

# The income analysis of pinus merkusii sap tappers in Cenrana Baru Village, Cenrana Sub-district, Maros Regency

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## The income analysis of *pinus merkusii* sap tappers in Cenrana Baru Village, Cenrana Sub-district, Maros Regency

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**Abstract:** Tapping pine sap is a sufficient job to help increase the income of the community around the forest. People are interested in working as tappers if the income earned can meet family needs and contribute better income than other jobs. The purpose of this study was to determine the pine sap tapping technique, as well as to find out how much income the tappers had and the factors affecting the income of pine sap tappers in Cenrana Baru Village, Cenrana District, Maros Regency. The sap tapping technique was analyzed using descriptive analysis, while the amount of income and the factors that influenced it were analyzed using descriptive quantitative data analysis. The results showed that the tapping technique used by pine sap tappers in Cenrana Baru Village, Cenrana District, was the koakan technique (quarre) with an average monthly income of IDR 2,523,661.27. The results of the regression analysis showed that the factors that had an effect on income were the tapping area, the production of pine sap and the wages of the pine sap. The tapping activity carried out by sap tappers in Cenrana Baru Village requires guidance from related parties so that these activities can be carried out properly with minimal damage to pine stands. As well as the company needs to consider and determine the determination of wages based on the distance from the tapping site to the sap collection point.

### 1. Introduction

*Pinus merkusii* is one type of tree that is good to be managed and cultivated because it not only provides forest products in the form of wood, but is also able to provide non-timber forest products, namely pine sap. Pine sap is one of the non-timber forest products that has commercial value and has the potential to be developed. The use of pine sap is a producer of *gondorukem* and turpentine which is used in the batik, plastic, soap, printing ink, lacquer, paint, adhesives, and so on [1].

Pine sap can be obtained by making a cut on the wood or said to be tapping [2]. Human labor is needed in these tapping activities. Efforts are made to meet these needs by involving communities around the forest in forestry activities. One of them is taking the communities around the forest to become pine sap tappers. According to Suwaji et al (2017) [1], in general, rural communities who live around forests have limited employment opportunities only in agriculture. Most of the people of Cenrana Baru Village work as farmers. So that if the people in Cenrana Baru Village do not have limited employment



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opportunities only in agriculture, to increase their income they have to do tapping. This pine sap tapping job is a sufficient job to help increase the income of communities around the forest. Based on research conducted by Suwaji et al. (2017) [1], the income of pine sap tappers was IDR 3,082,004.54 each month, which is quite large, exceeding the 2016 Minimum Wage for Central Sulawesi Province.

Generally, the income of pine sap tappers in rural areas does not only come from one source, but comes from two or more sources of income. The difference in income sources is thought to be influenced by the level of income itself. The relatively low income level requires household members or household heads who work as farmers to be more active. But the problem that arises is whether the community around the forest in Cenrana Baru Village, Cenrana District, Maros Regency is interested or not to work as pine sap tappers. The community will be interested in working as tappers if the income earned can meet family needs and tappers work provides better income than other jobs. The problem of how much income is obtained by tappers from tapping activities, as well as the factors that affect the income of tappers from tapping activities need to be further investigated.

The conditions above are interesting to study, so one of the places for pine sap tapping in the village of Cenrana Baru, sub-district Cenrana. Where it is managed by a company, namely PT. APU HOME BESSE ARNESH, with a managed pine forest area of 100 ha which is right in Tanete Hamlet and Dusun Malaka, Cenrana Baru Village, Cenrana District. This research was conducted to determine the tapping technique used by the sap tappers, as well as to find out how much income the sap tappers have and the factors that affect the income of the sap tappers in Cenrana Baru Village, Cenrana District, Maros Regency.

## 2. Research methodology

### 2.1 Time and location

Research was carried out for two months from October to November 2019 in Cenrana Baru Village, Cenrana District, Maros Regency.

### 2.2 Types of data and data collection techniques

The data collected in this study consisted of primary data and secondary data. The data collection method was carried out by means of observation, direct interviews using a questionnaire, including: Respondent identity (age, education level, and number of family dependents), the tapping technique used, the tapping device used, the area of the pine tapped area, the number of pine trees used. tapping, the production of pine sap per month, the distance to carry sap from the tapped pine tree to the collection of sap on the side of a forest road, the tapping fee that the respondent gets, the shoulder fee that the respondent gets, and the costs incurred by the respondent for the pine sap tapping as well as literature study.

