

# Traditional Domestic Architecture in the Rural Cultural Landscape of Borobudur, Indonesia

Dwita Hadi Rahmi<sup>1</sup>, & Shabrina Tamimi<sup>2</sup>

<sup>1</sup> Department of Architecture and Planning, Faculty of Engineering, Universitas Gadjah Mada

<sup>2</sup> Magister of Architecture, Department of Architecture and Planning, Faculty of Engineering, Universitas Gadjah Mada, Indonesia

Email: [dwitahr@ugm.ac.id](mailto:dwitahr@ugm.ac.id)<sup>1</sup>

## Abstract

Borobudur rural village is an area with advantages in the form of land processing, rural traditional architecture, community living systems, and existing natural formations. Traditional residential architecture is one of the aspects of the cultural landscape (*saujana*) down from one generation to the next. The traditional Javanese architecture of the residential houses has a distinctive character, which is very clearly seen in the shape of the roof. Along with the development of the population and tourism activities of the Borobudur Temple, changes have occurred in the architecture of these traditional residential houses.

This paper examines these changes. The research aims to identify the architectural characteristics of the traditional residential houses in the rural areas of Borobudur, and find out the changes and continuities. The research employed qualitative methods taking samples of physical traditional Javanese houses in three villages: Candirejo, Wanurejo and Borobudur). Occupants were interviewed to find out the characteristics of the domestic architecture and how they contributed to sustainability. Qualitative spatial analysis were conducted to identify the changes and continuities of architecture and the influence of them on the sustainability of the cultural landscape of Borobudur.

The results show that changes have occurred primarily in the patterns of inner spaces and wall materials of the houses. There are also additions of new buildings with semi-modern architecture. traditional Javanese architecture still continues in terms of the functions and the shapes of the houses, including the shape of the roof. Nevertheless, the emergence of the new buildings is a threat to the declining quality of the village atmosphere and threaten the sustainability of the Borobudur *saujana*.

**Keywords:** Architecture, Domestic architecture, Village, *saujana*, Borobudur.

## Introduction

A cultural landscape

*Saujana* in the Indonesian language is a reflection of the interactions between a landscape and a community culture that includes cultural processes and products in the unity of space and time. In Indonesia, such interactions have lasted very long, from generation to generation manifesting in a harmonious life balance between Nature and the people. The

residential environment is inseparable from cultural activities and the natural environment that interact continuously. The relationship between culture and landscape that is connected into the term cultural landscape carries so many meanings and understandings.

Two perspectives on cultural landscape are as expressed by Jones (2003) and Calcatinge (2012). Jones (2003) points out that cultural landscape has two dimensions, the physical dimension, which is a product of human activities in modifying Nature through time; and the cognitive dimension, which are cultural meanings as the effect of the human attachment to the landscape where they live. Furthermore, according to Jones (2003), people have a bond with the physical environments around them, both natural and human-made environments. This is the intangible or cognitive dimension of a cultural landscape. Calcatinge (2012) says that cultural landscape is a reflection of all the attributes, features and characteristics of the society through space and time.

Taylor (2003) also articulates the notion of cultural landscape and says that cultural landscape can be seen as a long journey of people in interacting with Nature, which reflects their tangible and intangible dimensions. According to Taylor (2003), the form of cultural landscape can express the achievements of our ancestors in the past, and inform values that exist in the present and the future. Meanwhile, as Rahmi, et al (2012) writes, cultural landscape can be interpreted as a product of human creativity in changing the landscape over a long period of time so that a harmonious balance is obtained in life. She points out that the interaction between Nature and culture is often reflected in land utilization, architecture, community life, and natural features of the region (Rahmi in Kanki, Adishakti and Fatimah, 2015). From many understandings, cultural landscape which is a reciprocal relationship between landscape and culture contains several components that make it up, namely: physical dimensions, cognitive dimensions, space, and time.

Cultural landscape is a field of study in architecture that can be approached from the spatial, socio-cultural, environmental, and conservation dimensions (Page et.al, 1998). The spatial dimension seeks to explain the spatial aspects which include the location, the physical characteristics of a location, spatial distribution and patterns, spatial interactions, and spatial changes. The socio-cultural dimension is focused on the various matters relating to people living in an area, such as traditions and habits, behaviors, and works (Page, et.al, 1998).

In Indonesia, the term *Saujana* is used as a translation of cultural landscape, that according to Indonesian Dictionary means 'as far as the eye can see'. Such interactions between Nature and community culture have lasted very long, from generations to generations manifesting in a harmonious life balance between Nature and the people.

Borobudur, a rural area in Central Java where the Borobudur Buddhist Temple stands and which has been designated as a World Heritage Site, is a heritage cultural landscape. The cultural landscape of Borobudur is an expression of cultural values and community behavior in land utilization that have come down from generation to generation. The villages in Borobudur are a product of interactions between the landscape and culture of the community, in such a way that each village is a unique cultural landscape.

Borobudur area has rich historical values, archaeological resources, geographical conditions, landscapes and community socio-culture that have continued to change over time. Surrounded by mountains (Mount Merapi, Mount Merbabu, Mount Sumbing and Menoreh Mountains), Borobudur is a fertile area with a rich conglomeration of villages, paddy fields and relics of archaeological objects (Borobudur Temple, Pawon Temple, Mendut Temple, Selogriyo Temple, and Ngawen Temple). The community of rural villages in Borobudur has a unique social and cultural life, including customs and traditions, beliefs, ways of life, and traditional arts.

The life concept of the village community, which represents a balance and harmony with Nature, underlie the forms of the village cultural landscape, and with this concept, the community has indirectly maintained the sustainability of the cultural landscape (Rahmi, 2015). One manifestation of the relationship between Nature and culture of the community is a house. According to Atmadi in Kartono (2005), the houses in Borobudur have already existed since the construction of the Borobudur Temple, evidenced by the images of houses on the stone

reliefs of the temple. They show similarities to the forms of the traditional Javanese houses that still exist today. The shapes and layouts of the houses, as well as the materials used show the condition of the environment where the houses have been constructed and the socio-cultural life of the community. The houses with the community's activities are the product of the traditions and the community way of life, inherited from generations to generations. Therefore, sustainability of the traditional domestic architecture shows the high value of their heritage.

