



Ethnotechnology of Sago Sieve (*Metroxylon sagu Rottb*) : A Case Study of Malay community in Meranti Island, Indonesia

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ABSTRACT

This research aims to identify the manufacturing process and use of the Sagu Sieve ethnotechnology. The research used is descriptive qualitative research with a case study method or approach. Data collection techniques used observation and interview methods. The data was analyzed using the qualitative analysis method of Miles and Huberman. The research results show the local wisdom to understand the process of making and using the Sagu Sieve. The process of making the Sagu Sieve goes through several stages. Among them are the selection of pulai wood and the drying of bamboo. Furthermore, before the process of using the Sagu Sieve, the sago that will be sifted must be sun-dried until dry.

Keywords:

Local wisdom, Sago Sieve, ethnotechnology, meranti, *Metroxylon sagu*

INTRODUCTION

Local wisdom, besides being conceptualized as local genius, can also be conceptualized as local knowledge because local wisdom is rooted in a system of knowledge. Local wisdom conceptualized as local knowledge is defined as local knowledge. Local knowledge is the distinctive knowledge possessed by a particular community or culture that has developed over a long period as a result of the reciprocal relationship between the community and its environment. Local knowledge is the well-valued thought/ideas of the local community. Forms of local wisdom can include a way of life, values, norms, ethics, beliefs, customary law, customs, and special rules that are usually symbolized in myths and rituals (Alimah, 2019).

The development of science and technology cannot be separated from the development of society and culture, with all the norms, values, meanings, beliefs, habits, and mentalities built within them. There are certain cultural values in a society that encourage the development of science and technology. Conversely, there are values that actually hinder that development. In traditional communities, indigenous knowledge is built in the form of messages, customs that are believed by the community, and are passed down from generation to generation on how to behave towards nature.

Traditional technology is the technology of living equipment that is not influenced by technology from European-American culture. The technological system in question is the entire sum of techniques possessed by members of a society which includes ways of acting and behaving in relation to the collection of raw materials from their environment. These materials can be processed into tools for work, tools for storing food or clothing, and transportation equipment as well as other material needs. Technology is born when humans seek and meet daily needs, when humans organize society, and when humans express a sense of beauty in creating a work of art (Lestari et al., 2019).

Riau Province is one of the regions or areas that has a broad potential of local wisdom in supporting the economy of the people within it. One of the local wisdoms that can be renewed, owned by Riau Province, and can be a reliable source of income for the community for the present and the future is in the field of agriculture or plantations (Dicky et al., 2016).

Kepulauan Meranti Regency is one of the national food security development areas because it is the largest sago producer in Indonesia. The sago plant area in Kepulauan Meranti Regency is 38,163

Hectares. The sago plant (*Metroxylon* spp.) is a food commodity that contains a lot of carbohydrates, so sago is a staple food for several regions in Indonesia such as Maluku, Irian Jaya, Riau, and Sulawesi. Sago can also be used as a raw material for the food industry which, among other things, can be processed into food products such as sago pearls, cookies, noodles, biscuits, and crackers (Bahtiar Ruli, et al, 2017).

The Sagu Sieve is a traditional technology that is still widely used by the community in Kepulauan Meranti Regency, specifically in the village of Lalang Tanjung. Because the Kepulauan Meranti area is very famous as the largest sago producer in Indonesia, there are many villages that process this sago into food ingredients. Although many sago processors now use machines or modern technology, the people in Kepulauan Meranti still use the Sagu Sieve as a tool in sago processing.

In Kepulauan Meranti Regency, Riau Province, where the livelihood of the population is more dominant in the marine sector, production and distribution equipment is adapted to the needs of the area. In this area, traditional equipment is still used by the majority of fishermen. This is certainly related to a strong enough motivation for the use of these tools. What is meant by traditional equipment is a set of tools that are still simple in nature, used by a group of people from generation to generation and are part of the technological system they have according to their cultural conception.

