



**STAYING OR LEAVING FLOOD-PRONE AREAS (FPAs)?
COMMUNITIES' DECISION-MAKING AND ADAPTATION
PATHWAYS IN THE MAHAKAM CASCADE LAKES (MCL),
INDONESIA**

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Abstract

The decision to move or stay in FPAs is crucial and impacts livelihood sustainability (LS). This study investigates household decisions to stay or relocate in flood-prone communities around the MCL in Indonesia and analyzes how these choices shape adaptation strategies. Drawing on qualitative data from in-depth interviews with residents of Pela Village (PV) (original settlement) and Sangkuliman Village (SV) (relocation site), the study reveals that the interplay of flood risk perception (FRP), place attachment (PA), and livelihood security (LSc) influences decisions. Communities remaining in PV have normalized flooding and are investing in structural adaptations, such as elevating house foundations to sustain their livelihoods and social ties. Conversely, relocated communities prioritize flood safety but face new challenges related to livelihood access and economic burden. Both groups exhibited active adaptive capacities and a willingness to bear adaptation costs, highlighting adaptation as a continuous process rather than a one-time response. The findings emphasize that relocation should be integrated within a holistic framework that balances risk reduction with economic and sociocultural sustainability, supported by community participation to enhance resilience in flood-prone settlements.

Keywords: Relocation, Place attachment, adaptation strategies, community decision-making, livelihood sustainability, socio-ecological resilience.

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INTRODUCTION

The increasing frequency and intensity of flooding worldwide pose unique challenges to the sustainability of settlements in flood-prone areas (FPAs). Various areas near river networks, including Jakarta (Gunandar et al., 2024), Onitsha (Chinedu et al., 2024), and Bangkok (Marks & Elinoff, 2020), face high flood risks and require flood mitigation strategies to increase settlement resilience. These improvements can be achieved through the spatial planning of FPAs, including settlement relocation, to reduce flood risk (Yang et al., 2022). However, relocation often faces political and social resistance from communities (Rahman et al., 2025). Therefore, a community-based approach that involves local stakeholders from planning to implementation stages is required (Auliagisni et al., 2022).

In the context of MCL, flood-prone areas experience extreme water fluctuations that impact livelihoods, transportation, and social activities (BWS Kalimantan IV, 2019). From 1987 to 1990, the Kutai Kartanegara Regency government implemented a three-phase relocation program from Pela Village (PV) to Sangkuliman Village (SV). However, the program only partially relocated the population, as some residents remained in PV, while others moved to SV.

Although relocation is widely discussed as a flood mitigation strategy, previous studies have generally examined relocation and decisions to stay separately. Consequently, limited attention has been paid to how households that stay and those that move adapt to the same socioecological context. This study addresses this gap by investigating household decisions to stay or move in flood-prone communities around the MCL and examining how these decisions shape adaptation strategies. These findings provide empirical support for more responsive spatial planning and relocation policies, particularly for government stakeholders involved in settlement planning and disaster-risk reduction.

LITERATURE REVIEW

The relocation process aims to reduce flood risk and consider its socio-economic impact on affected communities (Tasnia & Growe, 2025). The decision to move or stay is influenced by various factors, including socio-economic conditions, cultural ties and risk perception (Thompson, 2017). Economic factors are crucial in determining whether people decide to stay or move, with negative prospects influencing decisions more than positive ones (Czaika, 2015). Cultural ties are also highly influential in shaping a sense of home and purpose (Thompson, 2017). Furthermore, perceptions of various risks, particularly long-term environmental disasters, are positively associated with migration decisions (Koubi et al., 2016). Meanwhile, communities that choose to remain in flood-prone areas typically develop coping strategies to deal with flooding and strengthen their solidarity

(Auliagisni et al., 2022). Communities that decide to relocate must adapt to the environment at the relocation site, build social networks, and face economic challenges (Twerefou et al., 2024). However, the existing literature tends to differentiate between relocation and remaining in FPAs, and few studies have simultaneously compared these two decisions. This limitation creates a gap in understanding resilience in dynamic socioecological contexts, as the interactive dynamics between those who relocate and those who remain are often overlooked in the literature. Therefore, a comparative perspective is crucial for uncovering the diverse adaptation strategies and conditional factors that shape resilience in socioecological systems.

