# SUSTAINABILITY CONCEPT OF BALI *AGA* ARCHITECTURE

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## ABSTRACT

*Architecture is one of human works that consumed a lot of energy. Present research shows that architecture consumed more than 50% of total energy in the world. That is why awareness of sustainability issues become prominent issues among architects, architecture students and academics. Practically sustainability concept is not some thing new for some countries. Traditional settlements used similar concept to sustainability concept, for example Bali Aga settlement. The settlement showed how the community used the concept as tradition and way of their life.*
*The Bali Aga architecture was developed between 9 to-11 AD and mostly located in the highland or the mountain of Bali. The word "Aga" is used to distinguish the highland settlements from the rest of traditional settlements of Bali which mainly located in the down line of Bali, particularly in the southern Bali. Bali Aga settlements are located mostly in eastern and northern Bali. The village of Tenganan is the prime example of the genre, and for this discourse, the research site was Julah village in Buleleng Regency. This village is located on the northern part of Bali.*
*Referring to Bali Aga's traditions and customs, the community recognized the relationship between the people and the environment. Bali Aga architecture shows the expression of their tradition that keep the environment sustained. This paper will discuss about tradition of Bali Aga community and how they articulated through their architecture. The aims of this study are to increase the awareness of modern soceity on sustainability issues and learned from tradition of Bali Aga community how to keep environment friendly.*

***Keywords:*** *sustainability, Bali Aga Architecture, tradition and customs*

## ABSTRAK

*Arsitektur adalah salah satu karya manusia yang mengkonsumsi banyak energi. Penelitan yang telah dilakukan menunjukkan bahwa arsitektur mengonsumsi lebih dari 50 % dari total energi di dunia. Itulah sebabnya kesadaran isu-isu keberlanjutan menjadi isu yang menonjol di kalangan arsitek , mahasiswa arsitektur dan akademisi. Konsep keberlanjutan praktis bukanlah sesuatu yang baru bagi beberapa negara. Konsep permukiman tradisional yang digunakan memiliki kemiripan dengan sustainability konsep. Salah satunya adalah penyelesaian Aga Bali. Penyelesaian menunjukkan bagaimana masyarakat menggunakan konsep sebagai tradisi dan cara hidup mereka.*

*Arsitektur Bali Aga dikembangkan antara 9 sampai 11 M dan sebagian besar berada di dataran tinggi atau pegunungan Bali. Kata "Aga" digunakan untuk membedakan permukiman dataran tinggi dari sisa permukiman tradisional Bali yang terutama terletak di garis bawah dari Bali, khususnya di Bali selatan. Permukiman Bali Aga sebagian besar terletak di bagian timur dan utara Bali. Desa Tenganan adalah contoh utama dari genre dan untuk kesempatan kali ini, desa yang akan diteliti adalah Desa Julah di Kabupaten Buleleng. Desa ini terletak di bagian utara Bali.*

*Mengacu pada tradisi dan adat istiadat Bali Aga, masyarakat mengakui hubungan antara manusia dan lingkungan. Arsitektur Bali Aga menunjukkan ekspresi tradisi mereka yang menjaga lingkungan berkelanjutan. Penelitian ini akan membahas tentang tradisi masyarakat Bali Aga dan bagaimana mereka diartikulasikan melalui arsitektur mereka. Tujuan dari penelitian ini adalah untuk meningkatkan kesadaran soceity modern isu-isu keberlanjutan dan belajar dari tradisi masyarakat Bali Aga bagaimana menjaga lingkungan yang ramah .*

***Kata Kunci:*** *keberlanjutan, Arsitektur Bali Aga, tradisi dan adat istiadat*

## INTRODUCTION

Sustainability issue is one of the problems that discussed by the various fields of science. After passing the 20th century people realized that the environmental quality began to decline. Global warming, climate change and the greenhouse effect are the topics that discussed recently to get a solution on how to manage sustainable development.

Protecting the environment is one of man's choices to keep the earth sustain to be handed down to the next generation. Through the advance of science and technology, the modern architecture tend to exploit natural resources to meet human needs. Actually architecture is one subject that plays an important role in protecting the environment. Architecture is one of the largest energy users in the world through the exploitation of natural resources used to develop building materials, more energy is needed to operate the buildings (Former and Guy, 2005) With the increasing standards of comfort demand by building users, energy consume and resources needed are increasing too. Recent decades scientists have begun to look for alterna-

tives to reduce the energy consumed by buildings, such as the low energy lighting (LED), green air conditioning, recycle materials, renual energy such wind, sun light and other materials that gives minimal pollution on the environment.

