# The role of local wisdom in controlling deforestation

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## Abstract

Deforestation is a controversial issue for countries with abundant forest resources. Forest exploitation without supervision and control brings significant negative impacts, especially for community living in the forest area. The local community in Selat Village, Buleleng District, Bali Province is forest communities who are aware of the threat of deforestation and try to control it with cultural landscape based on local wisdom. This study aims to analyze the cultural landscape of community in controlling deforestation. Through descriptive analysis based on the survey, it is shown that the cultural landscape that has an essential role in controlling deforestation are: (1) in the form of ideas with *awig-awig*, (2) activities with the existence of *pecalang* and (3) artifact with the existence of shrine in Forest. These three forms of cultural landscape are manifestations of local wisdom that lead people to live in harmony with the forest.

*Keywords:* Local Wisdom; Deforestation; Cultural Landscape; Indonesia

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## 1. Introduction

Indonesia is blessed with one of the world's most expansive tropical forests and high levels of biodiversity. Some of the world's largest tropical forests are in Indonesia. In terms of breadth, Indonesia's tropical forest ranks third after Brazil and the Democratic Republic of Congo and these forests have unique biological riches. The main forest types in Indonesia range from the ever-green lowland Dipterocarpacean forests of Sumatra and Kalimantan, to the monsoon forests and savannas in Nusa Tenggara, as well as to the non-dipterocarp forest of lowland and alpine areas in Papua. Indonesia also has the largest mangrove forest in the world. The estimated width of 4.25 million hectares in the early 1990s.

Tens of millions of Indonesians rely on their lives and livelihoods from forests, either from different types of forest products to meet their living needs or work in the wood processing industry. This tropical forest is a habitat of flora and fauna whose abundance is unparalleled by other countries of equal size. Indonesia is also home to some of the most beloved mammals in the world, namely orangutans, tigers, rhino, and elephants.

Most of these habitats face critical threats. Indonesia currently loses about 2 million hectares of forest each year. This condition is in line with Indonesia's rapidly growing economic growth, market demand for forest products is also increasing and often has to be met quickly so that responsible aspects of forest management are often overlooked. Environmental degradation is a global issue that is very troubling because the consequences have an impact on the reduction of natural resources, damage to ecosystems, the water level rise, climate change and others (Rugebregt and Kissya, 2015).

Indonesia is a country with the most severe deforestation in the world. If drawn a century backward, Indonesia has lost 15.79 million hectares of tropical forests. According to the Ministry of Forestry and Forestry Ministry of Forestry statistics in 2015, the deforestation rate in Indonesia in three periods decreased by 2 million hectares per year during the 1980-1990s, around 1.5 million per year during 2000-2010 and around 1.1 Million hectares in the period 2010-2014. Although this figure has shown a decline, the hazard of deforestation is still threatening from irresponsible production and consumption patterns. The greatest threat to Indonesia's forests is the conversion of forests into plantations, illegal logging, encroachment, forest fires and unsustainable forest exploitation for residential and industrial development.

Deforestation is a change in land cover conditions from forests to non-forests (including changes to plantations, settlements, industrial estates, etc.). Deforestation is the permanent destruction of forests in order to make the land available for other uses.

Deforestation is generally due to the urging of land convergence for settlements, infrastructure and timber harvesting for an industry. Sasaki et al. (2011) research found about 10 variables that triggered the occurrence of deforestation: (1) land sale, (2) settlement development, (3) opening of fields/gardens, (4) searching for firewood, (5) natural forest fires, (6) ) Burning for land preparation, (7) illegal logging for commercial, (8) illegal logging for local needs, (9) plantation development and (10) natural disaster. Setiawan et al. (2015) formulated a deforestation model using logistic regression showing two main factors driving deforestation which consist of: (1) accessibility factor i.e. distance from road, distance from river, distance from forest edge, distance from Settlement and distance from mixed dryland farming, as well as social factors i.e. population density and biophysics i.e., elevation and slope. In other cases, poverty is a major

driver of deforestation, as well as unemployment, land tenure claims, proximity to forests, forestry services, household needs and disregard for government regulations or policies (Otieno and Buyinza, 2010). In addition, land conversion as a form of deforestation is due to land clearing for plantations, agriculture, livestock, and mining.