RESEARCH METHODOLOGY

Study Area

The research locations were PV and SV, both in the Kota Bangun District, Kutai Kartanegara Regency, East Kalimantan Province, Indonesia (**Figure 1**). These two villages are located around the outlet of the MCL. The MCL is a lake system that experiences frequent and often extreme annual flooding (BWS Kalimantan IV, 2019), directly impacting PV. This relocation site is not far from the initial settlement of PV, approximately 2 km away, and is separated by the outlet of Lake Semayang-Melintang, locally known as the Pela River. Despite their spatial proximity, these two areas exhibit significantly different flood exposures owing to elevation disparities; for instance, PV has minimal dry land as its elevation is close to 0 m above sea level (BWS Kalimantan IV, 2019). This spatial proximity allows for a comparison between the communities that moved and those that remained in PV, which share similar socioecological characteristics but experience different levels of flood exposure.

Data Collection Procedures

Data were collected from September to November 2024 through in-depth, semi-structured interviews. The village head initially recommended key informants with direct experience of the PV–SV relocation process (1987–1990). Snowball sampling was used to identify additional participants representing diverse experiences and perspectives. A total of 12 informants were interviewed, comprising six residents who moved to SV and six who remained in PV. All informants were male, aged between 55 and 70 years, reflecting the generation directly involved in or witnessing the relocation process. The informants included village heads (SV1 and PV1), a former resettlement coordinator (SV2), a traditional leader (PV2), and community members (SV3-6 and PV3-6), most of whom relied on fisheries-related livelihoods. Informants were selected based on their direct experience with relocation decisions, long-term residence in the study area, and ability to provide detailed information regarding their flood

experiences, adaptation practices, and relocation outcomes. Data collection continued until thematic saturation was reached, as indicated by the absence of substantial new themes or explanations in subsequent interviews.

Interviews were conducted in Banjar, audio-recorded with participants' consent, supplemented with field notes, and transcribed verbatim. Coding and thematic analyses were conducted using the original transcripts to preserve the contextual meaning. The quotations presented in this article were subsequently translated into English and checked against the original recordings to ensure accuracy. Data validity was strengthened through source triangulation using relocation documents, member checking with selected informants, and researcher discussions to assess the consistency of coding and interpretation. This study received ethical exemption approval from the Research Ethics Committee of Malang State University (No. 26.07.6/UN32.14.2.8/LT/2024). Before participation, all informants were informed of the study's purpose, confidentiality measures, and their right to withdraw at any time, and verbal consent was obtained before each interview.

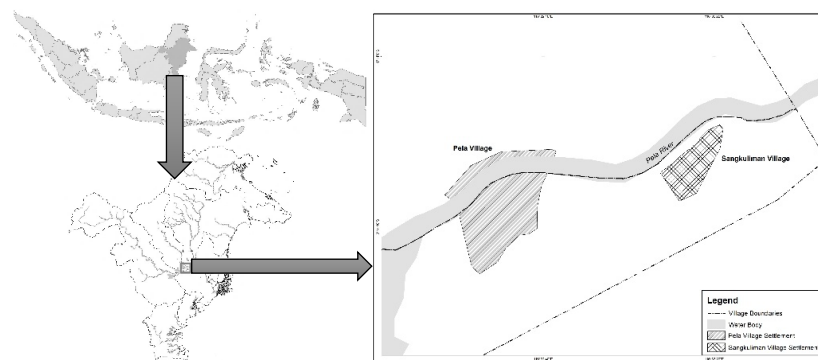


Figure 1: Research conducted in PV and SV, Kota Bangun District, Kutai Kartanegara Regency, East Kalimantan Province, Indonesia.

Data Analysis

Data analysis was conducted using a thematic analysis approach. After transcription, the transcripts were read repeatedly to gain familiarity with the data and identify meaningful patterns. Initial codes were generated from the participants' narratives regarding flood experiences, relocation decisions, place attachment, livelihood considerations, and adaptation practices. Related codes were then grouped into broader categories and further synthesized into themes explaining why households chose to remain in PV or moved to SV. A thematic matrix was used to compare similarities and differences between the two groups and to identify relationships between flood risk perceptions, place attachment, livelihood security, adaptation costs, and relocation decisions (**Table 1**).