### 2.3 Data analysis

The data collected in this study were analyzed in accordance with the research objectives. The first objective of the pine sap tapping technique uses descriptive analysis, while the second objective is to determine the amount of income and the factors that affect the sap tappers income using quantitative descriptive methods. The formulas used include [1]:

$$u = TR - TC$$

Where:

$\pi$  = Income (IDR),

TR = Total Revenue (IDR),

TC = Total Cost (IDR)

The factors that affect the income of pine sap tappers are used multiple regression analysis with the formula:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + X_5 + e$$

Where:

- Y = income pine sap tappers (IDR)
- a = constant
- b = regression coefficient
- X<sub>1</sub> = area of tapping
- X<sub>2</sub> = Number of trees tapped
- X<sub>3</sub> = Distance to collecting sap
- X<sub>4</sub> = Sap production
- X<sub>5</sub> = sap shoulder salary
- e = Residual

### 3. Results and discussion

#### 3.1 Pine sap tapping technique

The pinesap tapping technique used in the village of Cenrana Baru is the *koakan* or *quarre* technique. Tapping the sap using the *koakan* technique is done by making a wound on the trunk of a tree. Making tapping wounds is initially made 15 cm above the ground surface with the initial wounds of 15 cm long and 3-5 cm wide, and a depth of up to 3 cm. This contradicts the opinion of Natalia (2010) which states that the general provisions in carrying out tapping activities using the *koakan* technique are *koakan* width less than 10 cm and *koakan* depth not more than 2 cm. However, Restyani (2012) [3] states that at this time *koakan* are starting to be developed with a width of 4-6 cm and a height of *koakan* reaching 240 cm. Sukadaryati and Dulsalam (2013) [4] suggest that the *koakan* technique is approximately 5 cm wide and 3 cm deep.

Pine sap tappers learn this technique by paying attention to the people who were previously involved in the sap tapping activity in Cenrana Baru Village, namely experts who were brought in directly by the company. The tools used to make a *koakan* are still classified as conventional tapping tools which can be called *kedukul* or *petel* (Figure 1).



**Figure 1.** Tapping of pine sap using the Koakan technique used by tappers in Cenrana Baru Village

The sap tappers in Cenrana Baru Village use the *koakan* technique in tapping because the technique is simple to do in the sap tapping activity. The equipment used is still relatively simple and easy to take to the sap tapping location and its easy operation. However, the shortcomings of the *koakan* technique if it does not comply with wound regulations, such as multiple tapping wounds in one tree and unpredictable

depth of tapping wounds, can threaten the sustainability of sap production and easily collapsed trees. This is in line with Lempang's research (2018) [5] which states that the *koakan* technique causes more injuries to pine trees when compared to other techniques and the risk of falling trees is greater and damage to wood can reduce the tree's ability to metabolize so that sap production will decrease.

### 3.2 Sap tapper revenue

3.2.1 *Sap tapping costs.* The costs are an amount of money spent during the tapping activity. The calculation of costs in tapping activities is intended to determine the amount of costs incurred by pine sap tappers in Cenrana Baru Village. At the research location, the tools and materials needed for the sap tappers in the pine sap tapping process are borne by the company. However, there are some tools and materials that pine sap tappers have to bear on their own because these tools and materials are needed for tapping activities. Here is presented tools and materials borne by tappers can be seen in Table 1.

**Table 1.** Equipment and materials covered by the sap tappers in cenrana baru village

| No | Equipment and Material | Price                  | Economical lifespan |
|----|------------------------|------------------------|---------------------|
| 1  | Scraper                | IDR. 55.000,- per unit | 1 year              |
| 2  | Whetstone              | IDR. 20.000,- per unit | 1 year              |
| 3  | Fertilizer             | IDR. 125.000 per sack  |                     |

3.2.2. *Fixed costs.* Fixed costs in pine sap tapping are costs incurred for supplying the sap which can be used repeatedly. In the sap tapping activity, the fixed cost component is the depreciation cost for the scraper and the whetstone. The fixed costs incurred by pine sap tappers in the Cenrana Baru village can be seen in Table 2 below.

