



ANALYSIS OF HOUSING RECONSTRUCTION FROM RESIDENTS' PERSPECTIVES AFTER THE 2014-FLOOD IN KUALA KRAI, KELANTAN

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Abstract

Post-disaster housing reconstruction (PDHR) is considered the most critical assistance after emergency aid, such as food, clothes, and temporary shelter, particularly in underprivileged areas where disaster victims depend primarily on external assistance to restore their basic needs. PDHR provides opportunities to rebuild the affected community into a better condition for continuous recovery and development. Nevertheless, various studies also highlighted numerous problems within PDHR that resulted from neglecting the community's needs and viewpoints before and after the project completion. This paper examined the housing reconstruction in the aftermath of the 2014-flood in Kuala Krai, Kelantan. It was publicized that the disaster victims had received their new houses within six months to 2 years after the disaster. However, the long-term impacts of these housings on the affected villagers remain unknown. It is essential to acquire the strengths and weaknesses of the housing project so that the future PDHR project can learn from it and be built better. Therefore, this research aims to evaluate the reconstructed house design from the residents' perspectives and examine their living traditions in response to their housing needs. This research focused on Kampung Manek Urai in Kuala Krai by adopting a case study approach, where 36 respondents were selected through purposive sampling. Data were collected through semi-structured interviews and visual research. The analysis discovered that residents were generally delighted with the house assistance but were dissatisfied with the housing attributes. The findings revealed that the housing actors disregarded certain local traditions and housing necessities during the design stage of the houses. The housing configurations profoundly caused difficulty in their traditional way of life, forcing them to modify the house according to their tradition with the already-limited financial resources. This study established the importance of evaluating post-disaster housing outcomes as they offer opportunities to facilitate better pre-construction planning and post-disaster recovery in Malaysia.

Keywords: housing reconstruction, flood, post-disaster, housing evaluation, Kuala Krai

1 Introduction

Rebuilding houses in the aftermath of a disaster requires thorough consideration, including their responsiveness to local culture and climate, durability, ease of maintenance, adaptability for future living, and being developed with the beneficiaries' participation (da Silva, 2010). However, these considerations were often overlooked by building donors, particularly in rural areas where disaster victims depend primarily on external assistance to restore their basic needs. The affected communities are regarded as mere receivers and are incapable of decision-making during the planning stage of housing reconstruction.

Previous research has discovered various housing problems during occupancy stages resulting from overlooking the actual needs of the beneficiaries. These problems have led to living difficulties in their daily lives (example: Di Gregorio & Soares, 2017; Hanafi et al., 2021; Karki et al., 2022). In Kuala Krai, there is little coverage of the flood victims' condition after receiving the house replacement, although it was well documented that the affected community is the most critical stakeholder in the post-disaster housing context (Shafique and Warren, 2015). In this context, the impacts of the post-flood housing on the flood victims in Kuala Krai remain unspoken. Hence, this paper aims to fill this gap by evaluating the reconstructed house design and its condition from the residents' viewpoints. This study also analyzed their living traditions in response to their housing needs.

Evidence of the disaster victims' recovery and development could be acquired from evaluating their experience during the occupancy stage (Hayles, 2010). The outcome should indicate if the housing project has contributed to the beneficiaries' well-being or otherwise (da Silva, 2010). Analyzing the housing is essential to learn about the occupancy stage and condition of post-disaster housing in Malaysia from the residents' viewpoints. The research outcome presents the potential to improve the future PDHR in Malaysia in which the weaknesses could be improved, and the strengths could be implemented in the next project. However, if evaluation is disregarded, similar problems within the housing might recur in the next project and may impede post-disaster recovery and long-term resilience.

2.0 Overview of 2014-flood in Kuala Krai

Unexpected extreme rainfall and strong winds during the North-east Monsoon in December 2014 caused a widespread and destructive flood in Malaysia, severely affecting the majority of states in Malaysia, including Kelantan. News reported that nine out of ten districts in Kelantan were inundated, making Kuala Krai the hardest-hit district, with thousands of victims, were evacuated. Villages in Kuala Krai were entirely

submerged, with the estimated cost of damages being approximately RM200 million (Akasah and Doraisamy, 2015)

The water level recorded in Kuala Krai was up to 10 meters and inundated buildings up to the 4th floor (Anua and Chan, 2020). The flood, which was known as the Yellow Flood or *Bah Kuning* in Bahasa Malaysia, had left immeasurable damages that some news reported it was as intense as the tsunami aftermath. The strong currents had ruined a large number of houses in the villages and had wiped away thousands more. It was recognized to have caused the most devastation in Kelantan within 100 years (Wan Ahmad and Abdurahman, 2015).