Sustainable architecture has been developed since the last three decades, but has not reached the goal of the concept of sustainability architecture. Many profesional architects ignore the influences of their design to environment and resources. But on the other hand contemporary architectural practice tends to 'confuse', rather than 'reinforce', an ecological friendly architecture (Wines 2000: 11 in Former and Guy, 2005).

Vernacular buildings are considered to be the reflection of human civilazation that is more resilient to the modern change and have been handed down to the next generation by pratices. Vernacular architecture which created by local soceity mostly applied sustainability concept, event they did not have intention of sustainable development. Through tradition they regulated the relation between man and environment. Julah is one of the ancient villages in northen part of Bali. Julah village had been well known as an important harbour during Warmadewa dinasty in 9-12 AD. The local peopleJulah community have tradition that regulate relation of man and environment. The village and architecture still exist until recent time and they still traditionally keep the harmonious relationship with the environment.

## THEORY / RESEARCH METHODS

Julah is one of five ancient villages that located at Tejakula district at eastern Buleleng regency (see Figure 1). To reach this village we can go via Bedugul to Bulleleng city and it takes about three hours from Denpasar or we can also go through Payangan going Notrh and we will arrive at this village from eastern side. Julah Village is easy to find because the location of the village is on the main road toward the eastern Bali.

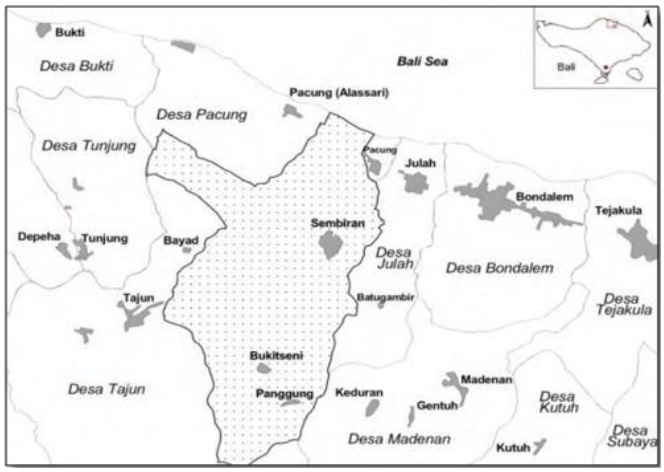


**Figure 1.** Map of Julah Village and Other Villages around it
Source: Hauser-Schäublin, 2008, take from: BAKOSURTANAL 1999

For this study, data collection were done through observation into the village to study the settlement and the architecture. Interview was conduct with the head of community (*kelian desa adat*) and members of the community to understand their tradition on architectue. For this paper, types of information gather in the field are building typology, building materials and technology that is applied by local people. All this information will be analyzed by using interpretation approach so we understand the sustainability concept of Julah community.

## RESULTS AND DISCUSSION

### Sustainability and Architecture

Sustainability is discussed not only by scientists but also by politicians around the world. Sustainability is problems for elites, but also an issue of human being such as traditional societies, social organizations or anyone who wants to maintain the environment for the future. The definition of sustainability is still debatable, for example the use of woods for building material. Sudjic 1995 states that: using the wood need a bit of energy and the use of aluminum requires a lot of energy to produce it, but the wood cannot be recycled, and aluminum is easy to melt and reuse it. Between this two materials which are considered as a sustainablele material? To understand sustainability architecture should be seen in a broader context and involves many fields of science.

As Jamison argues, sustainability is not related with practices only but can interpret it from scientific side. He questioned the definition of being "green knowledge" that is, the ways that different producers of knowledge take their point of departure, their problem formulation, from different aspects of reality. By focusing on the process of making environmental knowledge we can avoid setting up bipolar oppositions between different paradigms of thought: the light versus dark green architects or the sociologists versus scientists (Jamison 2001: 32 in Former and Guy, 2005).

