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## LOOKING AT RELIGION AND FARMLAND PRACTICES IN BATUKARU AS LOCAL GENIUS FOR FOREST AND WATER CONSERVATION

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### Abstract

Religions practices are based on believe in God and thanks God for their blessing which is known as sradha and bhakti. Duties to thank God for their blessing may be expressed as ritual or attitudes that represent respects to people, environment and God. Batukaru temple, as one of 6 biggest temples in Bali, performs a routine ceremony every six month in Manis Galungan Day. It is believed that Batukaru temple is a holly place to pray God for it power to conserve natural resources which is locally known as Sang Hyang Tumuwuh. Beside of main temple, there are at least 5 sites or temples in Batukaru that are related to water and plant growth. Thus, religion activities in this temple could become an excellent insight to conserve forest and water. This temple is located on the feet of Batukaru Mountain in a relatively conserved forest which indicating that people surround the forest highly respect and look after the forest as parts of holly area of Batukaru temple. Rituals, that are usually performed, could inform and educate people about the important of natural resources. However, although ceremonies are usually performed in unflinching faith to the God, the increases of daily spending in current economic development affect people attitude toward environment, particularly agricultural practice on farmlands. Without sufficient knowledge on soil management, economical based agricultural practice could eventually endanger environment and people. It is concluded that water conservation can be improved by conserving local genius and improving agricultural practices in farmlands.

**Keywords:** Religion practice, local genius, Batukaru, agricultural practices.

### Introduction

Batukaru temple is located in the forest on the feet of Batukaru Mountain probably because it is believed that mountain is viewed as a holly place. It is reported that this temple was built in 11<sup>th</sup> century by Mpu Kuturan and was aimed to motivate people to keep the existence of soul, oceans, forest, earth and peoples (<http://www.pawongan.com>, Gobyah 2007). The uniqueness of Batukaru area is that most rivers in Tabanan and other regency are originated from this mountainous area. Furthermore there are 3 lakes, in the area nearby Batukaru Mountain, i.e. Beratan, Tamblingan and Bulyan (Fig.1). Since sustainability of fresh water is depended on trees, conservation of forest in this area is crucial for sustainability of water supply for some regency in Bali.

In agreement with the important of forest conservation and possibly in accordance with the purpose of temple establishment, people who enter Batukaru temple are traditionally subjected to some conditions such as no one are allowed to enter the temple under condition that is regarded as “disturbing”. For example, women during menstruation, children under ca 7 years old and people under condition of misery (locally known as cuntaka), are not allowed to enter this temple. These conditions have to be obeyed by pilgrimages or visitors in order to keep the holiness of the temples.

Those kinds of conditions have been practiced traditionally for a long time and are still practiced in this present time. Every child, particularly in the village nearby Batukaru temple or someone who visit the temple for the first time, are told story which basically advise them to keep the holiness of the temple. This kind of practice is applied not only during ceremonial days, but also as an attitude in daily life. For example, Balinese people are advised to respect other people, environment and God. This attitude has widely been known as Tri Hita Karana. This paper is looking at religion and agricultural practices which is related to forest and water conservations in Batukaru area.



Fig.1. Batukaru temple is located in forest on the feet of Batukaru Mountain.

### **Religion practice which related to conservation of natural resources**

Almost every day Balinese people make offering as thank giving to the nature or God that have made life better, particularly a healthy environment to live. It is not surprising that visitor can see people who bring offering to the paddy field, lake, farmland, spring water, rivers, etc.

Water is viewed not only as important parts of the ceremony for a media of God blessing to the pilgrimages, but also as important parts in daily life, such as agriculture and domestic uses. So, offering that is made as a way to thank God for the sufficient supply of fresh water is frequently performed. According to a member of temple committee, beside the main temple, there are at least 5 temples in Batukaru area that is related to water and plant growth, i.e. Pura Beji kauh, Pura penyaum, Pura Jero sasah, Pura Pengubengan and Pura Petaangan. Each of these 5 temples has different ceremonial days. So, ceremonial day is different from ceremony that conducted every 6 month in Pura Batukaru.

In pura beji kauh, which is located in riverside, ceremony is perform to respect God in relation to the present of water in the river. Ceremonial day is usually informed by local traditional authority (kelihan adat). During this ceremony, under direction of priest or local traditional authority, people were informed to make offering to prey in river. Pura Penyaum is a place to perform ceremony at the time when rice seedling in paddy field has just emerged from the seeds. So, ceremonial day in this temple is about the time when farmer is sowing rice seeds for growing seedling. Pura Jero sasah is located more than 500 m from main sites of Batukaru temple. Ceremonial day for this temple is performed at the time when farmer in rice field is transplanting rice seedling into rice fields. The other temple is Petaangan and Pengubengan which is located very close to main site of Batukaru temples. Ceremonial day in this temple is performed when rice is already mature and almost ready for harvest. These ceremonial time clearly indicate that Balinese people has a great attention, traditionally, on the development of plant, particularly rice. This ceremony could become a traditional activity to educate people on the important of keeping optimal conditions for plant growth.

