

REPRESENTATION OF THE LAYOUT AND ORIENTATION OF THE DWELLING IN THE BETANG TUMBANG GAGU DAYAK NGAJU HOUSE, CENTRAL KALIMANTAN

Angel Stevany¹, Jesica Riana Susanto Basuki², Titin Fatimah³ & Nafiah Solikhah⁴

¹Department of Bachelor Architecture, Universitas Tarumanagara, Jakarta, Indonesia
Email: angel.315220054@stu.untar.ac.id

²Department of Bachelor Architecture, Universitas Tarumanagara, Jakarta, Indonesia
Email: jesica.315220032@stu.untar.ac.id

³Department of Magister Architecture, Universitas Tarumanagara, Jakarta, Indonesia
Email: titinf@ft.untar.ac.id

⁴Department of Bachelor Architecture, Universitas Tarumanagara, Jakarta, Indonesia
Email: nafiahs@ft.untar.ac.id

ABSTRACT

The arrangement and orientation of the Traditional architecture on a macro, meso, and micro-scale is a form of integrating the forming factors. The Tumbang Gagu Dayak Ngaju Betang House in Central Kalimantan has the characteristics of a large family home, where 5-7 heads of families inhabit one house. This makes the arrangement and orientation formed distinctively. This study aims to examine the proportions of space and architectural elements that reflect the harmonious relationship between God, humans, and the universe of the Tumbang Gagu Betang House. The analysis method used is narrative-interpretive. The discussion indicator is Vernacular Study to discuss Proportion and Forming Factors to then understand the relationship between space and architecture that is formed. Based on the results of the analysis, it is known that the Tumbang Gagu Dayak Ngaju Betang House is a form of architecture that reflects the integration of nature, culture, and social values of the Dayak Ngaju community in Central Kalimantan. This house is not only a communal residence for 5-7 heads of families but also reflects a deep philosophy rooted in three main elements: God, humans, and the universe. These three elements are reflected in the vertical and horizontal structure of the Tumbang Gagu Betang House in Central Kalimantan.

Keywords: vernacular architecture, traditional architecture of Central Kalimantan, Tumbang Gagu Betang House, arrangement and orientation

1. PREFACE

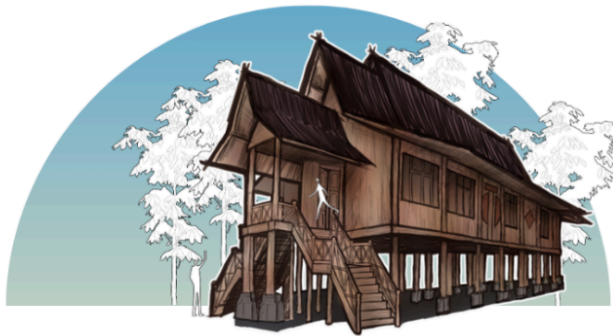
Vernacular architecture grows and develops in a society that evolves over time to reflect the cultural, environmental, social, and economic context, as well as history. Therefore, the manifestation of vernacular architecture in the form of the arrangement and orientation of housing on a macro, meso, and micro-scale in each place has its uniqueness and becomes a characteristic of integrating its forming factors. Issues related to the sustainability of vernacular architecture include tradition itself, conservation itself, self-builder, legalistic aspects, ethical issues, and bringing together issues of contemporary life needs and cultural sustainability (Susetyoarto, 2013; Rudofsky, 1964; Nguyen et al., 2019). *Betang*, *Huma* or *Lamina* also known as *Rumah Panjang* (literally means long house) is a traditional Dayak tribe house in Central Kalimantan. This house is permanent for several generations built in the village by several heads of families who still have blood ties. One of the characteristics of the *Betang* House is located along the Kapuas, Kahayan, Barito, Mentaya, and Katingan River Basins. The *Betang* House is the forerunner of the development process of cities in Central Kalimantan (Galih et al., 2023).

