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## Resilience Capacity Planning: A Strategy Requirement for Vernacular Architecture Existences as a part of Sustainable Development in Lampung

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# Resilience Capacity Planning: A Strategy Requirement for Vernacular Architecture Existences as a part of Sustainable Development in Lampung

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**Abstract.** Facing vulnerability of vernacular architecture existences, resilience capacity planning is involved as a strategic requirement for new established ecosystems of human settlement. Resilient capacity planning concept implementation will help local community to reduce impact of climate change and disaster risk, and also increase safety management. The research is intended to measure the resilience of urban system according to sustainable development for historical heritage and resilient approach that has applied in vernacular settlement. Vernacular architecture of Lampung is a suitable example for this research. Lampung is an area that has multi-culture acculturation, which is seen, in the social system of society, cultural patterns, building typologies and traditional settlement patterns. On the other hand, vernacular architecture of Lampung provides outstanding shelter from climate change and disaster risk, meets the requirements of local food security, where the development adjusts the cultural landscape, the potential of food sources and other natural resources. In addition, the development process also uses local technology and construction that adapts the environment and its location to ease the production land. However, there is much vernacular architecture, which have high socio-cultural potential and are not identified by academic researchers. By studying architectural vernacular, we not only repeat the way of life of the past, but also as a first step to create new technologies and designs in the future by learning the knowledge and technology applied in the past especially in Lampung. In this paper, researcher takes lead by conducting a review of important part of the existence of vernacular architecture to conduct resilience capacity planning strategy as a part of sustainable development in Lampung.

**Keyword:** vernacular, architecture, resilience, sustainable, and lampung

## 1. Introduction

In context vernacular architecture existences, resilience capacity planning is involved as a strategic requirement for new established ecosystems of human settlement. Resiliency has become a strategic requirement for the human settlements (urban and rural) as global change, climate, social and cultural change, natural and industrial disasters, and economic shocks affect local communities [1][2]. Resilient concept implementation will help local community to reduce impact of climate change and disaster risk, and also increase safety management [3][4][5]. A constant process of urban transformation has two fundamental principles of resilient architecture such as “flexibility” and “adaptability” was acquired by dynamic architecture of resilient settlements which considering all the surrounding conditions. Local



communities have learned to read the signs in the sea, the skies and wildlife to predict impending hazards [6]. Direct experience with disasters has taught many communities the duration, location, time, frequency, intensity, predictability, onset and possible behavior of the hazard linked to these events.

Community life patterns formed through the center of customary networks, traditional law, social relations, myths, taboos, and community ties through religion, create physical forms that constitute the community's identity, called vernacular architecture. Identification and examination of local community traditions, land use, spatial planning and building culture creates a comprehensive understanding of the relationship between vernacular architecture and resilience, which found that architectural vernacular has a high resilience capacity [7]. If architectural vernacular is assumed as an asset, then architectural vernacular will be more likely to be valued as intangible asset. Architectural vernacular is designed to accommodate the activities of the occupants (families) and their communities, where the structure is designed by villagers through the direction of the main builder and / or carpenter and uses available resources [8]. The values carried by vernacular architecture are more of a cultural value and the community's identity evolves and follows global changes. In this case, dynamic factors such as "macro climate", "environmental materials" and "living cultures", are the three factors that influence the "resilient" existence of vernacular architecture [9].

Vernacular architecture of Lampung is a suitable example of well adapted to climate and natural hazard i.e. floods, hurricanes, and earthquake and volcano eruption where Lampung region topography have lying at costal area, the Eurasian junction, Indo-Australian and Sunda Sea tectonic plates poses an actively deforming area with high seismicity. In 1883 and 2018, Lampung was hit by a series of earthquakes and volcanology causing death of thousands of people. Besides the human tragedy the earthquake the natural disasters showed that outstanding resilience of the vernacular buildings: whereas 80 percent of the modern style houses collapsed, few old buildings were damaged, causing less harm to the inhabitants. The vernacular architecture provides excellent shelter from the hot and humid tropical climate. In particular they seem to be constructed specifically to withstand the common unstable ground conditions and earthquakes in the area.

Furthermore, the development of Lampung's vernacular architecture has a uniqueness that meets the requirements of local food security, where the development adjusts the cultural landscape, the potential of food sources and other natural resources. Vernacular architecture of Lampung meets the requirements of local food security, where the development adjusts the cultural landscape, the potential of food sources and other natural resources. In addition, the development process also uses local technology and construction that adapts the environment and its location to ease the production land [10][11][12]. However, there is much vernacular architecture, which have high socio-cultural potential are not identified by academic researchers.