The other ritual that has been performed in Batukaru temple is Wana kertih. This ceremony is particularly aimed to thank God for the conservation of forest. All of this ceremonies are clearly indicated how Balinese people via religion practices highly concern on sustainability of natural resources particularly for fresh water and forest.

Interestingly, Batukaru temple also has water reservoir which is locally known as Danu or lake. It size is about 10000 square meter or one hectare. It is remain unclear whether this reservoir is a complement of temple construction since not all the 6 biggest temples in Bali has water reservoir. However, in view of environment, this reservoir has a very important function. During rainy season, this reservoir accommodate rain water, so reduce flooding. During dry

season, water in this reservoir could maintain soil moisture so very important for continuing growth of forest surround the temple.

The present of this reservoir might also indicate that Batukaru temples were built to motivate people to conserve natural resources. These high conservative insights toward natural resources then make water resources and forest is relatively conserved. This conserved area may be also due to the implementation of strict formal law from the Government. Collectively, various religion practices employed by Balinese people are a genuine insight in conserving natural resources. This local genius should be supported scientifically not only for the conservation purposes but also for the well being of the people.

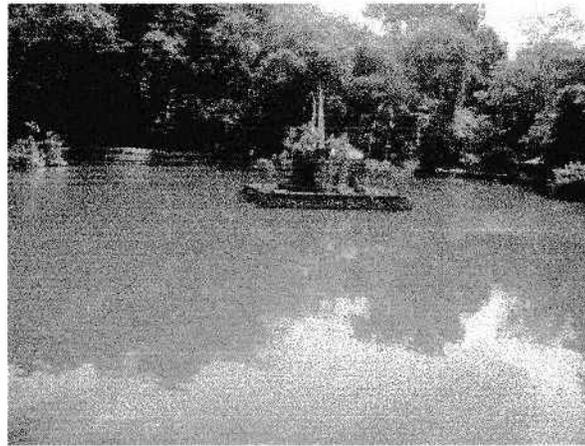


Fig.2. Water reservoir in Batukaru temple, it size is almost 1 hectare.

### **Economical demands and attitude shifts**

Although ceremonies is performed in unflinching faith to the God and is aimed to fulfill spiritual welfare, it is inevitable that economical development in this current modern situation demanding a higher cost of living. During these economical developments, people have to increase their income for longer education of their children, domestic daily spending and ceremonial spending. This economical demand more or less affect people attitude from conservative to more exploitative toward natural resources. These changes could eventually generate various environmental problems. For example, tropical rain forest is continuously decreasing by logging and conversion into other land uses (Putri 2012), fresh water crisis

because of inadequate agricultural practices and tourism industry (Suriyani 2009) and potential social conflict because of inequity fresh water uses (Cole 2012). That environmental problem, which has already been concerned globally, requires various efforts not only to conserve local genius which highly respect natural resources, but also improve agricultural practice to raise income. One option that might promise to mitigate this problem is improving agroforestry.

### **Agricultural practices in farmland**

Island of Bali is a mountainous area, so most agricultural activity particularly rain-fed farmland is performed on hillside area. This type of area is characterized by water runoff that potential to result in landslide, particularly during rain seasons. Small farmer holder in rural area well aware of these possibilities, so various techniques had been developed. One of the most fascinating techniques that had been developed was terrace system for paddy field (Fig.3). This system could direct and distributes water in such a way which avoids water runoff and landslide. The outstanding universal values of these systems have now been acknowledged as world heritages (Buckley and Wijesuriya 2015).



Fig. 3. Paddy field

In other land management, plantations on hillside were traditionally grown in mixed culture with trees. This land management is currently known as agroforestry. According to Rao et al. (2007), this traditional system is aimed to provide shade, a steady supply of food and income. In addition to that proposed by Rao et al. (2007), Balinese peoples performed agroforestry very likely because of culture and religion which need various kinds of plants for offering and trees

for traditional architecture. Cultural need to practice agroforestry is certainly favor the sustainability of environment. However, developments of agricultural practice for improvement of income may have changed attitudes from conservative into a more exploitative.

In order to raise income, agribusiness management is regarded as more appropriate. In this practice, agricultural activity is directed into the production of high yields in respect to profit. This practice is preferred because farmers have to increase their income for daily spending and for longer education of their children which is very similar to a case found in Peru (Johansson and Parsson 2012). However, this system then brought some serious impact whether economically or environmentally. Conversion of traditional agroforestry into a high yield crop production has been experienced as not sustainable (Fig. 4).

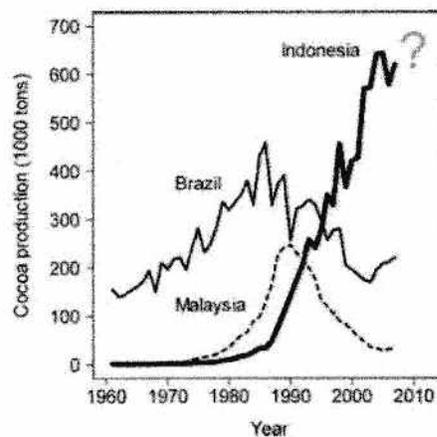


Fig. 4. Boom and bust of crop productions after shade trees were removed (Clough et al. 2009).