Betang House has characteristics of a long extended family home, where one building can be inhabited by 5 to 7 heads of families. Its size is much larger than traditional houses in general, reflecting the function of this house as a communal residence for several generations in one family (Hamidah & Garib, 2014). The existence of many families in one house requires efficient

spatial arrangement, so that its orientation and structure are formed distinctively. The spaces in the *Batang* house are arranged linearly, with rooms placed along the building, while the central area functions as a shared space for social and ritual activities. This concept reflects the culture of family and cooperation that is very strong in the Dayak community, where the values of togetherness and collaboration are instilled through communal life under one roof (Affrilyno, 2020). One example of this is the *Tumbang Gagu Dayak Ngaju Batang* House in Central Kalimantan (Figure 1).

Figure 1

Exterior Perspective of Batang House



Tumbang Gagu Batang House is administratively located in *Tumbang Gagu* Village, *Antang Kalang* District, East Kotawaringin Regency, Central Kalimantan Province. *Tumbang Gagu Batang*, also known as *Antang Kalang Batang*, was built for 7 years, starting in 1870, and was only occupied in 1878. *Tumbang Gagu Batang* House is located on the banks of the Mendawai River with a land area of 1,880 m², in the form of a rectangular stilt house with a building length of 58.7 m, a width of 26.40 m, and a height of 15.68 m from the ground level to the roof (Bpcbkalim, 2017). To being a communal dwelling in the Dayak Ngaju community, three important elements are firmly held, namely, the relationship between God, humans, and the universe that is reflected in the structure of the head, body, and feet of the *Tumbang Gagu Batang* House (Widjaja & Wardani, 2016). Therefore, this study will examine the proportions of space and architectural elements that reflect the harmonious relationship between God, humans, and the universe of the *Tumbang Gagu Batang* House.

2. RESEARCH METHOD

Research approach

This study uses a naturalistic paradigm with a narrative-interpretive research strategy. Interpretive research investigates socio-physical phenomena in a complex context to explain the phenomenon in a holistic narrative form (Groat & Wang, 2002). The study attempts to understand the meaning of 3 elements, namely the elements of God, humans, and the universe which are represented in the structure of the head, body, and feet of the *Tumbang Gagu Batang* House based on data collected from various sources.

Indicator

With an interpretive approach, the study focuses on the subjective interpretation of the three elements, especially the proportions and factors that form the *Tumbang Gagu Batang* House as an important space in the life of the Dayak Ngaju community.

Data collection and analysis

The data analysis was conducted by interpreting information obtained from the literature review. Furthermore, a descriptive exploration was conducted on how the arrangement and orientation of the *Tumbang Gagu Betang* House in Central Kalimantan are carried out by considering the context of 3 elements (God, humans, and the universe).

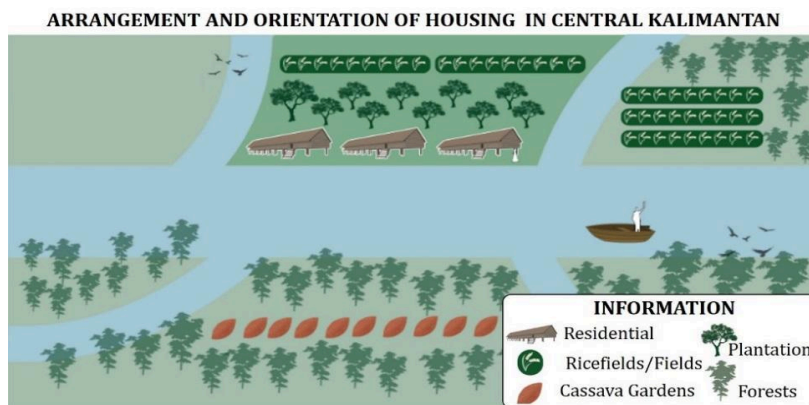
3. RESULT AND DISCUSSION

Arrangement of orientation of Central Kalimantan residential areas

Dayak settlements are generally located on the banks of rivers with a linear pattern following the river's curves and oriented towards the river. The community believes that the river is the source of life. Settlements are spread linearly from downstream to upstream. In the village, there is only a land road that is used as a transportation route within the village between one house and another with an arrangement of 2 rows of houses arranged lengthwise (Elbas et al., 1986) (Figure 2).

