



Lesson Learn from Traditional-Vernacular Houses in Kinali Village, West Lampung, Indonesia

Andi Harapan Siregar

Departemen Teknik Arsitektur, Universitas Komputer Indonesia, Indonesia

Email: *andi.harapan@email.unikom.ac.id

Abstract. Traditional-vernacular housings are customarily built to meet the specific needs, values, and ways of living of the local people within a specific environmental context and resources. They are unique compared to other kinds of housings currently in use by the society because they are non-engineered construction and transferred by the ancient tradition so that they could withstand its physical environment and be easily accepted by the local people. The uniqueness is called indigenous knowledge or local wisdom. Indonesia is a country that consists of traditional-vernacular housings in various places. This paper will elaborate on one of the traditional-vernacular housing in Indonesia, which are traditional-vernacular housings in Lampung. The purposes of this research are to elaborate documentation of the indigenous' knowledge of the traditional-vernacular housings in Lampung to apply for construction today. This paper is based on research which is purely field research and semistructured interview with various stakeholders of the traditional-vernacular housings and local community in Lampung. Field research and semistructured interviews focus on two aspects of observations, which are: 1) traditional building, and 2) skill & local resource use. Observation of traditional buildings include 1) house form & design, 2) structure system, 3) material used, 4) joinery & other details. Observation to skills and local resource use include: 1) building skill, and 2) culture (such as solidarity).

Keywords: Traditional building, vernacular houses, West Lampung

1. Introduction

Traditional-vernacular housing in Lampung is one of a kind of building which differs from the others (non-traditional-vernacular). This uniqueness has occurred because vernacular housings The ancient tradition of non-engineered construction allowed structures to be built in a way that they could endure the physical environment while also being readily embraced by the local community. [1,2]. Traditional-vernacular housings share some characteristics, those are: 1) does not support my theory and principles of building [3,4], 2) The design is tailored to suit the climate and surrounding environment. [3-5], 3) The local people constructed it collaboratively, utilizing their specific building skills. [3,4,6], 4) have ordered ornaments,

picturing tradition or marking symbols from the people [3,7], 5) Embracing organic materials, the approach is also open to changes through a process of trial and error. [3-5, 8,7].

Traditional-vernacular housing in Lampung is special because of the position of Lampung in an earthquake area [2]. In an earthquake area, vernacular housings in Lampung have also been compiled and designed to respond to it [2]. It is proven by the perfectly standing housings despite the great number of earthquakes (with the variation of magnitude). In earthquake areas like Lampung, vernacular housings can survive from the earthquake [2,9].

Characterized by a holistic and integrative approach, indigenous knowledge is embedded within wider cultural traditions. [3,4,7]. In many societies, indigenous people view themselves as integral to the natural world, contrasting sharply with the perspective often found in Western ideology, which tends to position humanity as conquering nature. [10,11]. Most indigenous people have respect and knowledge for the ecosystem as their life-ways are intermingled with nature. Although indigenous knowledge and tradition are often perceived as static and unchanging, they are, in reality, dynamic and capable of transformation. [3,10]. It is therefore adaptable and influential. The sustainable construction of traditional housing involves meeting current human needs without compromising the ability to satisfy those needs in the future. This paper tries to point out some lessons learned of traditional-vernacular housings in 1) house shape, 2) structure & construction system, 3) Detailing of building component, and 4) building materials. The aims of this study are to find out architectural characteristics of traditional houses in Kinali Village that generally represent traditional houses in Lampung as a lesson-learned. Architectural characteristics will be very beneficial for architectural development in the future.

2. Method

This lesson-learn is based on primary and secondary data from the traditional village in Lampung. Primary data are gathered through various field surveys in Lampung, which collected with taking a photo, measuring of traditional houses, and sketching some of the details. The research focuses on villages in Lampung that still have a significant number of traditional houses. The villages were chosen as the research location in Lampung Village

The case study area in Lampung is Kinali Village, which is located in West Lampung. Kinali Village has a unique characteristic that is applied to building, culture, and society. Based on these unique characteristics make the Kinali Village is different from the other villages in Lampung. This uniqueness is characterized by diversity in terms of the physical environment (including earthquake), ethnicity, and culture.

The typologies mentioned above were developed by the people of Kinali Village in response to earthquake events, as revealed through semi-structured interviews. These earthquakes have given the vernacular housing in Kinali Kampong distinct identities, which include:

2.1. Raised box frame

Vernacular housing in Kinali Kampong (typology 1 & 2) used raised box frame which raises the floor from the ground surface (± 1 m). The main structure of housing is wood, and the roof cover is sugar palms for typology one and metal for typology 2. This building features a stone foundation that supports columns above the stone surface.

