

# Traditional concepts of Dayaks in the longhouse of Nek Bindang Village of West Kalimantan

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*Received: August 2020 • Final Acceptance: January 2021*

## Abstract

The architecture of a longhouse was/is built to protect the occupants from the environmental threats. This paper examines the traditional concept of Dayak in the longhouse of Nek Bindang Village in West Kalimantan. A Longhouse was built to facilitating activities for interaction between them or with people outside the longhouse. As the answer to the needs of the natural environment, a longhouse was/is established by an appropriate structure with the composition that is appropriate to the physical and spiritual activities inside/outside the longhouse. This study conducted in a qualitative method with an observation of the research object. The construction of the longhouse was in line with the availability of materials, the locals' capability on a method of the establishment at the time, the security factors, and the understanding of the structural system to supports the load. Indigenous thought and traditional concepts of thinking become the main factors in running customary law in the community of Dayak. The belief of nature as the basic norms to control the Dayak in Nek Bindang village to be sustained with the surrounding environment. The presence of a community leader as the key person in all aspects of activities formalizes in the design and composition of the longhouse. People of Dayak in Nek Bidang Village attached the design, the architecture, and the meaning of the longhouse as the thought of the community. The design and composition of longhouse expressed the traditional concept of the Dayak community on balance and harmony to nature.

## Keywords

Construction, Dayaks, Environment, Longhouse, Traditional concept.

## 1. Introduction

Kalimantan is a place of settlement for Dayaks and other ethnic communities to live together in harmony. Amidst different ethnicities in Kalimantan, the Dayak societies have evolved their cultures and traditions to use natural resources. Kalimantan is famous for its numerous biodiversity inside the tropical forest (Rahu et al., 2013). The Dayak ethnic group is one of the major communities which occupies and is spreading throughout the island of Borneo (Victoria et al., 2017). The Dayak ethnic group is divided into sub-ethnic groups of small communities and lives in some scattered areas in the hinterland of Kalimantan (Budiman et al., 2019; Lontaan, 1975). As a main community in Borneo, Dayaks have an indigenous house, a place to live together within the society (Beynon, 2013). The indigenous house is a microcosm of the society or culture and its shape is a representation of social beliefs and organisation (Bickle, 2013: 73). Wuysang et al. (2017) noted that longhouses in West Kalimantan still exist and have spread out all over the province, but have decreased in number. Furthermore, Wuysang et al. (2017) emphasized that Dayak architecture is fading away since it is no longer used by modern communities. Some of the Dayaks prefer to settle rather near to the road or industries as the timber and mine industries have developed in the hinterland of Kalimantan. They were convinced to hand over their hereditary lands to be developed as palm oil plantations. New, nuclear families who previously lived with their closest relatives in longhouses began to erect their own private homes. These houses were often built at some distance from each other along the lanes of small roads. On the other condition, any surviving longhouses were adjusted down and reorganized to a new physical structure with a smaller layout of whole villages (Collins & Herpanus, 2018). The traditional longhouse, in view of its architectural concept, materials, and function, shows the strong relationship between people, the environment, and the concept of sustainability. Traditional longhouses promote the use of materials with the awareness of environmentally friendly practices, as the construction was in line

to a natural condition, and its concept lends itself to energy conservation (Victoria et al., 2015).

One of the locations of traditional longhouses that is/was occupied by the Dayak Desa sub-ethnic is in Nek Bindang Village of Sanggau Regency, West Kalimantan, and known as “*Rumah Batang Panjang*” (Beynon, 2013). Another name is also used to describe this longhouse, which is called as “*Domong Sembilan Raja Sepuloh*”. This name was chosen to express gratitude to the previous leader of the community (Domong), who made many contributions to the community of the Dayak Desa sub-ethnic.

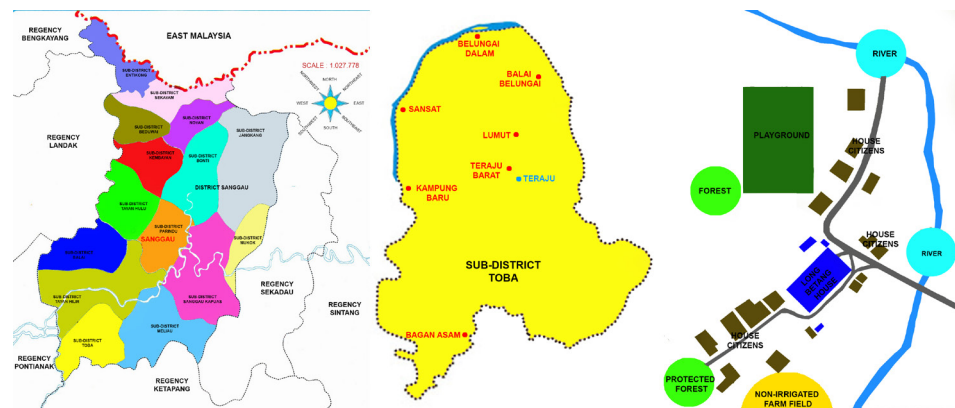
Longhouses were/are built to meet the physical and spiritual needs of the community of Dayaks (Wardani et al., 2018: 265). The architecture of a longhouse was/is built to protect the occupants from the environmental threats. The architecture was built by the communities as a dignified local cultural concept in the natural environment (Bickle, 2013: 70). Longhouses were built for facilitating activities for interaction between them or with people outside the longhouse (Wardani et al., 2018: 266; Jawan, 1996: 123). The construction of longhouses contributed to the requirement of comfort for the inhabitants by the use of local materials. The setting of the layout and space organization create harmonization with the local environment and climate conditions (Mahayuddin et al., 2017).