The development of the Borobudur area, especially as a result of the development of tourism, has become a threat to the sustainability of the architectural heritage values of the traditional houses. Nevertheless, there are still many rural people who maintain their traditional houses, particularly those who still have traditional livelihoods; such as farmers, traditional food makers and pottery craftsmen. However, some of the villagers have switched their occupations to tourism and have converted their traditional houses into homestay facilities for the tourists.

The purpose of this research is to identify the architectural characteristics of the traditional houses in Borobudur *saujana*, and further examine their changes and continuity. Its aims and objectives are as follows.

1. Identify the architectural characteristics of the traditional houses.
2. Examine the changes and continuity of the traditional houses.
3. Examine the effect of changes and continuity of traditional houses on sustainability.

## The Context

### Borobudur *Saujana*

A cultural landscape can be seen as a long history of human journey in interacting with Nature, which is related to tangible and intangible dimensions. The form of a cultural landscape can unravel the achievements and values of our ancestors, and inform the values that exist in the present and may be carried to the future. A cultural landscape, according to Taylor (2003) is a window that shows our past, and our culture. Thus, understanding the form of the village cultural landscape means also understanding the past and the present of the village.

Related to architecture, cultural landscape studies can be approached from space, as well as socio-cultural, environmental, and conservation dimensions. Indeed, in studying the architectural characteristics of traditional residential houses, spatiality and socio-cultural dimensions can be used. The spatial dimension explains the aspects such as the location, physical characteristics of a location, the distribution and spatial patterns, spatial interactions, and spatial changes. Cultural landscape in the socio-cultural dimension focuses on various things related to the living order of people, such as traditions and habits, behaviors, and works.

Borobudur is a cultural landscape, a product of human creativity in changing the landscape for a long time, forming the balance of harmony of life between Nature and people. Borobudur cultural landscape is an integration between the landscape of the area consisting of settlements with the culture of its people, flowing rivers, mountains and surrounding mountains, other natural forms, as well as Hindu and Buddhist temples from the past scattered throughout the region. It is a fertile area in the Kedu plain and is surrounded by several volcanoes (Merapi, Merbabu, Sumbing), non-fire volcanoes (Tidar, Telomoyo, Andong) and a mountain (Menoreh). There are rivers flowing in this area, such as the Progo River, Elo River, and other small ones that support the agricultural activities of the community.

Three Buddhist temples in the central area (Borobudur Temple, Pawon Temple, and Mendut Temple) have been designated by UNESCO as a world heritage site in 1991 (UNESCO, 1991). According to Rahmi (2015), each village in Borobudur is a cultural landscape, and the all the village cultural landscapes form the larger Borobudur cultural landscape, The form of the Borobudur cultural landscape is similar to the forms of the village cultural landscapes, which are comprised of:

- 1) Land utilization
- 2) Life systems of the communities
- 3) Traditional architecture; and
- 4) Nature

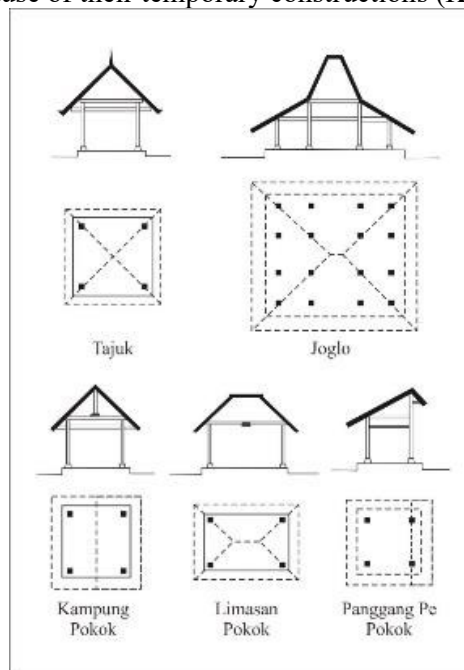
These four forms engage in a mutually affecting relationship producing the landscape and the socio-cultural life of the community. Rahmi (2012) explains that the shape or design of the traditional houses in Borobudur has been passed down through generations by their ancestors. The houses serve not only as comfortable places to live, but also as places to work. The architecture of the houses reflects the simplicity of the life of the community who live in harmony with Nature.

Rural traditional architecture is one of the physical elements of the Borobudur cultural landscape that can be seen and enjoyed visually. The architecture of the village houses can be observed from the physical elements, the setting of the environment, the shapes of the houses, the layouts, as well as the vegetation systems around the houses. A village houses generally has a large yard, where the house is built in the middle of a lush yard in the midst of local trees and shrubs.

### Javanese Traditional Architecture

Traditional Javanese buildings have a unique architecture not found anywhere else, and it has been a part of the Javanese culture since a long time ago. Based on their functions, traditional Javanese buildings are divided into several types, which are houses; buildings for worship, buildings for deliberations; and buildings for storage (Slamet, 1985). Houses are classified again based on the type of the roof, including *panggung pe*, *kampung*, *limasan*, and *joglo* roofs (Dakung, 1982, Slamet, 1985, Hamzuri, 1985). Those roof types, except *joglo*, can also be found in the reliefs of the Borobudur Temple. The type of the roofs in the Borobudur reliefs is the same as the type of the traditional Javanese roofs present (Atmadi in Kartono, 2005).

The classification of the shapes of the roofs is based on the complexity of the structure of the roof and the level of status of the house owners. The *joglo* houses are generally owned by the nobles or the rich, because they require more building materials and a difficult level of workmanship. The *limasan* roof and *kampung* roof are simpler forms of roofs than the *joglo* roof. The *kampung* roof house is very commonly used in most houses (Slamet, 1985). The *panggung pe* roof is the simplest form of roof, but the buildings with *panggung pe* roofs are not recognized as houses because of their temporary constructions (Kartono, 2005).



**Fig. 1:** Traditional Javanese roof type  
Source: Mintobudoyo in Kartono, 2005

In addition to the roof type, the arrangement of the rooms in the traditional Javanese houses are also unique (Dakung, 1982 and Wibowo et al., 1998). In principle, the space in the house is formed by the distance between the columns of the roof support. As mentioned by Slamet (1985), the simpler the shape of the house, the simpler the layout of the room, and *vice versa*. Slamet said that the simplest form of the spatial arrangement of a residential house consists of space for living and kitchen. If there is an additional space (*emper*) on the back side, then the space is called the middle *senhong*. The additional space on the left side is called the left *senhong* and on the right side is called the right *senhong*. The middle *senhong* is usually used to store rice, and the left and right *senhong* are used for sleeping and other activities. If the space at the front of the house is expanded, then it will be a *pendopo*. In large houses, the layout of the room is divided into *pendopo*, *pringgitan*, and inner space (*ndalem*). *Pendopo* can be a separate building connected by a *pringgitan* room (puppet playground) to *ndalem*. This is the complete layout of a traditional Javanese residential house (Slamet, 1985).

