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The Limas House of Palembang: A Flood-Resilient Architecture

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ABSTRACT

The Musi River waterfront area in Palembang has environmental characteristics influenced by tidal fluctuations, necessitating housing designs capable of adapting to flood risks. The Limas House, as a form of vernacular architecture in South Sumatra, is believed to employ various adaptation strategies to these conditions; however, studies analyzing its resilience by comparing buildings with varying degrees of transformation remain limited. This study employs a qualitative descriptive approach through field observations, ducomentation, and literature review, using House Form and Culture theory as the analytical framework. The analysis focused on five variables: building structure, elevation, spatial layout, ventilation, and materials. The results indicate that Limas House in the 7 Ulu area still retain vernacular architectural characteristics that support their resilience capacity through elevated platforms, high floor elevations, the kijing system, natural cross-ventilation, and the use of Unglen wood, which is resistant to humid environments. Conversely, physical transformations to the Limas House in the 10 ilir area such as closing off the under floor space, altering elevations, simplifying spatial layout, and using modern materials have been shown to reduce the building's adaptive capacity. This study confirms that the resilience of the Limas House is shaped by the integration of five mutually supportive architectural elements, meaning that these principles have the potential to serve as a framework for adaptive housing designs in riverside areas.

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1. INTRODUCTION

The Musi River plays a pivotal role in shaping the civilization and spatial structure of the city of Palembang. The riverbank settlements, particularly those located in the 7-10 Ulu area, are continuosly influenced by hydrological processes, including tidal fluctuations and recurrent flood hazard (Saputra et al., 2021). This section of the Musi River is characterized by a mixed tidal regime, reflected in a Formzahl value 0f 2,01. Water levels fluctuate considerably, with high tides reaching approximately 1,25m above the riverbank reference level, while extreme low tides may reduce water levels to around 0,5m. These environmental conditions require local communities to develop adaptive housing strategies that enable them to cope with changing water levvels while maintaining everyday activities (Saputra et al., 2021). Such conditions highlight the importance of resilient housing in waterfront environments, where dwellings are designed not only to withstand flooding but also to adapt effectively to hydrological variability and ob going environmental changes (Rashid et al., 2019).

In contrast, the environmental conditions in the slums along the Musi River are often plague by complex problems, ranging from tidal flooding, piles of trash, the stench of sewage, to poor sanitation (Oktarini et al., 2022). This demonstrates that despite the poor quality of buildings and the environment, residents of the slums along the Musi River have varying perceptions of environmental comfort. The community refuses to relocate and prefers to develop survival strategies deeply rooted in local wisdom. One of the main tools in this survival strategy is the use of traditional architecture designs in the form of stilt houses.

The stilt houses and Limas Houses of Palembang are not merely architectural relics of aesthetic value; rather, they are forms of vernacular architecture that have evolved through a protracted process of adaptation to the characteristics of the environment along the banks of the Musi River. This adaptability renders the Limas House a form of resilient architecture, capable of responding to environmental challenges in a sustainable manner (Zamhari et al., 2023). In accordance with this perspective, (Jamaludin et al., 2024) contend that traditional houses are the result of an interaction between society, culture, and the environment that has developed gradually, thereby creating adaptive, safe, and sustainable dwellings without reliance on modern technology. The Limas Houses principle of adaptation is realized through the use of natural ventilation, adequate openings, and local materials that enhance the building's thermal and visual comfort (Anwar, 2019). In accordance with this perspective, Dharmatanna's research substantiates the efficacy of vernacular housing in Indonesia in achieving passive cooling The study elucidates that this efficacy is attributable to a symbiotic interplay of cross ventilation, raised floors, and spatial and roof configuration that are conductive to natural airflow (Dharmatanna et al., 2024). This, in turn, enables the maintenance of thermal comfort without the necesity of recourse to mechanical systems (Dharmatanna et al., 2024). In addition to these adaptive aspects, the Limas House also embodies philosophical, religious, and local wisdom values that reflect the social structure of Palembang society (Zamhari et al., 2023). Consequently, the architectural principles pf The Limas house maintain their pertinence in addresing the challenges of sustainable development in the contemporary area. This assertion is supported by numerous studies that indicate modern housing designs have yet to fully satisfy the environmental sustainability requirements embodied in traditional architecture (Luciani & Malihah, 2020; Rois & Mutia, 2023).

