Research Article

Local Knowledge in the Utilization of Sugar Palm Trees by the Community at the Slopes of Mount Ungaran

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Abstract.
People in Medono use the environment around them as agricultural land and plantations. The land on the slopes of Mount Ungaran is not very fertile and experiences low rainfall. Cultivation for food agriculture is carried out with dryland farming systems without an adequate irrigation system. As a result, the yields are not optimal. Plantation land on a slope between 30^{o}-50^{o} is used for coffee and sugar palm plants. Sugar palm *(Arengan pinnata)* trees in Medono grow naturally without a cultivation process. Although not planted intentionally, the sugar palm tree is one of the most common trees in Medono. This tree is used by the Medono community to be processed into sugar. This paper aims to identify local knowledge of using palm trees to adapt to the environmental conditions around them. This study uses a qualitative approach, and data collection was carried out through observation and interviews. The results showed that in the utilization of palm trees, there is local wisdom in sugar processing, and it has implications for social relations in its utilization.

Keywords: environment adaptation, local knowledge, palm sugar

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1. Introduction

Utilizing natural resources is a form of relationship between humans and the environment. In practice, this relationship takes place continuously to form an ecological system. In that ecological system, humans are connected with other non-human environmental elements. However, human existence in relation to the environment is different from other environmental elements. The existence of humans in this ecological system is the focus of studies in ecological anthropology, the study of the complex relationships between humans and their environment. Humans maintain contact and impact the climate, various animal species, and everything around them. However, in their interactions, humans use culture that includes aspects of knowledge, technology, social organization, belief systems, values, and norms, as an integral part that shapes

and is shaped by environmental conditions in a dialectic relationship (1). Therefore, the environment becomes a holistic unity with sociocultural life. (2). Humans and the environment are connected through culture. The environment in the form of physical elements, as an ecological unit of air, water, soil, and various organisms connected through energy exchange networks are related to humans through cultural systems. Human actions and behavior towards the environment are determined by how humans perceive the environment (3). This perspective emerges from the knowledge possessed by a community. Goodenough state that culture is a system of ideas, the interaction between humans and the environment is part of the cultural system.

Utilization of the environment, especially sugar palm trees by the Medono community is a form of relationship between humans and the environment based on specific local knowledge in an ecological and sociocultural context, as a form of adaptation to environmental conditions with geographic settings on the slopes of Mount Ungaran. Local knowledge is integrated with local values, norms, myths and beliefs that last dynamically for a long time. The dynamic relationship between humans and the environment is a process of ongoing adaptation. Human adaptation to environment is determined by culture. However, it can also be seen that culture is adaptive to the environment. Adaptation takes place both biologically and socio-culturally. Humans adapt to the environment through the medium of culture by developing ways of utilizing resources within the boundaries of the environment in which they live. Culture combines and classifies knowledge about the environment. The classification system is essential in understanding how people perceive the environment. The study of what people know about the environment, and how they classify it, is part of the ethnoecological approach. This approach is closely related to the geographical concept, namely landscape (4)

This paper tries to identify the form of local knowledge in the practice of utilizing sugar palm trees by the people of Medono village. The ethnoscience perspective was chosen to recognize local knowledge in environmental utilization, especially the utilization of sugar palm trees. This local knowledge includes the classification of sugar palm trees, utilization practices, myths and beliefs, and social relationships that arise from sugar palm trees utilization.

2. Method

This paper uses a descriptive qualitative approach. Data is taken through interview, observation, and documentation. The research is carried out in Medono village, Boja

sub-district, Kendal district, Central Java. The research subject is sugar palm tress tappers and the owner of sugar palm trees garden, both those doing tappers and those doing the cultivation of land only.