As the Government declared that housing reconstruction is urgent assistance for the flood victims, the National Disaster Management Agency (NADMA) identified that a number of 1295 houses replacement needed to be rebuilt in various villages across Kuala Krai, given that beneficiaries retained their valid land documents. The housing reconstruction process received assistance from multiple parties, including Government and external agencies, with local and external donations continuing to arrive at the disaster-stricken areas.

Post-disaster housing reconstruction can be effective at reducing the vulnerabilities of the flood victims as it provides an opportunity to build the community in a better condition (Ahmed and Charlesworth, 2015). The housing donors and actors gradually constructed different housing schemes across the district. All flood victims with valid land documents received permanent house replacements within two years. The reconstruction process adopted donor-driven reconstruction (DDR) or also known as the top-down approach, in which the housing donors would be the decision-maker in most of the process. Housing actors and donors would often leave the site after the completion of the housing project with minimal or no consideration of the occupancy stages, which eventually resulted in various housing problems. Evaluation of these housing programs may provide evidence of advantageous components that can be integrated into other projects and the unsuitable segments that need improvement.

2.1 The Outcome of Post-disaster Housing Reconstruction

Post-disaster housing reconstruction (PDHR) has become a significant component in the post-disaster reconstruction context (Ahmed, 2011). It offers an excellent opportunity to improve pre-disaster vulnerabilities, rebuild the communities in better conditions, and facilitate sustainable development. Besides providing houses for the affected communities as part of disaster response, PDHR is initiated to reduce home-loss impact and disaster risk, assist in long-term recovery, and rebuild a resilient environment (Ade Blau, Witt and Lill, 2018). Previous research emphasized that those involved in PDHR interventions need to identify any vulnerable housing condition that existed before disasters and improve it in post-disaster housing reconstruction (Tran,

2015). Therefore it should be delivered to fulfill equal qualities in terms of physical and technical measures, as well as living traditions and quality of life (Hayles, 2010). However, in most donor-driven reconstruction approaches, the building actors would determine nearly all decisions regarding reconstruction. As a result, housing donors and builders frequently misinterpret the community's needs and capacity, presuming they know what is best to provide for the community. PDHR that disregards local customs and preferences frequently leads to unsatisfactory living conditions and consequently will affect the community's well-being (Rahmayati, 2016). Previous research identified three forms of cultural inappropriateness as a result of overlooking local needs in housing reconstruction: namely, building materials, infrastructure service, layout, size and spaces of the house, and overall house design (Ahmed, 2011).

A longitudinal study was carried out by Barenstein (2015) in a post-earthquake resettlement village in Gujarat, India. The purpose of the study was to assess people's coping methods in relation to the socio-spatial structure of the community. The survey in 2004 revealed that the vast majority of villagers were highly dissatisfied with the new house, and some had refused to move into the house. Conversely, eight years later, the same community had established patterns of adaptations and transformed the houses to accommodate their privacy needs, spatial needs, and thermal comfort. The beneficiaries undertook the changes based on their traditional lifestyle and cultural needs, which were not considered in the original donated house (Barenstein, 2015).

Other research discovered that many rebuilt houses after the Gujarat 2001 earthquake had remained empty because villagers were dissatisfied with the house layout and amenities. Some house designs which ignored local and traditional necessities caused discomforts, such as leaking and excessive heat (Sanderson, Sharma and Anderson, 2012). Households had expressed disappointment when their traditional spatial request was rejected. Eventually, those with financial resources would renovate the house according to their traditional lifestyle and cultural needs, which were not considered in the original donated house (Barenstein, 2015). On the contrary, the lower-income groups had to carry on living with difficulties (Sanderson, Sharma and Anderson, 2012).