According to Clough et al. (2009) crops production is significantly high (booming) in the initial period after shade clearance. However, this production then decreases (bust) and it unable to be resumed. This pattern of crops productions was reported in Brazil and Malaysia for cacao plantations (Fig.4). In my own experiences, Balinese people have also experienced this type of impact. For example, production of vanilla was booming for a periods of time but subsequently decreasing to almost zero production. Cacao plantation was also produced high yield in initial period, but subsequently decreased to a very low production. The main factor that viewed as the cause of this problem is diseases. However, although various methods have been applied, crop yield was hard to improve.

Studies which were aimed to resume crop production certainly have been conducted using various approaches, such as the use of diseases free vanilla seedlings, improvement of soil fertilities by addition of synthetic fertilizers. Adiputra et al. (2007, 2008) have also conducted two year experiment in order to resumes vanilla productions. In these experiments, the growth of vanilla plants was monitored after application of various fertilizers. This experiment examined a hypothesis, i.e. slow vanilla growth is attributed by low amount of nutrient available for uptake by these plants. These experiments found that vanilla required fertilizers only in a particular dosage. Even though, after a prolonged observation, vanilla plant was then found almost totally ceased to grow. It is speculated that nutrient insufficiency is not the main cause of growth inhibition. Accordingly, in order to examine more comprehensive study on the effect of fertilizer to the plants growth, further experiment was then conducted using orchid seedlings.

Experiment that was conducted using orchid seedlings showed that inorganic fertilizer, which was applied as solution, is required only in a very low concentration. This experiment indicated that synthetic fertilizer absorbed by plant could inhibit physiological mechanism in plants seriously (Adiputra 2014). Fertilizers that had been taken up might then squeezed water from physiological machinery attributed by water loss from the plants. These experiments suggesting that soil moisture is more important for plants to grow rather than fertilizer. Difficulties in resuming crop yields after booming then has a significant effect on environment and farmer income.

In small holder farmer, decreasing crop productivity would certainly decrease income. So, in order to resume production, all possible method then applied, such as increasing the rate of synthetic pesticide and fertilizers applications. However, without sufficient knowledge on soil and plant characteristic, application of synthetic compounds into plantations may be useless and endanger environment and human health. This practice has widely concern conservationist since these chemical compounds contain heavy metal that endanger not only human health but also soil biota and environment (Dias 2012, Zwieten 2004). By contrast, diseases outbreak is hardly controlled without the involvement of the synthetic fungicide, and crop production unable to increase without fertilizers. This situation insisted smallholder farmer to plant other crop in order to maintain income.

In the period of chasing crop production, small holder farmer look at other commodity to make farmland continuously profitable, such as introducing cacao plants after the cessation of

previously grown vanilla. Introduction of this new commodity was employed with a fairly robust method during the initial establishment of plantations. It was suggested that before cacao seedling were transplanted into farmland, land cover has to be cleared such as big trees, bushes and grass (Litbang perkebunan 2010). This method has been employed in Sulawesi (Clough et al. 2009) and also in Bali. In the initial period of production, crop yield was booming, but then followed by bust, similar to that reported in Brazil and Malaysia. After this bust, cacao plantations may then be abandoned or other commodity then introduced.

In Bali, some farmlands previously grown cacao then changed into trees plantations. This plantation very likely influenced by green movement, such as one billion trees programs (Simamora 2010). This program is really an excellent effort and support for forest function in maintaining water cycles and also mitigates global warming issues. However, there is a little worry since small holder farmer may require income for daily spending. Unlike crop plants, where harvests are conducted more than twice a year, trees has to be grown for ca 10 years before harvest. This problem may then results in a shifting attitude from conservative into a more exploitative.

One possible solution is intensification of agroforestry which had already been practiced traditionally. This system might not produce yield as high as that in shading clearance methods, but environmentally much more sustainable. For example, agroforest system has been known to have a capacity to maintain fresh water cycles and soil moisture (Shaxson and Barber 2003). This soil moisture has been regarded as very important in maintaining plant growth (Coder 1999). Therefore, it is speculated that agroforestry which involving trees in production of crop is a suitable practice for sustainable environment and income for small holder farmer. Problems raised by this system should then become a priority for researcher in finding the solutions. For example, plant's disease is mostly fungi which prefer moist condition to grow. So, developing clones that resistant to diseases (Motamayor et al. 2013) is becoming more crucials. Other problem that also faced by plant grower is global climate changes which could threaten food security (Henry and Nevo 2014). According to these authors, climate changes which reduce crop production urgently require varieties-resilient breeding.

## **Conclusion**

Religion practice which thanks God for the present of natural resources has reminded and educated Balinese people to look after natural resources. However, increasing daily spending during this current economic development is slightly shifted attitude to more exploitative. Scientific aid is required to conserve local genius via improvement of agricultural practice, particularly in rain-fed farmland.

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