A longhouse was/is established by an appropriate structure with the composition that is appropriate to the physical and spiritual activities inside the longhouse—the obligation to serve the needs without disruption of the natural environment. Cultural sustainability is not only a discussion in a circumstance of the preservation or reinvigoration of the past, but also about in-depth exploration of the engagement in a continuing discussion of the dynamic nature of its locality (Beynon, 2013). This paper has examined the structural composition of the traditional longhouse in Nek Bindang Village in the Regency of Sanggau, West Kalimantan. This paper elaborates in-depth the relation of structure to the dignified local cultural concept and the natural environment.

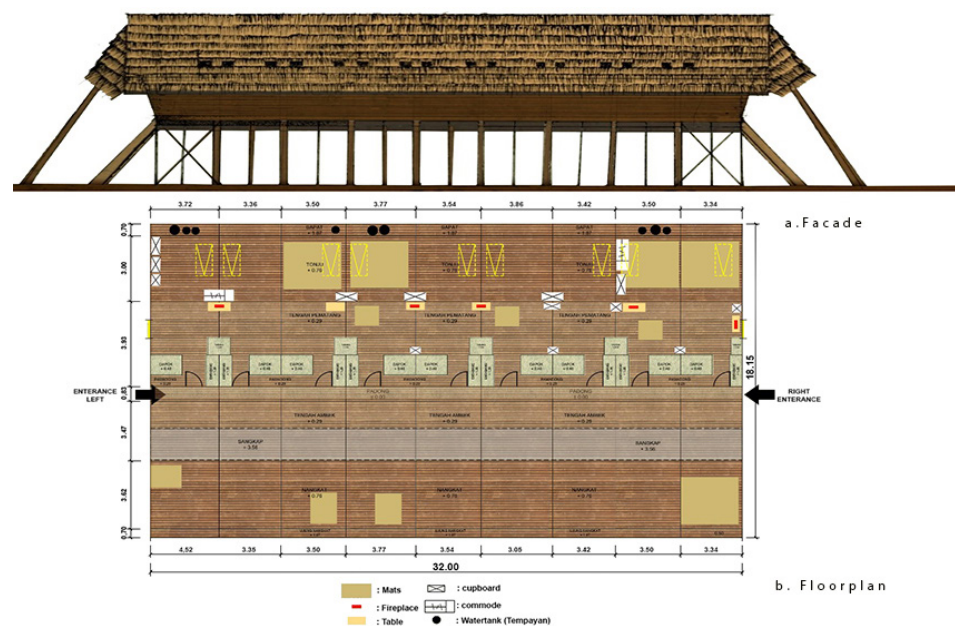
## 2. The architecture of the longhouse in Nek Bindang Village

The longhouse in Nek Bindang Village has been occupied by the Dayak Desa ethnic group since the year 1900. In the past, the Dayak Desa community occupied a longhouse in Sebandang Village (around 5 km from the existing longhouse). People in Nek Bindang Village called the longhouse “Batang Panjang”. While most recognizable for its length, the composition of a longhouse is most advantageously understood in a cross-sectional view. In terms of residency, the longhouse can be considered as a sequence of connected compartments (Bilik), each of which is owned and occupied by a single-family (Beynon, 2013). The longhouse in Nek Bindang Village is/was surrounded by

102 single houses (Dangau). The longhouse in Nek Bindang Village consists of nine Biliks, with only four families living together under the roof. People of Nek Bindang Village used the longhouse as their main place for the community to gather on a special occasion or meeting (Jawan, 1996). The bilik oriented onto a covered open-elevated-space that was spatially continuous with its neighbours. Its appearance seems like an extending space from one end of the Rumah Batang to the other side. A single-family owns an open-elevated-space in front of each bilik for daily activities. However, in a customary event, it is prescribed as communal space—the open gallery as space to hold gatherings, rituals, and festivities. The longhouse in Nek Bindang did not have

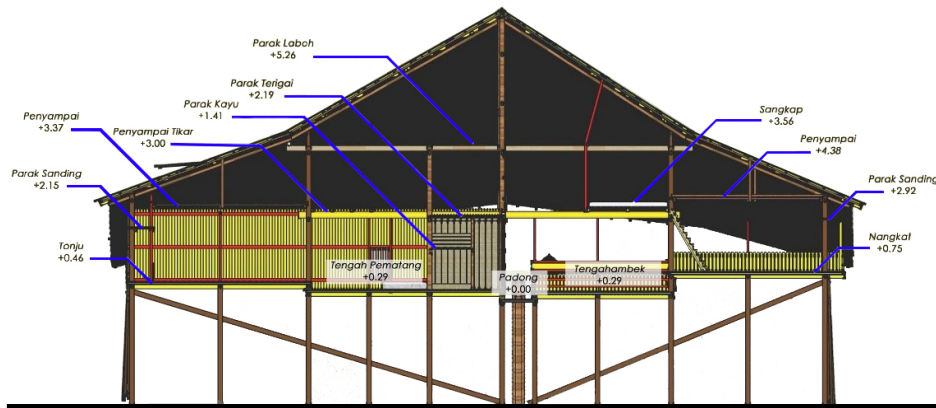


**Figure 1.** Series information of the research object location of Dayak Desa longhouse (Source: a and b downloaded on the open access materials).



**Figure 2.** Sketchs of the longhouse in Nek Bindang Village (Source: Document of the Department of Architecture of the Tanjungpura University, 2018).

