. (2023)
4	Collective risk perception	Shared awareness of flood threats	Participation intention and preventive action	Adlina et al. (2025); Sapawi et al. (2023); Kumaresen et al. (2025)
5	Household adaptation practices	Elevating house floors, asset protection, evacuation routes	Survival strategies during and after floods	Adi et al. (2022); Mamun et al. (2025)
6	Integration of local knowledge and formal information	Use of meteorological information and early warning systems	Synchronization of community response	Anwar et al. (2025); Abid et al. (2024)

Source: Processed from 25 articles (2020–2025)

Local knowledge also develops from long-term interaction between communities and their physical environment. Historical experience in facing river overflows and seasonal rainfall forms a knowledge system based on collective memory transmitted across generations. Strategies for interpreting environmental signs prior to flooding were documented in the study by Kamarudin et al. (2022) in East Coast Malaysia, demonstrating the use of experiential knowledge in decision-making. Adaptation practices in Beaufort

similarly reflect adjustments in housing patterns and economic activities based on annual flood cycles (Adi et al., 2022). The review Azhar et al. (2025) of multiple flood events in Malaysia reinforces that experience-based adaptive actions constitute part of long-term social learning. According to Adlina et al. (2025), collective risk perception also influences community participation patterns in mitigation activities. The level of awareness of flood threats is associated with intentions to engage in prevention



and preparedness programs. In the Klang Valley region, prior experience with flash floods increased residents' attention to weather information and potential inundation risks (Sapawi et al., 2023). Meanwhile, Kumaresen et al. (2025) found that education level and access to information contribute to how urban communities assess flood threats. Risk perception shaped through direct experience subsequently influences adaptive decisions at both individual and household levels.

Household adaptation practices represent concrete manifestations of local wisdom in everyday life. In the study by Adi et al. (2022), physical adjustments to buildings, protection of essential assets, and the establishment of family evacuation routes were identified as responses developed through repeated flood experience. Mobility decisions or considerations to relocate from flood-prone areas are also influenced by perceived flood severity in the Klang Valley, as reported by Mamun et al. (2025). These adaptations reflect behavioral transformation shaped by the interaction between experience, local knowledge, and environmental conditions.

The interaction between community knowledge and formal information systems further enriches mitigation practices. The development of early warning system frameworks integrating hydrological and hydrometeorological data demonstrates efforts to strengthen information-based responses (Anwar et al., 2025). Community involvement in community-based mitigation programs also enhances communication between residents and local authorities (Abid et al., 2024). This relationship illustrates that local practices evolve through dialogue with scientific knowledge systems, forming coordinated mitigation patterns at both community and institutional levels.

3. Transformation of Local Wisdom Practices in Community-Based Flood Mitigation Strategies

The transformation of local wisdom practices in flood mitigation in Malaysia demonstrates a shift from spontaneous responses toward more organized community-level patterns. In general, this transformation can be summarized in several forms as follows.

- a. Strengthening social capital through community organizations and local leadership. The value of



mutual cooperation, which previously appeared in the form of informal assistance among residents, has evolved into structured activities such as task allocation during evacuations, provision of emergency logistics, and collective monitoring of water levels. This dynamic is evident in communities with active local leadership and strong social networks, where social solidarity forms the basis of coordination during flood events (Afandi et al., 2023; Jailani et al. 2024). These practices indicate that local wisdom has adapted to the increasing complexity of urban flood risks.

- b. Integration of traditional knowledge and official meteorological information in decision-making. Intergenerational local knowledge has also undergone adaptation. While communities previously relied primarily on traditional interpretation of natural signs, these practices now operate alongside the monitoring of official weather information. This integration reflects a shift in how

communities interpret risk and make informed decisions. Historical experience remains a key reference in understanding flood patterns, yet it is increasingly connected to rainfall forecasts and early warning systems (Kamarudin et al. 2022; Anwar et al., 2025). This transformation illustrates a dialogue between experiential knowledge and modern information systems.

- c. Household-level physical adaptation in response to repeated flood experiences. At the household level, transformation is visible through physical and behavioral adjustments. Several communities have elevated house floors, modified interior spatial arrangements, and reorganized the storage of valuable belongings as responses to repeated flood experiences (Adi et al., 2022). In addition, perceptions of flood severity influence mobility strategies and long-term family decisions in flood-prone areas (Mamun et al., 2025). These changes demonstrate that local wisdom is not static but develops



through collective learning from previous events.

d. Increased collective participation in preparedness activities and evacuation simulations. Transformation is also reflected in strengthened community participation in community-based mitigation programs. Residents' involvement in evacuation simulations, village discussions, and preparedness activities expands the meaning of mutual cooperation from emergency assistance to collective prevention efforts (Abid et al., 2024). Heightened risk awareness in urban areas such as the Klang Valley has further encouraged shifts in public attitudes toward flood threats (Sapawi et al., 2023; Kumaresen et al., 2025). This participation shows that local social values have evolved into more systematic collective mechanisms.

These developments indicate that local wisdom evolves through continuous social learning processes within communities. Recurrent flood experiences shape collective memory, which is subsequently translated into

more systematic action patterns at both individual and group levels. Interactions among residents, village discussions, and post-event reflections function as spaces for knowledge reproduction that strengthen shared capacity. Within this process, values of solidarity, collective responsibility, and environmental awareness are reinforced while simultaneously adapting to increasingly complex risk dynamics. Local wisdom is therefore understood not as a static tradition but as a living knowledge system that continuously adjusts to social and ecological change.

On the other hand, interaction between local practices and institutional systems has also encouraged transformation toward more structured mitigation strategies. Community involvement in preparedness programs, coordination with local authorities, and the utilization of official information reflect integration between social norms and formal policy frameworks. Practices that were once based on spontaneous initiatives have developed into components of collective planning characterized by clearer role distribution, communication mechanisms, and response procedures. This transformation demonstrates that local wisdom functions as a social



foundation supporting community-based mitigation implementation, while simultaneously bridging empirical community experience and broader disaster governance frameworks.

CONCLUSIONS

Based on the synthesis of 25 analyzed articles, local community wisdom in Kuala Lumpur functions as a social foundation for community-based flood disaster mitigation. Social capital, local leadership, collective risk perception, experiential knowledge, and household-level adaptive practices collectively shape organized response patterns in dealing with recurrent flood events. The integration of local knowledge with official information systems further strengthens preparedness and response coordination at the community level. Flood mitigation in metropolitan areas has evolved through the interconnection between the social capacity of urban communities and the availability of flood control infrastructure.

This study has several limitations that should be acknowledged. The findings are derived exclusively from published literature selected through predefined inclusion criteria and are therefore dependent on the scope of available

studies indexed in the selected databases. In addition, the analysis focuses specifically on Kuala Lumpur and does not include empirical field verification of local wisdom practices across different urban settings in Malaysia. Consequently, the findings should be interpreted within the context of metropolitan flood governance and may not fully represent the diversity of community responses in other regions.

Future research is recommended to conduct in-depth empirical investigations through field studies in various densely populated settlements in Kuala Lumpur in order to map variations in local wisdom practices more contextually. The development of an integrative model linking social, spatial, and policy dimensions within a single operational mitigation framework may also serve as an important research agenda. Local governments and stakeholders can strengthen community-based mitigation programs by facilitating training, regular simulations, and collaboration among residents, local institutions, and city authorities to ensure that local wisdom practices are sustainably internalized within urban disaster governance.



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