**Table 2.** Summary of fixed costs pine sap tappers in the cenrana baru village

| No            | Equipment | Depreciation  |                  | Total cost    |                  |
|---------------|-----------|---------------|------------------|---------------|------------------|
|               |           | IDR per kg    | IDR              | IDR per kg    | IDR              |
| 1             | Scraper   | 99.63         | 49.536.03        | 99.63         | 49.536.03        |
| 2             | Whetstone | 36.23         | 18.013.56        | 36.23         | 18.013.56        |
| <b>Jumlah</b> |           | <b>132,86</b> | <b>67.549.59</b> | <b>132.86</b> | <b>67.549.59</b> |

Depreciation is the lost capital in an equipment which is caused by its life. Depreciation costs are costs incurred to cover investment in equipment. In Table 2, it can be seen that the depreciation expense per kilogram of sap for the scraper and whetstone is IDR. 99.63 per kg, or IDR. 49,536.03 per month and IDR 36.23 per kg or IDR 18,013.56 per month, so the total variable cost that is charged to the sap tappers per month is IDR 67,549.59. This difference in depreciation expense occurs because the purchase price for the scraper and the whetstone is different. As reported by Putra et al. (2020), the depreciation cost for the sap tapping tool carried out in Singingi Regency is IDR 11,259. This is lower than the results of this study, due to differences in the number of tools and the price of the tools covered. Oktavia et. al (2016) [6] suggest that the size of the depreciation on cost depends on the economic age of the tool, the longer the economic life, the smaller the depreciation cost.

3.2.3. *Variable costs*. Variable costs are costs depending on the size of the amount of production. The variable cost borne by the sap tappers is the cost of procuring materials, namely the imposition of fertilizers. The fertilizer is used as a stimulant additive so that the sap ducts do not close easily. The price of fertilizer per sack with delivery costs is IDR 125,000 with a content of 70 liters. The amount of fertilizer used by tappers is 15 liters per month. So that the cost of fertilizer that is charged to the pine sap tappers is IDR. 53.88 per kg or IDR. 26,789.14 per month. Research conducted by Suwaji et al (2017) [1] stated that the variable cost incurred by pine sap tappers in Tangkulawi Village, Sigi Regency is IDR. 1,262,295.24 per month. This is greater than the results of this study, because the variable costs borne by tappers are only in the form of fertilizer costs, while Suwaji et al (2017) [1] are in the form of liquid fertilizer costs, production fees and labor costs.

3.2.4. *Total costs*. Total costs are all costs incurred in carrying out the pine sap tapping activity. The total costs incurred by pine sap tappers are the sum of fixed costs and variable costs. Based on the sum of fixed costs and variable costs, the results are as shown in Table 3 below.

**Table 3.** Fixed Costs, Variable Costs, and Total Costs Charged on Pine Tappers in Cenrana Baru Village

| No. | Costs component | Costs      |               |
|-----|-----------------|------------|---------------|
|     |                 | IDR per kg | IDR per month |
| 1   | Fixed costs     | 132.86     | 67,549.59     |
| 2   | Variable costs  | 53.88      | 26,789.14     |
| 3   | Total costs     | 186.74     | 94,338.73     |

The table 3 shows that the fixed costs incurred by tappers are greater than the variable costs, so that the total or total costs charged to the sap tappers for the tapping of pine sap is IDR. 186.74 per kg or in the amount of IDR. 94,338.73 per month. This is in contrast to the results of research conducted by Munandar et al. (2020) [7] which states that variable costs incurred are greater than fixed costs. This occurs due to differences in the amount of variable costs and fixed costs borne by tappers at the research site.

3.2.5. *Reception*. Receipt is the result of selling the sap at a price that has been determined by the company concerned or said to be the wages for tapping that the tappers receive from the tapping of pine sap, which is then added to the number of wages they receive. The level of acceptance of the sap tappers is influenced by the wages for tapping and the wages for the tapping that the sap tappers receive.

3.2.5.1. *Tapping wages*. The wages for tapping sap that are tangible in Cenrana Baru Village are wholesale in nature. The wage is given based on the number of tapped pine sap the tappers get in kilograms (kg). Then, the results of these taps are multiplied by the continuous price of sap. The price of the sap which is suitable at the time of this research is IDR 5,000.00 per kg. The following is the tapping wages received by pine sap tappers in Cenrana Baru Village can be seen in Table 4.