Traditional concepts of Dayaks in the longhouse of Nek Bindang Village of West Kalimantan



**Figure 3.** A cross-sectional view of Rumah Batang Panjang in Nek Bindang Village, West Kalimantan (Source: Document of the Department of Architecture of the Tanjungpura University, 2018).

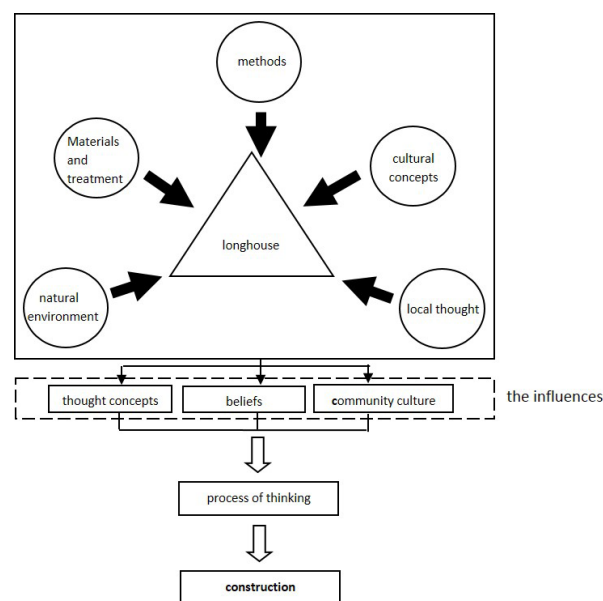
an open platform on the other side of the gallery. Not as found in the layout of another longhouse in Kalimantan, which has an uncovered gallery called Tanju, in Nek Bindang village the longhouse is without an uncovered gallery and there is a yard outside of the longhouse. The yard serves to organize outdoor tasks, and a place to dry paddy or other natural food (Beynon, 2013).

The longhouse in Nek Bindang consists of two main sections: the public section and the private section (see Figure 2 a and b). In the private section, the observer will find some rooms called *Dapok*, *Tengah pematang*, *Tonju*, and *Sapat*. In the public section, the rooms found are called *Padang*, *Tengah ambek*, *Sangkap* and *Sangkat*.

### 3. Methodology

This paper is based on the methodology of basic research. This research used a qualitative method with an observation on the object. A Dayak Desa longhouse in Nek Bindang village is/ was identified and examined based on the related theories. The technical drawing is a tool to explore the structural elements of the traditional Dayak longhouse in Nek Bindang village, West Kalimantan, and then followed by an investigation on the construction methods, material treatments, natural environment, cultural concepts, and local thought. All the graphical documents such as images, drawings, and plans were organized and compared to identify the similarity and common features. The analysis of the parameters was conducted during site visits

at the selected longhouse. Observations of the parameters, interviews with occupants, and measurements of building dimensions were recorded in the catalogue cards of the respective longhouses. The influences of the thought concepts, the beliefs, and the community culture are the main focus to elaborate a process of thinking in the composition of structural elements of the longhouse. By simulating the thinking process of the locals, we find the relationship of structures to the development of a dignified local culture concept and to the natural environment and the composition of structural elements of the traditional Dayak longhouses in Nek Bindang West Kalimantan. The logic of this research is described in Figure 4.



**Figure 4.** The logic of research of the longhouse in Nek Bindang Village (Source: Author, 2019).



#### 4. Discussion

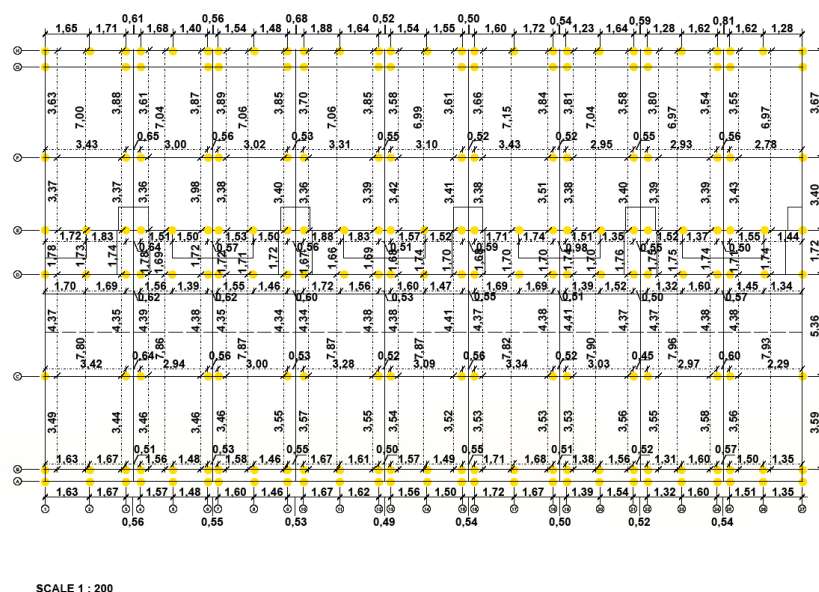
The current state of the structure, construction, and material characteristics of traditional buildings is important to investigate as inquiries to understand some elements that comprise structures. By the investigation of the building in its present state on the elements, i.e., the structure, techniques used during construction, the alterations, and their effects, we could also contribute to better construction practices in the future (Mahayuddin et al., 2017). The local thought is referring to the traditional views and knowledge as reference in behavior and has been practiced for generations to meet the needs and is beneficial for Dayak life (Fajarwati & Masruri (2019: 3). In the following, the examination on the Dayak Desa longhouse in Nek Bindang village is divided into five parts: construction methods, material treatment, natural environment, cultural concepts, and local thought.