Rahmayati (2016) asserted that housing donors or actors should be more perceptive on the importance of integrating socio-cultural aspects into the design and planning of post-disaster housing. These aspects were often ignored or incorrectly translated into the housing design. Her study on housing reconstruction after the 2004 tsunami in Aceh focused on the assessment of the new housing reconstruction design's influence on the social practices of the occupants and the implications of the changes towards the community. The research showed that in most post-tsunami Aceh house-building projects, housing donors did not sufficiently consider local concerns, socio-cultural issues, family customs, or space usage. When unsatisfactory houses are constructed, the

poor living conditions cause a severe impact not just on socio-cultural family practices but also on community welfare.

The initial analysis from around the world demonstrated that beneficiaries were not merely receivers but were one of the most critical stakeholders in post-disaster housing reconstruction programs. Thus, housing actors must not overlook their viewpoints on basic needs and contextual practices. Assessment of the housing outcome could provide us with the necessary features to be improved in future post-disaster housing development.

3.0 Research Methodology

This study adopted case study research was used for this investigation. This study used semi-structured interviews to obtain data, which allowed for in-depth exploration and analysis of respondents' experiences. Besides, observations were carried out to examine the condition of the house. Based on the objectives and nature of the case area, purposive sampling is adopted to maintain homogeneity in sample selection within the village. The interview was conducted with the head of the household or the second member of the household until it reached data saturation or data adequacy, which is the process of collecting data until no new information can be obtained (Morse, 1995). Thirty-six participants were interviewed, and data were analyzed using Thematic Analysis.

4.0 Findings and Discussion

4.1 Overview of Post-flood Houses in Kuala Krai

In Kuala Krai, there are two permanent housing reconstruction plans, consisting primarily of one-story houses built on the beneficiaries' land and houses built on new sites or relocation schemes. This research focused on the former project, which will be the case study in Kampung Manik Urai, a typical Malay village located 25 kilometers from Kuala Krai town center. This paper selected a housing scheme funded by the Federal Government through the Public Work Department of Malaysia (JKR) to maintain homogeneity in sample selection. Throughout this paper, this scheme will be termed *Rumah Kekal Baru* (RKB). The beneficiaries must possess the land with appropriate land documents to be eligible for an RKB house. This process, although viewed as time-consuming for particular beneficiaries, was necessary to avoid disputes in the future.

The house design was initiated and managed by JKR, while the construction process was undertaken by contractors appointed through JKR. There was a total of 48

units of RKB built across Kampung Manik Urai, consisting of two types of design, namely, Type 1 (RKB1) and Type 2 (RKB2). The beneficiaries were given the option to choose the house type according to their preferences. RKB1 was built on stilts 2.4 meters above the ground. The floor area is 62 m² which consists of spaces including a living and dining area, three bedrooms, one kitchen, one bathroom, and one toilet, which was illustrated in the floor plan in Figure 1. Figure 2 shows the overall 3D image of RKB1. The other design, RKB2, which was built on the ground, had a more extensive floor area (76 m²). The house consists of a living and dining area, three bedrooms, one kitchen, and two toilets, as depicted in the floor plan in Figure 3, while the overall 3D image of RKB2 is shown in Figure 4.



Figure 1 : The floor plan of RKB1
(Source: Hanafi et al., 2021)



Figure 2 : The 3D image of RKB1
(Source: Author)



Figure 3: The floor plan of RKB2
(Source: Hanafi et al., 2021)



Figure 4 The 3D image of RKB2
(Source: Author)

4.2 Physical Condition and House Design

This segment will evaluate how residents in both RKB1 and RKB2 viewed the physical condition of their houses and the overall village look. It was observed that overall village character appeared to be different after the flood as compared to the pre-flood setting. Villagers also mentioned that there were fewer numbers of timber houses with various features and characters in the village due to destruction during the flood, and at present, the village and its street were rebuilt with brick wall houses that looked similar. The donated houses, constructed with reinforced concrete (RC) as their structure and brick wall as the primary construction material, were perceived as sturdy and able to withstand a future flood. The construction materials also were viewed as modern by several beneficiaries.

4.3 Spatial provision and relationship

4.3.1 This inequitable house size and spaces

In rural areas, it was common for extended families to be living together under one roof because of close family relationships and financial constraints. House is also becoming a place for economic activities where they were built to incorporate the economic means and the users' needs who work at homes such as tailors and babysitters and even attached to eateries and stalls. Women participants in this study mostly expressed concern about the inadequate kitchen areas in the donated houses, highlighting that their activities and pre-flood living traditions had to be adjusted accordingly due to lack of space. This indicated that space provision, circulation, and spatial relationships in their old house were directly linked to living traditions and norms.

