Green development based on local wisdom: a study of kuta’s indigenous house, ciamis

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Abstract. Indonesia has a cultural diversity and many potential disasters. Human response to the surrounding environment creates local wisdom in harmony with nature as part of preserve environmental quality, one of which is known from indigenous houses existence. This study aims to analyse a green development concept based on local wisdom of Kampung Kuta's indigenous house in Ciamis, West Java. The green development concept was revealed through socio-cultural facts based on lexicon data on indigenous house building with an eco-cultural approach. The study found 36 lexicons from Kuta's indigenous house which are divided into the upper, middle, and lower parts of the building, where all the lexicons are noun according to their functions and meanings. Green development at the Kuta's indigenous house was found at the stage of obtaining and selecting, storing, and reprocessing the building materials consisting of bamboo, wood, palm fibres, leaves, and stones. The green development of Kuta's indigenous house is oriented to the use of sustainable material that only comes from the surrounding. The green development concept in indigenous house signifies harmony with nature to sustain the needs of future generations.

1. Introduction

People awareness of environmental sustainability is often influenced by development pace around. The anthropocentric paradigm of development results in declining awareness about environmental impact and unconsciously encourages many problems in the future [1]. Development without ecological literacy is one of many disaster generators such as floods, droughts, landslides and heat waves which also provide a multiplier effect for humans and the environment [2,19]. The multiplier effect causes increase consumption in energy, land, logistics, and health needs which has become a global trend so that the overall development costs enlarge [3].

Responding to the phenomenon, many countries and international institutions initiate sustainable development patterns to preserve the natural environment and its resources through green development. In Indonesia, the green development concept inspired various regulations on buildings and housing that emphasizes a balanced function and identity with the environment. However, construction of buildings in Indonesia is still less attention to the environment both aspects of site planning, architectural form and materials selection. Missed concept of modern living into indigenous culture makes a study of local wisdom less desirable [4]. In fact, local wisdom is a cultural identity to preserve the national culture from threats. Indonesian people have known and applied green development implicitly in their culture, especially in managing the environment and buildings that exist in some indigenous communities [5].
The social stigma of ancestral tangible and intangible relics lead values in local wisdom has not been implemented in regional development activities [6]. Located in the natural disasters zone, Indonesia has a cultural diversity that reflects harmonious life between human and the environment. Impact of volcanic disasters, earthquakes, floods, land movements, and meteorological phenomena inspire human thinking in carrying out local wisdom. Local wisdom contains many living strategies are forming local community activities to response their problems in fulfilling life needs, including architectural adaptation to potential disasters around [7,8]. The local wisdom values can be viewed from customs, territorial managing and building architecture as a whole. Local wisdom that contains green development concept found on buildings in traditional villages through facts study of their language and culture.

Indigenous house is a vernacular architecture that holds two meanings, namely the art or science of building or constructing of any kind for human use and human creation [9]. Vernacular architecture in traditional villages shows the green development concept to support sustainable development. House buildings in traditional settlements have been designed to be able disasters resilient because of separate structures over the top, middle and bottom [10,11]. For example, an indigenous house in Kampung Kuta Ciamis, West Java has adapted to environmental conditions that have steep topographic, earthquakes, mass wasting, high rainfall and located on the meandering zone of Ci Jolang. Kuta’s indigenous house also has a distinctive style of Sundanese forms which are influenced by customs, religion, and natural environment [12]. Kuta's indigenous house is cultural artifacts that contain the meaning of linguistic signs, a meaning formation can be explained by connecting symbols, references, and referents [13]. Meanings of an indigenous house can be assessed through five approaches namely meaning as a reference, meaning as logical form, meaning as context and use, meaning as culture, and meaning as conceptual structure [14]. Therefore, this study aims to analyse a green development concept based on the local wisdom of Kuta's indigenous house in Ciamis, West Java. This effort to revival local wisdom as a basis for disaster mitigation with an eco-cultural nuance of indigenous communities in Indonesia.