The direction of a house is one of the considerations in its establishment. Hamzuri (1985) states that the orientation of a house building has its terms and meanings. The vernacular houses generally face North-South. East-facing houses do not exist, because this opposite direction is reserved for the palace buildings. The building orientation is in accordance with the people's beliefs that every corner of the direction is guarded by one of the gods. The East is associated with the king of all Gods, and the West is associated with the God of death. Therefore, the West direction is avoided (Hamzuri, 1985).

Koentjaraningrat (1984) mentions that a traditional residential building of Javanese farming families is generally rectangular with a size of 8x10 square meters, with wooden poles for the skeleton. The walls are made of woven bamboo (*gedhek*) which often have no windows. The inside of a house is divided into several rooms with bamboo woven partitions that can be moved easily, so that the rooms are flexible in their layout.

### Life in the Villages

Javanese people are very close to Nature and always try to understand the universe. They are part of the natural environment and it is impossible to separate them from the environment where they live. In the traditional Javanese society, the continuous integration between Nature and people has formed views or philosophies in life that have become the basis for every action (Endraswara, 2010). Views on the life of the traditional Javanese people, especially in rural areas include:

- 1) Unity/harmony with Nature.
- 2) Togetherness.
- 3) Tranquility.
- 4) Tolerance, and
- 5) Simplicity.

These five philosophies of life aim to achieve a balance in life, because "life must be balanced and in harmony with Nature" (Rahmi, 2012). The five philosophies of life of the Javanese will affect the cycle of human life of the Javanese.

The way Javanese people live is related to the cycle of human life. When a person has reached the adult age, he will begin to have his own family. In Javanese family households, as Koentjaraningrat (1984) says, there are no special rules regarding the place where the newly-weds must live. Ideally, a new family has its own house, but because in the village, usually, the couples marry quite young, they are considered too young to take care of their own households. Therefore, they stay with the parents of one of the spouses until they are able to take care of themselves. Sometime after marriage, the young couple will live in a house with their parents, or occupy a new house built by his/her parents, which is located adjacent to his/her parents' house (Koentjaraningrat, 1984). If the yard is too narrow to build a separate new house, then the new house built can connect to the main house with the extension of the roof. If there is a new space addition in the main house for the new

residence, then the original form of the house building (the main house) will change (Koentjaraningrat, 1984).

According to Koentjaraningrat (1984), in the relationship between people and their neighbors, Javanese always help each other and therefore they must maintain good relations with relatives and close neighbors. The Javanese community loves to gather, do something together, join together, and have a sense of likeness. The Javanese phrase *mangan ora mangan sing penting kumpul* can be interpreted as “gathering together family, relatives or friends is better even if there is no food”. Nevertheless, Koentjaraningrat (1984) says that the meaning and purpose of the phrase can change, because it tends to be an obstacle for people who will leave their villages to settle elsewhere. Parents want their children to stay together, and prevent him/her from wandering on the grounds of the phrase. However, parents do not mind if the young people in their villages migrate to work in the city based on seasonality only, and the village is still where they live.

## Review of Literature

### Traditional Architecture

As mentions by Rapoport (1969) in his book *House Form and Culture*, Architecture was formed because of culture, and he divided architecture into high style and folk architectures. Folk architecture has a more popular designation, vernacular architecture. Many notions of vernacular architecture are all intended to explain that vernacular architecture results from local traditions and knowledge that live in the community, and is a collective product not personal. Rapoport (1969) suggests that vernacular architecture is an architectural work that grows from all kinds of traditions and utilizes local potentials, including materials, construction, technology, climate, land and socio-culture. This is emphasized by Turan (1990) and Dayaratne (2018) that vernacular architecture is architecture that is born, grows and develops from ethnic communities by employing the wisdom, knowledge, and practices handed down from generation to generation. The buildings are built following the ethnic traditions by local craftsmen based on experience (trial and error), using local techniques and materials, and are the answer to the setting of the environment where the building is located. Meanwhile, Oliver (1997) has said that vernacular architecture is closely related to the context of the environment and local natural resources that are processed and built with traditional technologies.

Traditional architecture is related to vernacular architecture. As Brown and Mauldin (2011) said, conducting a study of vernacular architecture is as same as a study of 'traditional buildings' as an authentic building product of a particular place and has undergone the evolution of form over time. Brown and Mauldin have argued that vernacular architecture in the form of traditional buildings has a closeness between form and function that can control design (Brown and Mauldin, 2011). Hasol in Keskin (2015) clearly define traditional architecture as vernacular architecture, a kind of anonymous architecture where people use local materials with traditional methods and forms. In addition, there is an assumption that traditional architecture is the cultural identity of the community and this cultural identity is an important value in traditional architecture.

Soeroto (2003) says that identity is inherent in the characteristics of traditional architecture that manifest from the culture where architecture was born. This is clarified by Rachmaniyah (1991) who says that traditional architecture is the identity and physical form of culture of an ethnic group. She argues that traditional architecture as a place of human life adapts to natural conditions and local values, and has a metaphysical relationship with ancestral nature that is passed down from generation to generation in form, structure, function, ornamental variety and how to make buildings for life activities. From various understandings of vernacular architecture, then with the diverse cultures of people and various type of environment and natural resources in this world, each place has its own architectural form. It is architecture that has its own characteristics and uniqueness, which differs from one place to another.

## Change and Continuity of Traditional Houses

The theme of vernacular architecture is directly related and cannot be separated from the conditions of change and continuity of the architectural elements that form it, because architecture is an expression of the dynamic physical culture of a society. Cultural changes in a society will affect the form of physical culture of architecture, especially the building form of the traditional domestic architecture. Rapoport (1969) has illustrated a lot of how past cultural values can still survive and can coexist with today's contemporary culture which is rapidly changing. Rapoport refers to the concept of form stability, and in reality can still use the old form as a product of the old culture, but can be appreciated in the current culture (Rapoport, 1969). This can certainly be applied to traditional architecture, that the changes are able to reach historical values that can still be conserved and culturally accepted by contemporary society today.