As multitude of prior studies have investigated the Limas House from a variety of vantage points, including cultural value and the philosophy of vernacular architecture, cultural identity, spatial transformation, and the physical characteristics of traditional buildings.

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Conversely, research on the Musi River waterfront area has predominantly centered on environmental quality, settlement conditions and hydrological dynamics. However, studies that specifically analyze the Limas House as a flood-resilient architectural system through a comparative approach examining buildings with varying degrees of transformation remain relatively limited. Consequently, the relationship between changes in traditional architectural elements and an decline in flood adaptation capacity has not yet been systematically explained.

Along the rapid urbanization, the existence of The Limas House is under pressure due to changes in the city's spatial structure and shifts in community settlement patterns. Imam explains that the transformation of urban space has shifted the function and meaning of the Limas House as an architectural heritage, causing its adaptive value to be increasingly marginalized (Sumarwoto, 2025). In line with this, Wicaksono and Anisa demonstrate that the narrowing of waterways due to land expansion has driven communities along the Musi River to shifts from stilted dwellings to non-stilted dwellings that are less responsive to tidal dynamics (M. R. Wicaksono & Anisa, 2020). These changes not only threaten the local architectural identity but also have the potential to reduce the buldings adaptive capacity against flood risks. This phenomenon is compounded by the suboptimal utilization and provision of public open space infrastructure facilities in the riverbank areas and along the river's foreshore (Hargianti, 2021).

This tsudy contributes by evaluating the relationship between the architectural characteristics of The Limas House and its resilience to flooding through five key aspects such as structure, elevation, spatial layout, ventilation, and building materials. In line with the evolution of flood disaster management concepts, current risk reduction strategies no longer focus solely on hard engineering infrastructure but also promote the implementation of adaptive solutions that enhance the resilience of communities and the built environment (Ritnawati et al., 2025). In this context, vernaculat architecture holds potential as a form of mitigation rooted in local wisdom that remains relevant for addressing flood challenges in riverside areas. A comparative analysis of two Limas House structures with different levels of transformation provides insight into the impact of modernization on the adaptive capacity of vernacular dwellings in the Musi River waterfront area. The research findings are expected to serve as a foundation for developing design principles for riverside settlements that are more adaptive to environmental changes and flood risks.

Based on this research gap, this study aims to identify and compare the adaption strategies of Limas House in the 7 Ulu and 10 Ilir areas in response to flooding caused by the tidal fluctuations of the Musi River. The analysis was conducted using five main variables building structure, elevation, spatial layout, ventilation, and materials with Amos Rapoport's "House Form and Culture" theory serving as the analytical framework. The results of this study are expected to strengthen the understanding of the role of vernacular architecture as a resilient architectural system and serve as a reference for the conservation and sustainable development of riverside settlements.

2. RESEARCH METHODOLOGY

This study employs a qualitative descriptive approach to identify the adaptation strategies of the Palembang Limas House in response to flood risks as a form of resilient architecture (Pratama, 2019). This approach was chosen because the study focuses on understanding the physical characteristics of the building as well as the relationship between architectural elements and the environmental conditions along the banks of the Musi River, which are influenced by tidal fluctuations. The analysis was conducted using the "House Form

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and Culture" theory proposed by Amos Rapoport, which explains that the form of a dwelling is the result of interactions between environmental factors, culture, residents activities, technology, and available resources. Through this framework, the study evaluates how the characteristics of the Limas House have evolved in response to aquatic environmental conditions while maintaining their resilience to flooding.

The study sites are located in the 7 Ulu and 10 Ilir districts of Palembang City, South Sumatra. These two locations were selected using purposive sampling because they still feature Limas House that represent two distinct conditions: building that have relatively preserved their traditional architectural characteristics and buildings that have undergone transformation due to urban development. These differences in characteristics allow for a comparative analysis of how changes in architectural elements affect the buildings ability to adapt to flooding.

The research stages were conducted systematically, beginning with problem identification, the development of a theoretical framework, the determination of the research subjects, and data collection through field observation, documentation, and literature review, followed by a comparative analysis based on five research variables, such as structure, elevation, spatial layout, ventilation, and building materials. Next, the results of the analysis were synthesized using the Limas House to flooding, before finally drawing conclusions and formulating research recommendations. The research variables are presented in Table 1 and were used to identify the ways in which the Limas House adapts to aquatic environmental conditions and flood risks.