Students can learn about the traditional technological system in the process of sago processing, fishing, along with the equipment used in these various processes which traditionally contain cultural values that are beneficial in the formation of student character. The community in Kepulauan Meranti Regency uses various traditional tools in carrying out their daily activities. An example of a tool used in their daily life is the Sagu Sieve. The objectives of this research are:

1. To describe the process of making Sagu Sieves by the community of Lalang Tanjung Village, Kepulauan Meranti Regency.
2. To describe the use of Sagu Sieves by the community of Lalang Tanjung Village, Kepulauan Meranti Regency.

METHODS

This research employs a case study approach. A case study is an empirical method that investigates contemporary phenomena in depth and within their real-life context (Yin, 2018). The purpose is to obtain a comprehensive and in-depth description. A case study produces data that can be analyzed to build a theory. Case study data are obtained through observation, interviews, and documentation study (Arifin, 2011).

The subjects of this research are the village head, sago farmers, and the community of Lalang Tanjung Village. The study employed purposive sampling, which uses specific criteria in selecting informants. The criteria were that the informants must be native residents of Lalang Tanjung Village who have knowledge of the Sagu Sieve. The first subject is Mr. Muhammad Anas, the head of Lalang Tanjung Village, interviewed to obtain information about the village profile. The second subject is Mr. Bahrin, a community member who makes Sagu Sieves. The last subject is Mrs. Sawilah, a community member who uses the Sagu Sieve as a traditional tool in processing sago. The research was conducted in Lalang Tanjung Village, Tebing Tinggi Barat Subdistrict, Kepulauan Meranti Regency, Riau Province.



Figure 1. Map of Kepulauan Meranti Regency, Riau

Source: Google

RESULTS AND DISCUSSION

The people of Lalang Tanjung Village have a traditional tool for sifting sago, called the *Sagu Sieve*. This sieve is made from pule wood, which belongs to the family (*Alstonia scholaris*). This plant has a very hard and durable trunk, which makes it the main material in producing the Sagu Sieve so that the tool can be used for a long time.

"One of the reasons we use pule wood is because it is strong and durable. Besides being strong and durable, it is also lightweight. Since the Sagu Sieve is used when people here want to make 'sago pearls', and the way it is used is by shaking it back and forth with the hands, the frame needs to be lightweight so it is easy to lift. Sometimes, people also use pelare wood, but pelare wood is difficult to find in this area. That is why most people use pule wood for the frame of the Sagu Sieve."

The reason the people of Lalang Tanjung Village use pule wood as the main raw material in making Sagu Sieves is because it is strong, durable, and also very light. As the sieve is operated manually by shaking it from side to side, the use of lightweight wood makes the process easier. Although some people also use pelare wood, it is less available in the Lalang Tanjung area, so pule wood has become the more common alternative.

The pule tree (*Alstonia scholaris*) is widespread throughout Indonesia. It tolerates various soil types and habitats and generally grows in areas with an altitude of 0–1000 m above sea level and annual rainfall of 1000–3800 mm. Pule trees can be harvested within 10–12 years, with diameters ranging from 30–40 cm and trunk height (free of branches) reaching 10–14 meters. Pule is categorized as a fast-growing species with straight stems, making it highly promising for forest plantation development. In addition, pule wood is easy to dry, easy to process, and has moderate shrinkage and swelling properties. It is commonly used for plywood, crates, carving and sculpture, matchsticks, pulp, stationery, and moulding. However, its utilization remains limited, and the species is often overlooked (Arinana & Diba, 2009).

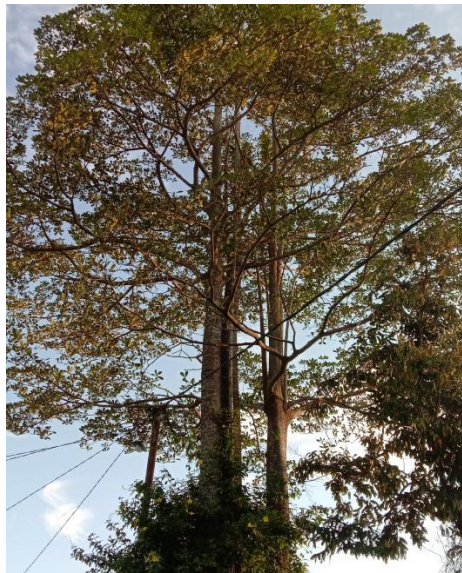


Figure 2. Trunk of the Pule Tree

Source: Researcher's Document

Morphologically, the pule tree is large and tall, with straight, round stems, sometimes with buttresses. The branching is whorled and layered, forming a pagoda-like crown. The outer bark is rough, gray-white to gray-brown or dark, while the inner bark is white or light yellow. The bark contains white latex, similar to jelutung sap (Mashudi et al., 2014).