Figure 2

Arrangement and Orientation of Central Kalimantan Housing

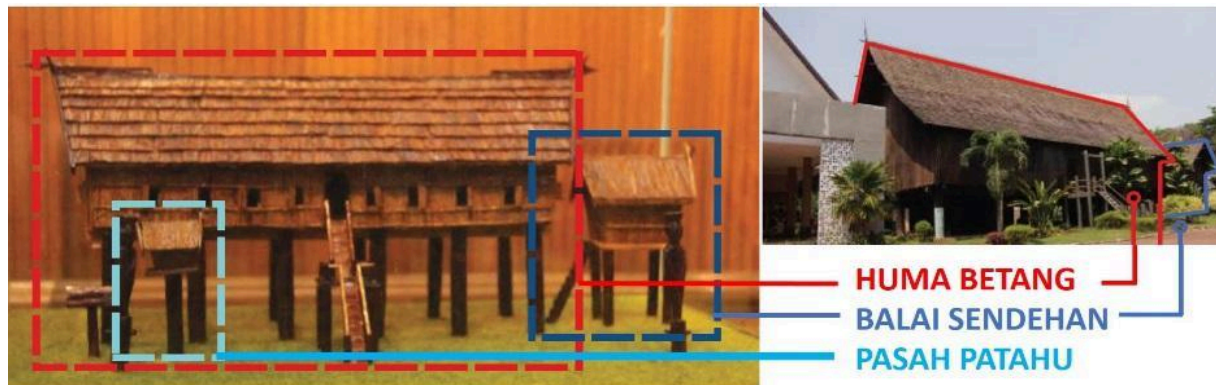


The farming area is located quite far from the village, following the flow of the river, and is reached by boat. In the estuary area, the ebb and flow of the river water occurs; it is used for coconut, banana, and fruit plantations. Meanwhile, the rice field area is located behind the village to get sufficient care from the surrounding community. Due to the location of the settlement, which is still in the forest, the community uses the river as a safer means of transport to reach the plantation area (Elbas et al., 1986).

Parts of a Betang House

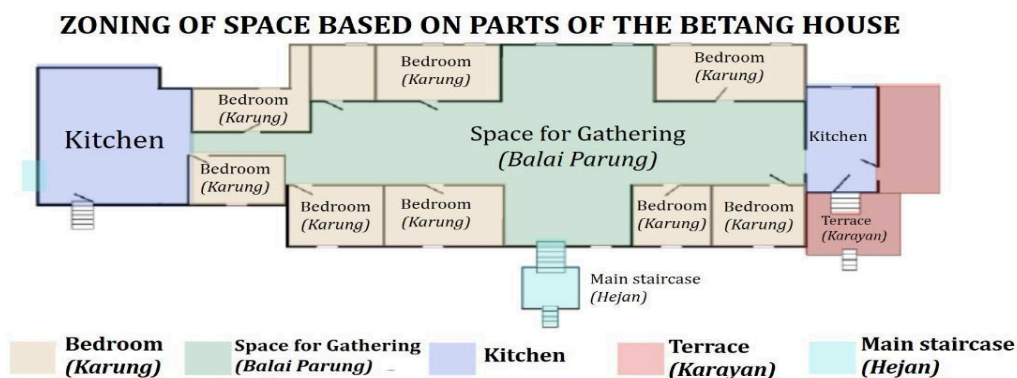
Space on Betang House is separated based on its function and position (Figure 3).

Figure 3
Parts of a Betang House



Huma Betang is a residential area used by 5-7 families who are still related by descent. Inside a *Huma Betang* there are several rooms, as shown in Figure 4 below (Guntur et al., 2021; Tjahjono, 2002).