Table 1. Research Variables, Indicators and Observation Parameters

Variable	Indicator	Observation Parameters
Structural Adaption	Structural system that adapts to environmental conditions	Stilt house configuration, foundation system, and primary structural system
Elevation Adaptation	Adjustment of building height to flood risk	Floor evaluation above ground level
Spatial Adaptation	Spatial organization that responds to environmental conditions	Spatial layout, floor level differences, and functional zoning
Ventilation Adaptation	Ventilation system that responds to humid climatic conditions	Type of ventilation, opening configuration and air circulation
Material Adaptation	Use of materials appropriate to the environmental context	Types of structural, flooring, and wall materials, and their resistance to moisture

Source: Author's Analysis, 2026

To assess the effectiveness of a building's adaptation, this study applies a methodology for evaluating the level of resilience based on a mitigation criticality scale, with the following weightings:

1. Mitigation Function (High) : Building elements that directly serve to prevent disasters (flood and structural failure). If these elements are lost, the building will be immediately submerged or suffer structural collapse.
2. Supporting Functions (Medium) : Elements that serve to improve quality of life or accelerate the recovery process (such as thermal comfort or water flow rate), but are not crucial to the continuity of the building's primary functions during a flood.
3. Social Function (Low) : Elements that primarily serve as visual or aesthetic markers of identity (such as ornaments or carvings) without having a technical impact on disaster mitigation.

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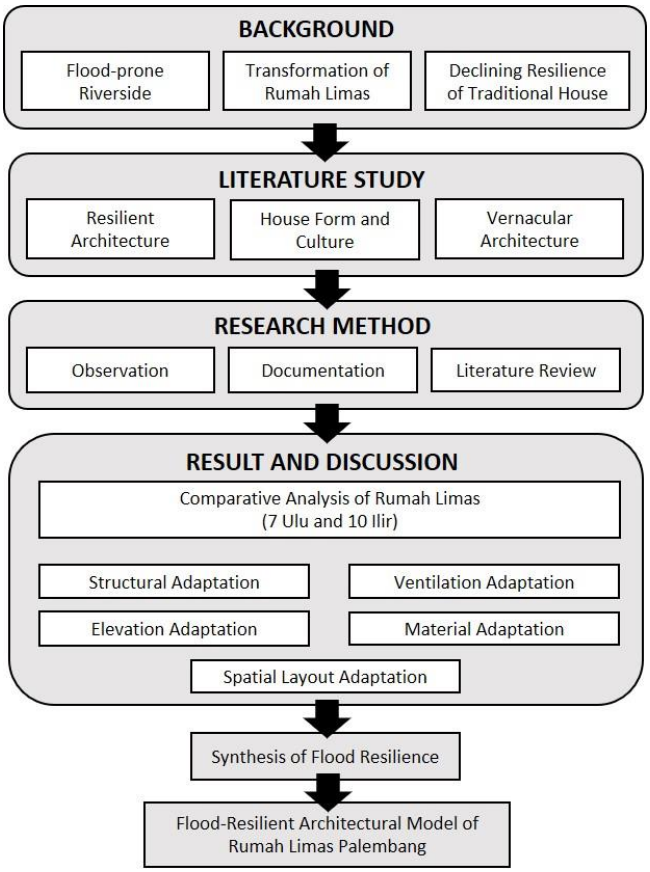

Figure 1. Research Stages
Source: Author 2026

Data collection was conducted through field observations, documentation, and a literature review. Observations were used to examine the physical condition of the buildings in terms of structure, elevation, spatial layout, ventilation, and building materials. Documentation involved taking photographs and recording the existing condition of the buildings. The literature review was used to establish a theoretical foundation regarding the Limas House, vernacular architecture, resilient architecture, and the "House Form and Culture" theory. The data obtained were then analyzed using qualitative descriptive methods through the stages of data collection, data reduction, data presentation, and deduction of conclusions. The observation results were compared with the established research indicators to identify the adaptive characteristics of the Limas House to theriverside environment. Furthermore, the research findings were interpreted based on the "House Form and Culture" theory to explain the role of the Limas House as a form of resilient architecture that has evolved through a process of adaptation to flood conditions in the city of Palembang (Purnama et al., 2021).