##### Construction Methods

The passive structural concept on the longhouse in Nek Bindang Village is found in the composition, the components of materials, and space lay-outing to provide comfort to the interior. The passive structural concept of the longhouse provides comfort to the interior by the use of low-absorption materials, having high roofs and the presence of an attic space. (Victoria et al., 2017).

The structure of the longhouse in Nek Bindang Village could be divided into three main parts: bottom part, middle part, and upper part. The bottom part consists of *Tiang* (post), *Tiang Sambut* (sambut post), *Suit* (main beam), *Pembotong* (support beam), and *Tungkang Huar* (bracing beam); the middle part consists of floor, wooden plate, *Mpaut* (cripple stud), *Pompah* (tie beam), and *Tiang* (stud); and the upper part consists of *Kasau Lelaki* (outrigger), *Reng* (batten), *Kasau* (rafter), *Tungkang Huar* (wind brace), *Katiti Tikus* (collar tie), prop, roof sheeting with Sago leaves, and *Tebing Layar* (wooden panels with struts). The *Tebing Layar*, a typical characteristic of the roof, are wooden panels that are commonly found in West Kalimantan timber structures. Wood and sago leaves are common materials used to cover the panels.

Rumah Batang Panjang consists of rows of poles used as foundations and columns. There are 27 units of continuous poles on the X-axis and 11 units of continuous poles in the Y-axis. In Figure 5, the pole is shown in yellow. According to Hartatik (2013), a continuous pole is a single timber log from a tree plant installed from the ground to the top of a longhouse (see in Figure 3). Barrett (2004) stated that the continuous poles are the row of poles of each *bilik* as marking line of the owner (Figure 5).



**Figure 5.** Poles arrangement in the floorplan of Rumah Batang Panjang in Nek Bindang Village, West Kalimantan (Source: Document of the Department of Architecture of the Tanjungpura University, 2018).

The longhouse in Nek Bindang Village has some poles – with height up to eight meters from the ground – and it is equivalent to two or three storeys of building in a normal house (Beynon, 2013). This was constructed with the assumption of ease in the first erecting, the security factors to protect against threats from wild animals and attacks of another ethnics, and also to support the load of the occupied houses, which was fully understood. The availability of the natural resource materials in the past and limited knowledge made Dayak communities build the pillars from one intact tree trunk as the foundation of the house (Hartatik, 2013).

According to the Dayak customary chief in Nek Bindang Village, the construction of longhouses follows the form and composition of spaces of the previous building (the previous longhouse was built in 1963 and has collapsed) with adjustments to the needs of the number of family heads living in the planned compartments (Bilik). The shape and space organization of the longhouse in Nek Bindang village is the local wisdom of the Dayak community and there is little similarity with other Dayak sub-tribes in West Kalimantan. The similarity is only in the type of stage construction with the number of compartments, while the space pattern and roof shape are their distinctiveness.

#### *Material treatment*

Material treatment is needed as preparation for house construction. Locals in Nek Bindang Village divided the treatment for longhouse materials into two parts: structural materials and non-structural materials. The life of the Dayak is dependent on, grows along with, and is learned from nature (Sada et al., 2019; Sobian et al., 2018). The longhouse was built using environmentally-friendly local materials (Victoria et al., 2017), so that they consumed the products of the forest for their life needs (Fajarwati & Masruri, 2019). Therefore, the Dayak, as part of community behaviours, circumlocutorily helps to maintain the preservation of forest ecosystems (Sari et al., 2019).

As structural material, timbers and *Akar Malam* were collected from the forest in the neighbouring area of the

house site (Pebriano, 2013). There are some important rules for the Dayak community to use timber as materials for building construction. According to Roslinda (2016), Belian (*Eusideroxylon Zwageri*) can be used only for the first pole (Tiang Pemun) of the longhouse. For this usage, the community usually use newly cut belian. *Akar Malam* as binding material and timbers should be soaked overnight before being used on the house structure. *Akar Malam* must be dried under sunlight to reach the needed level of dryness.

Struck wood is considered as the best timber material for the construction of the house. Kumpang tree (*Horsfieldia Polyspherula*) is usually used for the roof structure material with the belief in skin elements to protect the occupants from evil spirits (Roslinda, 2016). Timber materials for the floor structure also have an important treatment in drying under sunlight, so that the cross-sectional (growth ring) faces to the direction of sunlight (Pebriano, 2013). One other material used in the construction of the longhouse is sago leaves (Mahayuddin et al., 2017). The Dayak community may use a dead/lightning strike tree, especially with the species of the Durian tree (*Durio Zibethinus*) for another need of light construction in a longhouse (Roslinda, 2016). As non-structural material, sago leaves are the materials to envelope the top of the roof structure. Bamboo or a small log may be used as the attached material to bond the sago leaves layer by layer as a roof sheet. A roof sheet of sago leaves for the local Dayak people or the common people in West Kalimantan is mentioned as *atap daun*. Sago leaves could be used as a roof sheet without special treatment. Sago leaves were constructed on a small piece of log or cut bamboo. The original sago leaves from the forest must be separated from their stems and will be attached individually to a new stem of a small piece of log or cut bamboo to form a roof sheet.