In the Forest Watch Indonesia (2001) report shows the direct result of deforestation is the loss of biodiversity, the disruption of the hydrological cycle, the dangers of erosion and the loss of livelihood. Forests are a warehouse of biodiversity. More than 80% of the world's biodiversity can be found in tropical rainforests. Losing the forest means losing the species or in other words the loss of life itself. With the loss of forest, there is no evaporation of groundwater by trees. This can make the local climate become drier. Land that is not covered by forest vegetation is more easily eroded. Erosion causes the loss of soil fertility, flooding, to landslides. In the end, millions of people who depend on their livelihoods on forests, especially for the people around the forest will become unemployed. Small-scale farming activities, hunting, gathering, collecting forest products are very reliable followers of forest communities. With the destruction of their livelihood forest will be disrupted.

There have been many studies on avoided deforestation and mitigation efforts, from a legal approach, environment to technical approach. Since the 1970s, legal remedies to reduce deforestation rates have been implemented through the Directorate General of Forestry Decree on timber harvesting procedures using the Indonesian Selective Cutting Guideline (TPI). However, the rate of deforestation grew with the average deforestation rate for the 1985-2009 period was 2.05 million hectares/year (Ardhana, 2016). Reforestation of damaged forest areas is one of environmental approach aimed at increasing the number and quality of forests through planting activities. However, reforestation efforts often have low success rates. The cause of the low success rate of reforestation in some cases is due to the lack of government socialization in reforestation activities, uncontrolled forest fire factors, lack of maintenance of planted seedlings and less desirable species (Hutagalung et al., 2014). Improvements in forest management practices are conducted through improved *silvicultural* practices and forest harvesting (reduce impact logging).

To reduce the negative impacts of forest harvesting and facilitate monitoring, the government established a *silvicultural* system regulation for forest exploitation in Indonesia. In the period 1972 to 1980, the applied *silviculture* system was a selective logging system. Since 1980, regulations have been changed and the system used is the Indonesian Selective Cutting (TPTI) system. The difficulty in implementing the TPTI system is the assessment of the final result since the age of the trees in logged-over forests is not the same. In addition, the yield per hectare of wood can be estimated to be lower than the system of Cutting-Out with Artificial Regeneration (Husaeni and Sudaryanto, 2001). Most of the approaches that have been implemented are centralized, and without much involvement of local communities.

Few studies have emphasized the involvement of local communities with local knowledge to control deforestation. Theoretically, local communities and forests have an inseparable relationship. Local people depend on forest resources for life, and the sustainability of forest ecology is strongly influenced by the activities of the local people. The process of local community living related to the forest has been accumulated experience in management for mutual living and inter-independence as the cultural landscape (Burirat et al., 2010).

One of the cultural landscapes that have managed to control deforestation is local wisdom owned by local communities in restoring the conservation of Puncak Landep Protection Forest, Selat Village, Sukasada District, Buleleng Regency, Bali Province. This protection forest from 1988 to 1999 had encroached 25 Ha of forest due to the cultivation of shifting cultivation and smallholder cultivation (Sunderlin and Resosudarmo, 1997). Forest encroachment that occurred in 1988 to 1999 caused damage to these protection forests and caused drought. Recognizing this disturbance due to deforestation, local communities have created a new cultural landscape capable of controlling deforestation and living in harmony with their protection forest. On the other hand, the local community recognizes that the forest is an important resource. The forest plays an important role in the lives of the local communities as they mainly obtain numerous benefits either as direct or indirect benefits (Su et al., 2011). Local forest management is essential for enhancing the sustainability of both communities livelihoods and reducing emissions from deforestation (Awung and Marchant, 2016). Therefore, local communities need to manage forest resources to avoid negative impacts of deforestation. This is evidenced by the data of security disturbances, which include the occurrence of fires and illegal logging in the Buleleng Regency forest area in 2013 which shows that only forest areas in Kecamatan Sukasada are not deforested as shown in Table 1.

**Table 1.** Security Disorders of Forest Area in Buleleng Regency in 2013

| No | Forest Areas in District | Forest Fires | | Illegal Logging/Stealing Forest Resources | | |
|----|--------------------------|-------------------|-------------|-------------|-------|-----------|
|    |                          | Frequency (times) | Volume (Ha) | Volume (Ha) | Trees | Wide (m³) |
| 1  | Gerokgak                 | 7                 | 99          | 2           | 27    | 6.7141    |
| 2  | Seririt                  | -                 | -           | 1           | 5     | 6.71      |
| 3  | Tejakula                 | 1                 | 5           | -           | -     | -         |
| 4  | Banjar                   | -                 | -           | 2           | 26    | 30.37     |
| 5  | Busungbiu                | -                 | -           | 7           | 39    | 51.85     |
| 6  | Kubutambahan             | -                 | -           | 1           | 8     | 1.64      |
| 7  | Sukasada                 | -                 | -           | -           | -     | -         |
|    | Total                    | 8                 | 104         | 13          | 105   | 97.41     |