Debates and discussion about what sustainability architecture is haves been done in the last three decades, but the result may not satisfy many people. Many architects try to obliterate their responsibility in destroying environment and nature, but some of them are still confused in understanding sustainability architecture. Sustainability Architecture has a narrow focus on energy efficiency. The Brundtland Report of 1987, the Earth Summit of 1992 and the subsequent Kyoto Protocol of 1997 have tended to be instrumental in framing the environmental problem in the macro-physical mainly terms of greenhouse gas emissions and ozone layer depletion. The main outcome sustainability architecture is continuing emphasis on improving physical performance generally and the efficient use of energy in particular. (Former and Guy, 2005)

## Tradition in Vernacular Architecture

Vernacular architecture is the property of a place, and an expression of local or regional dialect. Vernacular architecture is an expression of the human relationship with the environment. Vernacular architecture is the text, in which people save their knowledge in it. Traditions and architecture have a close relationship in which traditions creates architecture and it works the orther way within architecture there are traditions to tell. Traditions that use as reference in vernacular buildings and some times force certain authority and sometimes applying unwritten codest. Tradition is a reference to the past, therefore tradition is fixed idioms, but as a social structure tradition is often re negotiate by next generation in every community (Bronner, 2006).

Tradition can be seen in either a cultural context or be seen as a text, because architecture is a medium to express their comprehension of the environment (Schulz, 2000). Tradition in a society is a convention that has been agreed upon and considered ideal by the community itself. Tradition has a long process of trial and error and is considered as something that best suits for the community. Tradition passed on from one generation to the next, and in the process of inheritance tradition is always a process of reinterpretation by future generations and do justification to adapt the needs of the community. Tradition is not something static but dynamic following the development of the society (Bronner, 2005).

Using the model of linguistic vernacular, tradition can be seen as a local language to get the respect due to the use of frequent and long. Local knowledge is important because it has been accepted by the community and has inherited and has been tested in a long period, and may get various impact of public perception on certain environmental conditions.

On material culture, tradition relates not only to building skills and how the process occurs, but also how science was inherited, adapted and passed on to subsequent generations. In the broader context of the variations that occur through space and time, but the pattern can occur in identification that can be mapped. Vernacular building has weak characteristic in terms of theory and aesthetic pretensions, but the vernacular usually work with a footprint and a micro climate, respect for others and their homes, and therefore to the total built environment, working in an idiom with the given order. Although vernacular buildings always have limitations, but at the same time they can suit for variety of situations be and able to create a place. With all the limitations of expression, vernacular buildings are able to make the communication possible, and one must learn to communicate with language, beliefs and shared vocabulary (Miller 2007: 28)

Vernacular architecture typically has almost the same expression, the actual difference is allowed, but in traditional society togetherness and equality is something which is considered important because of the differences in the expression of architecture is still given a chance but on a small scale and are not dominant. Tradition as a social construction shows little changes, therefore if there are major changes in the tradition may be an indication that there is a greater change in the social conditions of the people (Bronner, 2005).

## Bali *Aga* Architecture

### History of Julah Village

The terms of "*Aga"* derived from ancient Javanese language, which means mountain or hill. Bali *Aga* is used to distinguish the Balinese cultures of mountainous regions from orther regions of Bali. Reuters says there is no empirical data that distinguishes coastal and mountain culture, because there are some Bali *Aga* village located in the down land. Terms *Aga* only to distinguish the Bali *Aga* culture that flourished in Bali from the point of view of the down line of Bali (Reuter, 2005)

History of cultural development in North Bali is some how different from South Bali. Bali's northern region has long been in contact with outsiders like China, Arab and Bugis. In this area relics are found from the pre-Hindu bronzes and heritage and it seemed that it was at times when political and economic power was dominated in northern Bali (Pringle, 2004:6). Bali's northern region especially Julah, Pacung and Sembiran attract many ethnographic researchers as they are considered as one of the remaining part of the development of the original pre-Hindu culture, that is still survived, still displayed feature animistic and not in contact with the culture of the 16th century eastern Java (Schäublin, 2008).

Bali *Aga* culture develops around age 9-11 AD, as written on 20 bars of copper inscription found in the village of Sembiran. This relic coverred about six royal records, and in this inscription it mentioned Julah had complex social stratification. In the inscription the village Julah was part of the mandalic state or *"Balidwipamandala"* or one of the seven states *"sapthanagararari"*. At that time people of Julah consisteds of several levels of community groups (*candha*/caste) and also mentioned about priests and monks as Siwa and Buddhist priests are called to *mpungku cewasogata rsi* (Schäublin, 2008).

