

# The Role of Local Ecological Knowledge of Loksado Dayak Society in The Turn-Back Cultivation System

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## ABSTRACT

The negative impact of the green revolution provides valuable lessons for Indonesia to manage agriculture to be more environmentally friendly. The majority of the Laksado Dayak people work as farmers to implement environmentally friendly agriculture with a rotating system. This study aims to examine the role of local ecological knowledge of the Loksado Dayak community in shifting cultivation systems. This study uses an ethnographic approach with in-depth interviews with the Loksado Dayak community (especially farmers as research informants). The results showed the practice of shifting cultivation with a rotating system conducted by the Loksado Dayak community based on local ecological knowledge shows the values of conservation of the surrounding environment.

**Keywords:** *Local ecological knowledge, turn back cultivation.*

## 1. INTRODUCTION

The local knowledge of a farming community that lives in a specific regional environment is usually obtained based on hereditary experience. Sometimes a technology developed elsewhere can be harmonized with the environment so that it becomes an integral part of their farming system. Farmers' knowledge about how to farm based on ecological principles, by [1] named as Traditional Ecological Knowledge, abbreviated as PET. This term describes community knowledge that is in harmony with both native culture and the environment and cultural practices in which the knowledge is formed. Local Ecological Knowledge is a basic resource that depends on observation, experience structure and function, and is related to priorities and farmer practice.

Farmers' practical knowledge of local ecosystems, about natural resources and how they interact with each other, will be reflected both in farming techniques and their skills in managing natural resources. Indigenous knowledge is not only limited to what is reflected in the methods and techniques of farming, but also includes the understanding (insight), perceptions and conscience or feelings (intuition) relating to the environment that often involves calculating movements moon or sun, astrology, geological and meteorological conditions.

Ecological wisdom in the context of a number of knowledge related to local community activities can illustrate adaptation patterns that play an important role in the success of their agriculture [2]. The exploration of the ecological knowledge of the local community, especially among the Loksado Dayak community is expected to have positive and strategic implications for preserving the environment and its natural resources to support their survival.

According to [3] Ecological knowledge is basic knowledge that is used to understand the relationship between humans and nature, the relationship between human activities and events in nature that have an impact. Knowledge to be able to take action to restore the capacity of natural resources and be able to assess the impact of development by humans. This can be used as an understanding by humans to be able to behave wisely in managing natural resources, so as to maintain the balance of the ecosystem and reduce the risk of environmental damage. Meanwhile according to [4] Ecological knowledge refers to an intense relationship between nature and humans that is dynamic and cumulative. The relationship between humans and nature has an impact on the construct of knowledge that is built.

The interaction of the community around the forest with the forest is an effort to meet the needs of life [5]. Community beliefs, understandings, experiences and habits lead to behavior in ecological communities. Behavior and experience in meeting the needs of life gave rise to knowledge systems that are related to social or environmental or ecological [6]. Communities around the forest have an understanding and habits as knowledge in the activities of utilizing natural resources. Knowledge based on these ecological principles constitutes capital in the management for sustainable use of natural resources [7]. Knowledge based on ecological principles is referred to as Local Ecological Knowledge [8,9].

Local ecological knowledge of the community can be defined as an understanding of the local community that is obtained based on the experience and observation of the community about a matter [10]. Knowledge of human local ecology is influenced by human ecological intelligence on the environment. Human ecological intelligence is a form

of empathy and a deep concern for the surrounding environment, as well as a way of thinking critically about what happens in the environment due to our treatment [3]. According to [11] the people who live around the forest succeed in protecting critical land through conservation efforts. Local people are considered to have the knowledge, information and incentives needed to manage and conserve the forest resources on which they depend [12].

The shifting cultivation has been carried out since 10,000 BC by indigenous peoples. Many assume that shifting cultivation is a primitive activity that destroys forests. However, in some cases, shifting cultivation can actually maintain the biodiversity of the surrounding ecosystem [13]. Shifting cultivation is the traditional culture of the people found in almost every island in Indonesia, including South Kalimantan.

One area of South Kalimantan that still uses the shifting cultivation system is the Loksado area by the Meratus Dayak community. The name given to their system is not shifting cultivation but turn-back cultivation which has a more positive connotation. They have a system of knowledge about the management of forest and garden resources by making clarifications or forest arrangements based on the use and protection of everyday life for future generations (grandchildren). In carrying out hazardous activities, the community only uses their production areas such as ex-cultivation several years before or formerly productive land which is already unproductive because it is old or cut down because of taking the results, for example cinnamon.