The people of Lalang Tanjung Village also have their own process for collecting pule wood: *"First, we need to know where the trees are abundant and can be felled. Before cutting down a pule tree, we have to carefully select it; not all trees can be cut down, only the right ones."*

By looking at the size of the wood. Usually, the wood used has a size of about half a meter in diameter, so it cannot be cut down carelessly, it must be selected first. Because with that size, the pule tree trunk is already harder and stronger, while if it is still small it is sometimes still soft. After the pule tree is felled, it is then cut into several parts and split, then dried for 2–3 days until it is completely dry.

The process of obtaining and processing pule wood used as the basic material for making Sagu Sieves goes through several stages, from felling to forming the frame of the sieve. The first process is that the community selects pule trees that are suitable for felling. Then, after the tree is cut down, the pule trunk is cut into several parts and dried. The pule tree usually used has a diameter of approximately 40–50 cm to be used as the basic material for making Sagu Sieves. The felled and cut pule tree is then continued to the drying process by sun-drying. The drying process is carried out for 2–3 days until the pule wood is completely dry and has no water content in it.



Figure 3. Frame of the Sagu Sieve made from pule wood

Source: Researcher's document

The Sagu Sieve has a filter made of bamboo. The community carries out a series of processes. *"For the filter part, it is made using bamboo because bamboo has a smooth surface, so it is easier when sifting sago. Moreover, bamboo is not easily broken, it is quite tough. From the inside to the outside, bamboo has almost the same smoothness. But for making the filter of the Sagu Sieve, the bamboo must first be shaved so that it becomes smoother and has no remaining hairy parts. Bamboo has fine hairs on the outer part of its stem, so it must be cleaned first."*

"And until now, there has been no community member who uses other materials besides bamboo for the filter, because the distinctive feature of the Sagu Sieve is that it uses bamboo as its material. This makes the sifting process easier."

For the filter part, bamboo is the main raw material of the Sagu Sieve. The reason is that bamboo has a smooth stem texture, making the sifting process easier. In addition, bamboo is not easily broken and is relatively tough. Bamboo has an inner and outer part that are almost equally smooth. The community must smoothen the rough parts because bamboo has fine hairs on the outer surface. This step must be cleaned first before continuing to the next process.

The people of Lalang Tanjung Village have never used other materials besides bamboo for the filter part, because bamboo makes the sifting process easier due to its smooth texture.



Figure 4. Bamboo as the filter material of the Sagu Sieve

Source: Researcher's document

"For binding the bamboos, we use rope, usually nylon rope. Because nylon rope is stronger for tightening the arranged bamboos. It cannot be replaced with another rope, because if other rope is used, the binding strength is not strong enough, and the bamboos may loosen or not be tight. That is why we continue to use nylon rope. In the past, it had been tried using other ropes such as raffia rope, but it did not work. The bamboos became loose and could not be tightly bound."

In the process of binding the bamboos in the middle part of the Sagu Sieve, the people of Lalang Tanjung Village use rope, usually nylon rope. According to the community, nylon rope is stronger for tightening the bamboos arranged in the middle of the sieve. Other ropes cannot be used because if other ropes are used, the binding strength is weak, and the bamboos remain loose. Therefore, the community continues to use nylon rope to tighten the bamboos. In the past, the community tried using raffia rope, but it was not effective. The tightness level was much weaker compared to nylon rope.

Nylon rope is made from very strong fibers, namely nylon fibers. Nylon fibers are very strong and also flexible, making them relatively expensive. Nylon rope has the advantage of being one of the strongest fibers with resistance to sunlight and abrasion. Nylon rope is considered capable of representing steel cables on a smaller scale (Purwono & Yatnawijaya, 2013).



