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Nira aren's tapping business at Hasanuddin University education Forest, Maros

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Abstract. Population growth creates competition in meeting the needs of daily life. The forest area is the target for the community to depend on for their life. Palm trees are forest products that have many benefits. This study intends to describe the process of tapping palm sugar, calculate production costs and business income of palm sugar, and describe the marketing flow of palm sugar. This research was conducted for two months, in the Education Forest. Data collection methods include field orientation, observation and interviews. Determination of the sample was carried out by census, namely 14 sugar palm farmers. The analysis was carried out descriptively qualitatively on the process of tapping sap, making palm sugar, and marketing flow. Meanwhile, quantitative descriptive analysis was carried out on the calculation of production costs and income. The results of this study illustrate that the flower bunches tapped are male flowers. The process of tapping includes the following activities: preparation, taking sap, making palm sugar. The results of tapping sap are generally used as raw material for palm sugar. Tapping the sap and making palm sugar is carried out for approximately eight months every year. The process of tapping nira carried out by sugar palm farmers in the location is still based on habits and experiences that have been passed down from generation to generation. The average production cost is IDR 7,026,552.-/year/family and the average income is IDR. 10,705,500.-/year/family, so that the average profit is IDR. 3,675,948.- per year per household. There are three marketing channels for palm sugar in the research location, namely: (1) Producers Directly to consumers (2) Producers to collectors to consumers (3) producers to collectors to the market and to consumers.

1. Introduction

The urgency of the necessities of life and the limited amount of arable land make the people around the forest area depend a lot on forest resources, including sugar palm plantations. sugar palm is a non-timber forest product that can be used as a solution to fulfill the needs of daily life [1,2]. This potential is one of the forest resources that provides many benefits, because almost all parts of the palm tree can be utilized. These parts include palm fiber, fruit, leaves, sap, stems that produce flour.

Tapping sap and making palm sugar has long been carried out in the UNHAS Education Forest, but there is no detailed description of the income of farmers from the palm sap tapping business. Based on this description, it is necessary to know the process of tapping palm sap and calculate some production costs from each kilogram or pack of palm sugar.

The objectives of this study are: Describe the process of tapping palm sap in the UNHAS Education Forest, Calculating production costs and palm sugar business income and Describe the marketing of palm sugar. The usefulness of this research is to be able to provide the best solution for farmers tapping sap and palm sugar makers as well as information material for government agencies regarding palm



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sugar business that is more effective and profitable for palm farmers and still pays attention to forest sustainability.

2. Research method

The research was conducted for two months, starting from June to July 2021. The research location was in the Forest Education, Hasanuddin University, Maros. Objects and equipment used in the research are :

1. The community of nira tappers and palm sugar makers.
2. A list of questions used to obtain information from sugar palm farmers.
3. Writing utensils to record the data obtained in the field.
4. Meter and calipers for measuring firewood.
5. Liters and kettles to measure sap so that you can know the ratio of sap to the amount of sugar that is made.
6. Scales for weighing sugar to obtain data on the weight of sugar per pack of palm sugar.
7. Calculator to make it easier to process data.
8. Camera to document activities.

The collection methods used in sap tapping/palm sugar production and marketing of the produce are as follows:

2.1. Field

orientation Field orientation was conducted as a preliminary study aimed at obtaining information on the situation and condition of the object or research area.

2.2. Data collection

Collected includes primary data and secondary data. The data collection was carried out on sugar palm farmers using two methods, namely:

- a. Primary data collection was obtained by interview and field observation techniques, namely direct observation of tapping sap and palm sugar making and documenting the stages of activities, such as respondent identity, type of equipment, age. use tools, etc.
- b. Secondary data collection was carried out through various sources.

Respondents based on existing data, the number of sap tappers and palm sugar makers was 14 people. So that the number of respondents taken as many as 14 people or 100% of the total sap tappers and palm sugar makers. The data collected were analyzed descriptively on the process of tapping sap and making palm sugar by the community based on the results of field observations and direct interviews. Costs in the activities of tapping sap and making palm sugar up to the collectors, are tabulated based on the grouping of costs. Analysis of the data as follows:

2.2.1. *Fixed*. costs fixed costs are costs that during one working period are fixed in number, and do not change. As for what is included in the fixed costs in this study is the cost of depreciation of the equipment used in the process of tapping sap and making palm sugar [3]. The method used to calculate depreciation is the straight-line method, ie the investment is depreciated in the same amount every year during the economic life of the equipment and is calculated by the equation [4]:

$$D = \frac{M - R}{N}$$

Where:

D = Cost of Depreciation/Depreciation (Rp/year)
M = Capital (Rp)
R = Residue/Remaining Value (Rp)
N = Economic life of the tool (years)

2.2.2. *Variable costs* Variable costs are types of costs that fluctuate together with the volume of activity. The types of variable costs in this study are labor costs, firewood, and transportation costs.