Based on the above background, it is necessary to conduct research to see the role of local ecological knowledge of the Loksado Dayak community in shifting cultivation systems. The general objective of this study is to examine the role of the local ecological knowledge of the Loksado Dayak community in shifting cultivation systems.

## 2. METHOD

The study was conducted in Lok Lahung Village, Loksado District, Hulu Sungai Selatan Regency. Dayak Bukit tribe is a native tribe who inhabit Meratus mountains in Hulu Sungai Selatan Regency. Astronomically, Loksado District is located at 114°51'19"- 115°36'19" East Longitude and 02°29'58"-02°56'10" South Latitude.



Figure 1 Administrative Map of the Research Area

This study uses a qualitative method with an ethnographic approach. [14] explain that the ethnographic approach seeks to describe and describe in detail the cultural behavior of the community in its "ethnic" cultural environment and even to understand its behavior or actions based on "natural" truth. The selection of informants using purposive sampling (intentional) techniques is based on certain characteristics that are considered to have a close connection with previously known population characteristics, including: Damang (Loksado Dayak traditional head), head of traditional hall, community leader and farmers in Lumpangi Village, Loksado District, Hulu Sungai Selatan Regency. Data collection techniques were carried out by field observations and semi-structured interviews using interview guidelines. The data used are primary data in the form of field notes and interview results as well as secondary data in the form of literature relating to the research objectives. Data analysis techniques using qualitative descriptive data analysis with data reduction stages, data presentation and conclusion making [15].

## 3. RESULT AND DISCUSSION

The cultivation carried out by the Dayak tribe in Loksado District is known as the Gilir Balik cultivation. The shifting cultivation activity by the community is basically a local wisdom that was born from experiences and traditions of intergenerational life, where in the shifting cultivation activity there are elements that are religious, magical and looking at humans are part of the natural environment itself, where there is the spirits in charge of maintaining balance.

Almost all of the process of cultivating plants in the fields by Loksado people is always colored by ritual. From the process of opening new land, planting, to harvesting activities, you can always find Aruh processions (ceremonies) carried out by Loksado people. They believe that every ritual procession that they carry out according to Kaharingan belief will bring smooth running of all their economic endeavors. Conversely, if they do not perform rituals or break the rules that they believe to be true, then all economic activity will bring failure and disaster.

Planting patterns are carried out in a simple way known as agroforestry. In this agroforestry, mountain rice is the main crop, while annual crops are peanuts, vegetables such as spinach, chillies, corn, cassava and bananas, and perennials or perennials in the form of rubber, cinnamon and candlenut.



Figure 2 (a) Cassava Plants (b) Chili Plant



Figure 3 (a) Banana Plant (b) Sweet Potato Plant



Figure 4 (a) Durian Plants (b) Rubber Plant

In general, the shifting cultivation pattern practiced by the Loksado Dayak community can be seen in the following figure:

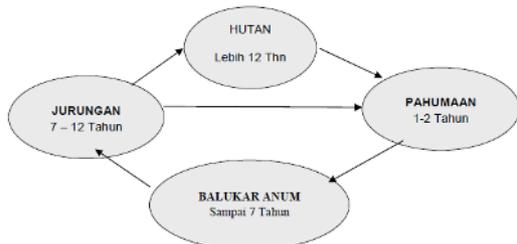


Figure 5 Reverse shifting pattern [16].

Information:

- a) *Balikal Anum* (Young Shrubs) is a former area of community cultivation that they have left behind and is still in the form of shrubs (ages around 1-7 years). This area in general can not be used for bahuma (farming). Even if forced, the results will be less good, because the level of soil fertility in the area is still low.
- b) *Jurungan* (Young Forest) is a former area of cultivation which started to become forest again (young forest), in which various types of trees have grown with a trunk diameter of approximately 20 cm. The age of the forest ranges from 7-12 years. This forest area will later be opened / cut down to be made a reward.
- c) *Pahumaan* is the name of the local community, which means an area or area that has been cleared for conversion. The area later they planted banih tugal (rice seeds) which intercropped with horticultural plants. After being exhausted, the land was left until it became a forest again[17].

The Loksado Dayak community cultivates agricultural crops in shifting fields in the forest in the huma system. The distance of their fields from the village is approximately two

to five kilometers. For every cultivation that is opened, only the main crop is cultivated for one harvest period (1 year 1 harvest period). In one rice planting period, efforts will be made to plant rice for about 5 months.