Figure 1. Study Area.

2. Methods
This study is held in Kampung Kuta, Karanganpinggal Village, Tambaksari Sub-district, Ciamis Regency, West Java, Indonesia. With an area of ± 119.8 Ha, Kampung Kuta is located at 108° 33' 45.40'' E and 7° 16' 27.08' S. This study used a qualitative method involving researchers as human instruments. Researchers are directly involved in the community to make approaches that mission to explore lingual and socio-cultural data [15]. The lexicon of Kuta's indigenous house is obtained through ethnographic interviews with their leaders. The data is reclassified based on the structure of space division in the
house construction divided into the upper, middle and lower parts, the selecting of building materials that have a green development concept to obtain lingual and cultural meaning based on the eco-cultural approach. Understanding the perceptions and conceptualizations of Kuta community towards their house is information to support and inspire green development.

3. Results and Discussion
The Kuta community uses resources around them as main suppliers of their indigenous house building materials. Many materials derived from tropical plant parts, while only abiotic material is an andesite stones use as tatapakan (building base) – the southern part of Java is a subduction zone between Eurasia and Indo-Australia tectonic plates that produces andesitic rocks [16]. Andesite is an igneous rock with high durability and serves to avoid contact between soil and building organic materials. Bamboo, wood, fiber, palm leaves, stones, and other building materials are prohibited from a forbidden forest (hutan larangan) near Ci Jolang meander. Forest and environmental sustainability as a priority icon of environmental conservation for the community and received full support from the Indonesian Government (Ministry of Forestry and Environment) through Kalpataru award [12].

![Figure 2. Kuta’s Indigenous House Materials.](image)

Kuta's indigenous house has 36 lexicons which are divided into the top, middle and bottom parts. The upper part has 23 lexicons which characterise the function as a protector for house residents with the main characteristics of materials derived from palm fibers (ijuk) and dried palm leaves (kirai). Lightweight materials compose the upper part that is easy to be forming and routinely replacing [5]. In the middle part generally comes from Albizia wood (Albizia chinensis) and bamboo, there are 7 lexicons are indicate its function as fences, doors, windows, posts, footwear storage, and walls. The space division of Kuta's indigenous house is separated by bamboo or wood namely pamaro which not parallel form to each other, thus the house's privacy keeps maintained. Kuta's indigenous house has a stage building, there are feet, floor, support, and lower cubicle which compose the lower part. All materials come from andesite stone, bamboo, and wood which have 6 lexicons.

All types of wood and bamboo can be used in Kuta's indigenous house, provided selection and extraction are in accordance with the customs rule. The selection of wood-based on certain criteria such as straight, not branching and enough age. Wood extraction is forbidden by removing trees with their roots, thus trees regeneration take quickly and maintain soil structure around. Bamboo for buildings is chosen according to ancestor philosophy and bubuk tuhur bangbara liwat rule. Bamboo must come from a mature plant and has three shoots to reduce starch content, thus bamboo becomes more durable and avoids pest / termite attacks. In addition, to keep the quality of Kuta's indigenous house there are several additional criteria for acquiring wood and bamboo such as not being struck by lightning, falling, or swept. Non-organic material like asbestos, zinc, brick, cement/concrete, and glass are not allowed freely because rigid and difficult to decompose [5].
processing the rest materials of Kuta's indigenous house shows positive interactions between human and environment. Kuta community has a habit of let rest materials to lie on the ground and prohibiting for use as fuel because awareness about environmental services have been formed that rest materials have many benefits for other organisms [17]. If rest materials are burnt that produce charcoal which has high absorption, resistant from weathering and unsuitable for fungus. This phenomenon has harmony with the food chain rules in nature, where the organic materials will be obsolete firstly by detritivore organism before decomposition.