3. RESULT AND DISCUSSION

Based on field observations at two locations in 7 Ulu and 10 Ilir in Palembang, a variety of adaptation patterns to the tidal environment of the Musi River were identified. The analysis of these field findings was conducted using six main variables to measure the extend to which the architectural form of the Imas House has adapted and maintained its resilience amid the dynamics of the urban landscape.

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3.1 Characteristics of The Research Objects

Prior to the analysis of specific adaptation variables, the fundamental characteristics of the two case study sites are delineated in Table 2. The purpose of this overview is to provide a visual and factual foundationn regarding the degree authenticity and architectural transformation occuring in the Musi River waterfront area.

Figure 2. (a) Object 1 in 7 Ulu and (b) Object 2 in 10 Ilir
(Sumber: Observasi Lapangan Penulis, 2026)

Table 2. Characteristics of The Research Objects

Observation Aspects	Object 1 (7 Ulu)	Object 2 (10 Ilir)
Building Type	Traditional Limas House	Transformed Limas House
Structural System	Ironwood (ulin) timber	Timber and concrete
Underfloor Space Condition	Open (without enclosing walls)	Partially enclosed (repurposed for other functions)
Predominant Material	Vernacular timber boards	Timber, brick, and concrete
Degree of Authenticity	High	Moderate

Sumber: Authors 2026

Table 2 shows the basic characteristics of the two locations. Authenticity parameters were assessed based on the extend to which the buildings retain their original vernacular form. Object 1 in 7 Ulu was assessed as having high authenticity because it still maintains the complete architectural integrity of the traditional Limas House with vernacular material (Unglen Wood) and an oper air raised platform. Object 2 in 10 Ilir was rated as moderate because it represents a phenomenon of hybridization: the pressure of space costraints in urban areas has forces residents to make structural compromises by using concrete and brick which has affected the authenticity of its original form.

3.2 Adapting Building Structures To Floods

Building construction systems serve as the first line of defense and the most fundamental mitigation tool in responding to hydrological threats in tidal water environments. The highly fluctuating waters along the Musi River require structural designs that are not only robust but also responsive and in harmony with the nature of water movement (Sunyoto & Trisno, 2022).

Figure 3. Structure of (a) A Building in 7 Ulu and (b) A Building in 10 Ilir
Source: Authors 2026

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Table 3. Analysis of Structural Adaptation

Analysis Aspect	Limas House in 7 Ulu	Limas House in 10 Ilir	Analysis
Structural System	Traditional Limas House	Transformed Limas House	Both buildings originate from the traditional Limas House architectural typology but exhibit different spatial adaptation strategies in response to environmental and functional changes
Underfloor Height	± 1,5 - 2,3 meters	Underfloor space partially enclosed with permanent brick walls	The open underfloor space of the 7 Ulu building passively relieves hydrostatic pressure during flood events, whereas the enclosed underfloor space in the 10 Ilir building obstruct floodwater flow
Structural Details	Ironwood (ulin) timber piles driven dirrectly into swampy or soft soil, creating a fully open underfloor space	Reinforced concrete columns combined with permanent brick walls supporting a timber superstructure	Both buildings are designed to transfer structural loads to soft or swampy ground. However they employ constrasting flood adaptation strategies.
Foundation System	Ironwood (ulin) timber piles	Combination timber and reinforced concrete	The transformation from a traditional timber foundation to a timber concrete system reflects adaptation to urban development and changing functional requirements, resulting in differences in structural strength and flexibility

Source: Authors 2026

Based on the analysis in Table 3, there is a stark contrast in the paradigms adopted by the two subjects of study in addressing the threat of tidal flooding. In the case of building 7 Ulu, the structure demonstrates a very high level of structural adaptation and is ecologically sound. The use of a stilt house system comprising rows of Unglen wooden posts directly embedded into local wooden foundations provides excellent elasticity, allowing it to adapt to the movement and bearing capacity of the typically unstable swamp soil. Furthermore, the space beneath the structure left completely open without any wall partitions functions as a waterway. When the Musi River floods, water can flow freely through the gaps beneath the elevated platform without exerting any thrust or hydrostatic pressure that could compromise the stability of the main structure. This passive pressure relief mechanism represents the highest manifestation of the concept of resilience architecture in traditional dwellings.