According to archaeological evidence found in Julah, the village used to be a port and an important international market for ruling the kingdom in Bali at the time and was one of the spices trade routes in Indonesia. At certain seasons the ships from India, China and Arabian landed in Julah to trade goods. Interaction between Bali and foreigner have occurred approximately since 2000 years ago, but until now archeologist could not be determin exactly where the location of the port is. According to folk stories obtained seaport located around Pura Sang Hyang Marek, because the place is still known as the customs (Schäublin, 2008: 15). In further developments during the reign of king Sri Maharaja Jayapangus, Julah was told as the region of the kingdom defence (*Julah pinaka pagar ida ring nagara*), and therefore the people of Julah were exempt from paying taxes. Location of Julah village is close to the coast causing this village are suffers from robbers, and their refuge Upit and Batu Gambir. The name of "Julah" is taken from the words in-tantrum (expelled) who later became Julah. According to information from the interviews, but the name of this village is Kerta Sari Wringin (interview with Julah officer: 2013). Based on interview with the head of the village, indigenous village name wa Cutak at first, turned into Cakrasari, Ponjokbatu and became Julah.

## Architecture of Julah Village

Julah village sometimes include into the group of Bali *Aga* village, although the location is not in the mountains, but on the waterfront of northern Buleleng regency. But Julah is also categorised into a group of Bali Mula village, the settlement seen as a native resident of Bali (*mula* = the original). However, there is no empirical evidences have been found to prove this theory. In this paper Julah village incorporated into the Bali *Aga* village as it develops at the same time in 9-11 century AD.

The settlement pattern of Julah village is gridding, but if we seen it from the main acsess of the village it canbe seen as a pole pattern. The Julah settlement use the main road as an acsess to the main temple Pura Bale Agung. According to local cosmology, the road showed an expression of *kaja-kelod* (*kaja*=mountain; *kelod*= sea) axis. The settlement consist of three or four layer of housing site, and they located in the left and right sides of the main road. Every layer is devided by narrow streets/gangways where the main gate of the house is located. All of the streets are connected to the main road, like nest of spider (see Figure1 and 2).

**Figure 2.** Maps of Julah Village
source: Laporan Akhir Dept PU

The residential units consist of several stages, one structure for the kitchen, one for residential building and the other structure is design as a place of worship. In some houses another structure was added,which is called *bale sakanem* (building with six columns), the function of the building is *sumanggen (sumanggen* is a multi porpuse building). The configuration of this three buildings are based on the cosmological concept of Julah tradition, that is implementation of the *kaja-kelod* axis *Kaja* side of the site is a position to place worship/*sucian/sanggah kemulan* and side kelod is for kitchens. These buildings should be in the same axis and the line of sight. While residential building its position in the kaja side, and be located on the left, right or in front of *sucian,* adjusted to the width of the site. Site of the house consist of 3-4 dwellings unit, and between these families, they usually have family ties.

These building units lined up from the entrance to the east or west without a border between the household units and in the middle of the structures will form an

open space called *Natah*. *Natah* serves as a common space, circulation paths and places to social activities among family members. On the back of the kitchen there is usually a pigsty, a place to put the firewood, or garbages, etc.