2.2. Light, Elastic, and Ductile Structures

The vernacular housing in Kinali Kampong utilizes lightweight, elastic, and ductile structures, as evidenced by the properties of the materials used, particularly wood. Wood is employed for various structural components, including the columns, roof frame (comprising the tie beam, ring beam, king post, and purlin), as well as the wall frame and floor frame. For housing with typology, one is using bamboo for wall enclosure and floor enclosure of kitchen.

2.3. Box Frame

The building frame is structured like a box, which has related components that make the building rigid and solid. The wall frame, which supports structural systems and joins with a box frame, is what gives rise to the rigid box frame rather than columns, ring beams, and floor beams alone. The columns beside are bounded by ring beam and floor beam and bounded by floor frame.

2.4. Roof

The roof of vernacular housing in Kinali Kampong uses the trunk of the sugar palm for roof cover (housing with typology 1) and metal (housing with typology 2).

2.5. Connection and joint

The joint system used by this traditional-vernacular house is a pivot (knockdown system).

3. Results and Discussion

Regarding the physical environment, the topography of Kinali Village is flat with soils that are suitable for coffee and laid on Sumatra Trench. The people in Kinali Kampong have adapted and behavior to specific nature in their territory. For instance, their complex house pattern and their house are considering their physical environment, especially when we are considering earthquakes

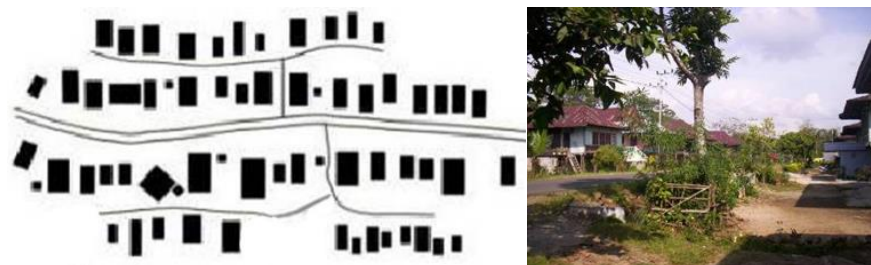


Figure 1. Complex Housing Pattern in Kinali Village

Traditional- vernacular housing in Kinali Village consists of 2 building typology, which is: 1) typology 1: Lamban Pesagi Housing, Lamban Pesagi is the old vernacular housing (Figure 2), 2) typology 2: current vernacular housing, this typology was built after the earthquake in 1933 (Figure 3).



Figure 2. Building Typology 1



Figure 3. Building typology 2

3.1. House Shape

- House shape

The House shape is square with dimensions 7 m x 8 m (typology 1) and 7 x 15 m (typology 2). From the environmental technical aspect, this house is a good shape, especially with typology 1.

- Accommodate the local climate

Vernacular housing in Kinali Kampong takes climate into account by incorporating features designed to enhance airflow. The house includes windows, doors, and walls that facilitate the flow of fresh air, helping to reduce heat and humidity indoors. An elevated floor is also employed to minimize moisture from beneath. Additionally, holes in the gable end of the roof promote airflow, which lowers heat within the roof space and throughout the building.

- Large overhanging roof

The large roof overhang, measuring 100 cm, offers effective shading and protection from heavy rains.

3.2. Building Structures

- Foundation

The foundation consists of a stone base with columns embedded in the surface of the stone. The material for the foundation can be found from the river or the forest, which is closed to their kampong.

- Supporting frame

The supporting frame are made out of wood. They choose the appropriate wood which consists and able to get in their forest. The frame system is designed as a box frame, featuring bracing at the corners to create a rigid structure.

- Floors

In Kinali Kampong, vernacular housing features an elevated floor, raised approximately 100 cm above the ground, to facilitate airflow from beneath. This concept is well-suited for hot and humid climates. They are using bamboo, which specific construction and arrangement which applied to the kitchen wall and ceiling.

- Walls, windows, and doors

The walls in Kinali Kampong are constructed from wood, which is securely tied and connected to the building frame. The construction technology of the wall is simply a knockdown system (without using a nail). The window and the door have been made from wood with knockdown construction. bamboo or rattan are used as a cover of the window allowing airflow to the inside of the building (houses with typology 1).

- Roof

The roof truss frame is made of wood and is connected to the building frame, enhancing the structure's rigidity and solidity. For typology 1, the roof is covered with sugar palm trunks, bundled together as roofing materials sourced from the surrounding environment, while typology 2 features a metal roof.

3.3. Building Methods

In Kinali Kampong, vernacular housing is built collaboratively by the local community. The materials were taken from the forest near the village. People easily form strong bonds in this fellowship due to their shared ancestry, which is rooted in a strong lineage. – An ancestor passed down knowledge about building technology over the years. This legacy has been maintained and shared through generations. When questioned, today's locals often struggled to understand the reasons behind the specific joint designs and the choice of materials used. They merely follow what they called tradition in building vernacular housings.