To enhance analytical rigor, coding decisions and theme development were reviewed through discussions among the research team. This process helped refine categories, merge overlapping codes, and ensure that themes were grounded in the data rather than the researchers' assumptions. Member checking was also conducted with selected informants to validate the interpretations and confirm their alignment with the informants' experiences.

Table 1: Analytical Matrix of Factors Influencing Household Decisions

Example Initial Codes	Category	Final Theme	Interpretation	Stay in PV	Relocate to SV
Floods are routine; floods can be managed	Flood experience and risk evaluation	Flood Risk Perception	Risk is shaped by experience and adaptive capacity	Floods are perceived as manageable through experience and adaptation.	Floods are perceived as increasingly intolerable and disruptive.
Family history; inherited house; emotional ties	Emotional and symbolic attachment to place	Place Attachment	Attachment creates resistance to relocation	Strong emotional attachment, family history, and previous investments.	Relatively weaker attachment and greater willingness to pursue new opportunities.
Fish cages near home; access to fishing grounds	Dependence on livelihood resources	Livelihood Security	Livelihood dependence influences residential decisions	High due to proximity to fishing grounds and productive assets.	More uncertain due to greater distance from fisheries and additional operational costs.
House elevation; asset protection; transportation costs	Costs of adaptation and livelihood maintenance	Adaptation Cost	Different adaptation costs shape decision pathways	Costs associated with housing elevation and asset protection.	Costs associated with transportation, livelihood adjustments, and asset relocation.
Stay despite flood exposure; move for safety	Evaluation of risks and benefits	Decision Outcome	Decisions result from balancing risks and benefits	Remain in flood-prone areas.	Relocate to less flood-exposed areas.

RESULT

Factors Influencing the Decision to Move or Stay

Interviews revealed that decisions to stay or relocate were shaped by the interplay among FRP, PA, and LSc. Together, these factors influenced household decision-making in the MCL. The factors influencing these decisions are as follows:

FRP Factor

Experience with recurring floods shapes perceptions. According to all informants who chose to live in PV, flooding is a normal occurrence and part of life, described not as a threat requiring relocation but as an annual phenomenon that can be managed through adaptation. As one informant, PV5 stated: *“Flooding is common here. It’s the same pattern every year, and we already know how to deal*

with it.” This perception refers not only to flood intensity but also to its impact on daily activities. Informants considered conditions safe as long as floodwaters did not enter their homes, even if roads were submerged, allowing daily activities to proceed normally. As PV1 stated: *“If the water is only under the house, it is still considered safe. As long as the floor isn't flooded, activities at home can still take place.”* These results suggest that flood risk is assessed primarily through its impacts on daily activities and mobility rather than through hazard characteristics alone.

Although flooding is often perceived as a routine occurrence, changes in flood patterns, particularly increases in inundation height and duration, shape residents' tolerance limits. Informants who chose to relocate emphasized the impact of prolonged flooding on their physical and mental health, which prompted them to relocate. Informant PV3 described an extreme flood event that triggered this shift in perception: *“In the past, floods receded quickly, but there was a change in flood patterns in 1980, when the first major flood I experienced lasted for about two months. This made us unbearable because it was physically and mentally exhausting.”* Collective memories of extreme flooding serve as a benchmark for determining whether flooding remains within normal limits or exceeds a community's adaptive capacity.

FRP is also shaped by adaptive capacity, particularly the ability to modify and protect homes from flooding. Communities with capital tend to feel more secure and can manage the impacts of flooding. These structural adaptations help provide a sense of security and reinforce the decision to remain in MCL FPAs. Conversely, communities with limited financial resources and unable to raise their homes tend to perceive the flood threat as beyond their control, making relocation the most reasonable option. Overall, these findings suggest that FRP is dynamic and is influenced by repeated interactions with flooding.