3. Findings and Discussions

3.1. Environmental Condition

Medono Village is located at an altitude of 350-500 masl with a slope between 30 ˚ -60 ˚. Daily weather is hot, with temperatures ranging from 24 ˚ C to 30 ˚ C during the day and 20 ˚ C to 25 ˚ C at night. Average rainfall ranges from 237 mm with an average of 19 rainy days. The landscape of Medono Village consists of paddy fields, settlements, plantations and forests. Agricultural land is divided into several categories, namely paddy fields with simple irrigation, covering an area of 39 ha, and rainfed land of 4 ha. Paddy fields are planted with food crops, especially rice, corn and vegetables. Simple irrigated rice fields can produce three crops, namely two harvests of rice and one harvest of vegetables or beans. Meanwhile, rainfed rice can only produce two harvests, in the form of rice and maize or beans. Rice fields are located in an area with a slope of 30^{o}.

In addition to rice fields, there is also land in the form of plantations with an area of 66.42 ha, and community forests covering an area of 26.88 ha. In an area with an altitude of 500-600 masl, there is a state forest area

covering around 40 ha. The estate's location is far from the settlement so that the treatment of plants is constrained by topographical conditions. Moreover, the access road to the plantation is still in the form of a footpath, making it difficult to transport facilities for garden maintenance and transporting crops. Actually, seen from the size of the area, the plantation has the potential to be used by the community.

Ownership status of paddy fields and plantations is privately owned land. Some of the land cultivation is done by the owner himself, some are worked on through a profit sharing system and an annual rental system. The land with the status of a state-owned forest has its management rights owned by PT Perhutani. Part of the state forest land adjacent to the village area is managed by granting land rights to Medono villagers with a coffee plant. But the condition seemed untreated.

The types of plants planted in the garden are adjusted to the conditions of the location and the slope of the land. On land with a slope of more than 45^{o}, the type of

plant is Sengon *(Albizia chinensis)* trees. While on more gentle sloping land, it is planted with sugar palm, coffee, and clove. This is done with the consideration of the ease of maintenance.

3.2. The existence of Sugar Palm Trees in Medono Village

The sugar palm tree *(arenga pinnata)* is a tree that can be found in areas with an altitude of up to 1400 masl. This tree can grow on the slopes of mountains or river cliffs. Although it is classified as an easy tree to grow, its population is decreasing. Sugar palm trees can be utilized by tapping to produce *badeg*, a kind of sap that is an ingredient in making sugar. While the fruit, which is called *kolang kaling,* can be consumed as food. Sugar palm trees are also used for their stems for flour. The tree's trunk is cut and then extracted to take the flour. Utilization by extracting flour is very expansive so that it can reduce the population of sugar palm trees.

The sugar palm trees found in Medono nowadays are trees that grow wild, without any planting process. The sugar palm trees grow from the seeds that fall and scatter naturally. Old palm fruit will be eaten by mongoose (*Paradoxurus hermaproditus).* The undigested part of the seed will come out with the animal waste. These seeds can grow into sugar palm trees. In the knowledge of the people of Medono, palm seeds that come from civet droppings will grow into good palm trees. The tree grows quickly, the sap produced is also more. It is better than the palm trees that come from seeds purchased from other regions which usually have a slower growth, and the yields are less. Based on the experience of tappers, the process of making sugar from wild sap only requires 5-6 hours of processing time, while the sap from purchased palm tree seedlings takes up to 12 hours. Therefore, the community prefers to cultivate wild growing sugar palm, and do not want to multiply the palm trees by planting seeds from other places. Because of the wild growth of sugar palm trees, the population of palm trees cannot be controlled, and their place of growth cannot be predicted so that there are those that grow in places that are difficult to access so that they cannot be tapped.

3.3. Medono Community and Sugar Palm Trees

According to the story of the tappers in Medono, their knowledge in utilizing palm trees has been obtained from generation to generation. It is initially taught by Sunan Kalidjaga, one of the guardians who spread Islam in Java. Until now, the sugar palm tree has been

an important tree for the life of the Medono community because of its high economic value. The primary use of palm sugar is to be tapped to get *badeg*, a kind of sap that is to be processed as palm sugar. The tapping of sugar palm trees has been carried out from generation to generation by people in Medono. Palm sugar produced by tappers from Medono is known in the local market as palm sugar with the best quality, and the price is higher than palm sugar from other villages. The characteristics of a sugar palm tree that can produce a lot of sap can be seen from the growth of its leaves. Sugar palm trees with upward growing leaves are bad and do not produce much sap. Meanwhile, if the leaves grow sideways, it will produce a lot of sap. Besides the leaves, another characteristic is the root of the tree. Fiber roots around the tree indicate that it is a good species, but big roots inside the soil is an indication that the sap will not be much.