*Source: Forestry Department in Buleleng Regency, 2014*

The focus in this study is the exploration of sustainable forest management based on local wisdom. The specific objectives of this study are:

- To analyze local people's perceptions of local-based wisdom deforestation control
- To study of ideas, activities and artifacts as a cultural landscape that local people have in controlling deforestation in North Bali forest areas, especially in the Puncak Landep Protection Forest in Selat Village, Sukasada District, Buleleng Regency, Bali Province.

## 2. Methodology

This research uses descriptive research design which is based on community activity of forest area in Selat Village. The variables analyzed in this study are related to the perception and cultural landscape of forest

area in Selat Village, Sukasada District, Buleleng Regency. The target groups are 86 people who live in areas directly adjacent to protected forest areas in Selat Village. These were derived from the purposive sampling.

The data collection in this study consists of 2 techniques. First, structured interview techniques to target groups to get information about people's perceptions of the cultural landscape to control deforestation. Second, by observation technique by observing the cultural landscape contained in the location of the study directly.

The data have been analyzed descriptively qualitative. Descriptive analysis to reach conclusion from the concrete data or perceived evidence in the practice of community forestry.

## 3. Result

According to the anthropology science, culture is the whole system of ideas and taste, actions, and works produced by humans in the life of society, which is his own in learning (Koentjaraningrat, 2009). The form of culture is a series of actions of patterned human activity. Representation of the form of culture is the existence of ideas and behavior in the living order and produce products in the form of personal expression, means of life, and value in the form of birth (Kurniawan, 2012). J.J. Honigmann in his book The World of Man (1959 in Setiadi et al., 2007) divides the cultural landscape into three forms, as follows:

- Ideas, which are cultured in the form of an abstract collection of ideas, ideas, values, norms, rules, etc., that cannot be touched or touched.

- Activities, namely the form of culture as a patterned action of humans in society.

- Artifact, which is a form of physical culture that results from the activities, deeds, and works of all humans in a concrete society.

Community perception is the community's perspective on protecting forests. This arises because of certain meanings possessed by the community to protect and preserve protection forests from the phenomenon of deforestation. Local communities perception on the role of wisdom in controlling deforestation in terms of the three forms of cultural landscape, namely ideas, activities, and artifacts.

First, cultural landscape produced by the community in Selat Village comes from ideas derived from local wisdom values that have been translated into an *awig-awig* form to preserve forest and control deforestation. *Awig-awig* as a form of customary laws is a living law made by indigenous peoples as a guide in behaving socially (Astiti et al., 2011). *Awig-awig* has a philosophical foundation of *Tri Hita Karana*, which teaches on Hinduism which essentially teaches about the balance between man and God, a man with man and man with his environment. *Awig-awig* contains a set of rules both written and unwritten along with sanctions and rules of implementation (Widyastini and Dharmawan, 2013).

*Awig-awig* is a benchmark of behavior, both written and unwritten, made by indigenous peoples in Bali based on a sense of justice and propriety that lives within the community in question. In principle, *awig-awig* regulates *parahyangan* (as a reflection of the human relationship with God), *pawongan* (as a reflection of human relationships with a man) and *palemahan* (as a reflection of human relationships with the

environment). As a benchmark of behavior, *awig-awig* is equipped with legal sanctions. Therefore, *awig-awig* can be regarded as a form of customary laws, especially Balinese customary laws. As a rule of laws, in the beginning, *awig-awig* there are rules, obligations, and restrictions. *Awig-awig* as a rule of laws can function as a means of social control and also as a social engineering tool (Astiti, 2007).

Social control is a process undertaken to influence people to behave in accordance with the expectations of society. As a means of social control, *awig-awig* serves to preserve existing rules or terms and patterns of relationships. Preventively it can be done by preventing the possibility of misbehavior of community behavior or preventing situations that may cause irregularities. In addition, efforts to maintain the prevailing rules and patterns of relationships can also be taken repressively if such deviant behavior has occurred. In other words, the presence of *awig-awig* is to safeguard the behavior of society which can disrupt the balance or harmony in the living relations of the community, whether in a relationship with God, with the community and the environment, which in this context is the community's life relationship with the forest. The community's perception of the role of *awig-awig* in controlling deforestation as shown in Table 2.