Figure 4. Process of binding bamboo for the Sagu Sieve filter

Source: Researcher's document

"As for connecting the frame of the Sagu Sieve, people here never use nails. All connections are made using wooden pegs. Because if nails are used, they can alter the wood hole and cause it to enlarge and even crack the wood. That is why people here prefer to use wooden pegs instead of nails. Moreover, using wooden pegs means we do not need to buy nails, we just use leftover wood from the process of making the Sagu Sieve frame."

In the process of making the Sagu Sieve, the people of Lalang Tanjung Village never use nails as connectors, all are made using wooden pegs. This is because if nails are used, they can alter the shape of the wood and the nail holes can enlarge.

and the wood can crack. Therefore, the people of Lalang Tanjung Village prefer wooden pegs as an alternative connector, moreover, by using wooden pegs the community does not need to spend money to buy nails. In the development of wood construction in Indonesia, nails and bolts still dominate the use of connectors because they are easy to obtain and practical to use. One of the problems caused by the use of these two connectors is the enlargement of the wood that will be joined. In general, nails and bolts have lower efficiency compared to pegs or adhesives. Therefore, in terms of connection efficiency, the use of nails and bolts is still very unfavorable (Tjitradi, 2005).



Figure 5. Wooden pegs as connectors for the Sagu Sieve frame

Source: Researcher's Document

Sago is one of the local foods that can be used as a substitute for rice. Sago (*Metroxylon sagu* Rottb) is one of the most potential carbohydrate-producing plants in supporting Indonesia's food security program. At the global level, 1.4 million hectares of sago plantations are in Indonesia from a total sago area of 2.47 million hectares. The rest are in Papua New Guinea, Malaysia, Thailand, the Philippines, and other countries. The potential of sago is very large, especially in Irian Jaya and Maluku in Eastern Indonesia (Rosida, 2019).

"This Sagu Sieve has been used since around 1930. Because our ancestors already used this Sagu Sieve to process sago. Maybe even earlier than that because this Sagu Sieve has long been used by the Malay people here. But until now many Javanese people also use this Sagu Sieve. In the past, there were no machines, so everyone used this Sagu Sieve."

The Sagu Sieve was first used around the 1930s, when Indonesia had not yet gained independence, and the village community was already using the Sagu Sieve. The Sagu Sieve has been passed down from generation to generation by the ancestors. This sieve has long been used by the community, especially the Malay ethnic group in Lalang Tanjung Village. However, until today, not only the Malay community but also many Javanese people have used the Sagu Sieve as a traditional tool in processing sago.

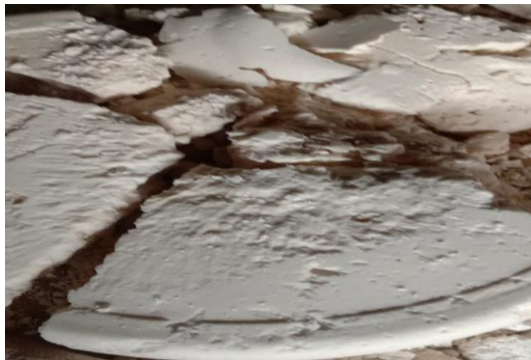


Figure 6. Sago that has not been sifted and is still in large lumps

Source: Researcher's Document

"The way to use this sieve is by moving it left and right until the sago on top of the sieve falls into the container below. This Sagu Sieve is used here to make sago pearls that will be cooked, so the sago, which was originally in large solid lumps, becomes smaller and shaped into small round balls."

The process of using the Sagu Sieve for the community is by moving the sieve to the left and right until the sifted sago falls into the container that has been provided. The main function of this Sagu Sieve is to make sago pearls or granules that will be cooked, so the sago that was originally large and solid can become small granules through this sifting process.