Sugar palm trees can be tapped after the trees are 10-15 years old. The trees ready to be tapped are marked by the appearance of sugar palm flower called *dangu*. *Dangu* is part of the palm tree that is being tapped. After the *dangu* was about a month old, the tappers installed bamboo sticks with small holes the size of their big toes. The bamboo is called *srigi,* which is used to climb when tapping. The newly grown *dangu* cannot be immediately tapped. *Dangu* stems are cleaned in their skin then beaten with wooden blocks once a week. The *dangu* stem was swung by hand so that it arched and the stalk did not harden. This process lasted several times. *Dangu* ready to be tapped will give off a strong smell. After that the *dangu* which is brown in color is cut and the end of the cut is the part which is tapped. The end of the *dangu* stem is thinly sliced so that the water comes out. After being sliced two or three times, the *badeg* just comes out and can be tapped. However, sometimes the sap does not come out so it does not produce *badeg*. Such a palm trees are called *gelompong* or lying sugar palm trees. Sometimes in one tree can grow up to five stems, but not all of them can produce *badeg*. At most only one or two can be detected.

Sugar palm trees that do not produce *badeg* will eventually dry out and die. Palm trees that are not producing can be cut down and sold. Tree trunks are used to make holders of agricultural equipment.

The productivity of palm trees cannot be determined. After the stalks of the *dangu* that were tapped run out, at least one year later a new *dangu* will grow so that it can be tapped again. But sometimes it takes up to two years for a new one to grow and can be tapped again. The length of time a tree can be tapped is in an average of 3-4 months. It can also be up to six months, but it rarely happens. The uncertain productivity of the palm tree makes the community interpret the work of tapping sugar palm trees

Figure 1: A tapper carrying *dangu* (palm flower) which has been cut for goat food.

as a living life. Tapping sugar palm tree is a picture of the twists and turns of life filled with uncertainty. Sometimes luck takes a side, but sometimes unluck is experienced. It shows that aspect of spirituality also shapes the behavior of tappers. Older tappers still apply their spiritual beliefs when tapping. When starting to tap palm trees, they have to ask permission first. The palm tree will be knocked as if someone knocked on the door of a house when visiting. After that, they will say that they come to ask permission from the tree to take care of and collect *badeg*. It is likened to a young man who comes to a girl's parents to marry him. The tappers will also make a promise that they will care for and treat the palm tree well, as a promise of a man to look after and care for the woman he married. The time to request permission was even chosen on certain days, namely *Legi*, *Wage*, and *Kliwon*, in the Javanese calendar system. Apart from that day, it will cause various obstacles, such as juice water that does not come out, and an accident for tappers.

3.4. Palm Sugar Processing

To get *badeg*, palm trees are tapped every day. Tappers will climb trees to replace the container used to collect sap twice a day, in the morning and evening. The sap taken in the morning will immediately be processed into sugar in the afternoon, while the sap

taken in the afternoon will only be boiled, and the processing into sugar is carried out the next day. In processing sap into sugar, there are belief systems and myths that are adhered to by the tappers. Some of the myths are related to the use of firewood to process *badeg*. Tappers recognizes the prohibition against using teak wood and clove wood for firewood to boil *badeg*. If they violate these rules, they will experience various things that are not profitable. If they use teak wood to boil the *badeg*, it will cause the *dangu* stalk that is being tapped to stop releasing the *badeg*. If they use clove wood, the sap that is tapped will smell like cloves. Or it could be that the stems that are tapped change color to yellow then dry and die. When boiling, the stove is also not allowed to burn certain types of fish. If that is done, the palm flowers that are tapped will stop emitting *badeg*. Wood from trees of several types of flowers is also prohibited for burning wood, including *kanthil* and cananga flowers. If this is violated, the *dangu* stalk that is being tapped will stop releasing *badeg*. The process of boiling the *badeg* must be done carefully in order not to spill any water. The spill of the cooking *badeg* will make the *dangu* stalks that are tapped stop dripping water.

