

Community participation towards the value of traditional architecture resilience, on the settlements' patters in Tenganan village, Amlapura

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Abstract. Ecological conditions such as landslide, flood, and the global warming issues are the disasters that should be anticipated. The value of traditional architecture resilience has a role towards a city as cultural heritage. Based on that influence, the role of architecture is needed in fostering the environment to be able to survive and sustain just as an architectural concept that considers human needs and natural balancing. The purpose of this study is to analyse the concept of traditional architecture and community participation in maintaining this condition, so it would be able to have a value of sustainability. The research method used is mix method that is start from observation and macro analysis element (main building and public facility) and micro element (house of resident) to analyse community participation in realizing traditional architectural resilience in Tenganan Village, Amlapura. The results of this study found that the traditional settlements in Amlapura, Karangasem, Bali is a form of urban architecture that can survive in a sustainable way of macro elements and micro elements oriented to environmental ecological conditions. This condition happens because the community has a high enough participation to maintain it in the form of custom rules.

Keywords: traditional architecture, community resilience

1. Introduction

Global warming is a phenomenon that is currently a big topic for discussion, due to the fact that it is a crucial issue that related to the environmental problems. As an impact, natural disasters such as landslides, floods, earthquakes, and others happened. Therefore, it requires a way to survive from such natural disasters. One way to survive is in a form of architectural design. Indeed, developments and advancements in the field of architecture have contributed to the global warming and the changes in ecological conditions. Based on this effect, the role of architecture is needed to foster the environment and to adapt to the degradation of the ecological in order to survive and sustain. It is just as the form of architectural concept that considers human needs and natural balancing. The existence of the concept of sustainability architecture put forward the concept of conservation and maintenance the ecological element itself and the used of environmental friendly technology are a breakthrough that is widely used. The concept of sustainable architecture is a design that needs to be implemented as an effort to reduce the effects of global warming and the prevention of natural disasters [1]. Traditional architecture is an



architecture form passed down from one generation to the next which puts forward natural and local cultural aspects. It is a tradition to maintain the value of the culture and the ecological or environmental aspects in which the resident resides. Amlapura is one of the cities in Bali that have many traditional architecture based on nature and until now it is still survive in the middle of technological development and architectural design form. Amlapura residents who uphold the customs and beliefs set forth in daily life, as well as on their settlements. The traditional architecture in Amlapura is able to apply the concept of sustainability in architecture, in the utilization of energy, land, materials, and waste management. This study was conducted to identify, analyse, and describe the concept of sustainable architecture in Amlapura, using cases in Tenganan village. Tenganan village is one of the villages located not far from Amlapura. The village has the concept of traditional architecture that maintains aspects of local culture through tradition to maintain the original design of the settlement and ecological conditions. Therefore, it is important to study typology and elements of traditional architecture in the Tenganan village, Amlapura and participation in maintaining the value of the traditional architecture.

2. Methods

This traditional architecture study concept of the settlements in Tenganan Village, Amlapura was done by direct observation on the environment and buildings condition and interviewing the residents using mixed method. To get the concept of sustainability environment on traditional architecture Tenganan Village, Amlapura, descriptive analysis method was used. Identification and analysis based on the sustainable environmental aspects. It used a parameter to assess the state of the city in macro element (public facilities) and micro element (house or traditional architecture). The aspects used as sustainable environmental parameters on traditional architecture in Amlapura are as follows:

- The ability to adapt to the climate, and utilization of local building material and traditional architecture typology.
- Community participation in preserving the sustainability value of traditional architecture will be analysed using quantitative method with 40 random respondents (random sampling).

The parameters are chosen based on tangible elements because the overall research is qualitative.

3. Discussion

3.1. Macro architectural concept of Amlapura

The area of Amlapura city center is formed by the existence of the former kingdom and the surrounding settlement design (royal hamlet). Activities undertaken in this area were related to the culture and in the context of efforts to empower the objects of cultural heritage building and trade and service activities. The effort to develop the image of the glory of this region in the past is by making the old city as a cultural tourism (heritage), a city centre, or a landmark. Amlapura city center can be developed as the center of cultural-related activities, while the supporting area is expected to be developed in line with the center of the region and in accordance with the characteristics of each cultural heritage objects in both tangible and intangible. The goal is none other than the creation of a living urban area, accommodating the activities and needs of urban space for the time to come as needed. The concept is used to maintain the existing condition of the building but revitalize the supported parts. Thus, it will be beneficial for the city of Amlapura itself as a tourist area of the old city culture that has special landmark characteristics and has a high ecological value to be an iconic form to maintain the traditional architectural design.