#### *Natural environment*

The materials used in Batang Panjang are the natural resources that are commonly found in the surrounding area of the site (Pebriano, 2013; Mahayuddin et al., 2017). The Dayak

community has used the forest to fulfil the needs of life, both for subsistence and commercial activities. According to Herianto et al. (2018), the Dayaks need timbers from the forest as the construction materials of the longhouse in repairing and building, or basic needs for firewood. Materials of various types of timber are used for structures; sago leaves are used for roofing and gables, and akar malam (rattans) are used for structural bonding. This type of wood is very sturdy and strong for supporting building loads. The materials for structures are obtained from the tree logs of the types of Jengir, Bedaru, and Selamar. According to Herianto et al. (2018), other types of timber trees used are Bani-tan (*Polyalthia Hypoleuca*), Bunyau (*Santiria sp.*), Damar Pipit (*Pentace Triptera*), Katiau (*Madhuca sp.*), Mahang (*Macaranga Triloba*), Mahawai (*Cyathocalyx Biovulatus*), Medang (*Dehaasia sp.*), Menjalin (*Xanthophyllum sp.*), Meranti (*Shorea Leprosula*), Tehang (*Xerospermum sp.*), Terap (*Artocarpus sp.*), Ubar (*Syzygium sp.*), and Ulin (*E. Zwagerii*). The materials that are used on the joint method for binding are rattans, and these are also abundant in the forest near the settlement. Rattans are grown as a parasite, trailing on large trees like vines, and the common rattan type that is used by Dayaks for house construction is the *akar malam*.

The stage house is used not only as a means to avoid the wild animals but is also intended as an effort not to cover the ground surface (Wardani et al., 2018). The covered ground will preclude water infiltration into the ground, whereas uncovered ground certainly will not prevent the drainage of water into the soil surface. Natural conditions are vulnerable to the tidal river, which makes the traditional Dayak dwelling design created in an equilibrium assignment toward the river and the ground conditions (Bahauddin et al., 2015). The longhouse construction and concepts are to comply with all the principles of sustainability. The sustainability is complied with using less harmful materials, the use of sunlight for energy saving, affordable materials within the en-

vironment, a lay-outing concept for good living quality, and the society tends to gain more in the possibility of natural preservation (Victoria et al., 2015). The large openings are created for cross ventilation of wind flow for the occupants' comfort as well as to take advantage of sunlight abundance to illuminate all rooms. Roof style, the shape of the gable roof with a high slope, is an adaptation to the local weather conditions; this roof slope is beneficial for draining the rainwater immediately and at once contains it in the water tanks for daily purposes of water needs. A traditional longhouse does not necessarily need a fan or air conditioner to cool down its room environment. The permeable materials, such as *belian* wood, bamboo, lightweight timber, and sago leaves, allow natural ventilation into the longhouse. The longhouse has few windows but numbers log gaps surrounding the building and the permeability of the material among guarantees for the comfort of air circulation in the longhouse interior (Victoria et al., 2015).

#### *Cultural concept*

Customary law is still applied in the daily lives of Dayak people as a guideline, and rules to define norms for all members of the community (Roslinda, 2016). The ethnic group of the Dayak Desa community in Nek Bindang Village has traditional rituals that are carried out before they begin the construction of the longhouse. As related to culture, it is important to conduct a customary event in timber harvesting activities (Roslinda, 2016). A customary event in timber harvesting activities is called as the ritual of *Ngudas*. *Ngudas* is a ritual that is led by a Tumenggung (a traditional community leader), who is responsible for seeking permission from the forest authorities (the spirits) for the establishment of a longhouse and the activities to proceed with the construction (Jawan, 1996: 123; Roslinda, 2016: 181). The same ritual will also be carried out for the opening of a new village, asking for protection and fertility in the agricultural activities (Fajarwati & Masruri, 2019). The Dayaks believe in the natural and supernatural that is a distinc-

tive entity in other dimensions of life. The Dayak people have an awareness of living in harmony with nature by offerings to supernatural beings that have a significant effect on human life (Roslinda, 2016). Offerings must be served for the *Ngudas* ritual of the daily food of Dayaks by preparation of the food, which consists of chicken, rice, brown rice, eggs, water, Teng-kawang fruits, betel leaves, traditional wine (arak), and rice. In special cases, the Dayak community also adds other various types of food items which they consume daily. These offerings are presented in containers and then placed on the ground at the location where the longhouse will be built. The method used in this traditional ritual is the reading of spells (*mantra*) as the community leader sprinkles water to the ground. The Tumenggung will collect two items of the prepared offerings, rice and eggs, which are then placed in a prepared hole in the ground before the first pole of the longhouse is erected. Simultaneous recitation of a mantra on the establishment of the first pole marks the continuation of the construction of a longhouse.

#### *Local thought*

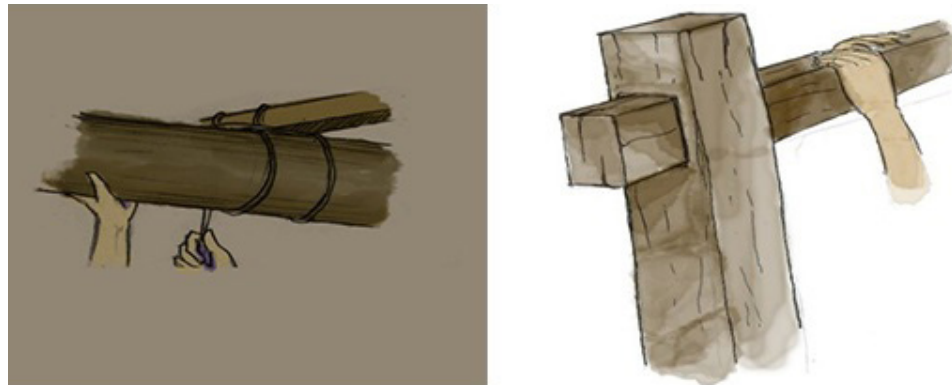
As similar to the Iban people in Rumah Panjai, Sarawak (Beynon, 2013), Dayak people in Nek Bindang village are still maintaining a balance between egalitarian communalism and individual ownership in Batang Panjang to be relevant in ongoing contemporary society. Dayak people believe that guidelines are hereditary laws from the ancestors of the Dayaks and generally to be understood and executed in the form of oral culture in their communities. In line with the statement of the Zain & Andi (2020: 29) the Dayak people are still running the rules that control the lives of the Dayak people. The Dayak are always obeying the customary laws, traditional customs, and beliefs (*adat Keyakinan*) as guidelines in every activity that takes place within the society. Local thought is still found in some activities of a longhouse's construction. The local thought found in the activities of the longhouse's construction determines the direction of the longhouse, the best time for the land clearing on

