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The Economic Value Analysis of Aren Palm Tree in Goloketak, Boleng, West Manggarai District

Liesiana Kurniawati^{1*}, Ni Wayan Noviana Savitri², Ni Made Dwita Ratnaningsih³

¹kurniawatiliesiana@gmail.com, ²wayannovianasafitri@gmail.com,

³dwitaratna.ningsih@gmail.com

Politeknik Elbajo Commodus Labuan Bajo

*Corresponding Author: Liesiana Kurniawati

Email: kurniawatiliesiana@gmail.com

ABSTRACT

This research is analyzed on aren palm tree in Goloketak, Boleng, West Manggarai District which aims to find out how many Goloketak people have used aren palm trees for economic benefits through the products they produce, these are sopi and palm sugar; and the possibility of developing economic value that has been obtained. The research sample was obtained from some people who produce sopi, palm sugar and other products from this aren palm tree which total of 28 respondents. The research method was conducted by interviewing 28 respondents. Based on the results of these interviews, it is known that most of the respondents use aren palm trees to produce only one product, it can be making sopi or making palm sugar and some people produce both. On the other hand, there are several respondents who produce other products such as palm fiber rope, palm fiber brooms and roofing fibers based on orders only or for their own needs. The results of the interview indicated that using these aren palm trees has not been fully cultivated by the Goloketak people because most of sopi and palm sugar production comes from aren palm trees that grow themselves in their gardens. The income of the community from sopi drinks is IDR 48.152.632, - and the income from palm sugar is IDR 28.701.842, - which is obtained from the average respondent per year.

Keywords: Aren Palm Tree, Economic Value, West Manggarai District

INTRODUCTION

Enau or aren palm tree is a type of tree that grows naturally in the tropics. Unfortunately, only a few people in Goloketak cultivate it. In addition, in utilizing water from the palm tree by processing it into sopi and palm sugar, Goloketak people also uses other parts of this tree.

Some people use the fibers found on tree trunks to make brooms, roofs and ropes. Nowadays, the roof of the house is rarely used anymore, only used in some traditional houses that still use the roof of the fibers. Brooms and ropes are also rarely used because people already use plastic brooms and raffia rope.

Enau trees can be used for economic benefits since the community can produce the Sopi and palm sugar through taking its water to make sopi (a type of palm wine) by simply distilling it or cooking the water to make brown sugar, then selling it. Sopi and palm sugar are two superior products produced by Goloketak community, Boleng District, West Manggarai. Sopi and palm sugar are sold to the market for the economic benefits to the community. This economic benefit has not been maximally enjoyed by the community since Enau Tree has not been cultivated and the community utilizes the Enau tree which grows by itself in their garden, nor has all parts of Enau tree been utilized to its full potential. Satya and Niken (2017) stated that sugar palm farming is feasible since it generates profits for the community.

Syarifah (2018) mentions that all parts of Enau tree can be utilized from its sap which can be processed into sugar, nata de pinna; which can be processed into palm flour; unripe fruit is processed into kolang-kaling; its leaves that can be processed into roofs, its sticks can be made into brooms, and its fibers can be processed into crafts.

Naja (2021) stated that palm sugar is a crystallized from palm sugar. Some of the reasons why palm sugar is healthier than granulated sugar is that the calories contained in palm sugar are smaller than white sugar in general, then palm sugar is often referred to as low-calorie sugar, and it also has a lower glycemic index with 35 glycemic index, while in granulated sugar has the glycemic index of 58. This lower glycemic index value makes palm sugar is safer to consume and does not cause significant spikes in blood sugar levels that can harm the body, especially for diabetics. The glycemic index of food is an index (grade) of food according to its effect on blood glucose levels.

The results from Conservation of Palm Trees (*Arenga pinnata* Merr) research conducted by Edi (2018) shows that there has been no conservation effort from the government or community in the management of palm trees management at Padang Village due to the lack of public knowledge about how to cultivate palm trees. People only use palm trees that grow wildly. Then, the utilization of palm trees has been able to improve the community's economy in various products, such as palm

sugar production, fermented drinks, palm wine making, kolang-kaling, house roofs, palm fiber brooms, and broom sticks.

The demand for palm sugar generated from sugar palm trees (*Arenga pinnata* Merr) will keep increasing as it is driven by the increasing consumption of natural ingredients. This should be followed by the production continuity which is tightly dependent on the availability of the production of sugar palm tree sap. Furthermore, the production of palm tree is tightly dependent on the quality of the palm tree seeds and the age of the tree (Simamora et al., 2021).