**Table 2.** The community's perception of the role of *awig-awig* in controlling deforestation

| No | The Role of *Awig-Awig* | Community | Percentage (%) |
|----|-------------------------|-----------|----------------|
| 1 | As a binder of the community not to penetrate the forest | 64 | 74.4 |
| 2 | As a deterrent effect on deforestation actors | 22 | 25.6 |
| | Total | 86 | 100 |

*Source: Primary Data Analysis, 2017*

Table 2 shows that most communities in Selat Village state *awig-awig* of indigenous villages have a role to bind the community not to reach forests with a percentage of 74.4%. Prohibitions and sanctions that bind the community who commit deforestation are in the form of social sanctions and monetary fines. While some communities in Selat Village states *awig-awig* of indigenous villages play a role to give deterrent effect to deforestation actors.

Second, activities as part of the cultural landscape related to the performance of *Pecalang Jagawana*, that is Rangers that specifically work in the forest area. *Pecalang* is a traditional security group in Bali. *Pecalang* has the main duty of maintaining the security and smoothness of various activities and ceremonies of religion and custom in their area (Mahadewi, 2014).

*Pecalang* has its own tasks and functions. In *Purwadigama* Book mentioned *pecalang* obligation is as follows (Widia and Widnyani, 2010).

- *Ngupadesa*, *pecalang* must always be close to the village of Pakraman and its citizens. With close and stay in the village, this is more assured of communication in order to direct the village community.

- *Atitikarma*, *pecalang* should always give the correct instructions to the village manners. The instructions can be either direct or exemplary. *Pecalang* must provide a good example for the villagers because it has charisma and dignity.

- *Jaga Baya Desa*, *pecalang* must maintain the security of the village by doing the village mandate, do patrolling or around the village so that there is no danger

If viewed in terms of *pecalang* clothing have a very distinctive appearance and have a distinct authoritative impression. According *to Purwadigama* Book, *pecalang* must wear some of the following elements (Widia and Widnyani, 2010).

- *Maudeng*. *Udeng* is also called headbands which are required to be used by *pecalang* with special shape arrangement which means to distinguish.

- *Mawastra akancut nyotot pertiwi*. Using a cloth with the front part dropped to the ground. This is already commonplace in Balinese society.

- *Mekampuh poleng*. Furthermore, the fabric is coated with black and white cloth (*poleng*), to give the impression of the authoritative and symbolic meaning of power and supernatural power.

- *Ayungkalit kris*. Pecalang should carry a dagger tucked in the waist on the front parts.

- *Masumpeng warning*. In the ear of a *pecalang* must be inserted *pucuk arjuna* flowers.

The community's perception of the role of *pecalang* in controlling deforestation as shown in Table 3.

**Table 3.** The community's perception of the role of *pecalang* in controlling deforestation

| No | The Role of *Pecalang* | Community | Percentage (%) |
|----|------------------------|-----------|----------------|
| 1 | As a forest security guard | 56 | 65.1 |
| 2 | As supervisor of community activities in the forest | 15 | 34.9 |
| | Total | 86 | 100 |

*Source: Primary Data Analysis, 2017*

Table 3 shows that the majority of communities in Selat Village states that the *Pecalang Jagawana* as traditional forest rangers plays a role in maintaining the forest security by a percentage of 65.1%. While a small percentage of the community in Selat Village stated that the *pecalang* play a role in supervising community activities in protection forests with a percentage of 34.9%. Supervision made by the *pecalang* according to the conditions and time set in the *awig-awig*.

Third, the artifact as part of the cultural landscape is manifested in the form of a sacred veneration. This shrine is usually in the form of a shrine or use of plants or one of the sacred big trees (Sardiana and Dinata, 2010). Trees used as sacred shrines are usually worn with a black white cloth. The view of the worship place in the forest as a sacred place or the habitat of the spirits still live in the mind of Balinese people who live in

the forest. The community's perception of the role of the shrine in controlling deforestation is shown in Table 4.