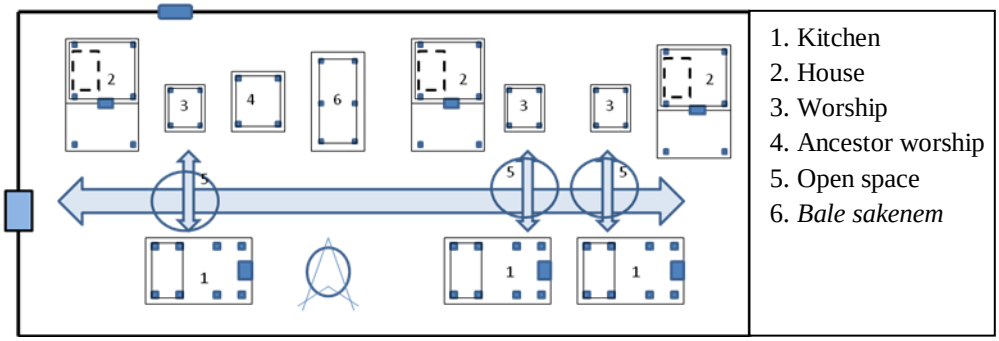


**Figure 3**. Pattern of Household

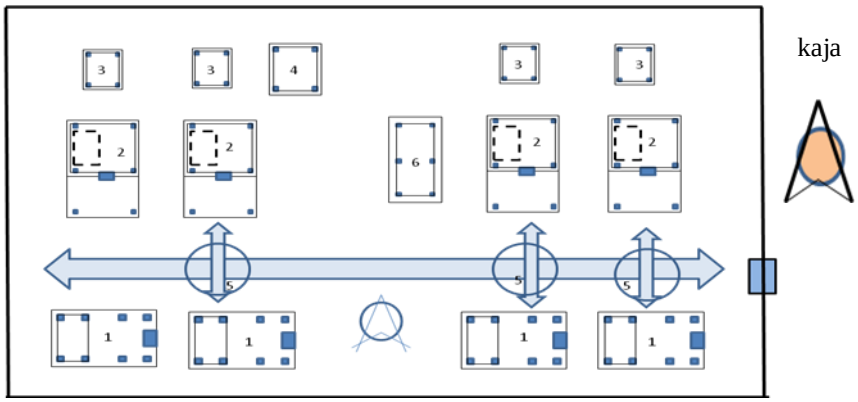


**Figure 4**. Variety of Household Pattern

The meeting point of the two axis were the place where people perform *pemendak* ceremonies (*pemendak* = sacred welcoming). The meeting of axes is considered as the meeting point of *catus patha* meeting point of the horizontal and vertical axis. This point is the centre and place where people symbolically connected with God through prayers and offerings.

Pattern of the three buildings have been prepared using the concept of *luan-teben* (upstream-low). Upstream direction is the direction of the mountain / *kaja* which is believed to be the holliest value, while *teben* the direction towards the sea is the lowest value. The architecture of the Julah where kitchen and *sucian* play the key role to determine the position of the other buildings. Spatial concept of kitchen and worship must face each other to form a strong *kaja-kelod* axis.

**Tradition and Expression of Julah Architecture**

A sustainable neighborhood is an ideal vision of environment. However when making an ideal architecture and built environment we have limitations and constraints. Climate condition and the availability of resources are the main constraints for human to develop a better architecture. People have to adapt the resources in habitat and climatic conditions because vernacular architecture is an expression of the choice made by the people and the possibilities offered by the environment (Schulz, 2000).

The structure of the Bali *Aga* architecture are mostly using organic materials and the size of the buildings are quite small. Couples that had married in Julah are not allowed to live with their parents, they must built a new house. The chance for the spouses to build a new residence must not exeed the time permited which is three years. This tradition is still followed untill recent generation. In time being after the couple raised their family and their children already married and the spouses were dead, the building should be left without inhabitant. The sons of spouse are not be willing to live in their father house before completing a certain ceremony and because of this tradition therefore building for dwellings are quite small.

The construction of a residential unit should start by made a kitchen. After a well-established family, they built *sucian* and the last structure to be built will be a bed room unit. By the time when the newly married just had a kitchen, the domestic activity started to be carried out in the kitchen including sleeping, cooking and for praying. The kitchen is a structure with 8 poles/pillars. The building dimension is about 2 x 3 meter. Fire place is put on the west side and halls on the east side of the building. On the top of the fire place is the rack to put stuff and also to lay offerings during Galungan holiday. Pole is made of wood, and walls made of woven bamboo or woven palm leaves (see Figure 5 and 6).

**Figure 5.** Front Facade of The Kitchen
Source: field survey, 2013

**Figure 6.** Row of Kitchens in A Site
Source: field survey, 2013

The expression of sacred buildings of worship is not done by making a large building, vertically or using a lot of ornaments. In Julah public worship seen as medium for doing offering to their ancestor but not as a house for God as we seen in Balinese architecture in downland of Bali. That is why they demolished the building after the owner passed away. This concept is distinct from south Bali, where the *sanggah*/worship should be maintain and inheritance to their childrens. In addition to *sucian* in some places there are worships which is called ancestor worship/*sanggah misi* (*misi* = someone/something inside) (see Figure 7). The building is made if the family or family members get sign through dream or other ways that their ancestors are willing to placed in the worship. Then the family groups make a place of worship besides *sucian* and *sanggah misi* belongs to a family group/clan.