According to Kornelia and Dwi (2020) Sugar palm tree have an important role in ecological, economic and social aspects since they are classified as multifunctional plants or MPTS (Multi-Purpose Trees Species).

Based on the results of Somadi's research (2018) the factors that hinder the palm tree tapping business in Wangunsari Village are packaging, production, product standardization, business management, tapper education, production site, processing technology, sales channels, fuel, capital, natural disasters, infrastructure, public transportation, markets accessibility, business competition, new entrants, bargaining power of buyers and suppliers and substitute products.

Alfred (2018) stated that in terms of business management, most of sugar palm farmers are not able to develop or compete because of capital problems, this causes the sugar palm cultivated by community experience a production reduction.

According to Memi (2016) The forms of local wisdom in processing palm trees are the existence of the place where the palm tree grows itself and the local knowledge of the community in knowing when the palm bunches are ready to be tapped. The equipment used is still traditionally through using a ladder made of bamboo, which is an environmentally friendly material.

Mody (2012) stated that the development of sugar palm in Indonesia is very prospective. Besides, it is able to meet domestic consumption needs for products from palm trees, it can also increase the employment, farmers' incomes, state income, and can also preserve the natural resources and the environment. Therefore, the ideas are required as the basis for policies in concrete steps, called an inventory of palm trees' potential, the development of sugar palm plants, increasing utilization and processing of both the physical and production of palm trees.

The research results from Ima (2018) stated that there are weakness factors in the development of palm sugar agroindustry, such as the lack of capital, inadequate quality of human resources, the simple production packaging and lack of promotion, weak access to markets and financial institutions, low productivity due to limited availability of palm trees. Researchers did the research because when the research visited the Goloketak village, they saw a lot of palm fruit trees that just fell and were not used. In other areas, the fruit of Enau tree has been used for making kolang-kaling which is rich in calcium. The threads on the trunk of Enau tree can be made into various tourism souvenir products since Goloketak village is located close to Labuan Bajo which is a premium tourism area. The creation of the souvenir

can be made with woven or knitted techniques for creating the beautiful and economic products. Therefore, the research team wanted to find out what the community had made using the palm tree in creating the souvenir or other products. This research is limited to the Goloketak, Boleng, West Manggarai district.

This research aims to identify the value of the economic benefits obtained from Enau tree, the extent to which the Enau tree is used economically and what are the obstacles faced by the community in optimizing the use of Enau tree to support the community's economy. This research was conducted since the researchers wanted to find out how the community utilizes the palm tree for economic benefits and can fulfil their daily needs and why the products produced by the community from the palm tree are relatively underdeveloped and there is no product diversification. In fact, all parts of the palm tree can be made into products that have the economic value.

This motivation to develop the community's standard of living is what spurred the research team to explore more about how much income the community earns from processing the various parts of Enau tree into various products that has economic value. The product development is also needed both in the form of packaging and marketed as well as various other products that have not been produced. This product that has not been produced is also what the researchers wants to know about why people do not make it and market it for earning more money. From this research, it was found that skills training needed to be held for creating various souvenir products for tourism in Labuan Bajo area from the fibers of palm tree trunk, training to produce kolang-kaling from Enau fruit to improve the economy of Goloketak community. Also, the training on packaging creation for palm sugar and Sopi drinks in increasing its value and this product can be absorbed in Labuan Bajo tourism area.

Enau or aren palm tree is a type of tree that grows naturally in the tropics and few of people in Goloketak village are cultivate it. The community of Goloketak not only use the water from Enau tree by processing it into Sopi and palm sugar, they also use other parts of it. Some people use its fibers to make brooms, roofs and ropes. The use of roof in the house is rarely used anymore, only used on houses that still use the fibers' roof. Brooms and ropes are also rarely used because people already use plastic brooms and raffia rope.

LITERATURE REVIEW

Enau tree which is also called aren palm tree has great economic benefits. In West Manggarai, enau tree is even called the tree of life, because all of its part can be used from roots, stems, fibers, kawul, leaves, flowers and fruit which can be utilized and have economic value. All parts of the palm tree can be used in various fields. Several type of sugar palms uses are include food, medicine and health food, feed, energy, building, crafts, industry and agriculture. Foodstuffs obtained from sugar palm are kolang-kaling derived from fruit, sap from flower bunches tapping, flour extracted from the stem (pith) and *umbut* from the young shoots of the stem (Lempang, 2012).