However, the above pre-flood living norms had undergone inevitable changes mainly due to the changes in post-flood living conditions. Several residents found the reconstructed house size was insufficient for their spatial needs and living norms which required them to modify the layout and spaces according to their basic needs. Some had planned for modification or extension even before the house was built. This inequitable house size and space had prevented the residents from continuing their income-generation activities.

4.3.2 Provision of a single access door in RKB1

Residents in RKB1 notified that they encountered inconveniences with the provision of a single staircase and access door in the house layout. They underlined the inefficient circulation and difficulties in their daily activities, especially activities or chores related to the kitchen and back of the house. Furthermore, the single entrance would impose risk and unsafe conditions, especially during an emergency. Consequently, this research identified extensions constructed at the back of RKB1, where residents had built an internal staircase with a secondary door at the rear part of the house. In traditional Malay houses, usually, women would enter the house from the back of the house, where the kitchen and women-related spaces would be. This tradition influenced the spatial organization of the houses and thus would determine the overall house layout. The practice also resulted in the extension of some of the RKB1, as shown in Figure 3 and Figure 4 below.



Figure 5

(Source: Author)



Figure 6

(Source: Author)

4.3.3 Separate toilet and bathroom

In certain traditional Malay houses, including in Kelantan, toilets and bathrooms are still built separately due to hygiene and religious preference. Although it was not obligatory in Islam to have a separate toilet and bathroom, they viewed that it was necessary because the bathroom was used mainly for cleaning oneself, washing clothes, and performing ablution or *wudhu*, an act of ritual washing before performing prayers. This aspect has been incorporated into the RKB1 housing scheme

. Nonetheless, a significant number of residents mentioned that the above provision is insufficient, especially in larger households where extended family was staying together in the house. It was discovered that an additional bathroom with *kolah* was constructed in nearly all renovated houses, mostly on ground level, for taking *wudhu* or ablution and washing clothes by hand. *Kolah*, a water tub meant to keep clean water, is also constructed as a practical solution for low-pressure water supply and in case of water supply interruption.

The findings of the housing reconstruction evaluation in Kuala Krai revealed that house donors did not pay much attention to the house's spaces and its functional requirements. The daily routines and social life of the villagers were not considered when planning the houses, resulting in additional difficulties and challenges for the inhabitants.

5 Conclusion

The post-flood housing reconstruction programs in Kuala Krai have given certain structural benefits to the affected villagers by providing house replacements. However, post-disaster house reconstruction is not merely providing shelter, but an important goal is restoring their socio-cultural characteristics. The research indicated that houses were perceived to be smaller with fewer rooms and spaces, that the house layouts were altered, and that some of the fundamental spaces for social practices and traditions were not considered. The finding revealed that the occupants' daily routines and social interactions are two predominant attributes that influenced the house layout and its functions. Therefore, these important factors must be considered in post-disaster house design and planning. It can be seen that the condition of the house has a direct impact on post-flood living conditions where the residents had to; either modify the house layout or hesitantly adjust their living tradition to suit the house constraints. In this regard, it was suggested that there were attempts to resume their pre-flood tradition in the post-flood houses; therefore, the houses reflected their cultural practices and significance. The post-flood housing reconstruction disregarded specific important design attributes, which could lead to significant effects on the residents living conditions and subsequently disturb their quality of life. A mismatch between the residents' life traditions and the reconstructed house will result in social costs that create a strain over the long term.

Therefore, in all subjects discussed in this paper, an essential measure in the post-disaster reconstruction process is the understanding of local conditions which can be acquired from the community and translating their spatial needs and traditions into

functional design outputs. This study emphasized the importance of evaluating post-disaster housing projects, especially from the beneficiaries' perspectives, hence highlighting the significance of the end-users as one of the stakeholders in the post-disaster context. The disaster victims, who were vulnerable and restricted financially, should not be burdened any further with the inappropriate housing layout, which forced them to modify their houses in accordance with their living traditions. Finally, post-disaster housing initiatives must consider sustainable development that not only focuses on housing improvements but also ensures that long-term physical, social and economic recovery has met the community's actual needs.

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