In reality, the preservation of historic urban areas, cultural heritage, traditional architecture is not just an effort to maintain and create a harmonious visual relationship between old and new forms. Utilization of old buildings in the historical area and traditional architecture in Amlapura, as an important contribution in the efforts to improve the quality of the area and to face the changes of environmental quality due to natural disasters. Therefore, the creation of a sense of place is more than merely restoring the authenticity of the city area. New in-fill developments should be made more meaningful and responsive, for the sake of ensuring social, cultural, and environmental sustainability. It means that preservation through physical intervention should also be understood as an effort or continuous activity in shaping the environment

3.2. Architectural traditional concept in Tenganan village ability to adapt with the tropical climate and disaster

The concept of traditional architecture in Tenganan village, Amlapura is a form of architecture that is made as a way to adapt with the hot tropical climatic conditions and contouring landscape. Tenganan village is located on the mountainous area with sloping contoured land conditions. The condition is tricked by cultivating staircase land following the slope. The village design is staircase lengthwise higher as it goes to the North. The settlements are contoured with cut and fill system. The foundation of the building used stone to adapt to the humid tropical climate on the mountainous area. The small and closed building is used to adapt cold mountainous weather. Each settlement is divided into smaller clusters so it has many open spaces with air holes for natural circulation.

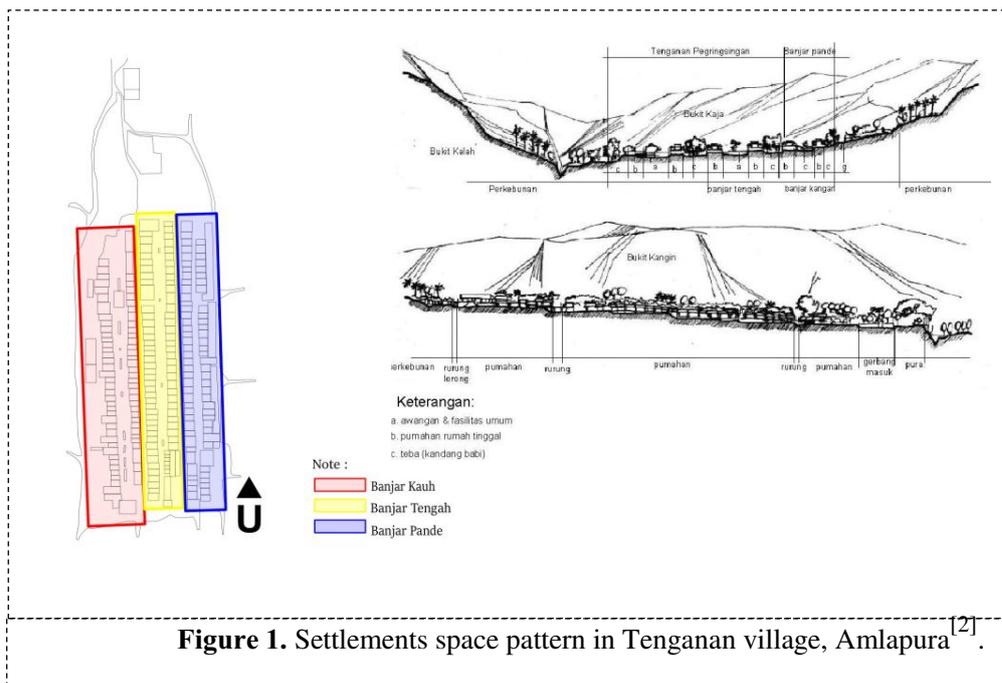


Figure 1. Settlements space pattern in Tenganan village, Amlapura^[2].

The sunlight can expose the insight of the building due to a lot of holes and impermanent partition. The roof is made of the mix of *ijuk*, tile, and sago palm (*rumbia*). *Ijuk* and sago palm (*rumbia*) are light materials on top of the roof. It creates cool shade and feels integrated to the nature. Many households nowadays use tile roof due to supply shortage of *ijuk* and sago palm (*rumbia*). The settlements are adjacent in series, facing each other with the face of the building head to the *awangan*. The settlements in Tenganan village is made with traditional architecture concept representing the community to preserve the environment and able to survive from natural disaster such as landslide, flood, as well as impacts of global warming.