Sugar palm belongs to the palm (Arecaceae) family in the major group of Angiosperm and genus *Arenga*. Genus *Arenga* consists of 24 Asiatic palm species which includes sugar palm (Muda & Awal, 2021). The botanical classification of palm trees is as follows:

Division	: <i>Spermatophyta</i>
Subdivision	: <i>Angiospermae</i>
Class	: <i>Monocotyledonae</i>
Clump	: <i>Spadictilora</i>
Clan	: <i>Palmae (Arecaceae)</i>
Family Name	: <i>Arenga</i>
Type (Binomial Name)	: <i>Arenga pinnata (Wurmb) Merr.</i>
Common Name/trade name	: Aren

The palm tree economic opportunities are as follows:

1. Palm sugar: can be processed into soft drinks or alcoholic beverages, palm syrup, palm sugar, palm vinegar, and ethanol
2. Palm flour: starch extracted from the pith of the palm stem.
3. Palm fruit: processed into kolang-kaling
4. Palm fiber: spun into ropes, roofing materials, brushes, brooms, a mixture of building materials and others
5. Leaves: wrapping tobacco, roofs of simple buildings, the wrap of palm sugar and fruits.
6. The midrib and petiole can be processed into yarn and rope
7. Sticks: can be woven and shaped as baskets and containers.
8. Aren stems: can be processed as raw materials for food, glue, noodles, soun, fodder, versatile wood and others.
9. Roots: for plaiting and medicine.

According to Darmiati (2019) Along with the development of science and technology, the innovation of new product are commonly known, called the reproducing printed palm sugar by increasing the added value of palm sap water into powdered palm sugar known as palm sugar with the term of modern market, that is palm sugar/ brown sugar or palmsuiker.

The research result by Idham and Nurhapsah (2021) show that the price of palm sugar and the amount of production have a significant effect on income, while costs, labor and the number of trees have no significant effect on the income of brown sugar craftsmen.

Research results Agus (2020) shows that based on internal and external analysis, the small palm sugar industry in Tongo Village, Sekongkang District has strengths that can be maintained or increased, and have opportunities that can be utilized properly to the maximum extent possible. The development strategy that should be used is a strategy that supports the aggressive growth.

The results of Laode and Windi's research (2020) obtained an analysis of strengths from internal strategy are the status of self-owned businesses, experienced producers, easy to obtain raw materials, the increased of palm sugar price, and has a clear market for buyers. While the weaknesses are the lack of manpower, simple product packaging, lack of promotion, the uncertain of production amount and there is no business license. The external strategic factors that become opportunities are equipment assistance, medium business loans provided with convenience, superior products and regional characteristics, the market of palm sugar is very broad with the use of marketing and sales technology. While the threats are the price of product is determined by market or collectors, the presence of competitors, uncertain weather, and the sugar palm plant will run out and there is no cultivation of palm plants. Palm sugar as one of the products of Palm Tree is very possible as an export commodity, the export market for palm sugar is still potential.

Apart from the benefits above, researchers believes that palm tree trunks used as ropes can be woven and knitted to make souvenirs related to Goloketak village, which is located close to Labuan Bajo as a super premium tourism area.

RESEARCH METHODOLOGY

This research is an exploratory qualitative research to explore the social phenomenon of the community in Goloketak village who do not process Enau fruit into kolang-kaling and other parts of the tree, but just throw it away. Quantitative research methods are scientific ways to obtain data with certain goals and uses (Yudha, 2022).

The data collection was conducted through structured interviews with several residents of Goloketak village to find out the causes and answers to the phenomena mentioned above. The types of data collected are primary data with direct interview observations and observation notes. The data that has been collected is product data produced by palm trees and data analysis is conducted by income analysis.

The economic value of the palm tree is calculated by determining the community's income based on market price obtained from revenues and the results are reduced by costs with the following formula:

$$TR = \sum_{i=1}^n Q_i . P_i$$

Definition:

TR = Total Revenue (IDR)

Q_i = Number of Production (units)

P_i = Production Price (IDR)

$$TC = \sum_{i=1}^n X_i . P_{xi}$$

Definition:

TC = Total Cost (IDR)

X_i = Type of input Cost (IDR)

P_{xi} = Input price Cost (IDR)

$$I = TR - TC$$

Definition:

I = Income (IDR)

TR = Total Revenue (IDR)

TC = Total Cost (IDR)