So, researcher need takes lead by conducting a review of important part of the existence of vernacular architecture to conduct resilience capacity planning strategy as a part of sustainable development in Lampung. Research in this area is considered very important because it produces a resilience capacity strategy plan that has adaptation patterns for changing external conditions. By studying architectural vernacular, we not only repeat the way of life of the past, but also as a first step to create new technologies and designs in the future by learning the knowledge and technology applied in the past [13][14]. This is because architectural vernacular is created as a result of the process of identifying, experimenting and modifying forms, materials and structures that are in accordance with the needs of the community, integrating with the natural environment, adjusting geographical conditions, potential disasters and carried out for years [15]. The loss of cultural identity, tradition and social equity occur due to loss of existence of vernacular architecture and is a problem that must be faced at this time [16][17].

## **2. Motivating and State of The Art**

In order to understand motivation behind resilience capacity planning: a strategy requirement for vernacular architecture existences as a part of sustainable development, it is most important to understand the current relationship between vernacular architecture, resilience and sustainability. This

paper investigate paradigm of vernacular architecture history, philosophy, theory, principle, concept and regulation of integrate urban conservation and preservation in both resilience and sustainability perspective. Vernacular architecture is considered as a complex asset that develops and prospers community life, as well as cultural identity and is a good resource for economic and political interests [12]. This knowledge is obtained through inventory and conservation, which then functions as a decision-making policy to improve the social ecological capacity which is a system for responding and adapting to environmental and socio-economic stressors [18][12]. Valuation of vernacular architecture plays a crucial role in recognition strategy of building design and construction policy. These policies should be established using standards and knowledge possessed by architectural vernacular in the future.

The research is intended to measure the resilience of urban system according to sustainable development for historical heritage and resilient approach that has applied in vernacular settlement. Broadly speaking, Lampung is a suitable location for this research. This is because Lampung is an area that has multi-culture acculturation, which is seen, in the social system of society, cultural patterns, building typologies and traditional settlement patterns. However, there is much vernacular architecture, which have high socio-cultural potential and are not identified by academic researchers. In this paper, researcher takes lead by conducting a review of important part of the existence of vernacular architecture to conduct resilience capacity planning strategy as a part of sustainable development.

### **3. Result and Discussion**

#### *3.1 Vernacular Architecture Existence as part of Sustainable Development*

In context of finding suitable approach for understanding of vernacular architecture existence as part of sustainable development, it is important to learn theory of sustainable development and how vernacular architecture can achieve it. Early idea on sustainability development has focused on concept of achieving stability, practicing effective management and control of change and growth [10]. To achieve sustainable development, building or area must be planned and managed to form a balance between human being and natural environment using resources carefully and transferring them to the next generation.

Community life patterns formed through the center of customary networks, traditional law, social relations, myths, taboos, and community ties through religion, create physical forms that constitute the community's identity, called vernacular architecture. Vernacular architecture is designed to accommodate the activities of the occupants (families) and their communities, where the structure is designed by villagers hereditary through the direction of the main builder and / or carpenter and uses available resources [8]. Man activities of residents has been focused by family and it community in vernacular building, which have produce a vital connection between human and environment [11]. Vernacular architecture of Lampung have successfully put the inhabitants humanely, both as individually or social environmental where reflect the spirit of openness, strength, comfort, beauty and a hierarchy of space. Building typology scheme was identified by physical and spatial criteria that are related to building construction and urban design into urban structure type. Urban structure type and building type of traditional houses was generated by specific typology [19]. The values carried by vernacular architecture are more of a cultural value and the community's identity evolves and follows global changes.

In short, sustainable principles can build a vernacular architecture where the sustainable paradigm is proof of architectural vernacular identity, which is seen through the relationship of the building and its natural environment, as well as the social conditions of the community that continue to evolve at any time. [19][20][15][21].

#### *3.2 The relationship between Vernacular Architecture, Sustainable and Resilience*

Vernacular architecture is related to local environment context and available resources where was built from traditional technology, meet specific human need, accommodating the value, economy and way of

living the culture that have produced it [22]. Identification and examination of local community traditions, land use, spatial planning and building culture creates a comprehensive understanding of the relationship between vernacular architecture and resilience, which found that architectural vernacular has a high resilience capacity [7]. In this case, dynamic factors such as "macro climate", "environmental materials" and "living cultures", are the three factors that influence the "resilient" existence of vernacular architecture [9].