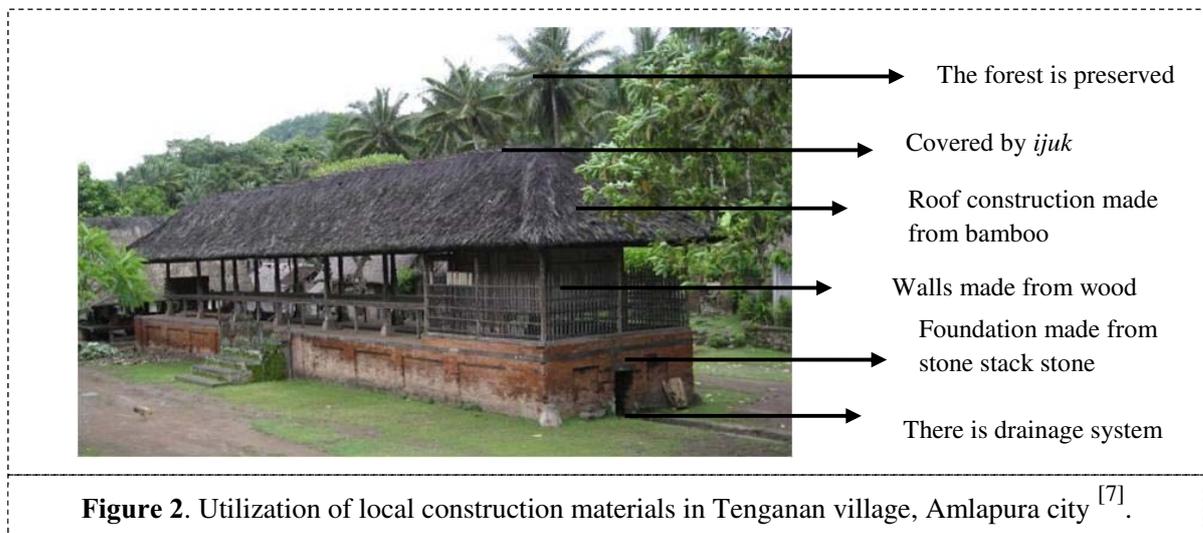
3.2.1. Utilization of local building materials as a concept of traditional architecture design.

In general, the building materials for traditional settlements in Tenganan village, Amlapura are taken from local area, including both public buildings (the buildings placed in the front), and private buildings (the settlements). Most of the materials are taken from forest garden around the community area and approved by customary chairman. There are custom rules, which regulate the utilization of forest garden as building materials called *awig-awig*, because Tenganan village uphold preservation of the environment. Lintang and Arum (2013), mentioned some of those rules (*awig-awig*) are [3]:

- The tree is allowed to cut down if it is already dead and it is should also be reported and check by the village.

- The tree that is still alive is allowed to be cut down as building materials if it is their own, as for a house of just married family and should be approved by the village. It is called *tumapung*.
- Tree logging is allowed for village needs without any consideration of the tree condition and its owner because of *rampangan*, for instance to build temple.