**Table 4.** The community's perception of the role of shrine in controlling deforestation

| No | The Role of Shrine | Community | Percentage (%) |
|----|--------------------|-----------|----------------|
| 1 | As a symbol of the embodiment of gratitude | 46 | 53.5 |
| 2 | As a symbol of the embodiment of soul or spirit that exists in the forest | 40 | 46.5 |
|  | Total | 86 | 100 |

*Source: Primary Data Analysis, 2017*

Table 4 shows that 53.5% of the perception of the community in the Selat Village towards the presence of the majority sacred place is influenced as a symbol of the embodiment of gratitude to God for the resources. Meanwhile, 46.5% of the people in Selat Village believe that the sacred shrine is a symbol of the embodiment of soul or spirit in the forest.

## 4. Discussion

Culture is inseparable from human activity. Humans in every activity are strongly influenced by the physical condition of its territory and social community (Christiawan and Lestari, 2015). Human and forest ecology have an inseparable relationship. Humans depend on forest resources, and the ecological sustainability of forests is strongly influenced by humans. The human's relationship with forest, therefore, has been so close that they cannot be separated from the life cycle (Burirat et al., 2010). The forests are the place where humans, animals, and plants have to rely upon, exist and germinate. The control of deforestation in the form of conservation and care done by the local community comes from a cultural landscape that includes ideas, activities, and artifacts.

### 4.1. Ideas

The ideas generated by the community in Selat Village in controlling deforestation are in the form of village *awig-awig* used as written guidelines for protecting protection forest. Based on the results of the study it was found that most of the people stated that the *awig-awig* role of the Selat Village is to bind the people not to penetrate the protected forest. This is because the main function of *awig-awig* is as a guideline of society in the village of Strait in behaving. *Awig-awig* has a very strict nature of force and sanction, making it one of the binders of society in the Selat Village to remain in mutually agreed customs.

Assertiveness in *awig-awig* makes people who have committed acts of violation in the protected forest of Selat Village get sanctions that are considered quite burdensome society. These sanctions have implications for the behavior of communities in Selat Village who are then reluctant even afraid to enter the protection forest, especially doing damage to the forest.

*Awig-awig* indigenous villages on protection forest are *pawos* (article) 72 which deals with customary sanctions related to acts of forest destruction. In this regard, most communities in Selat Village state that the rules in the customary village *awig-awig* are in the form of prohibitions and sanctions if they cut or steal timber in protected forest. This is because people in Selat Village only generally know the content of the *awig-awig*. Communities in the Selat Village who are obedient to the rule generally have a principle of doing something without permission within the protected forest area is included in the offense and will get sanctioned, so that knowledge is only limited to the principle.

On the other hand, the rules in the customary village *awig-awig* are in the form of a fine in the form of money or tree planting, if it destroys protected forest. In *pawos* (article) 72 in *awig-awig* one of them regulates violations for people seeking grass, a fine of at most 500.000 rupiahs and it is worth planting as many seeds as the place to look for grass. So far the people in Selat Village have only known the rough idea of the content of the customary village *awig-awig* on protection forests without a deeper understanding of the items contained therein. It can be likened that the community in Selat Village is merely known, but because of its socially binding nature, people do not dare to break the established *awig-awig*. The use of social rules or social orders was the means for success in the management of the community forest (Burirat et al., 2010). This finding was in line with the research and reference of Sukwongs (2007) finding that the key to success in the management of the community forest by the community was that the community had the social rules.

## 4.2. Activities

The form of activities regards to the existence and role of *pecalang* as an effort to maintain and protect the protection forest from damage. Based on the results of the study, it is found that most of the people in Selat Village stated that the *pecalang* play a role in protecting the forest. The main reason for the establishment of pecalang is due to the destruction of protected forest. *Pecalang* is also intended to assist the government in monitoring the protected forests. Moreover, the number of forest policy provided by the government is very limited in controlling the area of protected forest that is wide enough. In other words, *pecalang* is an effective social organization of local community in controlling deforestation compared to forest policy provided by the government. This finding was in line with the research of (Remegie and Yansheng, 2008) finding that the local people were the primary managers of the forest management.

Another role of the *Pecalang Jagawana* is to control community activities in the protected forests. *Pecalang* every day always spend time visiting protection forests to ensure that no community is committing forest destruction or deforestation. Communities in the Selat Village who participate as *pecalang* are community representatives based on *ngayah* (non-materialistic) principles or self-interest to work and without any compulsion in performing duties and obligations as a *Pecalang Jagawana*.