Figure 7. The sifting process using the Sagu Sieve

Source: Researcher's Document

"When starting to sift the sago, before we sieve it, the sago must first be dried until it is a little drier. Because the sago we buy from the mill is still wet and heavy, it is also difficult to sift if the sago is

still wet. Because the wet sago can stick to the sieve. That is why people here usually dry the sago first, and when it is already a little dry and can be sifted, then it is sifted."

In the process before the sago is sifted, the sago material must first be dried until it is dry. Newly purchased sago cannot be sifted immediately because it is still wet and heavy. In addition, wet sago is difficult to sift because it can stick to the sieve and cannot perfectly form small granules. Therefore, the people of Lalang Tanjung Village dry the sago first before proceeding to the sifting process.

Particle size is one of the most important parameters in various modern industries, especially industries with materials or products in the form of powders, suspensions, emulsions, and aerosols. The particle size of powders can affect the flow properties and compactness of the material. Larger particles can flow more easily than smaller particles (Santoso et al., 2019).



Figure 8. Sago after being sifted

Source: Researcher's Document

Table 1. Scientific Reconstruction of the Ethnotechnology of the Sago Sieve

No	Traditional Knowledge	Scientific Knowledge
1	The edge part of the Sagu Sieve is made using Pulai wood because it is light and durable.	Pulai wood (<i>Alstonia scholaris</i>) has a relatively high strength level (strength class IV-V and durability class V). The wood is easy to dry, easy to work with, and has moderate dimensional stability. Pulai wood is also used for various art purposes such as boxes, carvings, and plywood. (Arinana & Diba, 2009)
2	The middle part uses bamboo as the filtering section, arranged by the community.	Bamboo is one of the raw materials that is easy to split, shape, and work with, and it is relatively cheaper compared to wood. Bamboo is a lignocellulosic plant and can be used for many purposes. (Arsad, 2015)
3	Before making the Sagu Sieve, the bamboo to be used must go through a smoking or drying process until completely dry.	Traditional preservation of bamboo can be done by smoking, coating, soaking in water, and boiling. These processes help remove starch and carbohydrates contained in bamboo. (Arsad, 2015)
4	Wooden pegs are used as connectors for the sieve frame because they are more economical compared to nails.	In general, nails and bolts have lower efficiency compared to pegs or adhesives. One of the problems caused by nails and bolts is the enlargement of the wood size at the joints. (Tjitradi, 2005)
5	During the use of the Sagu Sieve, the sago must be dried first to make the sieving process easier.	The chemical content of sago includes carbohydrates, calories, protein, and others. Sago also contains about 36.99% water. (Bantacut, 2011)

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|---|---|---|
| 6 | The sieving process is carried out by moving the sieve back and forth (left and right). Large and lumpy sago becomes fine granules after sieving. | Sieving is performed horizontally and is related to filtration. Filtration is the process of separating solid particles from a fluid by passing it through a filtering medium. (Parahita, 2018) |
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Science learning is one of the important subjects for students. Knowledge of science is instilled from the elementary school level. Local wisdom is integrated into learning media because science learning is closely related to the surrounding environment, so many science learning materials can be integrated with local wisdom (Andriana et al., 2017).

The implementation of education has a strategic role in implementing conservation policies. Cultural conservation studies are not specifically found in certain subjects but are integrated into several subjects, including science. In the Ministry of Education and Culture Regulation number 58 of 2014, it is stated that every student is able to apply science wisely to preserve and maintain cultural sustainability (Parmin, n.d.).

CONCLUSION

The sago sieve is a traditional tool that is still used by the community in Kepulauan Meranti Regency, especially in Lalang Tanjung Village. The main materials in making the sago sieve are pule wood and bamboo. The frame of the sago sieve is made of pule wood, while the filter part is made of bamboo. The pule wood to be used must meet certain criteria such as the size of the tree circumference. For bamboo, before being used it must first be dried until completely dry. The use of the sago sieve by the people of Lalang Tanjung Village was first started around the 1930s. The sago sieve is used by the community to make various sago-based foods such as sago pearls, sago noodles, and others. The way to use the sago sieve is by placing the prepared sago on top of the sieve, then moving the sieve to the left and right so that the sago on top falls down and becomes ready-to-process sago.

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