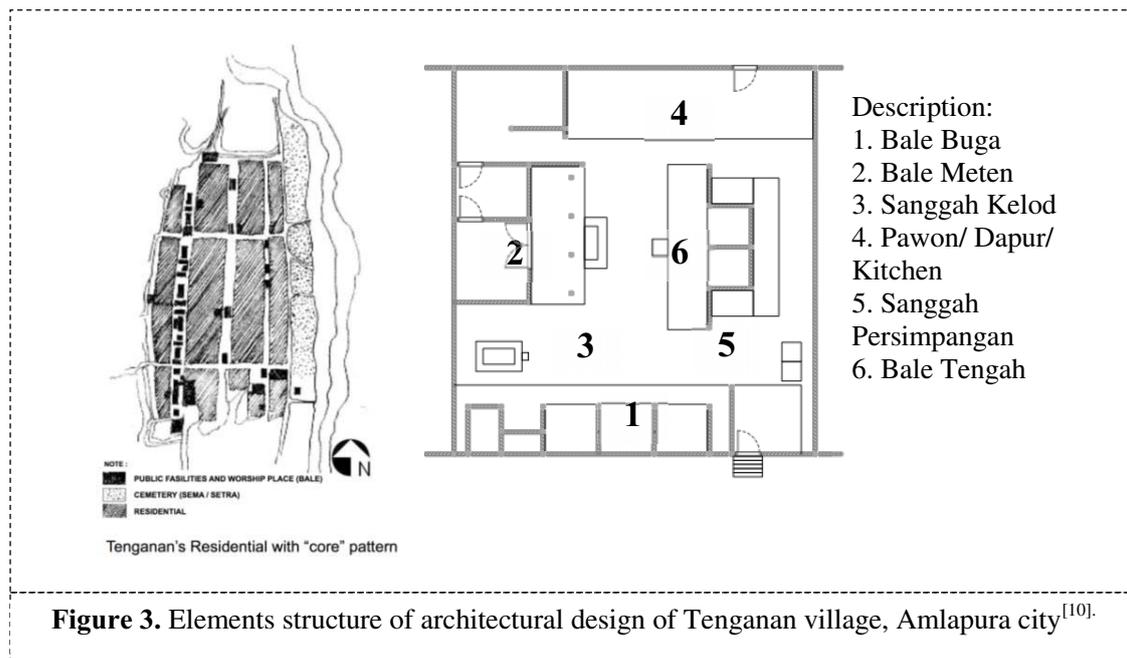
The value of forest preservation as the basis of their rules is the main point that Tenganan village is able to survive from of natural disasters or the effects of global warming that occur today. Therefore, the village of Tenganan is called as a pleasing village, cold, and is being a cultural heritage of Amlapura city due to its natural conditions and architectural concept of its own characteristics. More clearly the form of traditional settlements and environmental ecological conditions found in Tenganan village, Amlapura can be seen in figure 2.



Such rules are highly obeyed by the community, thus it is really support sustainable environment in the village. In addition, eventhough this Tenganan village is located in the mountainous area, it was very rarely affected by the natural disasters which can destroyed the local community.

3.2.2. *Element structure of traditional architecture in Tenganan village.*

Traditional architecture form in Tenganan Vilage, Amlapura is micro observation by looking at its elements. Then, make a map of function and value of each part of its architecture. Based on Lintang and Arum (2013) [2], figure 4 below showed the space of building typology in Tenganan village that used by the public and some examples of local building materials.



- Bale Agung

Bale Agung is located in *awangan* from the North to South, in which the building is rectangle. The foundation is made of stone stack of 50x5 meter and 1 meter height. The body is 47x3 meter and 1.5 meter height. The body is made of jackfruit wood (*ketewel*) with 28 pillars. The head is made of coconut leaves. The building materials of Bale Agung are taken from village's forest garden.

- Bale Banjar

Bale Banjar is a sacred building, which is also a village's reserve. The body is 13.5x4 meter and 50-centimetre height made of river stone stack glued together by clay. The body is 12x2.5 meter and about 1-meter height. The column made of wood, while the roof frame made of wood and bamboo with cover made from coconut leaves (*palpalan*).

- Bale Kenca

Bale Kenca or also called Pekenca is used as a place to discuss important case. The building base is square with 4x3 meter and 70-centimetre height. The foundation is made of stone stack glued together by clay. The body is 3x2 meter and 65-centimetre height made of wood and bamboo in 4 (four) columns. The roof cover is made of *ijuk*.

- Bale Petemu (Patemon)

Bale Petemu is used as a place for youth organization meeting (*seka teruna*). It consists of 3 (three) rooms, Bale Petemu Kaja, Bale Petemu Tengah, and Bale Petemu Kelod. The foundation is made of river stone, except for Bale Petemu Kaja which is made of brick. The column of all the buildings is made of wood. The roof is made of wood and bamboo with cover is made from *ijuk*.

Based on some explanation from the sample of housing or buildings in Tenganan village, Amlapura, it can be concluded that the building in Tenganan village, Amlapura uses traditional local building materials which is available around the area such as river stone, bricks and clay as the foundation, and wood and bamboo as the head. Meanwhile, the roof uses *ijuk* and coconut leaves. These have been appropriate with the concept of sustainability environment architectural with low cost and low technology, which minimizes the negative impacts toward the building itself and the environment. Therefore, traditional architecture in Tenganan village becomes cultural heritage of Amlapura as the preservation and conservation of the traditional architecture in East Bali.