site, and the search of materials, the first pole establishment, and the method of construction. The Tumenggung will lead the inhabitants to determine the direction of the longhouse by observing the sun's orientation. The front facade of the longhouse will be directed to face the sunrise in the East while the back of the longhouse will be directed to face the sunset in West (Hafid et al., 2015). The orientation is symbolic of the hard work involved to survive in everyday working hours from sunrise to sunset.

The Dayak also establish a small hut intended as a place to rest during construction and as a room to store materials brought from the forest. All activities of the land clearing and the collecting of construction materials in the forest must be done in the morning after sunrise. Dayak people cut the tree trunks by using a *Beliong* (axe) or a big saw. Dayak people always serve the supernatural beings with offerings and offering prayers as customary law (Wardani et al., 2018: 266). This customary (*adat*) law binds the inhabitants to always obey the natural spirits that live among them (Alcorn & Royo, 2000).

In the construction of longhouse, local thought was found in the system of house establishment. The Dayaks commonly used a method for connecting wooden joints called *Genggam Kora*. Another method used by the Dayaks, the post and beam connection system in the longhouse structure, is known as the method for locals for a beam penetrating the posts in the main structure without nails. The dimensional measurement used to form rooms in the Dayak longhouse is using units of the human body sections. The measurements often used are: *Depa'*, *Lengan*, *Badan*, *Seta*; *Jengkal*, *Kepal*. The conversion to international units is shown in Table 1. The width of a bilik's space usually is adjustable to the requirement of every family occupying these biliks. Each room has a different the size, adjusted for the body size of household heads who will occupy the Bilik. Each household head calculated the chamber width according to the number of occupants and his social status in the community. Before building the *biliks*, usually he will determine the width of each *Bilik*.





**Figure 6.** Traditional methods in Dayak communities for house construction in West Kalimantan (Source: Document of the Department of Architecture of the Tanjungpura University, 2018).

**Table 1.** List of conversion of traditional units in Dayaks to international units (source: Author, 2018).

No.	Measurement units	
	Traditional Dayak (local names)	International (approximate length)
1.	Se-Kepal	10 – 12 cm
2.	Se-Jengkal ( 2 kepal )	20 cm
3.	Se-Seta ( 2 Jengkal )	40 cm
4.	Se-Badan ( 2 Jengkal)	40 cm
5.	Se-Lengan ( 3 Jengkal )	60 cm
6.	Se-Depa Genggam ( 8 Jengkal )	170 cm

The rectangular shape is found in the middle structures of Dayak longhouses in the presence of wall construction. The wall formation of Dayak longhouses is found in the construction of *without gap* (massive wall) or *with gap* (transparent wall). The first type is found as the structure for the *Bilik*, while the second type is found as the structure for *Sangkat* which is set up by a row of wooden logs and installed horizontally with distance (gap). The rectangular and triangular shapes are used to form the structural elements of house. The triangle shapes are used to form the upper structure, while the rectangular shapes are used to form the middle structures. The shape of the triangle in the upper structure is an attempt to drain the rainfall water as well as to provide rooms in the section under the roof.

### 5. The influential aspects on the longhouse

Many aspects influenced to the longhouse in its first establishment. Knowledge of construction techniques and the characteristics of the traditional architecture are the attributes found in the longhouse (Mahayuddin

et al., 2017). The influences affecting the construction of the longhouse in Nek Bindang Village are classified into three elements: the thought concept, the belief, and community cultures.

#### *The thought concepts*

The human form is the basis of the local Dayak concept of thought (Wardani et al., 2018: 265). In traditional units to establish rooms, the human body is a baseline to calculate the spatial units. A circulatory path is required for two persons passing the room together side by side with a distance in between one *kepal* respectively of left - right and center, so then it takes four *jengkal* three *kepal* or five *jengkal* one *kepal*. The size of spatial units is adjusted to the length of the human body while lying down in sleep. The length of the human body is equal to the length of the human hands outstretched (one *depa*) while the width of a human body is in the size of four *jengkal*.

Transparent walls provide an opportunity for the occupants to remain sheltered from the observation those of the outside but still provide sufficient light necessary to illuminate

their activities in the Sangkat. In addition, in the past, a transparent wall served to provide a sense of security from the wild animals or enemies attacking from another tribe, as well (Barret, 2004). In longhouse construction, rooms are formed by paying intention to the activities. The rooms will be covered by massive walls to facilitate the private activities. However, public spaces are placed in a position near to the river and formed by walls with gaps, or transparent walls. On the other hand, a bilik, as a private space, is placed away from the river and formed by massive walls. In addition, public space sections also are formed with no walls or transparent walls, indeed to “get closer to the nature” i.e., the river and the forest (Wardani et al., 2018; Sobian et al., 2018).