In contrast, the building at 10 ilir underwant an extreme structural transformation that fundamentally altered its structural integrity. The pressures of demographic density and the high demand for functional space in urban areas have forced residents to make compromises by encroaching on the ecological space beneath their homes. The traditional wooden post structure was combined with modern materials concrete columns and brick walls at the base to enclose the area, which was subsequently repurposed into four units of row housing.

The structural conversion from a porous (open) to a massive (closed) design has seroius ecological consequences. Massive concrete walls in the under bridge area create what is known as the dam effect. This construction blocks the natural flow of tidal water. Based on an empirical assessment of the condition of the buildings in 10 Ilir, Wicaksono states that the cultural shits in settlement patterns from stilted housing to non stilted housing or walled stilt houses actually weakens the collective resilience of the waterfront area (B. Wicaksono, 2019).

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Enclosing the space beneath the structure not only eliminates the flexible nature of the wooden structure's ability to adapt to wet soil, but the hydrostatic pressure of water held back by the brick walls will force the water to overflow in search of alternative pathways at higher elevations, which ultimately has the potential to significantly worsen the duration and volume of flooding in the surrounding settlements. This demonstrates that modern interventions in the building's substructure have directly reduced the resilience of the Limas House itself.

3.3 Building Level Adaptation

The floor elevation of the main building is a critical parameter in river front architecture because it is directly exposed to the threat of fluctuating high tides on the Musi River. The vertical difference between the floor of the house and the ground or water level serves not only as physical protection but also as a social manifestation in the Limas House typology (Ferdi, Maliki & Saputra, 2021).

Table 4. Analysis of Building Elevation Adaptation

Analysis Aspect	Limas House in 7 Ulu	Limas House in 10 Ilir	Analysis
Main floor elevation	Lower (approximately 0,8 -1,5 meters)	± 2 meters above ground level	The building in 10 ilir is elevated above the surrounding ground level, allowing it to better withstand severe flooding. In contrast, the neighboring row houses continue to face a significant risk of flooding
Kijing as Split level floor system	Intact (3-5 stepped floor levels)	Partially lost, the floors have become predominantly flat	Changes to the traditional split level floor configuration demonstrate how the building has been adjusted to meet the practical needs of present day occupants
Function of Elevation	Flood adaptation and spatial hierarchy	Primarily accommodates daily functional needs	The traditional spatial hierarchy no longer carries the same cultural an philosophical significance, as practical considerations of space utilization hav become more dominant

Source: Authors 2026

Based on Table 4, the floor elevation of the main building at Building 7 Ulu is precisely positioned above the highest recorded high tide level of the Musi River (1,25 meters), thereby providing absolute protection for residents against the risk of water entering domestic spaces. This resilience is reinforced by the existence of a terraced flooring system (bengkilas or kijing) consisting of 3 to 5 levels with elevation differences of 20-40 cm. In addition to serving as a flood mitigation measure, this kijing system is a tangible social order, where each floor level is designated for sacred and functional spaces (Hidayat et al., 2021).

In the 10 Ilir buildings, a significant transformation has occurred in terms of elevation. The safety threshold has decreased not because of the elevation itself, but because the functions located below it have changed, which technically places the residences in a position far more vulnerable to extreme tidal flooding. Furthermore, the simplification of the spatial layout through the leveling of the main floor indicates a shift in the genre de vie, or residential lifestyle. Residents of the 10 Ilir building tend to prioritize functional practicality in their daily activities within the home, so the traditional tiered spatial hierarchy which was perceived as limiting mobility—has gradually begun to be reconstructed or leveled. This transformation confirms that the Rumah Limas, as an architecture "in the process of becoming," is highly

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flexible in adapting to changes in family structure and new forms of social continuity; however, the consequence is the loss of the originality of the traditional spatial layout, which has been the unique character of Palembang's architecture.

3.4 Ventilation

The combination of high temperatures and excessive humidity in tropical climates makes effective ventilation an essential element of building design. Beyond improving indoor comfort, continuous air movement limits moisture accumulation, helping to prevent material degradation associated with the humid conditions above swamp surfaces.