Figure 4
A General Outline of Huma Betang



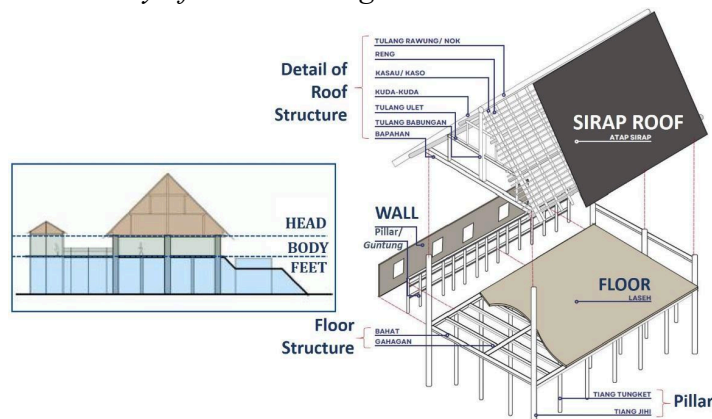
Hejan is the main staircase to enter the *Betang* House, which is made of ironwood. Climbing the *hejan* will end in the common room of the *karayan*. The narrow width of the staircase at *Hejan* is intended to deter wild animals from entering the house. In the past, when there was a tribal war, the *hejan* was designed to be pulled up so that the enemy could not enter the house area. *Karayan* is a terrace to store hunted. *Balai Parung* is a gathering room located in the middle of the building. It is also the center of the building where community religious and social activities are gathered. *Karung* or bedrooms are arranged in a row along the *Betang* building. A number of regulations have been established regarding the configuration of the house. One such stipulation is that the parents' bedroom must be situated at the end of the river. The community believes that violating this rule can bring disaster to the entire family. Shared kitchens are placed on the right or left side of the house. Indigenous people believe that the kitchen must face the river so that the house's residents always have abundant food. *Balai Sendehan* is a small house located next to the *huma betang* and is used as a meeting area (this part is not always there); *Pasah Patahu* is an offering place located close to the *hejan* area and main entrance. Generally, offerings are placed when someone in the family dies or gets married (Usop, 2014; Sriputri, 2018; Galih et al., 2023).

Feet, body, and head components of the Tumbang Gagu Dayak Ngaju Betang House

In general, the *Tumbang Gagu Dayak Ngaju Betang House* can be divided into 3 parts based on the structure of the house (Susanto et al., 2014) (Figure 5).

Figure 5

Axonometry of Huma Betang



Structure of the feet of the Tumbang Gagu Dayak Ngaju Betang House

The structure of the feet of the *Tumbang Gagu Betang House* is made high by the Dayak Ngaju community as a form of adaptation to environmental conditions and to face the threat of inter-tribal wars that have occurred in the past. The height of the *betang* house, which is in the form of a 3-5 meters high stage with sturdy ironwood poles, has a strategic defense function (Figure 6). During the tribal war, the *betang* house was equipped with a ladder that could be pulled up. This feature plays an important role in protecting the house's occupants from enemy attacks, because by pulling the ladder, access to the *betang* house can be blocked, making the house difficult for attackers to reach. In addition, houses that are built high also provide a wider perspective, allowing residents to monitor enemy movements from a distance. The geographical conditions of Kalimantan island, including dense forests and a high incidence of attacks by wild animals, are also significant factors influencing the construction of houses at elevated levels, thereby providing enhanced protection against potential dangers on land.

Figure 6

View of the Betang House Leg Structure



The structure of the feet of the *Gagu Betang House* is comprised of several components, including: *Jihi pillars* made of ironwood with a diameter of 40-60 cm which are installed at the corners and on the long part of the building. *Jihi pillars* strengthen the building's foundation by being planted at a depth of $\pm 1.7 - 2$ m; *Tungket pillars* are pillars with a diameter of 15-47 cm, which strengthen the leg structure, especially the floor. *Tungket* pillars are generally more numerous than *jihi* pillars. *Bahat* is a component made of ironwood formed like wooden blocks and placed between *jihi* and *tungket*. *Gahagan*, components placed above the *bahat* that directly

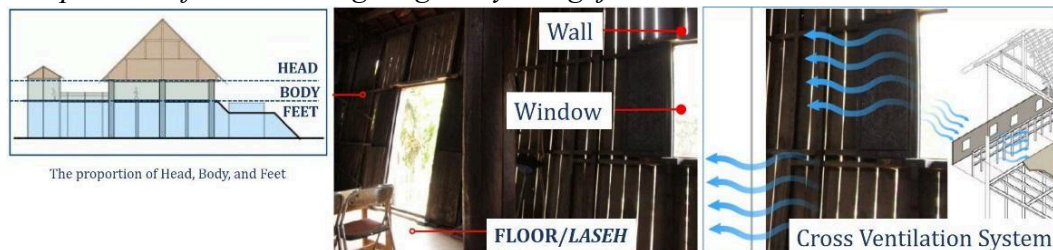
supports the floor. So that the installation of gahagan will be arranged more tightly than the installation of Bahat, Laseh, or the floor of the house, is made of several types of wood such as ironwood, kahui wood, lanan wood, meranti wood, karuing wood and others (Galih et al., 2023; Guntur et al., 2021; Usop, 2014; Sriputri, 2018).