**Figure 7**: *Sucian* and *Sanggah Misi*
Source: field survey, 2013

The type of residential buildings are the followings: *bale jajar, bale umpak, bale sedandan, bale meten and bale jait* (see Figure 8 and 9). The residential buildings are named according to the amount of poles and its structure. *Bale jajar* are mostly used for residential unit. *Bale jajar* is building that has six poles and half of this building is enclosed by brick wall and the other half is terrace. The function of this building is for sleeping and working.

**Figure 8.** Bale Jait, Building with 12 Wooden Poles
Source: field survey, 2013

**Figure 9.** Bale Jajar (Building with 6 Wooden Poles)
Bale Meten (Building with 8 Poles)
Source: field survey, 2013

## Sustainability Concept of Bali *Aga* Architecture

Before developing ideas regarding sustainability Naess made a statement about deep ecology and he said that people should think about the ecology in different view-points. Ecological problems cannot be solved only with a technical solution, but must be solved holistically and look at the problem from the point of view of other people/other species (Naess. 1989: 4). Although these concerns are certainly nothing new in architecture, the interweaving of the concept of 'environmentally friendly' with resource efficiency has tended to be a defining characteristic of the environmental debate since the energy crisis of 1973.

Tangible factors that influence the form of vernacular architecture are availability of materials, technology that owned by soceity and geographic condition (Rapoport, 1969). On the other hand socio culture also is one of determine factors in building form. Principles of sustainability architecture are concern about sustainability of supply for building material, minimize in using enegy, and applied of 4 R (reuse, reduce, recycle and replant). For Julah architecture all these principles are not studed in term of quantitative analyse, instead will be analysed in order to find the concept of sustainabitily of residential building inJulah Village.

In Julah architecture the type of materials that is used are organic materials such as *Intaran* wood/*Nimba* wood (*Azadirachta Indica*), coconut and bamboo. For wooden column they mostly used Intaran woods and this species are grown in dry land. *Intaran* woods are common building material in Bali *Aga* culture. These materials were selected by soceity, because these are offered by nature and there are plenty in their environment. All materials that exert over building are provided and made by the user/owner and local workers. By this tradition skills and knowledge of making building are transferred to next generation as a process of apprenticeship. By providing almost building material by themselves is one of ecology concept, because we just exploit nature as much as we need (Naess,1985). For keeping Intaran wood sustained, offering that made for certain ceremony in the temples and house shrine should add with Intaran leaves, so every house hold must planting Intaran trees in their yard or in their farm. Intaran trees have many advantages such as for medicine, for wind barrier and can fertile the soil. Environment is maintained with the concept of providing all of its own needs and replant trees that have been felled for the building. Environment is considered as a partner to be maintained so that its continuity can be used by the next generation.

In making building for residential, people of Julah have some considerations. Many of them have capability to build big or grand houses, but they deny to do it. Making a big house become a burden for their offspring, because their children should have to implement the same building as their father's. Beside that a house is built just for a life time and not allowed to inheritance to their children. Small buildings only need small amount of resources and caused less exploitation to the nature and by using organic materials, it minimizes pollution to the earth. In practices Julah community only developed small buildings for their houses, even for their shrine. In vernacular architecture sacred institution have an important role in the soceity, but they dont expressed it by making big and grand building for shrine as we see it in the downline of Bali. Sacred building for the house hold is small, simple and with minimal ornament.

The house are not used for articulating the financial capability of the soceity, which keep them away from jeaulousy in the soceity. According to inscription found, it is said that once Julah community had many of layer caste and this condition made people stratified. To solved this problems, Julah make concensus that every body in Julah should take off their caste and lived as common people and all can call themselves as *jero*. One of the architecture task is to improve the quality of human being and by making a similar building by discouraging them to create distinctive building. This create peace for the community. Sustainability is not only to keep earth sustained, but should be give opportunity for the people to create better live.

As mentioned above that every site of houses is consisted of 4-5 house holds and it has one main gate and they share open space/*natah* with the orther member of the family. With this kind of building lay out, every single person in that site should respect each orther and create high tolerance between themselves. Respect and tolerance are way of life of the Julah community, respect for human being, the nature, all species and always be tolerance to other human and to the environment. By this way of life people adapted, modified their practices, ajusted their norm and choosed

better posibilities offer by environment. These concepts are the way that we could sustain the nature.