(a) (b)

Figure 4. Ventilations of (a) A Building in 7 Ulu and (b) A Building in 10 Ilir
Source: Authors 2026

Table 5. Analysis of Ventilation Adaptation

Analysis Aspect	Limas House in 7 Ulu	Limas House in 10 Ilir	Analysis
Window Openings	Large windows with elongated upper ventilation openings	Smaller louvered (krepyak) windows with decorative stained glass transoms	The window design reflects a transition from a purely passive ventilation system to one that integrates cultural aesthetics with environmental adaptation
Opening Size	Very large (± 110 x 200 cm)	Moderate to limited (± 80 x 120 cm)	Although building 7 Ulu has larger window openings, cross ventilation performs more effectively in Building 10 Ilir due to differences in the configuration and operation of the ventilation system.
Ventilation Type	Louvered glass (nako) ventilation	Side-hinged (krepyak) windows	Indoor air eschange efficiency varies dependeing on the type and configuration of the ventialtion system
Response to Humidity	Good	Very Good	Indoor thermal comfort and microclimatic conditions are strongly influenced by the size, placement, and efficiency of façade openings

Source: Authos 2026

It can be concluded that Building 7 Ulu consistently relies on the principle of passive cooling through the use of large windows. This system allows for effective cross ventilation to draw air inside. However, the windows are not in optimal condition, which impairs their functionality. Furthermore, in Building 10 Ilir, the dimensions of the façade openings have been reduces, which technically lowers the air flow rate into the interior spaces. How ever,

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this does not affect the inflow of air, as the numerous wide openings allow air to circulate effectively. The homeowners have also made aesthetic adaptions by installing stained glass grilles with Arabic inspired ornamentation of Limas house often carried sociological and religious meanings as markers of the residents cultural identity is well documented (Hidayat et al., 2021). Functionally, natural ventialtion is severely lacking in terms of size; however this adaptation demonstrates that traditional buildings remain relevant as spaces for social continuity, where architectural elements can accommodate shifts in cultural identitiy without sacrificing the buildings fundamental façade characteristics (Ahmad Malik Abdul Aziz, Ibnu Aziz, 2026). This findings aligns with the research by Dharmatanna et al. (2024) on traditional Banjar houses, which shows that the effectiveness of passive cooling is influenced not only by the size of openings buat also by the presence of cross ventilation, building orientation, and the space benerath the raised floor, which allows air to flow naturally. Thus, natural ventilation in the Limas House can also be understood as part of a climate adaptation system that works in unison with other architectural elements.

3.5 Adaptation of Building Materials

The durability of a buildings envelope and structure are key factors determining the service life of a structure, particularly in riverside locations exposed to wet dry cycles caused by tidal fluctuations. In selecting materials for the Palembang Limas House, consideration was given not only to structural strength but also to resistance to biological damage (termites) and chemical weathering caused by high humidity.

(a) (b)

Figure 5. Materials of (a) A Building in 7 Ulu and (b) A Building in 10 Ilir
Source: Authors 2026

Table 6. Analysis of Material Adaptation

Analysis Aspect	Limas House in 7 Ulu	Limas House in 10 Ilir	Analysis
Materials	Tekstur kayu Unglen yang terpapar udara yang mana banyak yang sudah lapuk namun sebagian masih kokoh	Pertemuan material bata atau beton dan kayu yang mengalami rembesan air	Both buildings demonstrate relatively stable material durability despite prolonged exposure to humid environmental conditions
Primary structural material	Kayu Unglen murni	Kayu tembesu, Beton, dan Bata	Material hybridization reflects the transition from traditional vernacular construction toward permanent urban housing
Moisture resistance	Moderate to high	Moderate	Local hardwoods, particularly ironwood (ulin), have proven highly resistant to moisture induced deterioration and biological decay

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Analysis Aspect	Limas House in 7 Ulu	Limas House in 10 Ilir	Analysis
Degree of Authenticity	High	Moderate	Construction modernization has reduces the integrity of the original architectural character

Source: Author 2026

The material choices found in the 7 Ulu building reflect the local community's extensive knowledge of timber species native to the swamp ecosystem. Unglen wood was deliberately selected for the structural posts embedded in the muddy ground because of its exceptional durability under wet conditions. Its naturally high oil content provides strong resistance to moisture and termite attack, allowing the timber to remain durable despite prolonged exposure to tidal inundation. This preference for Unglen wood demonstrates an environmentally responsive approach to material selection, in which local resources are matched to the specific environmental conditions of the site.