Body structure of Betang House Tumbang Gagu Dayak Ngaju

The wall structure of *Batang* House is built using ironwood, *meranti*, or *karuing* wood panels installed on the main supporting structure, namely *guntung* or *jihi*. The selection of ironwood material known to be sturdy, durable, and strong, reflects the durability and adaptability of this house to local environmental conditions. In addition, *Batang* houses are designed with many openings, such as doors, windows, and even wall gaps. These openings not only provide good natural lighting but also allow for cross ventilation, which keeps the house cool in the tropical weather of Central Kalimantan (Galih et al., 2023; Guntur et al., 2021; Usop, 2014; Sriputri, 2018) (Figure 7).

Figure 7

Components of the Tumbang Gagu Dayak Ngaju House

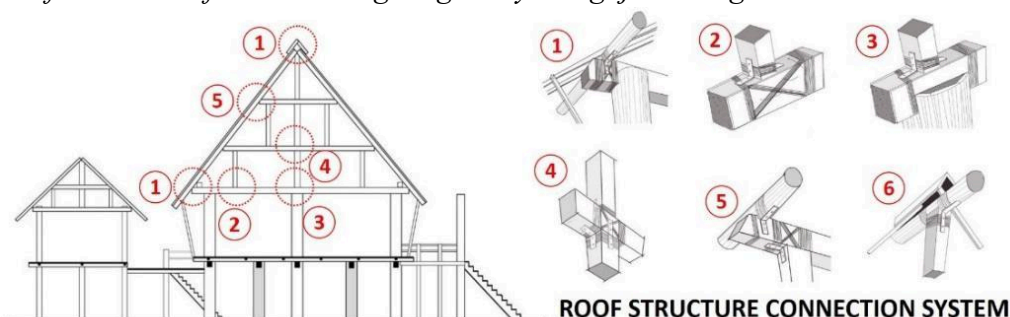


Head structure of Betang Tumbang Gagu Dayak Ngaju House

The roof structure of *Batang Tumbang Gagu Dayak Ngaju* House is designed with a reasonably high height, providing space under the roof that functions as a storage area (Figure 8). This space is frequently used to store various family needs, such as crops, equipment, and ceremonial objects. The high roof also helps keep the temperature inside the house cool, with good air circulation.

Figure 8

Roof Structure of the Tumbang Gagu Dayak Ngaju Betang House



The roof structure of the *Batang Gagu* house itself is divided into 2 main parts, namely the structural component and the covering component. The structural component consists of: *Handaran* as a support for the lower end of the rafters, which also functions as a support for the strength of the upper building. *Bapahan* is a term for a tensile beam on the truss structure on the roof of a house. The number of Bapahan for one building will depend on the number of *jihi*

poles; Tulang Babungan, located above the Bapahan and Guntung bones. The ridge bone uses *tabalien* (ironwood). *Tulang Ulet*, is wood that is installed lengthwise above the Babungan bone following the length of the house to strengthen or hold the rafters so that they do not bend. Kaso and Reng, rafters are components that are installed in a row according to the length of the house. After installing the rafters, the battens are installed to hold the roof covering components; *Tulang Rawung*, Wooden components that run from end to end of the house, located at the end of the ductile bones (truss posts) or the end of the upper truss legs. For the covering components themselves, this Betang House uses a Shingle Cover, the roof covering used is ironwood shingles that are placed on top of the rafter and batten structure. Ironwood is chosen because of its strength which is resistant to extreme weather, although within a certain period, it needs to be replaced to prevent leaks (Galih et al., 2023; Guntur et al., 2021; Usop, 2014; Sriputri, 2018).