Changes in a traditional architecture are inevitable because culture is in a dynamic environment, constantly changing according to the times. The changes that exist actually do not only occur in traditional buildings, but more broadly changes in the environment where these buildings are located including socio-cultural changes in the community. More precisely, changes occur in the cultural landscape. Change and continuity have been experienced by a cultural landscape throughout the history of its existence, and this will continue to happen into the future. With the desire for the cultural landscape to be sustainable in the future, it is necessary to have a balance between the changes that occur and its continuity. As Bimbaum and Peters (1996) argue, a cultural landscape requires a balance between change and continuity of all the landscape and cultural resources. It is also emphasized by Adishakti (1999), who says that conservation of a cultural landscape heritage that have historical, landscape, and cultural aspects needs to be sustainable in accepting change and development, between maintaining the continuity of old assets and meeting the needs of present and future life. Therefore, there is also a need for a balance between change and continuity of the elements forming the form of cultural landscapes, including architecture.

In a rural cultural landscape, the most obvious change is the change in the architectural forms of the houses, due to the influence of modern culture and the needs for wider spaces for the families. According to Faqih (2005), changing or modifying a house building is a process of universal and natural interaction between the residents and their form of occupancy. The knowledge possessed by residents allows them to change their built environment whenever necessary. Regarding this, Durmus (2009) in Quirix and Suleman (2015) argue that architecture must anticipate changes to face life in the future.

There is change, but of course, there is continuity. The elements forming a rural cultural landscape that until now still continue are the architecture of traditional village houses. A study conducted by Rahmi (2015) on Borobudur cultural landscape found factors that influence the continuity of traditional rural architecture, which are: culture derived from ancestral heritage has been deeply rooted and becomes part of the community lives, so it is not easy to change; and long-standing local wisdom is still part of the community lives. Almost the same as what Rahmi did, a study conducted by Dayaratne (2018) on the sustainability of vernacular settlements of Sri Lanka found that traditional villages still continue to exist because of the concept of community life that underlies them, namely a balance to live through submission to Nature. Respecting Nature is at the heart of the approach to ensuring ecological sustainability. Both studies indicate that there is a guarantee of the continuity of traditional architecture as long as the culture remains firmly held by the community. Another study by Wang (1992) on the transformation and sustainability of traditional settlements in Suzhou, China suggests that an important point related to changes in both traditional and contemporary types is the shared role of the occupants. It appears that the participation of the community in the process of change is very significant.

Understanding the changes and continuity of traditional architecture that have occurred so far, Bimbaum and Peters (1996) say that the history of the existence of the region, both landscape history and community culture, is the basis for understanding the changes and continuity that occur. The historical context provides the inputs in determining which

components of a building or area need to be conserved and which can be developed or even changed. Likewise, the uniqueness of conditions that are usually physically visible and become the authenticity of identity or integrity needs to be maintained (Bimbaum and Peters, 1996). Adaptation efforts carried out in traditional architecture are an option to harmonize with contemporary conditions while still incorporating elements of local traditions. It is appropriate that the intended change does not neglect the essence as an authentic cultural root and a distinctive cultural marker. Changes in traditional rural architecture, especially traditional domestic architecture will definitely affect the continuity of the cultural landscape. Thus, the value of the balance between change and continuity of a cultural landscape should include two important components: (a) the core of a cultural landscape heritage that remains continuous; and (b) changes that may support the identity of the cultural landscape. Changes that will occur must be well managed, as Adishakti (1999) says. Indeed, the changes are not drastic, but natural and selected. This means that a cultural landscape where traditional architecture is one of the elements will definitely undergo changes, and these changes are not forced but are in harmony and even support the identity of the heritage cultural landscape.

### Research Methodology

This research focuses on the architecture of traditional residential houses in three villages in Borobudur: the Candirejo Village, Wanurejo Village, and the Borobudur Village. The three villages are the closest to the Borobudur Temple. The Borobudur Village is the village where the Borobudur Temple exists. The data was obtained from 18 houses as the research samples selected by purposive sampling (6 samples per village) with the category of traditional residential houses. Those houses are reviewed from the form of the house roof as the largest proportion of traditional Javanese house architecture (*kampung* roof and *limasan* roof). Physical data is observed by measuring the floor plan of a house leading to the documentation of the entire house. Supporting data is obtained from the interviews of the homeowners. Data processing is done by describing the floor plan of the house and the location of the new building, giving a number code to each house, as well as the location of each house.

The analysis is done qualitatively, by grouping houses according to the functions, roof shapes, space patterns, orientation and the building materials. Analysis of new buildings is also done by grouping the shapes and the locations of the buildings. Furthermore, the results of the analysis are used to determine the changes and continuity of the character of the traditional houses in Borobudur. The findings of the interviews were used to ascertain the sustainability of the architecture of traditional residential houses and the rural areas of Borobudur.



**Fig. 2:** Three villages as case studies

Source: Google Earth, 2019



## Research Findings

### Traditional Houses in Borobudur Village

Villages around the Borobudur Temple are typical of traditional villages in Java, where there are still agricultural activities. In a village, farmer's houses are set between vast expanses of rice fields, roads, rivers, forests, and temples, all of which are interconnected and influence each other. In the Candirejo, Wanurejo, and Borobudur villages, traditional houses can still be found even though most of them have undergone changes in architecture, including the styles due to the influence of the contemporary culture. Tourism activities that have developed in the areas around the Borobudur Temple have also become one of the factors of the architectural changes of the traditional houses. In fact, the three villages have now become 'tourist villages', having tourist attractions. The 'tourist village' communities capture the opportunities for tourism by offering tourists the attractions of the landscapes of the villages and culture, including the architecture of its traditional rural houses. Of the 18 traditional residences that are used as research samples in Candirejo, Wanurejo, and Borobudur villages, the majority of houses serve as residences. Some houses also serve as places of work and tourist attractions (Table 1 and Fig. 3).