**Table 4.** Tapping Wages Received by Pine Tappers in Cenrana Baru Village

| No | Pine production (kg per month) | Tapping Wage (IDR per month) | Number of Respondents | Percentage (%) |
|----|--------------------------------|------------------------------|-----------------------|----------------|
| 1  | 176 – 367                      | 22,330,000,-                 | 16                    | 53.33          |
| 2  | 368 – 559                      | 11,550,000,-                 | 5                     | 16.67          |
| 3  | 560 – 751                      | 6,600,000,-                  | 2                     | 6.67           |
| 4  | 752 – 943                      | 16,500,000,-                 | 4                     | 13.33          |
| 5  | 944 – 1135                     | 4,950,000,-                  | 1                     | 6.67           |
| 6  | 1136 – 1327                    | 12,650,000,-                 | 2                     | 3.33           |
|    | <b>Amount</b>                  | <b>74,580,000,-</b>          | <b>30</b>             | <b>100</b>     |
|    | <b>Average</b>                 | <b>2,486,000,-</b>           |                       |                |

Based on Table 4 above, it can be seen that the largest tapping wage is IDR 22,330,000, - per month. This happens because many respondents with a percentage of 53.33% are able to produce 176-367 kg of sap per month. The tapping wage is quite large for tappers because it is already higher than the 2019 Maros Regency Minimum Wage, which is IDR 3,871,052. However, if seen based on the average wage for tapping the sap tappers in Cenrana Baru Village, IDR 2,486,000 per month, this number is below the Maros Regency Minimum Wage 2019. The difference in wages for tapping pine sap tappers is due to differences in the production of sap obtained by each pine sap tapper.

3.2.5.2. *Shoulder wages.* The shoulder wage is the wage received by tappers, pine resin based on the bearing distance from the tapping site to the sap collection point (TPG). The shoulder wage rates of the sap that applies in Cenrana Baru Village when this research was conducted can be seen in Table 5 below.

**Table 5.** The shoulder wage rates of the sap in Cenrana Baru Village

| No. | Carrying distance (km) | Sap shoulder wage rates (Rp / kg) |
|-----|------------------------|-----------------------------------|
| 1   | 1                      | 100. -                            |
| 2   | 2                      | 200. -                            |
| 3   | 3                      | 500. -                            |

In Table 5, it is known that the distance of 1 km for the pickup of sap is IDR 100 per kg, the distance of 2 km is received for shoulder of IDR 200 per kg and a distance of 3 km receives a salary for sap shoulder of IDR 500 per kg. The shoulder wage rate is then multiplied by the amount of sap or sap production obtained by each tapper. The following is the salary for the sap tappers obtained by each pine sap tapper, which can be seen in Table 6.

**Table 6.** The wages for the sap tappers obtained by the pine sap tappers

| Carrying Distance (km) | Sap Production (kg) | Shoulder Wages (IDR / month) |
|------------------------|---------------------|------------------------------|
| 1                      | 440 - 542           | 198,000. -                   |
|                        | 543 - 645           | 55,000. -                    |
|                        | 646 - 749           | 0                            |
|                        | 750 - 852           | 77,000. -                    |
| 2                      | 220 - 418           | 506,000. -                   |
|                        | 419 - 617           | 0                            |
|                        | 618 - 816           | 154,000. -                   |
|                        | 817 - 1015          | 550,000. -                   |
|                        | 1016 - 1214         | 242,000. -                   |
| 3                      | 176 - 462           | 858,000. -                   |
|                        | 463 - 749           | 660,000. -                   |
|                        | 750 - 1036          | 0                            |
|                        | 1037 - 1323         | 660,000. -                   |
| <b>Total</b>           |                     | <b>3,960,000. -</b>          |
| <b>Average</b>         |                     | <b>132,000. -</b>            |

Table 6 shows that sap tappers have different carrying distances. The different carrying distances can affect the wages of the pine sap tappers. The average wage for the sap of the pine sap tappers is IDR 132,000 per month.

Based on the wages for tapping and the wages for the sap tappers that the tappers receive, it is possible to know the amount of sap tappers received. The average income obtained by tappers is obtained from the sum of the average tapping and shoulder wages, namely IDR 2,618,000 per month. The amount of income is not only influenced by the shoulder wage and the tapping wage but is also influenced by the sap production itself.