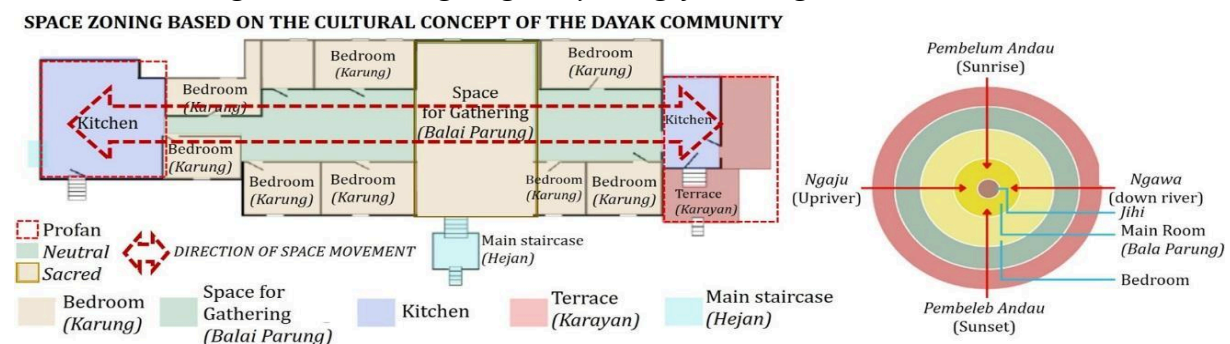
The significance of the head, body, and feet representation in spatial arrangement

The spatial proportions and architectural elements of the *Tumbang Gagu Dayak Ngaju Betang* House reflect the harmonious relationship between God, humans, and the universe, which is translated through the vertical and horizontal arrangement of the dwelling. The head of the house, in the form of a towering roof, depicts the Upper Realm, a sacred place in the Dayak belief (*Kaharingan religion*), where God *Ranying Hatalla* resides. In addition to functioning as a shield from the weather, this roof section is also used to store offerings as a form of spiritual respect for *God Ranying Hatalla*.

The body of the house represents the relationship between people, where daily activities take place. With an elongated space, several rooms and a central room, the *Batang House* shows the values of peace, order, and togetherness. The Dayak people live side by side in harmony, and this part is the center of social and family interaction. Meanwhile, the feet of the house symbolize the Underworld, namely the earth where humans depend for survival. The structure of the feet of the house in the form of a stage not only reflects adaptation to the natural conditions of Kalimantan, such as wet soil and the threat of wild animals, but also illustrates how the community utilizes the surrounding nature for daily needs (Widjaja & Wardani, 2016; Guntur et al., 2021; Widen, 2023) (Figure 9).

Figure 9

Horizontal Zoning in the Tumbang Gagu Dayak Ngaju Betang House



The sacred area of the *betang* house is located in the center of the house namely *Balai Parung* and *Karung*. This orientation is related to the center of the house where a sacred *jih* pole can ward off disaster. In the sacred area, various ritual ceremonies are carried out, welcoming guests, family rooms, and traditional meeting rooms. The most sacred room, namely the *Balai Parung*, is located in the center of the house, indicating that the Dayak people uphold religious values.

This can be seen in the placement of offerings in the roof space of the *Balai Parung*. The values of protection and patronage are reflected in the meeting forums held, traditional ceremonies, and deliberations; Neutral Area, located in the hallway that is a transition between the sacred area and the profane area in the form of a corridor between rooms; Profane Area, consisting of the *Karayan*, dining room, and kitchen where no ritual elements are carried out. Profane areas will be placed more hidden and difficult for guests to access (Widjaja & Wardani, 2016).

4. CONCLUSIONS & RECOMMENDATIONS

The *Tumbang Gagu Betang House of the Ngaju Dayak* in Central Kalimantan reflects the harmonious relationship between God, humans, and the universe through its proportions and architectural elements. The vertical structure of the house consists of three main parts: the head, body, and feet. The head or roof symbolizes the sacred Upper Realm, where God, *Ranying Hatalla*, resides. The towering shape of the roof reflects divine protection, with a storage area under the roof used for offerings to God. The body of the house represents the relationship between humans, where social life takes place. The spaces in the house, such as the *Balai Parung* as the center of social and religious activities, show the values of togetherness and peace that are highly respected by the Ngaju Dayak people. Meanwhile, the feet of the house symbolize the Underworld, where humans adapt to nature, and the stilt structure protects the occupants from wild animals and reflects the use of the surrounding natural environment for survival.