**Table 1:** House function  
Source: Author, 2021

No	Village	Code	Function
1	Candirejo	C1	empty
2		C2	place to live
3		C3	place to live and work
4		C4	place to live, work, and tourism attraction
5		C5	empty
6		C6	place to live, work, and tourism attraction
7	Wanurejo	W1	place to live
8		W2	place to live
9		W3	place to live, work, and tourism attraction
10		W4	place to live
11		W5	place to live and work
12		W6	place to live and work
13	Borobudur	B1	place to live
14		B2	place to live
15		B3	place to live
16		B4	place to live
17		B5	place to live
18		B6	place to live and work

Table 1 shows that there are 7 houses that have more than one function, and 3 of them serve as residences as well as workplaces and tourist attractions. The rest of the 9 houses serve only as residences, and 2 houses are empty or unoccupied. These findings suggest that the main function of traditional houses in the three villages is still as a place to live.

### Physical Characteristics of the Buildings

The physical characteristics of the residential buildings are the elements of visible architecture, including the shape of roof, pattern of space, building materials, and shape of the house yard.

### Roof Shape

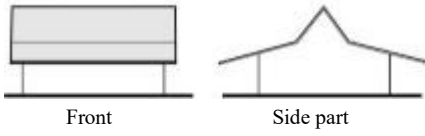
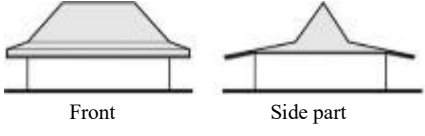
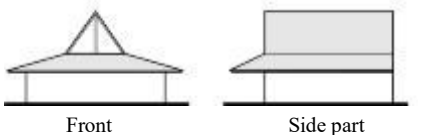
Roof is the most visible element of a traditional building that gives a strong architectural character. The shape of the roof in traditional houses in the three villages in

Borobudur is dominated by the form of *limasan* and *kampung*, which are *kampung srotongan* roof, *limasan maligi gajah* roof, and dan *kampung gajah njerum* roof. In the three villages, there are 9 (50%) houses with *kampung srotongan* roof, 8 (44%) *limasan maligi gajah* roof, and only 1 (6%) house with a *kampung gajah njerum* roof. (Fig. 3 and Table 2). Traditional houses with kampung-shaped-roofs are the most commonly found (56%). As Slamet (1985) also mentions, kampung shaped-roofs are very commonly used in the traditional houses in the Javanese villages.



**Fig. 3:** Observations of houses  
Source: Author, 2021

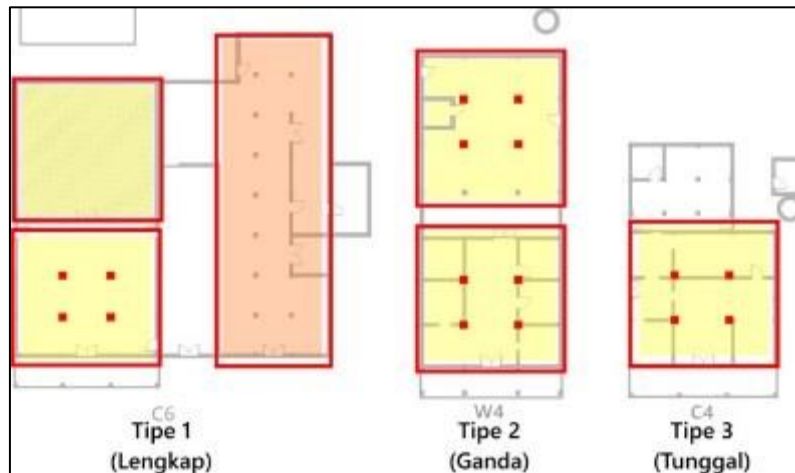
**Table 2:** Traditional house roof types in Candirejo, Wanurejo, and Borobudur Villages  
Source: Author, 2021

House type	Number of house
<p>Kampung Srotongan</p>  <p>Front                      Side part</p>	<p>9 (C1, C4, W1, W3, W4, B1, B3, B4, B6)</p>
<p>Limasan Maligi Gajah</p>  <p>Front                      Side part</p>	<p>8 (C2, C3, C5, C6, W2, W5, B2, B5)</p>
<p>Kampung Gajah Njerum</p>  <p>Front                      Side part</p>	<p>1 (W6)</p>

### Space Patterns

The space pattern of a traditional Javanese house consists of *pendopo*, *pringgitan*, *ndalem*, and *gandhok* buildings. This house is generally owned by nobles or people who are wealthy. *Pendopo* and *ndalem* each have the main structure of four columns called *saka guru*. The finding show that, out of the 18 houses, no one really has the completeness of the elements of the traditional Javanese house. Only two houses have *pendopo* components on the front and *gandhok* on one side. Other case is a house with a double pattern, or consists of two buildings with *saka guru* columns. According to Slamet (1985), this type of house does not mean to have two buildings that serve as *pendapa* and *ndalem* rooms, but the two buildings have become one and are divided into several rooms based on the needs of the residents. Thus, the 18 houses can be divided into three patterns of spaces:

1. Pattern 1 is a complete pattern: This is a house that has a *pendopo* at the front, *ndalem* in the middle/back, and *gandhok* on the side.
2. Pattern 2 is a double pattern: This is a house consisting of two buildings. Each building has a *saka guru*; and
3. Pattern 3 is a single pattern, which is a house consisting of only one building with four *saka guru* columns.



**Fig. 4:** Space pattern types  
Source: Author, 2021

Out of the 18 houses, 3 houses (17%) have complete space patterns, 4 houses (22%) have double room patterns, and the most encountered is a house with a single space pattern, present in as many as 11 houses (61%), as seen in the Fig. 4. Nevertheless, in a complete space-patterned house, there is no one that has a complete *senhong* rooms (left, center and right). There is only one *senhong* room on the left or right side of the main room *ndalem*. According to Slamet (1985), in general, the pattern of a traditional living room of a village has the simplest completeness, which is a single space pattern. It is also found in the houses in the three villages in Borobudur.

### Building Orientation

Majority of the traditional Javanese houses face southwards. Javanese people believe that the direction or orientation of a house is best towards the North or the South (Hamzuri, 1985). Thus, of the 18 houses, 10 were South-facing houses (56%). Four (22%) were North-facing, and 4 (22%) were facing the West. The two West-facing houses initially faced South, and this change was due to the division of inheritance rights of the house. Thus, the orientation of the house had to change. Most of the houses overlook both large and small streets, although there are still houses that are not oriented to the street.