The 10 Ilir building underwent a paradigm shift in material selection through a process of hybridization. The use of concrete and brick in the lower structure is an adaptation to the limited availability of high quality hardwood, as well as the residents desire to crrate a building that appears permanent in the eyes of the urban community. However from a structural perspective, concrete exhibits higher capillary action than wood if not properly coated with a waterproof barrier. Water infiltration, frequently observed on the surface of brick walls in the area beneath Building 10 Ilir, demonstrates that concrete actually tends to release moisture more slowly than elevated wooden structures with open, natural ventilation systems. This phenomenon underscores that the modernization of materials does not always correlate directly with an improvement in a building's resilience to the flood prone riverside environment.

3.6 The Synthesis of The Limas House as Resilient Architecture

To define the role of this local architecture in the formulation of urban environmental mitigation strategies, all identified variables were synthesized into a framework for building resilience performance. This synthesis explains how the architectural elements of the Limas House work synergistically as an integrated disaster mitigation system (resilience architecture).

Table 7. Synthesis of Adaptation Strategies in The Limas House as Flood-Resilience Architecture

Adaptation Strategy	Architectural Element	Adaptation Mechanism	Contribution to Flood Resilience
Structural Adaptation	Timber stilt structure	Allows unobstructed floodwater flow beneath the building	High
Elevation Adaptation	Raised floor elevation	Prevents tidal flood inundation	High
Spatial Adaptation	Kijing split level floor system	Established spatial hierarchy while improving functional accessibility	Moderate
Ventilation Adaptation	Facade openings	Reduces indoor humidity through natural ventilation	Moderate
Material Adaptation	Ironwood (ulin) timber	Provides high durability and resistance to water exposure	High

Source: Author 2026

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Based on this synthesis, the Limas House typology has been shown to be not merely a conventional shelter, but rather an integrated disaster mitigation system (resilience architecture) (Izzata et al., 2024). Drawing on the theory of “House Form and Culture” (Amos Rapoport), the form of the Limas House represents a harmonious interaction between technical solutions to cliamtic challenges and the fulfillment of the sociocultural needs of the Palembang community. Comparative findings between the 7 Ulu and 10 Ilir structures confirm that modernization interventions such as converting the under house spaces into high density housing and reducing the elevation actually undermine the structures inherent resilience. When architectural elements are stripped of their primary adaptive function, the ecological resilience of waterfront settelements is fundamentally degraded.

4. CONCLUSION

This study shows that the Palembang Limas House is a form of vernacular architecture that exhibits high resilience to flooding through the application of five key adaptation startegies, such as a raised platform structure, elevated floors, a spatial layout based on the kijing system, natural ventilation, and the use of local materfials resistant to wet environments. These five elements work in unison as an adaptive system that allows the building to remain functional despite the tidal fluctuations of the Musi River. A comparative analysis shows that The Limas House in the & uLu area still retain most of the adaptive characteristics of traditional architecture, giving them a higher level of resilience compared to buildings in the 10 Ilir area that have undergone physical transformation. The enclosure of the under house space, changes in elevation, simplification of spatial layout, and the use of modern materials have been shown to reduce the effectiveness of the buildings adaptive mechanism against flooding. These findings indicate that modernization does not always improve building quality if it eliminates the principles of adaptation that have evolved through local wisdom.

The contribution of this research lies in the development of a synthetic framework for the adaptation strategies of the Limas House as a resilient architecture based on five mutually integrated main variables. This framework demonstrates that the resilience capacity relationship between structure, spatial layout, ventilation, elevation, and building materials. The results of this study can serve as a reference for developing adaptive housing concepts in riverside areas as well as for the conservation of vernacular architecture in Indonesia. Based on the study’s finding, local governments and stakeholders involved in the preservation of the Musi riverside area need to maintain the adaptive elements of the Limas House as part of a flood mitigation strategy rooted in local wisdom. Conservation efforts should not only focus on preserving the physical form of the buildings but also on maintaining the adaptive functions of each architectural element. Future research is recommended to invlude a larger number of study sites and to combine qualitative analysis with hydrological simulations or digital modeling so that the effectiveness of The Limas House adaptation strategy can be evaluated more quantitatively. The research findings confirm that The Limas House not only holds value as a cultural heritage but also serves as a model for adaptive housing design that remains relevant for addressing the challenges of climate change and increased flood risks in riverside areas in the future.

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