3.5. Palm Trees in Medono Community Social Relations

Medono society views sugar palm not only as a material object that can be processed and used to meet their daily needs, instead, sugar palm trees create important forms of social relations for local communities. As a resource, sugar palm has an important role in the economic sector of the family. The yields of sugar palm trees are then processed into sugar which is a source of income for the community. The presence of sugar palm is also a binding in social relations. The uncertainty of the production of palm sugar from the trees and the absence of control over the process of cultivating sugar palm trees produce unique social relations.

As a resource that cannot be controlled for its existence due to its natural growth (without cultivation), the number of palm tree ownership cannot be controlled. A person with a large garden does not guarantee that he will have lots of palm trees. Whereas people with narrow land ownership may have a lot of palm trees. This is because it is determined by the distribution of the growth of the sugar palm tree which is not cultivated, but occurs naturally

Not everyone is able and willing to process sugar palm trees into palm sugar. Palm sugar production can be managed by profit sharing between the owner of the palm sugar with tappers. The profit sharing system is known as *mesi*. The Medono community

is familiar with several profit sharing systems *(mesi).* The first system is that the owner gives up some money to the owner of the palm tree as a sign that they are doing a mesi system. The amount of money given is between Rp. 200,000 - Rp. 400,000. After the agreement, the tappers had the right to tap the sugar palm trees. The yield of the sap for two days will be processed into sugar by tappers, and then the yields from the next two days will be handed over to the owner of the palm tree to be processed into sugar. However, if the owner of the palm tree does not want to process the palm sugar himself, the processing can be given to the tappers, with the finished sugar will be divided into three parts. Two-thirds of the portion belongs to the tapper, while the remaining third is given to the tree owner. There is also another system in which tappers process all the sap obtained, then half of the sugar produced is handed over to the tree owner. The profit sharing system lasts until the *dangu* stalks being tapped stop watering out. Besides mesi, there is also a sugar palm tree utilization system that involves three parties, namely the owner of the palm tree, tenants, and tappers. Palm tree owners make agreements with the second party as a tenants, but the second party does not disperse it himself. The second party leaves the work to the third party. The profit sharing of this system is within four days of tapping. The tree owner and the second party gets a share of the yields of one day of tapping, while the third party as tappers gets the results of two days of tapping. However, at this time, the system of sharing with three parties is no longer applied because it is considered complicated and the profit obtained by the owners of palm trees is low. Another system in the utilization of sugar palm is by selling owned palm trees to tappers. One palm tree can cost Rp. 1,000,000. Palm trees that have been sold, will be utilized by the buyer. Sugar palm trees can still be allowed to grow and be used for tapping.

Palm trees can also be social security for tappers. In a situation of urgency to make ends meet, the tappers can borrow money from other people, especially middlemen, with palm tree collateral. The middleman will give the necessary money on the condition that the palm sugar produced must be sold to the middleman. The existence of middlemen has an important role in the distribution of local commodities for the Medono community (5).

4. Conclusion

Sugar palm trees is a natural resource that grows naturally in the area at the slopes of Mount Ungaran, Central Java. Medono people make use of sugar palm trees to

be processed into sugar. Sugar palm tappers in Medono have detailed knowledge in recognizing the types and growth of palm trees, how to utilize and process sugar palm trees. This research shows that sugar palms in Medono are not only a source of income to make ends meet but an important part of social relations, belief systems, and myths. This knowledge is an important part of the adaptation process in human relations with the environment.

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