2.2.3. *Total production costs*. Total production costs are costs incurred to produce a finished product that is ready to be sold or not sold. It can be calculated by the following formula

$$\text{Total Production Cost} = \text{BT} + \text{BV}$$

Where:

BT = Total(Rp/year)

CostBV = Variable Cost (Rp/year)

2.2.4. *Gross Income* Gross income is the result of selling palm sugar before deducting costs.

2.2.5. *Profit*

$$\text{Profit} = \text{PK} - \text{BPT}$$

Where:

PK = Gross Income (RP/year)

BPT = Total Production Cost (Rp/year)

3. Results and discussion

The results of direct interviews at the research location of short-lived palm trees can be tapped at the age of ten to five twelve years, for long-lived palm trees about twenty years and over. Short-lived palm trees can produce a maximum of five years, while long-lived palm trees can produce for ten years. Other information obtained at the research site is that female flowers are not tapped, other than the results are unsatisfactory, the tapping process takes a long time, sometimes up to a year.

The characteristics of male flowers that can be tapped, namely the color of the flower changes from green leaves to light purple. To prove it, tests were carried out, for example, the male flower was split open, if the pollen had turned yellow or if the pollen was massaged with the fingers, if it was crushed like flour, slicing a few flower buds with a knife if the incision was gummy, then wiretapping was immediately carried out.

Wiretapping preparations can be carried out if there are signs as above. The preparatory activities are the installation and repair of stairs, cleaning the stalks of bunches, attaching ropes from rattan. Rattan rope serves to withstand the load when beating and tapping or taking sap. So that the bunches are not easily broken when cleaning the bunches or when swinging, previously the flower strands were tied and then hung. To facilitate the release of sap through the capillaries or the outer pores of the bunch, it is necessary to beat and swing. The beating and swinging is repeated for two to three weeks. The implementation of beating and swinging two to three days after cleaning the bunches is rested. Then the beating and swinging were carried out successively for four days, after which they were rested for three days. Continued beating and swinging for three days and rested for two days, while waiting for the bunches to be cut. The beating and swinging activities are carried out seven to ten times (days) with fifteen to thirty minutes for each beating and swinging.

In the experience of farmers at the research site, flower bunches can be cut right on the attached flower strands when there are the following signs: there are bees swarming, flowers begin to burst, and flowers emit a distinctive odor. Then proceed with testing, namely at the end of the bunches are incised and when it has issued a white liquid, it means that the bunches are ready to be cut. In addition, it can

also be done by piercing the base, middle and ends of the bunch with a nail, if the puncture marks have released a white liquid, the bunches are ready to be tapped. The cutting of flowers is done carefully so that the bunches are not damaged (broken) by removing the flower strands one by one until the bunches are cut exactly where the flower strands are attached. The end of the bunch is sliced thinly with a sharp knife until smooth, about 2 mm thick and the mucus is rubbed with the palm of the hand so that the sap is not blocked out. In order to keep the incision moist, it is affixed with leaves *ganceng* (*pa'mimmi'*) and wrapped with cloth or fiber which is always controlled every day for approximately two to five days by renewing the wound until the juice flows out smoothly.

Installation of the roof is done after the sap has been smooth to the outside. Bumbung made of specially prepared bamboo, 75 - 150 cm long, is attached to the end of the bunch with the mouth of the roof entering the bunch about two to three cm. So that the sap is directed into the roof, the lower part of the bunch is slashed. The ends of the bunches with the mouth of the roof are covered with fibers or cloth to avoid pests such as; mice, bats, monkeys and bees. So that the roof does not fall when it is filled with sap, the base is tied and hung on the leaf midrib or stem.

The sap was taken twice a day, in the morning and in the evening. The time of tapping carried out by farmers, namely in the morning at 07.30 - 09.30, and tapping in the afternoon is carried out at 15.30 - 17.30. The time used by farmers to take the sap depends on the distance from where the palm sugar is made from the tapped palm tree. At the research location, the average sap extraction time was 7-12 minutes per tree. The results of tapping sap are generally used as raw material for palm sugar. The sap is cultivated not to become sour. So that the sap is not sour (still sweet) then the roof used to hold the sap is always sterilized by washing the sap with the sap that is currently being cooked (boiling). In addition, the roof must be replaced (exchanged) every time the sap is taken, and the freshly extracted sap is immediately cooked or boiled, and the roof is filled with leaves or forest mangosteen rind so that the quality of palm sugar produced is good.

The amount of palm sugar produced depends on the sap and the amount of sap. cooked. The volume of sap in the morning tapping is different from that in the afternoon, the afternoon tapping is an average of 2.17 liters of sap per tree, while the tapping in the morning is an average of 4.75 liters of sap per tree. The difference in the volume of sap is due to the difference in storage time of about eight hours.