Furthermore, vernacular architecture is demonstration of identify and to developed sustainability through time. Resilient need to be link to sustainability, so that the concept of resilient for planning and design will be help people to move toward desired future sustainable system state and not undesirable one. Sustainable and resilience of urban design and planning have expanse on the vernacular influence and capability, integrating climate change, natural resources, healthy and dynamic community was formed as an urban compact form configuration [23]. The difference between sustainability and resilience can be seen in their ability to deal with changing environmental conditions. Environmental changes that occur dynamically cannot be addressed by sustainability, but can be overcome by resilience. Resilience has the ability to adapt, transform, and be flexible to change, while sustainability only has the ability to reduce and optimize vulnerability.

Both of sustainability and resiliency in architecture is essential to determine identification of architecture regionalism, which can help stakeholder to know what to do. The development of environmental ecological solutions that are sustainable and have resilience capacity can be built by reevaluating vernacular architecture, as a form of response to community needs [13]. The development of new resilience strategies can be obtained by research, through the identification of the potential and characteristics of vernacular architecture.

### *3.3 Analysis of Resilience Capacity Planning: A Strategy Requirement for Vernacular Architecture*

#### *Existences*

The loss of cultural identity, tradition and social equity occur due to loss of existence of vernacular architecture and is a problem that must be faced at this time [16][17]. The existence of identity and the meaning of place can be obtained through clarity. One of the most important aspects in the appearance of this meaning is the visual clarity of urban elements. Since we can't predict about what happened in the future, we can rely on past finding and compare to existing condition to evaluate factors of resilience [11]. One of best solutions is vernacular architecture conservation. The most important goal of vernacular architecture conservation and development is to manage the sustainability of vernacular architecture existence as tangible and intangible value of asset. With these conservation, we can provide resilience capacity planning that can reorganize and recover building changing and disturbance without changing to other state or safe- fail [10].

Resilience capacity as strategy of vernacular architecture existence enhanced through tree stage of strategies, that is:

- Prevention of environment, socio cultural and socio-economic resilience: these three indicators can avoid urban problem or reduce risk through land use management of urban development, based on geospatial, hydrographic and meteorological analysis where water source management is also considered. in addition, urban resilience strategies can also be realized by the use of local materials, understanding and maintaining the existence of historic buildings which have the character, perceptions, values and knowledge that solve problems, avoid and reduce economic crisis with using local and accessible resources
- Resistance of environment, socio cultural and socio-economic resilience: these three indicators can avoid urban problem or reduce risk through used sustainable and local material, environmental friendly and disaster building structure, community preparation for emergency, knowledge of alerting system for decision making perspective, sharing good, integrating producing, recognizing value of local product, provide new functions for historic of vernacular building and adaptations of vernacular architecture to adapt to the development of urban area as

a consequence of increasing access and role, including the addition of a small-scale business function on the first floor of a urban planning.

- Urban problems can be avoided through three main indicators of an urban resilience strategy, including: Environmental adaptation, socio-cultural and socio-economic resilience. The three indicators are realized through design flexibility, communal buildings and space, and independent construction systems which are a system to accelerate disaster recovery

In achieving these resilience strategies, there are three stages of actions, i.e. :

- In early step, preserve vernacular architecture scenarios for the project were performed identification of vernacular architecture characteristic and maintaining the current condition of vernacular architecture, include protecting the building from damage and providing new functions or dual functions in accordance with the demands of regional development.
- Second step, resistance of vernacular architecture with new functions (cultural, social and economic) of vernacular building, covering functions that accommodate changes in the accessibility system of the area and increased access to vernacular architecture to be able to play a role and benefit from the revitalization.
- Third step, adaptation of urban changing condition and built innovative solution such as creative space and building design in urban design and planning. This solution is useful to support the establishment of unique characteristics of vernacular architecture by giving a specific feel of the place.

#### 4. Conclusion

Based on the research conducted, it can be assumed that the vernacular architecture is a great potentiality evident of resilience capacity planning strategy in 21 century. Through caring vernacular architecture activities, this can help us as stakeholders to identify ecological solution where solutions have benefits for local environment to response the daily needs of local community. According to analysis, resilience need to be link to sustainability, so that the existence of vernacular architecture we are trying to preserve, plan and develop for actuality help us move toward, desired future sustainable system state and not undesirable ones. Meanwhile, this paper not provides deeper analysis related implementation of sustainable development and resilience system because most of analysis aims to a general role of resilience capacity planning and part of sustainable development in vernacular architecture existences strategy.

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