Attachment to Old Houses and Past Investments

Attachment to their old homes and past investments is one factor influencing people's decisions to remain in PV. A house is not only seen as a place to live but also as the result of hard work, capital, and memories of life experiences that are difficult to replace. Most informants who chose to stay stated that their houses were built in stages until they were comfortable living there. This implies a high economic and symbolic value of houses.

Beyond their physical value, old houses have emotional and historical significance for families. Several informants stated that the houses were inherited from their parents and passed down to them, where they raised their children. This attachment was deeply personal, as PV1 described: *“an inheritance from my parents, and this is where we grew up, and my children were born here. It feels hard to leave everything behind.”* This illustrates that attachment to place was

rooted not only in physical ownership but also in family history, intergenerational continuity, and personal identity.

Attachment to old homes was also reinforced by the perception of inequality in their value relative to those at the relocation site. Several informants felt that relocation assistance was disproportionate to the value of their old homes, both in terms of land size, relocation costs, and location. This created feelings of loss and injustice for those who chose to move, as they perceived relocation as a 'loss' due to the small size of the land and inadequate assistance.

In contrast, those who chose to relocate had relatively weaker attachment, especially among informants who did not own homes. Relocation provided them with the opportunity to acquire their own homes and land despite the new environment. This is conveyed by SV2, who said: *"At that time, we didn't have our own house, so moving to SV was actually our opportunity to own one."* However, some informants who moved still felt a sense of loss for their old homes, particularly because of forced demolitions. This loss was both material and symbolic. According to informant SV3: *"We had no choice but to demolish our old house because of orders from the village government. It was actually sad, because we had to dismantle the results of years of work and rebuild it on a smaller scale in SV."* This suggests that relocation was perceived not only as a physical move but also as the loss of long-standing emotional and material investments. This sense of loss extended beyond the house's physical structure, reflecting the disruption of long-standing emotional and social connections to place. These results highlight that attachment to old houses and past investments plays an important role in discouraging relocation to safer areas. The house's inherent economic and symbolic value led some people to choose to stay rather than move, despite the risk of flooding in the area.

Security and Ease of Access to Livelihoods

LSc is a key determinant influencing people's decision to remain in or move out of FPAs in the MCL. For those who remain in PV, proximity to their homes, rivers, and lakes is crucial, as it facilitates monitoring and protection of productive assets, such as boats, boat engines, and fish cages. Informants who stayed underscored how proximity to water sources directly enabled LSc and reduced the operational costs. Informant PV4 emphasized this: *"Here, we keep our boats and engines (the engines are never removed and stored at home when not in use) and our fish cages in front of the house. This makes our assets safer because we can easily monitor them at any time."* This indicates that proximity to water resources supports both asset security and the continuity of fisheries-based livelihoods. Access to water is another key factor. Although flooding disrupted land transportation, water transportation remained normal and supported local livelihoods. As Informant PV2 explained: *"Even though there*

was flooding, we could still carry out normal activities because every household has a boat for social and economic activities (fishing)." Thus, flood risk is not a barrier to livelihood continuity as long as water access is secure.

In contrast, residents who relocated to SV faced new challenges related to asset security and livelihood sustainability. Although their homes are safe from flooding, not all have direct access to waterways, making fishing and cage fish farming difficult for some. As SV5 explained: *"Our house is relatively safe from flooding, but access to the Pela River (waterway) is quite far. Furthermore, every time we leave our boat at the dock, we take the engine home to prevent it from being lost."* This illustrates how relocation reduced flood exposure but increased the effort required to maintain livelihoods and productive assets. Similar concerns have arisen regarding fish cages, many of which are located far from homes. Therefore, residents build floating houses in groups so that they can take turns guarding them or hire someone to do so.

These findings underscore that flood safety alone does not determine relocation decisions. Access to water and the protection of productive assets are the determining factors of household LS. Furthermore, relocation does not always guarantee economic sustainability, especially in communities that depend on aquatic resources for their livelihoods. Thus, in the context of MCL, LSc is a crucial factor to consider in relocation planning and community-adaptation strategies.