Figure 6 (a) Land Clearing (b) Farmer's Hut



Figure 7 (a) Land Conditions (b) Rice Plants on The Hillside

The stages of processing fields by the Loksado Dayak community:

1. **Malalahi**: Observe the condition of the forest that is cleared as a field to find out whether or not the land is suitable for planting.
2. **Batirau**: Waiting for a sign in the form of a hunch or dream to continue or not farming in the chosen land. This hunch or dream is obtained according to the beliefs of the Dayak community with their ancestors.
3. **Batanung**: ritual to determine the land to be planted.
4. **Batabas**: Clean the grass and small branches under the big tree using a machete. This is done when entering the end of the dry season around September. When entering the dry season, grass is easier to clean.
5. **Batilah**: Cutting bamboo trees (if there are bamboo trees)
6. **Batabang**: Cutting down a large tree using belaying, ax or chainsaw.
7. **Bailai**: Drying tree trunks, twigs and leaves in the field, the result of slashing, panilahan and felling. This is done until the stems and branches are completely dry in order to facilitate the combustion process.
8. **Manyalukut**: Burn dried stems, twigs and leaves. So that the fire does not spread so do the reserve (firebreak) about 4 meters. The purpose of this burning is to make the soil more fertile. At this stage also pay attention to the direction of the coming wind, so that the fire does not spread and expand. If the strong wind from above means it starts burning from below (because most of the fields are here on the hill). Burning is also carried out from both sides with the aim of the fire meeting at the midpoint so as not to spread.

When burning people work together to guard the fire, ensuring the fire does not spread. The community made sure the fire was completely extinguished, before that the community could not leave the field. According to the Dayaks, the land will be fertile if burned, so that in the stages of farming,

9. **Mamanduk:** Collecting branches that have not been burned to be burned again in the land that is still unburned. According to the belief of the community if the land is still not burning then the land is less fertile. At this stage make sure the fields are completely burned and ready to be planted, because the ash is used as plant fertilizer.
10. **Manugal:** Planting seeds is done by piercing the ground using a kind of torch stick with a pointed tip. Sometimes people use ironwood, because ironwood lasts for years. In the Loksado Dayak community this process is usually carried out by mutual cooperation. In this process men make holes while women make seeds in these holes.
11. **Manyambut:** The ritual is performed when the rice seeds begin to grow which is carried out after approximately 7 days after manugal. This ritual is carried out by the owner of the fields themselves by way of marriage.
12. **Marumput:** Clean the grass (weeds) on the sidelines of rice so that soil nutrients are not taken by the grass. Grass is done periodically if it is felt the grass has begun to interfere.
13. **Manyambu:** Ritual to refuse reinforcements carried out when rice is around 3 months old. The purpose of this ritual is to pray and ask to avoid pests and abundant crops.
14. **Basumbu Umang:** The ritual starts the harvest by binding 1 rice stick accompanied by a milling offering (kinangan and cigarettes).
15. **Maampatungi Banih/Maambil Banih:** aims to excuse the creator that harvesting will be done
16. **Mangatam:** Harvesting rice which is done when the rice is ripe which is marked with yellowed rice grains. Dayaks usually use kumpai or ranggaman to harvest rice. Usually the tools are made of sharpened bamboo, but some are made from milk cans or canned food made in the size of a thumb.
17. **Baancak:** put rice in the barn accompanied by chanting mantras.
18. **Aruh Bawanang:** feast harvest party.
19. **Baiirik:** the activity of separating rice from the stem.
20. **Bagumba:** throw empty rice (empty) with a tool called gumba.
21. **Babuat:** activities to put rice into a roll (a place to store rice).
22. **Aruh Bawanang:** harvest party which is conducted to close the previous planting season.
23. **Mambalukar:** Cleaning the field for the second time, this cleaning is done after harvesting.

Judging from their daily work patterns, it can be said that Dayaks basically have a fairly high work ethic. During the harvest season, the working time they use to cultivate crops

in the fields reaches a range of ten to twelve hours per day. Women and men start working in the fields at 6:00 in the morning. They departed from their homes in the village which is a distance of at least 2 kilometers on foot. Sometimes, with a lot of work in the fields and to prevent attacks by wild animals, they are forced to stay overnight in bamboo huts that they build in the midst of cultivation.