3.2.3. Community participation in sustainable conservation value of traditional architecture in Tenganan village, Amlapura

Their attention to the environment used to manifest their involvement to participate in maintaining their traditional architecture sustainability. The data used in this study is the primart data obtained by a questionnaire. The indicators used in determining the level of community participation are:

Table 3.1 Community participation parameters on the conservation of traditional architecture design in Tenganan village, Amlapura.

Indicator	Parameters	(a)
Involvement in community event	<ul style="list-style-type: none"> Interest to be involved in conservation efforts. Provide opinions or solutions or ideas, etc. 	
Provide helps	<ul style="list-style-type: none"> Provide helps in form of energy or thoughts or money, etc. 	
Attendance frequency at the meeting	<ul style="list-style-type: none"> Eager to be present and often involved in every activity. 	
Obey the local rules (<i>awig-awig</i>)	<ul style="list-style-type: none"> Never break the rules. Build houses by using traditional architectural concepts. 	

Table 3.2 Grade criteria for the respondents.

	Score
Very Agree	5
Agree	4
No Opinion	3
Disagree	2
Strongly Disagree	1

This analysis model explains the respondent's statement by describing it via tables, and the measurement using Likert scale. Table 3.3 below showed the total score of all respondents are:

Table 3.3 Total score of the respondents.

Information	Score
Maximal	40 (respondents) x 5 = 200
Minimal	40 (respondents) x 1 = 40
Median	40 (respondents) x 3 = 120
Quartile I	40 (respondents) x 2 = 80
Quartile II	40 (respondents) x 4 = 160

Based on Sugiyono (2008), the scores was analyzed using several approaches to determine the level of community participation:

- If Quartile III < Score < Maximal; means very positive. (active community participation).
- If Median < Score < Quartile III; means positive. (community participation is considered quite active).
- If Quartile I < Score < Median; means negative (Community participation is considered less active).

- If Minimal < Score < Quartile I; means very negative (Community participation is considered inactive).

If projected, the level of community participation can be calculated based on the following formula:

$$\text{Participation Rate} = \frac{\text{Obtained Scores}}{\text{Maximal Score}} \times 100 \quad (1)$$

This section will measure the level of community participation based on the benchmarks that exist in each indicator. Obtained data then processed using Microsoft Excel, to facilitate data processing. Table 3.4 below will explain it.

Table 3.4 Final score by the respondents based on the parameters.

Parameters	Score	Median
Interest to be involved in conservation efforts.	145	120
Provide opinions / solutions / ideas, etc.	146	120
Provide helps in form like energy / thoughts / money, etc.	129	120
Eager to be present and often involved in every activity.	137	120
Very abide by applicable rules with never breaking .	149	120
Build houses by using traditional architectural concepts.	137	120
Total	140,5	120

To be able to know the level of community participation can be seen from the overall score obtained. In table 3.4 it is shown that the overall score obtained is 140.5. The score is between the median area and the third quartile, or in the positive area. So it can be said that the level of community participation supporting the preservation and resilience of traditional architecture in Tenganan village, Amlapura is active.

$$\text{Participation Rate} = \frac{\text{Obtained Score}}{\text{Maximal Score}} \times 100 \quad (2)$$

$$= 140,5/200 \times 100\% \quad (3)$$

$$= 70,25 \%$$

4. Conclusions

The Tenganan Village architecture uses traditional architectural concepts based on nature, climate, and material availability are taken to the account. The location of the settlements in the mountainous area is combined with the shape of the village that has contour site, with the adaptation of the building form to the tropical climate of the mountains. Building materials use natural materials, with village (*awig-awig*) rules as the main guidelines, which can balance the needs of the community with existing natural resources. The use of traditional architecture concept that consider the needs and availability of present and future made Tenganan village being a cultural heritage of Amlapura and able to survive in tropical climate and slope contour. The concept of balance between human and nature should be able to be applied in every architectural design. The concept of sustainability in traditional architecture is able to maintain natural conditions, thus reducing the impact of global warming and natural disasters. Community participation through obeying the rules of *awig-awig* is quite pleasant in supporting the preservation and resilience of traditional architectural design in Tenganan village, Amlapura city.

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