The green development concept on Kuta's indigenous house has met sustainable criteria such as resources efficiently, attention functions for behavior, and maintaining physiological functions of humans. In terms of its social function, a similarity design of Kuta's indigenous house also characterises equality and social bond of the community which is strengthened by custom rules. The use of sustainable materials is contained in the eco-cultural lexicons that reflect their knowledge, environmental awareness, and disaster mitigation. Environmental management values of Kampung Kuta community shows the manifestation of mutualism symbiosis between human and nature which can also be found in many other traditional communities in Indonesia and the world [7,18]. Local wisdom has linear development with environmental awareness of the traditional community, even though there is something explicit or implied [20,21].

Table 1. Lexicons on Kuta’s indigenous house.

| House parts | Materials       | Lexicons (meanings / functions)                      |
|-------------|----------------|-----------------------------------------------------|
| Upper       | wood           | *pamikul* (roof holder), *pangheret* (upper frame), *susuhunan* (roof), *gagajahan* (equilateral triangle-shaped roof model), *suhunan panjang* (roof bar), *kuda-kuda* (roof base frame), *julang ngapak* (foof shape resembles a flutter of bird wings), *layeus* (lengthwise ceiling), *ereng* (crosswise ceiling), *babancong* (elbow), *para imah* (lamp holder), *langit-langit* (ceilings), *érang-érang* (ventilation), *dudur* (holder for *susuhunan panjang*), *cureman* (gutters), *paléang* (cookwares storage), *para hawu* (kitchen chimney) and *panombé* (pangheret reinforcement). |
| bamboo      |                | *tali berang* (bamboo rope), and *jajalon* (*kirai* frame) |
| leaves      |                | *kirai* (woven palm leaves for the roof)              |
| Fibers      |                | *ijuk* (palm fibers), and *landing* (palm fibers arrangement for the roof) |
| Middle      | wood           | *réling* (wooden fence), *panto kayu* (wooden door), *palang dada* (footwear storage), *sarigsig* (hollow window) and *tihang* (post / pole) |
| bamboo      |                | *bilik awi* (bamboo cubicle) and *panto sorolok* (sliding door) |
| Lower       | wood           | *balagbag* (wooden floor), *galang* (lengthwise holder) and *pananggeuy* (crosswise holder) |
| bamboo      |                | *talupuh* (bamboo floor) and *bilik kolong* (lower cubicle) |
| andesite stone |            | *tatapakan* (building base) |

Kuta community store building materials in different places. Wood and bamboo are stored in a dry room and are not directly exposed by the ground. They suggested that the wood be soaked in muddy ponds for months, whereas bamboo soaked in muddy water before use or storage. The selection and storage of Kuta's indigenous house are adjusted to keep it strong, elastic, easy to process and prevent weathering, mold, and termite/pest attacks. For *ijuk* and *kirai* must be dried to reduce water content and loss weight [10]. Kuta community usually weaving *kirai* before use or storage. The selection and storage of Kuta's indigenous house are adjusted to keep it strong, elastic, easy to process, durable and environmentally friendly.

Processing the rest materials of Kuta's indigenous house shows positive interactions between human and environment. Kuta community has a habit of let rest materials to lie on the ground and prohibiting for use as fuel because awareness about environmental services have been formed that rest materials have many benefits for other organisms [17]. If rest materials are burnt that produce charcoal which has high absorption, resistant from weathering and unsuitable for fungus. This phenomenon has harmony with the food chain rules in nature, where the organic materials will be obsolete firstly by detritivore organism before decomposition.

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4. Conclusion
Understanding and awareness of Kampung Kuta community, Ciamis is a form of adaptation to the surrounding environment as reflected in indigenous house building. The green development concept on Kuta's indigenous house is preserved through 36 lexicons that not only have lingual functions. Many sustainable materials like andesite stone, wood, bamboo, palm fibers, and leaves in every part of the house is an effort to preserve the environment while being responsive to various disaster threats. If the green development concept in Kuta's indigenous house and other vernacular architecture in many regions can be widely applied, the sustainable development goals based on local wisdom in Indonesia can be realised.

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