The stiffness of the longhouse structure is obtained from the relationship between the joints, which are interlocking (Mahayuddin et al., 2017). Connection between the columns with beams typically uses the system of pins (*pasak*) and the holes with a pin. Stiffness is also obtained from the use of timber poles that act as the foundation as well as its extension as the columns for the structure above it. This condition causes the loss of structure stiffness due to weakening of the connection among joints. On the floor or roof cover is found the use of rattan to bind the material layers to become rigid.

On the wall structure, columns in the longhouse are reinforced by the layers of wall that serve as a partition, but they also make the construction of the wall become more rigid. Layers that strengthen the walls on this structure are found in two types. The first type is the wall layers with tightly fitted wooden boards, while the second type is the wall layers with small wooden logs installed with a certain distance. The wall of wooden boards acts like a skin while a layer of small logs acts like nets; both of them have the same function to bind the structure so that it cannot be shifted. Both types are usually strengthened with the presence of additional columns and top beams as stiffeners. Stiffener beams are installed with penetration through the main column, which will then be the

basis for the construction of floors and roofs. While at the bottom, the foundation pillars are also strengthened by the presence of diagonal beams that give a stiffness influence to the structure in order not to experience a shift due to external forces.

#### *The beliefs*

The triangular and rectangular shapes dominate the facades of buildings. The dominance of these two shapes in the Dayak longhouses illustrates the stability and balance principles of the Dayak people in their daily lives. The triangular shape placed at the top indicates that the Dayak people are always maintaining the stability of their social life in the spaces underneath the triangular shape, while the imaginary lines forming an angle toward the top of all intended activities is a form of respect to Gods. In Dayak Belief, God (*Jubata*) is the destination for spirits of the dead. However, the Dayak also believe, God (*Jubata*) dwells in things, such as mountains, hills, trees, rivers, riverbanks, caves, big stones, forks in paths, entrances to the village, and even the peak of the roof of the Rumah Panjang (Hartono et al., 2018).

The Dayak people believe in the existence of evil spirits that dwell in nature, e.g. on the mountains, in the forests, the rivers, and on fields (Wardani et al., 2018: 270). As an effort to avoid the influences of bad spirits, the floor of a longhouse is erected by giving elevation from the ground as the distance between *Dunia Bawah* and *Dunia Tengah*, or the distance between bad spirits and humans. So then, by these efforts, *Dunia Bawah* does not disturb the daily life activities of occupants in the longhouse (who live in *Dunia Tengah*). This also means to make differentiation between the bad things of evils or spirits and the good things of humankind. The Dayak people believe that there are other natural forces that also put the human lives and influences in the longhouse community in order (Guerreiro, 2013). By providing distances between *Dunia Bawah* and *Dunia Tengah* and differentiation between the good from humans and bad from the evil spirits, it is a manifestation of Dayak belief to control their

lives in the world. In the cosmological view of Dayak people, the height of the floor elevation from the ground also gives the meaning that humans have a higher status than other living creatures on the earth and other living things are not allowed to exceed the limit of their part of the of living world. According to Hartono et al. (2018), in the original meaning, the second realm (*Rumah Bawah*) means the dwelling place of the deceased human spirits. It is an indifferent spiritual realm, where the deceased dwell temporarily in a journey towards Jubata. The human spirit in the second realm (*Rumah Bawah*) can still stay with the living humans, and even can be requested to come to help the living family members. Furthermore, the Dayak also believe in the possibilities at some point that the spirits may be changed into malevolent creatures or evils toward humans (Hartono et al., 2018).

#### *The community cultures*

The concept of adat to the Dayak is manifested in customary laws, each of which is a rule of the norm about the rights and obligations of people in the community (Hadi, 2019). According to Lontaan (1975: 415) the Tumenggung is a leader who has the function as a customary chief, the leader of a village chief (*Dusun*), head of religious or the community leaders. The leader is chosen, determined, and appointed by the descendants of the previous leaders. To be a leader, one has to fulfil the criteria of a notable comprehension of customary rules and the ability to lead the traditional ceremony (Bahauddin, 2014: 8). In an *adat* context, traditional Dayak leaders (Tumenggung) are the primary executors of living arrangements based on prevailing customs (Hadi, 2019). The Tumenggung is a person who is respected, adhered to, or obeyed by the whole society in both communities who live in the longhouses or other houses nearby (Sobian et al., 2018). As the tribal leader, the Tumenggung is also acting as the leader of the tribal ritual, the decision-maker of criminal cases, or acts as a judge of traditional justice (Bahauddin, 2014: 8). The Dayaks believe that the Gods and spirits of their ancestors are controlling the

world and the universe. They also believe that leaders who exist today, such as tribal chiefs and customary leaders, are descended from Gods to help people manage their lives on earth (Hadi, 2019).

In line with the obligations of a Tumenggung, the roominess of each bilik is adjusted to the position of the head of family in the longhouse community. According to Alexander in Fox (1993), the present headman's (Tumenggung) apartment is considerably bigger than most others, but does not have the raised roof, extended gallery, or elaborate paintings decorating in the front wall. The present Tumenggung was the eldest of the occupants when the longhouse was erected. The Tumenggung becomes the centre of the community of the longhouse and the roominess represents communal honourability (Hartatik, 2013). Tumenggung and the customs will control the rights to extradite tribal people to be isolated from the tribe for doing an unjustifiable behaviour (Hadi, 2019). Also assigned to guests when they come inside the longhouse, it is easy to recognize the headman's apartment.