REFERENCE

- Affrilyno. (2020). Rumah Panjang: Nilai edukasi dan sosial dalam sebuah bangunan vernakular Suku Dayak di Kalimantan Barat. *Jurnal Arsitektur Pendapa*, 3(1), 1-12.
- Bpcbkalim. (2017, February 21). *Batang Tumbang Gagu atau Batang Antang Kalang*. <https://kebudayaan.kemdikbud.go.id/bpcbkalim/2784/>
- Elbas, L., Ahmad, A., & Bahen, T. (1986). *Arsitektur tradisional daerah Kalimantan Tengah* (R. Darnys & R. Abu (Eds.). Departemen Pendidikan dan Kebudayaan.
- Galih, D. A. M. M., Kertiasih, N. P. P., Purnasari, A., Zedlina, L. P. C., Saraswati, N. K. A. M., & Wasista, I. P. U. (2023). Kajian arsitektur bioklimatik Rumah Betang. *Jurnal Vastukara: Jurnal Desain Interior, Budaya, dan Lingkungan Terbangun*, 3(2), 283-297. <https://doi.org/https://doi.org/10.59997/vastukara.v3i2.2896>
- Groat, L. N., & Wang, D. (2002). *Architectural research methods*. John Wiley & Sons.
- Guntur, M., Kurniawan, K. R., & Yunitha. (2021). Betang, a traditional house of the Dayak Ngaju in Borneo its space related to structure. *12th International Conference on Structural Analysis of Historical Constructions (SAHC)*, January 2022. <https://doi.org/10.23967/sahc.2021.040>
- Hamidah, N., & Garib, T. W. (2014). Studi arsitektur Rumah Betang Kalimantan Tengah. *Jurnal Arsitektur Melayu dan Lingkungan*, 1(2), 19-35.
- Nguyen, A. T., Truong, N. S. H., Rockwood, D., & Le, A. D. T. (2019). Studies on sustainable features of vernacular architecture in different regions across the world: A comprehensive synthesis and evaluation. *Frontiers of Architectural Research*, 8(4), 535-548. <https://doi.org/10.1016/j.foar.2019.07.006>
- Rudofsky, B. (1964). *Architecture without architects: A short introduction to non-pedigreed architecture*. University of New Mexico Press.
- Sriputri, E. (2018). *Arsitektur Betang Tumbang Gagu (kajian bentuk, fungsi dan nilai penting)*. <https://kebudayaan.kemdikbud.go.id/bpcbkalim/arsitektur-batang-tumbang-gagu-kajian-bentuk-fungsi-dan-nilai-penting-oleh-etha-sriputri/>
- Susanto, C., Arlene, R., Tamariska, L., Febri, W., & Sandrina, C. (2014). *Rumah Betang*. <https://www.slideshare.net/slideshow/rumah-batang-2/35859172>

- Susetyoarto, B. (2013). *Arsitektur vernakular: Keberlanjutan budaya di Kampung Bena Flores*. Padepokan Seni Djayabhinangun.
- Tjahjono, G. (2002). Rumah Panjang Orang Kalimantan: Uma Dadoq Kenyah. In G. Tjahjono & J. Miksic (Eds.), *Indonesian heritage: Arsitektur* (pp. 32-33). Grolier Internasional.
- Usop, T. B. (2014). Pelestarian arsitektur tradisional Dayak pada pengenalan ragam bentuk konstruksi dan teknologi tradisional Dayak di Kalimantan Tengah. *Jurnal Perspektif Arsitektur*, 9(2), 24-46.
- Widen, K. (2023). Orang Dayak dan kebudayaannya. *JISPAR: Jurnal Ilmu Sosial, Politik dan Pemerintahan*, 12(2), 207-218. <https://doi.org/10.37304/jispar.v12i2.9834>
- Widjaja, M. U., & Wardani, L. K. (2016). Makna simbolik pada Rumah Betang Toyoi Suku Dayak Ngaju di Kalimantan Tengah. *Dimensi Interior*, 14(2), 90-99.