The manufacture of palm sugar is carried out in several stages of activity. Nira immediately, poured while filtered and put into a cauldron that has been placed on the stove to be heated (cooked). The results of observations and direct interviews with sugar palm farmers at the research location were three to five hours depending on the amount (volume) of sap. Heating the juice is stirred until it boils. The foam (foam) that appears on the surface of the boiling sap is removed, so that the sap does not turn black and lasts longer. This heating is terminated after the sap becomes thick with a volume of about 8% of the initial volume (before heating) [5]. Then put in the crushed hazelnut seeds or coconut oil to harden the sugar. To find out whether the cooking process has been completed or not, a test is carried out by taking a little cooked material and then pouring it into water (*sokri*). If the *sokri* immediately clumps, then the cauldron is removed from the fireplace and cooled while the edges of the cauldron are cleaned with a *pa'karri'* tool for eight to ten minutes. Then using a dipper, pour the sap into the mold (*klikok*), so that the sugar is easily removed from the mold (*button*) previously moistened with cold water [6]. Then it is cooled until the sugar hardens, then it is removed and then wrapped or packaged with leaves *terro* (*Artocarpus teysmanii* Miq.) and ready to be marketed.

The average palm sugar production is 80.93 liters of sap per day which can produce 9.75 packs of palm sugar per day. The calculation results illustrate that an average of 8.3 liters of sap produces 1 pack of palm sugar with an average weight of 1.116 kg for more details can be seen in the following:

Table 1. Palm Sugar Production in UNHAS Education Forest.

Name of Respondent	Amount of palm sugar production (bks)			Length of tapping per year (month)	Hok
	Per day	Per month	Per year		
La'bu	3.50			8	1
La Kacong	16.50		.00	8	2
Lau'ba	19.00		4636.00	8	2
Wa' Kadi	8.00		1952.00	8	2
Heri	11.50		2806.00	8	1
Melle'	4.50		1098.00	8	1
Sulle	7.00	5.00	1708.00	8	1
Nuruk	16.00	106.50	3904.00	8	2
Muhammad	18.00	503.00	4392.00	8	2
Menggu	4.50	579.50	1098.00	8	1
Amir	13.00	244.00	3172.00	8	2
here	5.00	350.50	1220.00	8	1
Yeti	5.00	137.00	1220.00	8	1
Muh Ali		213.00	1220.00	8	1
Average	9.75	297.00	2,379.00	8	

Palm sugar farmers do business of tapping sap and making palm sugar only from April to November so that the frequency of making palm sugar during a year as much as 244 days with a daily wage of Rp. 15,000. In a day harvesting takes an average of 8.30 hours (07.30 to 18.00) which includes the activities of taking sap, making palm sugar, taking firewood, until it is ready to be sold.

The total costs incurred in the business of tapping sap and making palm sugar are accumulated fixed costs on average of IDR 143,876 per year per family head and variable costs on average IDR 6,882,676 per year per family head. So the total cost incurred by sugar palm farmers for a year is an average of IDR 7,026,552 per year per head of family.

The gross income of tapping sap and making palm sugar is an average of IDR 10,705,500 per year per head of family (KK), while the production cost is on average IDR 7,026,552 per year per head of household (H). Thus, it can be seen that the profit of palm sugar business is at an average of IDR 3,678,948 per year per head of family.

Soekartawi (1991) [7] and Nugroho (2002) [8] suggests that the marketing channel is a path traversed by the flow of goods from producers to consumers which can be very simple and can also be complicated depending on the marketing channel commodity, each path according to its cost capabilities will perform a marketing function to become a marketing function. different.

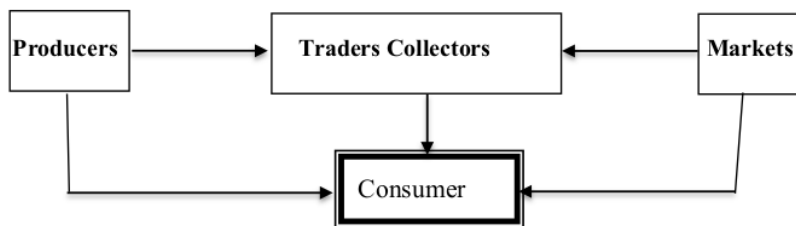


Figure 1. Palm Sugar Marketing Model in UNHAS Education Forest.

There are three marketing channels. According to the results of interviews and observations at the research location, the price of palm sugar varies according to marketing channels. The price of palm sugar per 1,116 kg (one pack) in each marketing channel is as follows:

1. Producer level of Rp. 4,500,-
2. Level of collectors of Rp. 5,000,-
3. Market/retailer level of Rp. 5,500,-

4. Conclusion

To increase income, experience is needed sufficient so that to achieve this it is advisable to hold a simulation between palm sugar farmers. To achieve forest sustainability and the sustainability of sugar palm products, it is necessary to plant types of wood that can be used as firewood and to propagate palm trees. In order for the community to develop products (other than palm sugar), the local government and UNHAS need cooperation in the form of trainings such as making palm fiber crafts, and brushes and techniques for making kolang-kaling.

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PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7