Adaptation as an Alternative and Sustainability of Relocation

Households employed various strategies to respond to flood risks and adjust to changing environmental conditions. The findings indicate that both those who remain in FPAs and those who relocate adapt to maintaining their livelihoods. For those who stay, adaptation is gradual and structurally sustainable. The most prominent adaptation was raising the foundation pillars of stilt houses, which all informants viewed as a long-term solution to flooding. Tribal chief PV (PV2) explained the historical experience that drove this strategy: *"Previously, the foundation pillars of houses in this village were generally low, so regular floods would have submerged them. Now we have raised the foundation pillars of our houses by more than five meters, making them safer from the impact of flooding."* However, when flooding is extreme and the raised foundations of stilt houses still sink, all informants stated that they implement temporary adaptation by building stilts inside their homes. This strategy allows people with PV to remain in their homes without being evacuated. This is explained by PV3: *"When this house (which has been elevated) is still submerged, we usually just build a platform inside the house, without needing to evacuate. Because in the past, when floodwaters submerged our house (before the foundation was raised), even almost reaching the roof, we remained in our house on a platform."*

Additional measures have also been implemented by the PV government level by raising the elevation of the wooden road connecting stilt houses to public facilities so that daily activities can continue during mild floods. During extreme floods, community mobility relies solely on household boats. This aligns with PV6's statement: *"When extreme flooding occurs, activities at home are limited to the house on stilts, while outdoor activities are usually carried out by boat. So, even when the floodwaters are high, our lives are not significantly disrupted."* Raising a house's foundation pillars is a long-term investment, whereas building a platform inside a house is a short-term and less expensive option. This combination is considered more rational by the community, which chooses to stay rather than demolish their homes and move to a new location in the SV.

This contrasts with the community that relocated to the SV. They adapted to reduced access to water resources and changing livelihood patterns. These adjustments focused on maintaining access to livelihoods and asset security rather than protection from flood hazards. All informants stressed the need to rebuild their livelihoods, secure boat mooring locations, and develop security systems to protect the cages located far from their homes. This aligns with SV5 statement: *"Because most of the fish cages here are far from our homes, we formed a cage fish farming group and built a floating house near our cages to serve as a rotating guard post."* Adaptation also included more demanding routine changes, such as hauling boat engines back and forth to their homes and longer travel times to the lake. These conditions slightly increased labor and operational costs; however, they were a step towards maintaining the economic sustainability of the communities that chose to relocate.

Communities that remained in FPAs adapted primarily to reduce flood impacts, whereas those that relocated adapted to changes in access to water resources and livelihood activities. While the forms of adaptation differed between the two groups, both continued to adjust their practices in response to the challenges associated with their living environments.

Willingness to Pay (WtP) for Adaptation

These results demonstrate a strong willingness among households remaining in FPAs to invest in structural adaptation. All the informants (who decided to stay) stated that the cost of raising their house foundations and building temporary stilts was a crucial investment for maintaining their livelihoods. This was emphasized by PV2: *"If we don't pay to raise our house foundations, we will have difficulty living here because the floodwaters have been rising recently."*

Several informants emphasized that they would rather finance the cost of raising their house foundations, which ranges from IDR 100 million to IDR 300 million, than move to SV, which is slightly further away from water sources, because of concerns about losing their livelihoods. Informant PV4 expressed this

sentiment: *“The cost of raising a house is indeed expensive, ranging from IDR 100 million to IDR 300 million, depending on the size of the house. However, it’s still better than moving and starting from scratch.”* This statement indicates that adaptation spending is viewed as a long-term investment to secure livelihoods, rather than a short-term response to flooding. The adaptations undertaken by the community are considered to provide direct benefits, particularly a sense of security from flooding and the sustainability of community socioeconomic activities. This was emphasized by PV1: *“Now when floods come, we don’t have to panic anymore, because our houses are safe from floodwaters, and we can still carry out our activities as usual.”* However, all informants acknowledged that this adaptation, which involved raising the foundations of their houses, was gradually implemented because of financial constraints.