### Building Materials

Almost all the houses have undergone changes of building materials to those used in when they were first built. This is because most of the houses are inherited from previous generations. Thus, both the roof, wall, and floor materials have been damaged and require a change or refurbishment. Roof coverings do not change much material and tend to have similar materials with the original one (red tile with bamboo/ wood construction). The damaged old red tile product is replaced with the factory-made red tiles, so that it does not have much impact on the change in the shape and color of the roof cover. The most obvious material changes seen in most houses are wall materials, from wood or bamboo materials to brick walls (50% of houses are now brick-walled). However, there are still houses with woven bamboo (*pager/gedhek*) and wooden planks (*gebyok*) for the walls. There are also houses with a variety of wall materials, a combination of brick and wood or woven bamboo (Fig. 6).



**Fig. 5:** Wall materials  
Source: Author, 2021

Although the wall materials have changed a lot, the main structural material, which are the columns supporting the middle part (*saka guru*) are still in the form of wood and have not undergone any change from the previous generation (Fig. 6). Of the 18 houses, only one house has replaced two of its wood *saka guru* into concrete columns. The type of wood for the *saka guru* usually are from jackfruit, teak, coconut, and Sengon trees, and teak wood is the best material for the Javanese traditional buildings, because of its strength and durability.



**Fig. 6:** *Saka guru* in some houses  
Source: Author, 2021

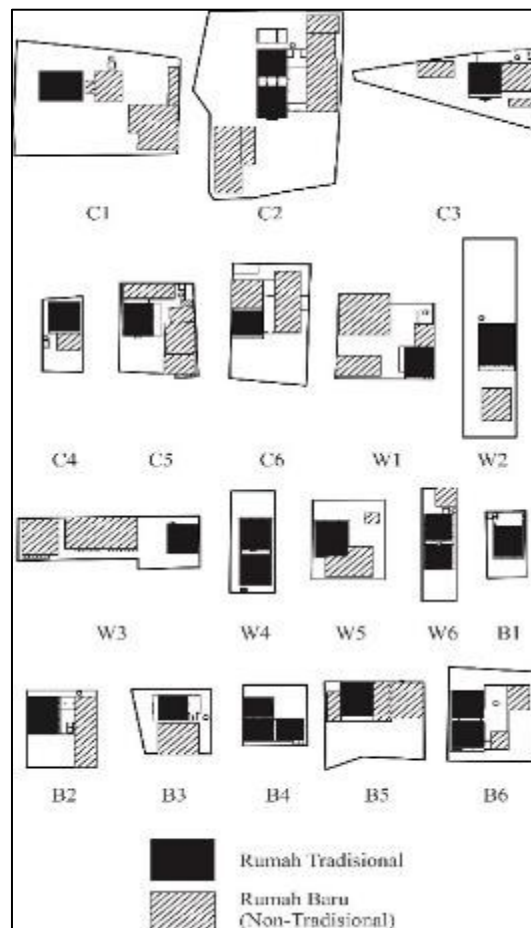
The floor material of all the main rooms of the houses are cement or ceramics. A total of 78% of the houses have cement-covered floors, and only the remaining 22% have tiled or ceramic floors. In some houses, the floor of the back rooms are still the solid ground.

### Additions of New Buildings

Traditional Javanese houses in the rural areas are generally established on a large land (site) and have a large yard as well. All the houses studied have a large yard whether it is the front, back, or both yards. In most houses, there is generally the addition of new buildings in the yard. The new building can be a new single house or additional rooms, because of the new

needs of the homeowner. The new buildings built in the house yard generally are owned by the close relatives, such as a brother/a sister or children. They generally are built with a modern style architecture very different from the traditional style of the old house.

There are two types of new buildings, which are new buildings separated from the main house and new buildings that are attached to the main houses. Fig. 18 shows the location of the new and the old buildings. Of the 18 houses, 50% of them have the addition of buildings outside their traditional houses. Four houses (22%) are with the new additional building attached to the old house; 5 houses (28%) are with separate additional buildings; and the remaining 9 houses (50%) have no additions. Although there are additions of new buildings with semi-modern styles (using modified traditional architectural elements, especially the shape of the village roof) (Fig. 7), physically, the traditional house buildings have not changed, and the shape of the houses still characterize the houses with traditional architecture. Even if the addition of a new building attaches to the main traditional house, then the main structure and the shape of the traditional roof of the house do not change. The addition of the new houses owned by the children generally occurs in houses with a large yard such as those in the Candirejo and Wanurejo Villages. In the Borobudur Village, the addition of new spaces is an extension of the traditional house.



**Fig. 7:** Location of the old and new house buildings on the land (site)

Source: Author, 2021



**Fig. 8:** Some new buildings  
Source: Author, 2021

## Discussion

### Change and Continuity of the Traditional Houses

Traditional houses of the villages in Borobudur have changed, because they are in a dynamic environment. They continue to change according to the needs of their residents. Based on research, changes and continuities of the houses can be seen from the functions, physical characteristics of the buildings, and the addition of the new buildings. In terms of the functions, it is not too much change, where the function of a house in general is for living and some houses are also functioning both as working places and living places. From the physical characteristics of the house, it was found that not all elements (space patterns, roof shapes, orientations, materials, structures) undergo changes. The shape of the roof and structure of the building have not changed, and therefore the buildings still show the architecture of the traditional Javanese houses. This is because the shape of the roof and the structure of the building is the shape of the traditional Javanese residential architecture.

The patterns of spaces are clearly changing, as the activities of residents develop that require more space. Nevertheless, the shape of the main room (*senthong* room), which is the square shape with 4 *saka guru* columns remains. Changes occur in the layout of the main room or in the addition of new spaces. Further, the result shows that only 17% of the houses are considered as a complete type of a traditional Javanese house, consisting of *pendopo*, *ndalem* and one room *senthong*. This shows that almost all villagers are ordinary people.

The orientation of the houses remains the same, and most of the houses face the North-strait or the neighborhood road. However, the building materials have changed a lot with the replacement of wooden/bamboo walls with bricks. The replacement of this material is due to the age of the old material that has weathered, and the desire to have a stronger house or with a more modern appearance.

The addition of a new building covering half the area of the old building (50%) shows that the old building is insufficient to accommodate the growing needs and activities of the families. Moreover, if there has been a division of inheritance for the children, then the additions of new buildings with different architectural styles are inevitable. This is what Koentjaraningrat (1984) said that in the traditional Javanese society, if a child has married, then the parents will build a new house in their own yard for the new couple.