- Low cost

Utilizing materials found around the kampong, such as wood, bamboo, and sugar palm, keeps building costs low. Locals are using local technology to construct the vernacular housing, such as a knockdown system.

- Practical and environmentally appropriate

The indigenous knowledge of construction teams aligns well with the physical aspects of vernacular housing, having been refined over the years through a trial-and-error process that adapts to their environmental conditions.

- Availability building material

The availability of building materials is sufficient to meet their needs for constructing new houses. The kampong's head, with the support of his society, is managing the utilization of a forest.

- Availability skilled worker

In Kinali Kampong, local people work together to build homes, leveraging their construction skills. The skills were passed down from their parents and have evolved over time through the locals.

3.4. Building Materials

As discussed above, local materials are being utilized as the building material. These materials come from the forest, which is controlled by the head of the kampong. Local people continuously manage the forest. Nowadays, Kinali Kampong has a serious problem of environmental degradation. This has been observed in many areas due to population growth, open free economy, and lack of policies. In recent years, extensive deforestation has seriously depleted the natural resources base. Thus, it leads to the loss of biodiversity and indigenous knowledge of local people in Kinali Kampong. Today, people in Kinali Kampong have built their houses with modern materials, such as cement. Based on their physical environment (character) related to the earthquake, those houses did not save to earthquake resistance.



Figure 4. Building today with modern material

4. Conclusion

Vernacular housing in Kinali Village has applied sustainable construction Based on criteria of building method, house shape, building material and building component. Traditional houses in Kinali Village have been fulfilled all the criteria related to their physical environment, culture, and their society. From the case study in Kinali Kampong, it is clear that indigenous knowledge holds significant importance in the development of their built environment (especially their traditional-vernacular house). Nevertheless, indigenous knowledge in Kinali Kampong has been eroded due to many social, economic, and environmental driving forces. Therefore, it is really necessary to put the indigenous knowledge that has applied to their built environment back to work by undertaking the actions, such as 1) collecting, documenting, disseminating indigenous knowledge (including in Kinali Kampong), 2) preserving and revising indigenous knowledge by empowering local people and rediscovering the values of indigenous knowledge, 3) building and strengthening national institution relating to indigenous knowledge, such make the national rules related to building environment, 4) promoting and enhancing indigenous knowledge through the development of partnership and stakeholders network.

References

- [1] Stabinsky, D., & Brush, S. B. (1996). Valuing local knowledge: indigenous people and intellectual property rights.
- [2] Triyadi, S., Sudradjat, I., & Harapan, A. (2010). Kearifan Lokal Pada Bangunan Rumah Vernakular Di Bengkulu Dalam Merespon Gempa Studi Kasus: Rumah Vernakular di Desa Duku Ulu. *Local Wisdom: Jurnal Ilmiah Kajian Kearifan Lokal*, 2(1), 1-7.



- [3] Rapoport, A. (1990). The meaning of the built environment: A nonverbal communication approach. University of Arizona Press.
- [4] Oliver, P. (2007). Built to meet needs: Cultural issues in vernacular architecture. Routledge.
- [5] Triyadi, S., Harapan, A., Pribadi, K. S., & Hidayat, B. (2009). Indigenous Knowledge on House Building System in West Sumatra and Southern-West Java, Indonesia. Text Book Indigenous Knowledge and Disaster Risk Reduction, From Policy to Practice, Editor: Rajib Shaw, Anshu Sharma, Yukiko Takeuchi.
- [6] Pribadi, K. S., Abduh, M., Wirahadikusumah, R. D., Hanifa, N. R., Irsyam, M., Kusumaningrum, P., & Puri, E. (2021). Learning from past earthquake disasters: The need for knowledge management system to enhance infrastructure resilience in Indonesia. *International Journal of Disaster Risk Reduction*, 64, 102424..
- [7] Harapan, A. (2019). Sistem Bangunan Rumah Tradisional Di Kampung Adat Baduy Luar Kadu Ketug, Kabupaten Lebak, Banten. *Jurnal Koridor*, 10(1), 35-47.
- [8] Vogelsang, S. (2019). The Transformation of Vernacular Architecture in Indonesia in Relation to Colonisation By the Dutch. *Journal of a Sustainable Global South*, 3(2), 39.
- [9] Bourdier, J. P., & AlSayyad, N. (1989). Dwellings, settlements and tradition: Cross-cultural perspectives. (No Title).
- [10] Gutierrez, J. (2004). Notes on the seismic adequacy of vernacular buildings. In 13th World Conference on Earthquake Engineering (pp. 1-6).
- [11] Waterson, R. (2012). Living house: an anthropology of architecture in South-East Asia. Tuttle publishing002E