Furthermore, the calculation of total value of economic benefits from palm plantations is conducted as follows:

$$NMEA = NS + NGA + NML$$

Definition:

NMEA = Economic Value of Palm

NS = The Value of Sopi Beverage

NGA = Brown Sugar Value

NML = Value of Other Benefits

RESULT AND DISCUSSION

General Condition of Research Location

Goloketak village is located 11 km from the Boleng sub-district, West Manggarai, East Nusa Tenggara province with a population of 2,334 people. With the following details:

- a. Number of Family consist of 576 people
- b. Total population by gender (all Indonesian citizens and no foreign nationals):
 - Male 1.207 people
 - Female 1.127 people

- c. Population by religion
 - Islam 222 people
 - Christian 2.112 people
- d. The area of Golo Ketak village is 105,894 Ha with the village boundaries as follows:
 - North side: Beo Sepang village
 - East side: Mbuit village
 - South side: Golo Nobo village
 - West side: Pota Wangka village

Goloketak village consists of 17 RT and 8 RW.

Respondent Identity Based on Age, Education Level and Number of Family Dependents

Age

Based on the research and the interviews result with 28 respondents, the age of Enau tree farmers are ranged from 25 to 80 years.

Table. 1 Number of Enau farmers by Age Group

Age	Total	Percentage
21 – 30 years	3	11
31 – 40 years	1	4
41 – 50 years	11	39
51 – 60 years	6	21
61 – 70 years	5	18
71 – 80 years	2	7
Total	28	100

Source: Processed primary data

Education Level

Table. 2 Number of Enau farmers by education level

Education level	Total	Percentage
Elementary School	21	75
Junior High School	2	7
Senior High School	5	18
Diploma	0	0
Total	28	100

Source: Processed primary data

Number of Family Dependents

Table. 3 Number of Enau farmers by Number of Family Dependents

Number of Family Dependents	Total	Percentage
1 – 5 people	8	29
5 – 10 people	20	71
Total	28	100

Source: Processed primary data**The Palm Trees Products**

The research results with a sample of 30 palm farmers found that there are 3 kinds of products from palm trees including sopi, palm sugar, and products made from palm fiber. The products made from this fiber include palm fiber brooms, fiber ropes and house roofs

1. Sopi beverages

The results of aren palm tree/Enau tree water are usually obtained by the community by heating its water and the water from Enau water evaporation is collected and sold as Sopi/Tuak. The community can sell 1 bottle of 300 ml sopi for IDR 25,000. The respondents who produce 19 people sopi beverages can be seen in table 5 as follows:

Table. 3 The Respondents who make Sopi in Goloketak village

Number of Sopi Products (600 ml bottle)	Number of Respondents	Percentage (1%)
4 -6 bottles	17	90
10 bottles	1	5
11 bottles	1	5
Total	19	100

Source: Processed primary data

2. Palm sugar

Respondents who produce palm sugar are 16 people

Table. 4 Respondents who produce palm sugar in Goloketak village

Number of Products (stems)	Number of Respondents	Percentage (1%)
48, 84 (<100)	6	38
108, 120, 180 (>100)	10	63
Total	16	100

Source: Processed primary data

3. Palm-fiber broom

Respondents who make fiber brooms based on the order of 4 people

Table. 5 Respondents who make fiber brooms in Goloketak village

Number of Products	Number of Respondents	Percentage (1%)
Sesuai pesanan pembeli	4	100
Total	4	100

Source: Processed primary data

The benefit value of palm tree products (calculated per year)

1. Sopi Beverages

Sopi is made by taking palm tree water and distilling (evaporating) the palm water with traditional methods

Table. 6 Net income of Sopi beverage products (in IDR)

No	Name	Receipt	Charge	Income
1.	Tarsisius Sidi	36.000	400	35.600
2.	Adrianus Jatu	90.000	400	89.600
3.	Hilla Situ	40.500	400	40.100
4.	Paulus Kedir	54.000	400	53.600
5.	Antonius Jehamin	49.500	400	49.100
6.	Rofinus Juru	40.500	400	40.100
7.	Eduardus Bahagia	49.500	400	49.100
8.	Kristoforus Duansi	45.000	400	44.600
9.	Simon Jan	40.500	400	40.100
10.	Aloysius Abun	40.500	400	40.100
11.	Saferius Harten	36.000	400	35.600
12.	Nikolaus Majun	40.500	400	40.100
13.	Kristina Imas	40.500	400	40.100
14.	Ferdinandus Abu	40.500	400	40.100
15.	Maximus Son	40.500	400	40.100
16.	Pit Bambut	49.500	400	49.100
17.	Gerardus Rali	99.000	400	98.600
18.	Adrianus Ngamput	49.500	400	49.100
19.	Mikael Memo	40.500	400	40.100
	Total	922.500	7.600	914.900
	Mean	48.552		48.152

Source: Processed primary data

2. Palm Sugar

Palm sugar made in the form of a rectangular box and wrapped in banana leaves or palm leaves. This sugar product is sold in large bundles of 30 palm sugar sticks of IDR 350,000 per bunch.