The study found that all new additional buildings do not interfere with or alter the physical shapes of the old houses. It means that the old buildings and the new ones, whether they are attached or not to the old buildings, stand side by side. Although the shapes of the traditional buildings do not change, the existence of the new buildings with modern

(contemporary) architecture has changed the traditional atmosphere that existed before. It is increasingly felt when the new building has a bigger physical shape than the old building next to it.

From the changing and unchanging elements of the traditional Javanese houses in Borobudur villages, several findings can be concluded, as follows:

1. Changes in the houses occur in the layout of its interior and the appearance of the building due to the use of new materials for the walls.
2. Changes of the traditional village atmosphere happens due to the addition of new buildings adjacent to the old buildings with different architectural styles. The design of the new buildings and the narrow land strips have been disruptive and cannot support the traditional buildings nearby.
3. Continuity of the traditional buildings is in the function that remain as residences, and architecture of the traditional rural houses, which is reflected in the shape of the roofs and the shapes of the buildings. Although the interior layout and building materials have undergone changes, overall, the shapes of the buildings still show the architecture of traditional rural dwellings.

It can be explained that although the functions and physical forms of houses with traditional architecture still persist or continue, the traditional village atmosphere has changed. People are worried and feel a sense of loss.

Further research on the changes of the rural houses can explore more understanding about the change and continuity of the traditional rural houses. For example, Manurung et.al (2022) examining the meaning of architectural spaces in vernacular settlement of Batak Toba Tribe in Sumatra, Indonesia has found that the Batak Toba houses in the Meat Village have been demolished due to the village developments and the changing needs of the residents. The physical and architectural styles of the houses have transformed them into modern styles, but the layout and the orientation of those houses to the common courtyard remain the same.

This research found that although physical transformation of the vernacular houses have occurred, the meanings of architectural spaces in the settlement are maintained and remain the same (Manurung et.al, 2022). Daketi and Srikonda (2022) looking at the house forms and transformations in rural area of Andhra Pradesh, India has found that transformation of the rural houses have occurred when the residential plots were sub divided. The old houses have been demolished or redesigned, and the new houses have been built due to the incremental growth of the families. Although many changes have occurred, the requirement of space to work remains the same. The families still use the granary storage spaces, cattle sheds, and storage for agricultural equipment. From the two other research findings, it is concluded that changes of vernacular or traditional houses in rural areas are inevitable, such as changes in the physical forms, architectural styles, and the functions of the houses.

However, there is always continuity in the midst of change. The continuity of the local meanings of architectural spaces and the requirement of the workspaces in homes show that the living culture of the rural people still survives. It is the same in Borobudur: the continuity of the function and physical forms of the traditional houses must coexist with the additional new buildings and the changes of the old traditional building materials into the new ones.

### **The Effect of Changes and Continuity of Traditional Houses on Sustainability**

Villages in Borobudur are cultural landscapes that continue to process, and their existence reflects the relationship between the landscape and the culture of the people. One element of the village cultural landscape is the architecture of the buildings and areas (Rahmi, 2015). Architecture of residential settings becomes an important aspect of the village cultural landscape. Continuity of the traditional architecture thus becomes important, so that the characteristics of traditional Javanese houses remain as a characteristic of the Javanese rural villages even in the future. Furthermore, the existence of the heritage architecture of the houses in Borobudur rural areas is influenced by the value of the houses for the residents and how far they can maintain them.



Based on the interviews with the homeowners about the most important parts of their traditional houses, it was revealed that most residents (78%) considered the shape of the house, especially the shape of the roof and four *saka guru* being the most important part of a Javanese traditional house. The remaining (22%) do not consider their traditional houses are important, because they do not understand the privilege of heritage architecture. Another interview about the future of the traditional houses show that the majority of the homeowners (72%) will still maintain the traditional architecture of their houses. The rest (28%) stated that it does not matter if the house is demolished or replaced with a new house with a modern architectural style.

This is because of the lack of knowledge that traditional house building as a heritage must be maintained. However, the majority of the residents who want to maintain their traditional houses suggest that, when the house is passed on to their children, they leave the decision of the house management to their children. In a sense, when the next generation does not want to maintain the traditional houses, then the continuity of the heritage architecture will stop at that generation.

The existence of traditional houses in Borobudur cultural landscape shows both change and continuity. A very noticeable change is mainly the addition of new buildings, either attached or adjacent to the old buildings. While continuity lies in the functions of the buildings as houses and the form of the old building remain the same. The new buildings, on the one hand are to meet the needs of a growing population, but on the other hand physically and visually has changed the quality of the rural landscape. The large house yards that were commonly found in the traditional houses have now become narrow because of the new buildings. The new architecture styles of the new buildings are not always in harmony with the old ones and they have reduced the heritage values of the traditional houses and the village environments. This condition worries the sustainability of Borobudur cultural landscape if changes in traditional architecture continues to occur. It is also the addition of new buildings that has threatened the loss of traditional architecture of the existing houses.

The change and continuity of traditional domestic architecture in Borobudur is influenced by several factors. Factors that influence the architectural changes, among others include:

- 1) The increasing number of residents (children, families) who need a place to live.
- 2) Tourism activities in the Borobudur Temple which are growing and the community use of their houses for tourist activities.
- 3) Lack of public understanding of the heritage value of traditional houses and
- 4) The influence of urbanization that has reached the villages, including the influence of urban architecture.

The factors that facilitate continuity of architecture are:

- 1) The ancestral heritage that are deeply rooted and become part of the people's lives, which is not easy to be abandoned.
- 2) The traditional Javanese cultural form is still strong enough to reduce the pressure of change.
- 3) The interaction between Nature and culture of the community is still going well, so that the house still reflects the traditional agrarian life of the people.

The future of the heritage architecture of houses in the rural area of Borobudur finally depends on the next generation of the community, both current and future generations. If the next generation does not have the care and knowledge of the importance of the traditional houses, then the traditional domestic architecture which is a heritage will gradually be replaced with contemporary (modern) style houses, and they will eventually threaten the sustainability of the Borobudur heritage cultural landscape.

## Conclusion

Cultural landscape, which is the result of a relationship between Nature and human activities, is not a fixed thing. Cultural landscape is dynamic. Likewise, village cultural landscape in the Borobudur area has undergone various changes that continue to this day: both changes in the landscape and culture of the community. This study found that traditional residential houses, one of the elements of Borobudur cultural landscape, experience two conditions in its existence, which are change and continuity.