Concept of sustainability architecture is mostly applied in physical performance of the building, and energy efficiency is the emphasis of this concept (Farmer and Guy, 2005). Tropical climate is hot and humid, so most of the people stay outside in the day time. Julah village are located near the sea and according to the geologic characteristic is dry land with stones, the village does not have wet rice field, but only dry field which planted with trees such as mangos, coconuts and corns. The climate is hot with salty wind. Julah community mostly are farmer and they do their daily work outdoor or in the field, so the building function mostly as a shelter for sun heat, that is why most building are opened. Their activity mostly done in open space/*natah* that roofed by coconut leaves or under the shade of the trees and they are moving around open space/natah according to direction of the sun light. This practices maybe in contrast with modern life style, where we spend most of our time inside the building, and we consumed more energy for air conditioning, for lighting, etc. Bali *Aga* architecture does not consume much energy to operate it, if they stay out side most of their daily time, enclosed building usually dark because they use it just for sleeping .

**Figure 10.** Slate Stone for Property's Wall (left) and
Organic and Non Organic Utensils (right)
Source: field survey, 2013

The concept of reused material is not suited for Julah architecture, because according to their tradition is not allowed to use building material that have been used. Building material have to be new and not defected materials. If it turns out known that the building material are defective, the building should be demolished and replaced with new ones. This action seem to be contrary of the sustainability concept. But the concept may be developed based on life time of the timbers. They are mostly use ordinary timber like Nimba woods and this material do not have good durability, that is why concept of reuse are not allowed in this soceity to guarantee safety for the people. Beside forbidden for using defected material, Julah community also have tradition that the building should not be exposed to "catastrophe", and this statement make sense that the community is very careful and meticulous. If a house or part of a building is exposed to fire only slightly, the building should be demol-

ished and replaced with new ones. This tradition express that Julah community have high awaeness of catastrophes to secure for the people and buildings.

### Learning from Traditions of Bali *Aga* Community

In western world architecture is more considered as a container of human activities, but for Balinese people especially Bali *Aga* community architecture is a part of nature and cannot be separated from it. Human have a responsibility not only to himselves but also on their surrounding. Keeping environment sustainable is not only physically, but also spiritually through the process of ritual ceremony. Environment in some reason some times is considered spiritually dirty or *cuntaka*. When this happens, the community will hold spiritual cleansing ritual for the environment. The dirty condition according to local tradition such as some one have twin children, some one die, or catastrophe. During this condition, every community members is not allowed to conduct any ritual even in their house and the *sucian* and Bale Agung temple are closed. After certain times they have special ritual to clean the environment. By this customs and traditions, local people try to harmonize between people and enviroment.

Although architecture and settlement of Julah were developed in the period of ancient Balinese culture, however sustainability concept seem remain suitable for this era. There are some kind of knowledge that we can learn from the tradition of Julah community:

1. Environment is considered as a partner not a resource that can be exploited for the benefit of human being. Human needs are increasing slightly and some times un limited so that the environment become exhausted. Environment must be seen as partners where people take some resources from nature and give back by replanting trees, minimize pollution, do cleansing ritual or minimize their needs. By these action environment are keep it sustained.
2. Respected to the others (nature, human and other species) and see them as partner is one of the concept of deep ecology and it can be applied where ever we live. Respect to each other also means that respect to the diversity of culture, customs, traditions and give more chance to local authority to decide what they need and how to sustain their environment.
3. Minimize human need and does not use houses or architecture as a media to articulate economic achievement. Every body have the same right and duty to sustain the environment.
4. Try to fullfill all needs, by this action people will try to replant trees, reduce the needs, recycle waste material. Application of these concepts will keep environment friendly.

## CONCLUSIONS

Sustainability is not a simple concept, but sterm from the interaction between a wide range of factors. An ecological approach should be seen as how people doing their

tradition, practices in constructing houses, values that added in their architecture and the social organization of the people. Built environment of the soceity are reflection of orders of environment and comprehension of the universe. In developing sustainability concept, we should not ignore local culture and ecological diversity and develop it from the comprehenssion of the people about their environment.

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