Other interesting findings in this study are related to the activities of the *pecalang* which include the procurement of socialization of the community in Selat Village on the security of the forest and its security, regular patrolling twice a month in protected forest areas, holding management meetings and members each month of at least one meeting to anticipate the findings in the field, and hold reforestation in the middle of the forest or at an agreed place. This shows that traditional forest management appears far more sustainable and operational that management by the forest police. *Pecalang* as social capital is fully trusted by the community (Arta, 2012). *Pecalang* has strong strength and charisma, making it easy to keep the community obedient and orderly.

### 4.3. Artifact

The result of an artifact in the local cultural landscape is related to the sacred place. Based on the results of the study it was found that the community trust in the majority of Selat Village was influenced by the reason of gratitude. As one of the source of life needs of the community in Selat Village, especially in keeping the availability of water from expressions of gratitude or thankfulness, the community is done by giving the offerings either in the form of *canang* or *banten* (means of prayer) done every *purnama* (full moon) and *tilem* (new moon) . The existence of a functioning indigenous management system constitutes a form of social or cultural capital which can serve an important function (Remegie and Yansheng, 2008).

The worship is intended to allow the resources of protected forests to continue to be utilized by communities in Selat Village. The existence of *pelinggih* (place of worship) also needs to be preserved because it is one of the realizations of the concept of *Tri Hita Karana* is the relationship of man with God (*parahyangan*). This condition shows that places of worship within the forest have intrinsic values that are sacred, respected and revered by local communities. Sacred meaning in the context of the environment can be interpreted as a very important and strategic value in sustaining human life, while the value of worship can be translated as a cautious attitude and always be vigilant in behaving and taking decisions to explore and exploit forest resources.

The sacred place in this case not only serves as a cult but can serve as a protector of protected forests. Based on the results of the study it is found that most of the people in Selat Village agree that there are other functions to the sacred place of the majority influenced by the fear. Basically, the sacred term has a magical or sacred meaning. The existence of the sacred place relates to the place of God Almighty in His manifestation so that the people in the Selat Village are afraid to destroy the environment surrounding the area of the sacred place.

## 5. Conclusion

This study shows that the control of deforestation by local communities is a manifestation of their local wisdom. Local wisdom leads the community to live in harmony with the forest ecology. The results of the study show that local perceptions of the role of cultural landscape in controlling deforestation are made up of

ideas, activities, and artifacts that are the way communities respect and safeguard forest resources. All three have different emphases in controlling deforestation:

- *Awig-awig* as a manifestation of ideas is a customary law that binds community activities in the utilization of socio-cultural forest resources. *Awig-awig* has stronger connectivity than government regulations and policies.

- *Pecalang* as a form of activities is a social organization of people who carry out the task of controlling deforestation voluntarily and sincerely sincere without the existence of force. The willingness and sincerity of the *pecalang* in work is based solely on the understanding that forest safety is the survival of community living in the forests, including the safety of their families.

- The shrine as a form of artifact is a symbol of gratitude for the blessings that the creator provides through the abundance of forest resources. The sacredness of shrines in the context of local Hindu communities means that the place is seen as having the energy that can create harmony between people and the forest.

However, from the context of outsiders, the place of worship is considered sacred because it is believed that there is a soul or spirit that is in the place. These different understandings and beliefs are never at issue, as long as they can keep the intentions and actions of humans from reaching the forest.

The major conclusion of this study is that people have a particular way of thinking, the way to act and the way to visualize in coexistence with nature, in this context is a forest. People awareness of the natural condition is the awareness of the sustainability of human life. The destruction of nature and the resources contained therein is the beginning of human extinction. In the context of this study, deforestation is the beginning of the end of forest community's life.

## 6. Policy recommendation

- The government should sufficiently remunerate the forest organizations if they are not to be tempted to turn to the resource under their custody. This is because the government policy has been contradicted to state control forest resources and paid little attention to local community participation in forest management.

- Failure to recognize indigenous systems of forest management and local communities right to economically and sustainably access valuable forest resource leads to excessive use of primitive measures by the state to enforce forest and environmental law or policies.

- Government should train the local communities on tree management such as, cutting tree branches for fodder, fuel wood and so on referred to as looping, pests and disease control, management of trees, in hedges and boundaries, home gardens, agroforestry and afforestation, tree protection, weeding, pruning, thinning and so other train. They should establish woodlots and practice agroforestry on their personal or private lands.

- Suggestions for further research, as following: (1) should conduct the research into the methods and means in improvement of the management of the community forest of the relevant group, especially pecalang for more effective performance, and (2) should conduct the research on the models and patterns of management of the community forests and their sustainability.

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