In contrast, relocated households faced a different set of adaptation costs, primarily because of the greater distance to water resources. Additional expenses included transportation to the lake and the purchase of land for fish cages. As SV3 explained: *“Our house is now safe from flooding, but the cost of fuel to the lake has increased because the distance is somewhat greater. Furthermore, if we want to install fish cages, we have to buy land first; we can’t just install them in front of our houses as we did in PV.”* This account illustrates that adaptation costs did not disappear after relocation but instead shifted toward maintaining access to productive resources and sustaining livelihood activities in the new settlement. This financial burden persists because cage fish farming is their primary source of income. Informant SV4 emphasized this: *“We have no choice but to buy land to install the cages. Otherwise, we can’t cultivate fish.”* This land acquisition adaptation was carried out in stages, for example, by starting with small-scale cultivation or collectively purchasing land, as most of the informants did.

Overall, both communities that decided to stay or relocate demonstrated a WtP for adaptation but with different orientations. Those who stayed focused on flood risk reduction, whereas those who relocated focused on sustainable livelihoods. This WtP reflects not only economic capacity but also residents’ evaluations of security, livelihood sustainability, and the relative benefits of different adaptation options.

DISCUSSION

The decision to move or remain in FPAs arises from interactions among FRP, PA, and LSc, highlighting the complexity of relocation outcomes. This finding is consistent with evidence from Ghana (Babanawo et al., 2022) and Pakistan (Ullah et al., 2025), where relocation did not necessarily reduce overall vulnerability, particularly when livelihood considerations were insufficiently integrated into planning.

This normalization of flood risk aligns with risk perception theory, which posits that repeated exposure to hazards without catastrophic consequences can shift the perception of risk from an extraordinary threat to an environmental condition considered normal (Rana et al., 2020). Rather than responding to flood hazards through avoidance or relocation, residents in PV instead incorporate flooding into their daily decision-making and adaptation practices. Similar patterns also occur in Ghana (Twerefou et al., 2024) and Central Vietnam (Duijndam et al., 2023), where prolonged exposure contributes to greater tolerance to flood risk. However, in contrast to these cases, PV residents actively invested in structural adaptations, such as raising house foundations and modifying living spaces. This shows that risk normalization does not mean a passive attitude but can be carried out simultaneously with ongoing adaptation efforts.

For households that relocated to SV, extreme and prolonged flooding was perceived as exceeding their adaptive capacity, triggering a shift in risk perception. Floods are no longer seen as something that can be overcome, but rather as a threat to welfare and daily life. These findings suggest that risk tolerance is not only shaped by repeated exposure but also by significant events that redefine acceptable levels of risk (Rana et al., 2020).

The contrasting experiences of informants in PV and SV indicate that PA goes beyond emotional ties. In PV, houses serve as both family heirlooms and productive assets, reinforcing residents' decisions to remain despite flooding. In contrast, some relocated households had weaker attachments due to limited prior ownership and investment. This finding suggests that attachment to residence becomes a significant barrier to relocation when reinforced by economic investment and livelihood dependence (Scannell & Gifford, 2017). Similar patterns have been observed in Chilean Patagonia (Wiegel et al., 2021) and the Pamir Mountains (Blondin, 2021), where resistance to relocation was driven by PA.

This contrasts with those who chose to relocate, particularly young households, whose ties to their homes in PV were more tenuous because of their minimal investment in previous residences. These individuals, a transitional group (newly establishing households and attempting to move out of their parents' homes), tended to have weak PA and were more open to relocation. Their decision to relocate was also supported by their lack of homes and limited asset ownership. Therefore, when these dimensions are weak or even absent, their attachment is weaker than that of communities with long-standing roots in the area (Thompson, 2017). In addition to ties to their homes or existing settlements, their decisions were influenced by security factors and easy access to their livelihoods.

These findings underscore the central role of LSc in household decision-making. For fishers, proximity to water is a prerequisite for their continued livelihood and a means of protecting their assets (O'Mara et al., 2025). In this context, flooding is viewed not as a disruption but as an environmental rhythm that they cope with through daily adaptation.