Table. 7 Net income of palm sugar products

No	Name	Receipt	Charge	Income
1.	Aloysius Andut	8.000	300	7.700
2.	Antonius Jehamin	16.800	300	16.500
3.	Nikolaus Ito	42.000	300	41.700
4.	Simon Jan	37.800	300	37.500
5.	Aloysius Abun	37.800	300	37.500
6.	Saferius Harten	37.800	300	37.500
7.	Lukas Nurdin	37.800	300	37.500
8.	Markus Ali	42.000	300	41.700
9.	Muhammad	63.000	300	62.700
10.	Nurdin	63.000	300	62.700
11.	Antonius Aco	42.000	300	41.700
12.	Paulus Nimpa	16.800	300	16.500
13.	Nurbaini	29.400	300	29.100
14.	Abdul Juihatut	16.800	300	16.500
15.	Maximus Son	29.400	300	29.100
16.	Pit Bambut	37.800	300	37.500
	M. Mikael Memo			
	Total	550.200	4.865	545.335
	Mean	28.957		28.701

Source: Processed primary data

3. Palm-fibers broom (estimates from indeterminate respondents)

This revenue data is not fixed since the product is made when there is an order only.

Table. 8 Net income of fiber broom products

No	Name	Receipt	Charge	Income
1.	Tarsisius Sidi	40.000	5.000	35.000
2.	Antonius Jehamin	100.000	10.000	90.000
3.	Eduardus Bahagia	100.000	10.000	90.000
4.	Aloysius Abun	40.000	5.000	35.000
	Total	280.000	30.000	250.000
	Mean	70.000		62.500

Source: Processed primary data

4. Fiber ropes and fiber roofs

These fibers and roofing products are made for the community needs

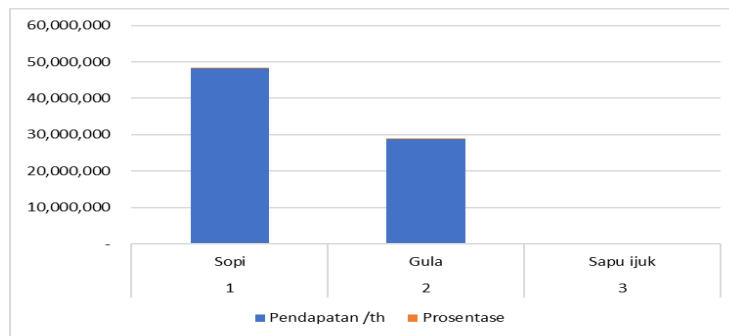
5. The total benefit value of Enau plant

Table. 9 The total economic benefits of palm products

No	Products	Income (IDR/year)	Benefit Value Percentage
1.	Sopi beverages	48.152.632	62,60
2.	Palm sugar	28.701.842	37,32
3,	Palm-fibers broom	62.500	0,08
	Total	76.916.974	100

Source: Processed primary data

Figure 1: the percentage of Economic Value of Enau Plants in Goloketak village

**Source:** Processed primary data**CONCLUSION AND SUGGESTION****Conclusion**

The products produced from palm trees are sopi beverages, palm sugar, palm fiber brooms, fiber ropes and fiber roofs. Palm tree farmers produce sopi beverages and palm sugar from sugar palm plants that grow by themselves in their garden. The palm tree farmer produces more sopi beverages than other products. Unfortunately, not all parts of the palm tree are used to make products that have economic value. The profit of sopi beverages is IDR. 48.152.632-, the palm sugar is IDR. 28.701.842, palm-fiber brooms are IDR. 62.500, - (the average respondents per year).

Suggestion

The utilization of palm trees should be cultivated for more optimal profit, and the use of Palm tree can be diversified with various products from other parts of the tree that have not been explored, for example by making souvenirs by knitting and weaving.

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