The most obvious change is the increase of buildings in the yards of the houses with new buildings that have semi-modern architecture. In addition, changes have also occurred in the arrangement of the inner spaces and the appearance of the traditional buildings with the replacement of old wall materials with new, more modern materials. Continuity is found in the functions of the houses that still remain as residential as well as places to work. The forms of the houses including the forms of the roofs still remains characterized by the traditional Javanese architecture. Although the changes that have occurred have not affected the physical continuity of the architecture of the old buildings, their existence have become a threat to the deterioration of the quality of the villagescape or the atmosphere of the rural environment.

The imbalance between change and continuity of the traditional domestic architecture is feared to affect sustainability of the Borobudur cultural landscape. Therefore, conservation efforts need to be made especially by the next generation, so that the continuity of the traditional Javanese residential architecture is maintained.

## References

- Adishakti, L. (1999) Pengantar Konservasi Lingkungan Kota Berejarah, Proyek Penulisan Direktorat Jendral pendidikan Tinggi, Departemen Pendidikan dan kebudayaan Republik Indonesia.
- Bimbaum, C., & Dan Peters, C. (996) Guidelines for the Treatment of Cultural Landscapes. Washington DC: US Department of the Interior.
- Brown, R., & Maudlin, D. (2011) Concept of Vernacular Architecture. [https://www.researchgate.net/publication/292664548\\_Concepts\\_of\\_ernacular\\_architecture#full](https://www.researchgate.net/publication/292664548_Concepts_of_ernacular_architecture#full)
- Calcatinge, A. (2012) The Need for a Cultural Landscape Theory: An Architect's Approach. LIT Verlag
- Daketi S. & Srikonda, R. (2022) House Forms and Transformations: The case of rural Andhra Pradesh, India. ISVS e-journal, Vol. 9, no.3, pp. 155-164.
- Dakung, S. (1982) Arsitektur Tradisional Daerah Istimewa Yogyakarta. Yogyakarta: Departemen Pendidikan dan Kebudayaan.
- Dayaratne, R. (2018). Toward sustainable development: Lessons from vernacular settlements of Sri Lanka. *Frontiers of Architectural Research*, 7 (3), pp. 334–346. <https://doi.org/10.1016/j.foar.2018.04.002>
- Endraswara, S. (2010) Falsafah Hidup Jawa. Yogyakarta: Cakrawala.
- Faqih, M. (2005) Domestic Architecture, and Culture Change Re-ordering the Use of Space in Madurese Housing. School of Architecture Planning and Landscape Faculty of Humanities and the Social Sciences University of Newcastle Upon Tyne, England.
- Hamzuri. (1985) Rumah Tradisional Jawa. Jakarta: Departemen Pendidikan dan Kebudayaan.
- Jones, M. (2003) The Concept of Cultural Landscape: Discourse and Narratives. In H. Palang, & G. Fry, *Landscape Interfaces: Cultural Heritage in Changing Landscapes*, pp. 21-52. Dordrecht: Kluwer Academic Publisher.
- Kanki, K., Adishakti, L. T., & Fatimah, T. (2015) Borobudur as Cultural Landscape. Kyoto: Kyoto University Press.
- Kartono, J. L. (2005) Konsep Ruang Tradisional Jawa dalam Konteks Budaya. *Dimensi Interior*, 3 (2), pp. 124-136.
- Keskin, Kader & Erbay Muteber (2016) A Study on the Sustainable Architectural Characteristics of Traditional Anatolian Houses and Current Building Design Precepts. *Procedia - Social and Behavioral Sciences*, 216 ( 2016 ), pp. 810 – 817

- Koentjaraningrat. (1984) *Kebudayaan Jawa*. Jakarta: PN Balai Pustaka.
- Manurung, P., Sudaryono & Pramitasari, D. (2022) The Meanings of Architectural Spaces in Vernacular Settlements: The Batak Toba Tribe in the Meat Village, Toba, Indonesia. *ISVS e-journal*, Vol. 9, no.2, pp. 23-40
- Oliver, P. (1997) *Encyclopedia of Vernacular Architecture of the World*. Cambridge: Cambridge University Press
- Page R., Gilbert, C. & Dolan, S. (1998) *A Guide to Cultural Landscape Reports: Concept, Process and Techniques*. Washington, DC: US Department of the Interior
- Quirix, W.B. and Suleman, N.E. (2015) Transformation and Continuity of Architecture in Kaduna City, Nigeria, From 1900-2000. *Journal of Engineering and Architecture* , Vol. 3, No. 1, pp. 139-149.
- Rachmaniyah, N (1991) *Bangunan Arsitektur Tradisional Madura (Telaah Kasus: Bangunan Tradisional Madura di Kecamatan Proppo Pamekasan)*. Surabaya: Pusat Penelitian (PUSLIT) ITS.
- Rahmi, D. H. (2012) Pusaka Saujana Borobudur: Perubahan dan Kontinuitasnya. *Jurnal Manusia dan Lingkungan*, 19(1), 85-94.
- Rahmi, D. H. (2015) The Cultural Landscape of Borobudur: Borobudur Villages – Continuity and Change. In Kanki, K., Adishakti, L., and Fatimah, T. *Borobudur as Cultural Landscape: Local Community Initiatives for the Evolutive Conservation of Pusaka Saujana Borobudur*. Kyoto: Kyoto University Press.
- Rapoport, A. (1969) *House Form and Culture*. Englewood Cliffs, N.J.: Prentice Hall.
- Slamet (1985) *Arsitektur Tradisional Daerah Jawa Tengah*. Semarang: Direktorat Jenderal Kebudayaan.
- Soeroto, M (2003) *Dari Arsitektur Tradisional Menuju Arsitektur Indonesia*. Jakarta: Ghalia Indonesia.
- Taylor, Ken (2003) *Cultural Landscape as Open Air Museum: Borobudur World Heritage Site and Its Setting*. *Humanities Research*, 10 (2): pp. 51-62.
- Turan, M. (1990) *Vernacular Architecture: Paradigms of Environmental Response*. Aldershot (England): Avebury
- UNESCO World Heritage (1991) *New Inscribed Properties (1991)*. <http://whc.unesco.org>
- Wang, C. (1992) *The Transformation and Continuity of the Traditional Dwelling in Suzhou, China*, Master's Thesis Massachusetts Institute of Technology. <https://dspace.mit.edu/handle/1721.1/70655>