For households that relocated to SV, reduced flood exposure is accompanied by new livelihood challenges. Greater distances to water resources increase transportation costs and require additional expenditures to maintain fisheries-based livelihoods, including the acquisition of waterways for cage fish farming. These findings support the interpretation of relocation as a form of risk transfer, whereby while flood exposure decreases, economic, social, and cultural vulnerabilities increase (Liu et al., 2024; Yokoyama et al., 2023). In the MCL, this transfer is reflected in increased livelihood costs, burdens of asset adjustment, and challenges in maintaining access to productive resources. A similar pattern has been observed in Kigali, Rwanda, where relocation reduced environmental risks but introduced new constraints on livelihoods and transportation (Nikuze et al., 2019).

Adaptation focuses on reducing flood risk for communities that decide to remain in FPAs. This strategy reflects the community's adaptive capacity, drawing on its experience and knowledge of floods. A similar situation is experienced by the people of Lagos, Nigeria, where those who have lived in FPAs for a long time tend to develop everyday adaptations based on repeated experiences and existing resources (Fayombo, 2024). One adaptation implemented by the PV community to cope with long-term flooding is raising the foundations of their houses, a practice similar to that of the Datian community in Zhejiang Province, China, where they raised their floors and implemented flood-proofing measures to mitigate flooding (Lai et al., 2023).

Adaptation was equally important for relocated households, although it focused on maintaining access to water resources and sustaining fisheries-based livelihoods. The findings demonstrate that relocation alters the ways households secure and sustain their livelihoods. This risk transfer often presents new challenges to livelihoods, social and cultural sustainability, potentially leading to maladaptation from disruptions to social networks, financial access to land and markets, and reduced mental health (Yokoyama et al., 2023).

Therefore, relocation policies must extend beyond hazard reduction to encompass livelihood sustainability, community participation, and long-term post-relocation support. Relocation planning should ensure continued access to productive resources, particularly for communities dependent on fisheries and water-based livelihoods, while also supporting locally developed adaptation measures for households that remain in FPAs. These findings highlight the importance of participatory planning processes that actively involve affected

communities in relocation and adaptation decisions to ensure that risk-reduction strategies align with local needs, capacities, and livelihood priorities.

All communities, whether they remained or relocated, were willing to allocate funds individually to reduce flood risk and survive in their new locations. This willingness reflects the efforts to maintain assets and livelihoods for sustainable development. Therefore, the desire to finance this adaptation demonstrates the community's priorities and strategies for preserving sustainability in their respective areas (Cabannes, 2021). This adaptation is a continuous negotiation process between risks, costs, and LSc for those who relocated and those who remained in the FPAs of the MCL.

Conceptually, this study refines existing theoretical perspectives by integrating FRP, PA, LSc, adaptation costs and WtP into a coherent framework for understanding decision-making in FPAs. The findings suggest that relocation should not be viewed solely as a mechanism for reducing flood exposure but rather as a process that can transform physical risk into economic and livelihood vulnerability. Consequently, relocation policies should be designed more holistically by integrating risk reduction, livelihood restoration, sociocultural sustainability, participatory planning, and long-term post-relocation support to enhance community resilience and sustainability.

CONCLUSION

This study demonstrates that decisions to remain in or relocate from FPAs emerge from the dynamic interaction among FRP, PA, and LSc. Households remaining in PV responded to recurring floods through structural adaptation and continued investment in existing livelihoods, whereas relocated households achieved greater flood safety but faced new challenges related to access to livelihoods and economic sustainability. Despite these differences, both groups demonstrated active adaptive capacities and a willingness to invest in adaptation. Rather than viewing relocation as a final solution to vulnerability, these findings emphasize that relocation represents a reconfiguration of risk and adaptation within a new socioecological context. Effective relocation policies should move beyond hazard-centred planning by integrating LS, sociocultural considerations, and meaningful community participation. Because adaptation to recurrent flooding is an ongoing process, governance frameworks should support flexible and long-term interventions that strengthen resilience rather than relying solely on one-off resettlement programs.

ACKNOWLEDGEMENT

The authors express their sincere appreciation to all the informants for their support and contributions to this research. We also thank the Faculty of Teacher

Training and Education, Mulawarman University, for the financial support through the Reputable International Publication Assistance Scheme 2026.

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Received: 15th May 2026. Accepted: 6th June 2026