Ethnoecology of cultivation in Dayak meratus people, as in Rentenukng communities as expressed [18] is a cultivation ecosystem that is understood as a cultural, effective, modifiative, manipulative and interpretive environment by the farming community itself. Understanding of farmers about their farming ecosystems is revealed in various classifications or categorizations of various elements in their agricultural ecosystems. This system of classification or categorization of elements in a farming ecosystem reveals a farming system about their agricultural ecosystem. The knowledge system is a cultural guideline for the behavior, actions, interactions, attitudes of the cultivating communities in their farming activities.

From the perspective of cultural ecology, in the reality of cultivation, a close relationship is seen between the community (cultivators), subsistence (farming economy), and the environment (farming ecosystems) [18]. The relationship lies in the pattern of ecological adaptation to cultivation. Each stage of processing cultivation functions and is interconnected in an integrated system [19,20].

Procedurally, the stages of cultivation are continuous in space and time, from choosing the location of the field to harvesting. The stage of selecting the location of the fields to the weeding stage can be considered as input and the harvest stage is the output. This relationship between input and output is circular in nature [21]. An integrated farming system is expected to be able to maintain ecological equilibrium or the stability of forest land ecosystems.

Farming activities carried out by Orang Bukit are always associated with their religion (Kaharingan). Where at each stage of the farming activity is associated with a particular god or spirit by way of offerings (offerings) and praises by balian attended by a number of people, then the farming activities as a religious ceremony. Furthermore, this religious symbolic act is a source of value in "environmental management" and how it is preserved by the religious obligation of each plant to plant various types of bamboo in newly opened fields [22].

The technique of shifting cultivation indirectly is the traditional conservation efforts of the indigenous people inherited from their ancestors. With this technique, the community does not need to open new land other than what has been mapped for cultivation, so that primary land and virgin forests are preserved. Moving fields only have an annual harvest time limit, so the seasonal factor greatly influences the farming process. During the dry season, fields that have been opened are dried and then burned. But when the rainy season comes, the rice that has been planted is allowed to flourish, then is harvested. Even though shifting cultivation has a very long harvest time, with shifting cultivation, people do not need to use fertilizer or pesticides on a large scale.

Practical significance of TEK: Traditional knowledge for protected areas and for education education. Protected areas may be set up so as to allow resident communities to continue their traditional lifestyles, with the benefits of conservation accruing to them. Especially where the local community jointly manages such a protected area, the use of traditional knowledge for conservation education is likely to be very effective [23,24].

Traditional knowledge for environmental assessment. People who are dependent on local resources for their livelihood are often able to assess the true costs and benefits of development better than any evaluator coming from the outside. Their time-tested, in-depth knowledge of the local area is, in any case, an essential part of any impact assessment [25, 26].

Indigenous groups have historically relied on TEK to guide their interaction with natural resources [27]. Traditional ecological knowledge "is acknowledged as having fundamental importance in the management of local resources, in the appeal of the world's biodiversity, and in providing locally valid models for sustainable living"[28]. In the traditional creation of knowledge in agriculture, ideas, experiences and experimentation were widely shared and discussed. TEK is also known as 'indigenous knowledge', 'people's knowledge', 'traditional science' or 'traditional wisdom'.

This knowledge is inherited by generations, generally by word of mouth and cultural practices, and has been the basis for agriculture, food preparation, education, health care, conservation and the wide range of other activities that sustain societies in many parts of the world. Traditional ecological knowledge has been defined as 'a cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment' [23].

The TEK based adaptive strategies help build soils that are resilient to droughts and harsh conditions and sustain the cropping systems in an era of drastic climate change [29]. TEK led adaptations in soil and agro-management help in achieving the long term goal of soil sustainability.

The collective storehouse of human knowledge about the natural world is commonly called "traditional ecological knowledge" (TEK) and it can be defined as "the knowledge base acquired by indigenous and local peoples over hundreds of years through direct experience and contact with the environment. "

This rich knowledge of how nature works and how to judiciously harvest and steward nature without destroying it is hard won the product of keen observation, patience, experimentation, and long-term relationships with plants and animals. It is knowledge built on a history gained through many generations of human beings teaching their children practical techniques that underscored this crucial human-environmental relationship upon which culture and life itself are depended.

#### 4. CONCLUSION

The shifting cultivation system by the Dayak Lokasdo community goes through several stages and some of them begin with traditional rituals. The technique of shifting cultivation indirectly is the traditional conservation efforts of the indigenous people inherited from their ancestors. With this technique, the community does not need to open new land other than what has been mapped for cultivation, so that primary land and virgin forests are preserved.

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