#### **6. The process of thinking of the Dayaks**

The stage house is an adaptation and the local wisdom of the Dayaks toward the local environmental conditions. The Dayak community also has myths and beliefs to protect the forest as remaining sustainable. The community considers some trees to be forbidden species of illegal logging. The people believe the trees have a guardian, and a physical condition will impact the person who cuts such trees down, such as sickness or death (Sari et al. 2019). The architectural and cultural understanding of the Dayak in respecting nature's offering has been established as an architectural expression of the longhouse (Bahauddin, 2014: 8).

In the Dayak community, the stage longhouse with the use of pile wood foundations is logically meaningful to deal with threats from outside, such as the wild animals or enemies from another tribes. The longhouses were built with elevation from the ground on stilts for several purposes. These include

keeping the building above water in avoiding flooding conditions, allowing the animals such as pigs, chickens, and livestock to live underneath, to serve as a refuge or fortress in case of attack, and to allow air circulation throughout the house (Bahauddin, 2014:8). A house with many compartments (*Biliks*), is an adaptation of the security conditions in the surrounding longhouse environment. In the past intertribal war in the hinterland of Borneo often happened, so they made the high elevation from ground level and transparent wall in the front as the part of self-defence (Barrett, 2004: 26). Each *Bilik* is usually inhabited by one family (or more) which are related to one another with other dwellers of the *biliks*. Usually, they are forming in groups because of ties of kinship, relationship in social strata, or in community relations from the same village.

The Dayak longhouse characteristics found are generally with fewer openings. However, the air circulation and the room illumination are obtained from the front of the wall façades, which are formed by the wood logs and installed with distance (Barrett, 2004: 26). The wood logs serve to observe, from the distance, people who come to the longhouse, and in the past, this wall acted well as the defensive barrier to enemy attacks from outside. Another orientation considered before erecting a longhouse is the rotation of the sun. This analogy is often used to describe human life in the world by life and death: the east as a symbol of life and the west as symbol of the dead. According to Sather in Fox (1993), a basic orientation of the longhouse is in terms of the sun's movement through the sky from east to west. In Dayak languages, east is called *matahari tumboh*, literally, 'the direction of the growing sun', and west, *matahari padam*, 'the direction of the extinguished sun' (Hafid et al., 2015: 40; Zain & Andi, 2020: 28).

*Matahari tumboh* is intended as the beginning of Dayak activities outside the longhouse. *Matahari padam* is intended as the end of Dayak activities outside the longhouse. They used to have activity in the fields (*ladang*) or in the forest after sunrise and get home before sunset. The activities at sunrise meant that the Dayak people were working as their

livelihood, while at night they used to rest. In Dayak cognition, humans conducting activities meant that human beings were alive, and taking sleep meant that humans did not do anything. Not doing anything means that humans are "in dead condition" (Hafid et al., 2015: 41; Zain & Andi, 2020: 28).

In addition, the rotation of the sun from east to west gave the effect to the existing rooms in the longhouse of becoming a "have enough" of the sunlight and a "did not have enough" of the sunlight. The rooms formed to obtain the sunlight were created without walls or transparent walls. These rooms were especially formed for public space or semi-public space. This section is the place where the Dayak people do activities at noon (in conditions: "alive"). On the other hand, the rooms formed as not obtaining the sunlight were created with massive walls. These rooms were especially formed for private space. This section is the place where the Dayak people take rest (in condition: "dead") or engage in private activities. For the Dayak cognition, considering their "in alive conditions", it is necessary to obtain guards from the influence of evil spirits or supernatural beings. For the Dayak, a bright room as an effort to anticipate when there was interference from evil spirits, would be "visible", while a dark room was illustrated as a safe place and did not need preservation because the Dayak people were not active, or they were "in dead condition".

Dayak traditional people are very reliant on the surrounding environment where they reside. The resilience of a strong relationship between Dayak people and nature is always expressed in the construction process of a new longhouse. On the establishment, Dayak people repeatedly exploit material for construction from the abundant sources around the building site. Dayak people always take into account the relocation of a new longhouse with the position of the building site and with the customary forest and cultivated land. The traditional community will leave the old location and will not return to the same location after several generations. The principle of sustainability is a concept of thought that is understood by the Dayak community. Building materials



are also processed using preservatives obtained from nature so that they do not disturb environmental conditions. The construction of the building also has an awareness of the signs from nature. Dayak people will give symbols in the form of offerings before and during construction.

## 7. Conclusion

The traditional concept of the Dayak's longhouse In Nek Bindang, West Kalimantan is found as the way of thinking of Dayaks about the surrounding environment. They attached the design, the architecture, and the meaning of the longhouse as the thought of the Dayak community. The appearance of the façade or the arrangement of space are the traditional concepts of thought, belief, and cultures of Dayaks as the influences of the life journey in their community. The concepts of the longhouse are the traditional views and knowledge of the Dayaks as their references in behavior and are practiced for generations to meet the needs of the local community and the surrounding environment. The reference ties the Dayaks as individuals or members of the community to have certain attitudes or to be engaged in the longhouse.

## Acknowledgement

Some data was collected from the documentation of the Department of Architecture, Faculty of Engineering Universitas Tanjungpura. Authors would like to thank the students of 2014, especially the Dayak documentation team (Surya Fajar Anugrah, Cindy Cheriasari, Ryan Doniansyah P., M. Hary Raihan, Rika Savitri, Renhard Kharistotho, Sarah Ramadhita, Maudy Indah Cahyani, Tantonio Dwi Putra, Wari Walingga, Leonardus Ivan, Claudia Rizky A., Asep Mauluddin, and Tri Eriansyah), colleagues in the Department of Architecture, and also to the dean of the Faculty of Engineering Universitas Tanjungpura.

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