3.2.5.3. *Revenue.* Revenue is the profit that sap tappers get from pine sap tapping activities in Cenrana Baru Village. This income is obtained from the difference between the average income (the sum of the tapping wages and the sap-pickled wages) of IDR 2,618,000 per month and the average cost of the sap tappers (the total cost obtained from the sum of fixed costs and variable costs) is IDR 94,338.73, so that the average monthly income was IDR 2,523,661.27. The average income is still relatively low when compared to the 2019 Regional Minimum Wage (UMK) Maros Regency, which is IDR. 3,871.05. Likewise, as reported by Suwaji et al (2017) that the average income of sap tappers in Sigi Regency, Central Sulawesi is IDR 3,082,004.54 per month. However, the wiretapping activities carried out in Cenrana Baru Village have proven that the benefits obtained are not inferior to other jobs, and it is able to improve the welfare of the community. The income of pine sap tappers will increase if the amount of sap production increases accompanied by an increase in the price of pine sap.

### 3.3. Factors that influence revenue

Factors that are thought to affect the income of pine sap tappers in Cenrana Baru Village include the area of the tapping area, the number of trees tapped, the distance to collection of sap, production of sap and wages. The results of the multiple regression can be seen in Table 7 below.

**Table 7.** Results of Regression Analysis of Factors Suspected of Affecting Pine Tappers in Cenrana Baru Village

| Model                      | Unstandardized Coefficients |            | Unstandardized Coefficients | T      | Sig. | F        | R Square |
|----------------------------|-----------------------------|------------|-----------------------------|--------|------|----------|----------|
|                            | B                           | Std. Error | Beta                        |        |      |          |          |
| 1 (Constant)               | -202853.875                 | 45701,909  |                             | -4.439 | .000 | 8581,740 | .999     |
| Area                       | 41360,643                   | 13317,925  | .032                        | 3.106  | .005 |          |          |
| Number of tapping trees    | -51,501                     | 31,140     | -.020                       | -1.654 | .111 |          |          |
| Distance to sap collection | -17873,175                  | 36104,611  | -.008                       | -.495  | .626 | Sap      |          |
| production                 | 5254,9118                   | 71,591     | .989                        | 73.402 | .000 |          |          |
| Wages pikul                | 166,343                     | 522,994    | 0.51                        | 3.144  | .004 |          |          |

a. Dependent Variable: Income

The regression equation obtained with the help of SPSS 25.0 is as follows:

$$Y = -202853.875 + 41360,643X_1 - 51.501X_2 - 17873.175X_3 + 5254.918X_4 + 522.994X_5$$

Based on the regression equation that has been obtained above, it is known that:

1. The constant value (a) of -202853.875, this negative constant occurs because the range is quite far between variable X (independent variable) and variable Y (independent variable).
2. The regression coefficient value of tapping area ( $X_1$ ) is positive, namely 41360,643, which means that each addition of the tapping area variable of 1 ha will increase the amount of revenue for pine sap tappers by 41360,043 IDR or Rupiah units.
3. The regression coefficient value for the number of tapped trees ( $X_{tapped_2}$ ) obtained a negative value, namely -51.501, meaning that each addition of 1 tree will reduce income by 51.501. This also means that the number of trees tapped has a negative effect on the sap tappers' income.
4. The regression coefficient value for the distance to the collection of sap ( $X_3$ ) gets a negative value, namely -17873,175, meaning that each additional 1 km distance to the collection of pine sap will

reduce income by 17873,175. This also means that the distance to the sap collection has a negative effect on the income of pine sap tappers.

5. The value of the regression coefficient of latex production ( $X_4$ ) is positive, namely 5254,918, meaning that each increase in the variable amount of sap by one (kg / month) will increase income by 5254,918. This also means that the production of sap has a positive effect on the income of pine sap tappers sap of the sap tappers
6. The regression coefficient value of the ( $X_5$ ) has a positive value of 522,994, that each additional variable wage of the sap tappers with units of 100 rupiah will increase the income of the sap tappers. pine amounting to 522,994 rupiah. This also means that the wage of carrying sap has a positive effect on the income of pine sap tappers.

The independent variable is said to have a significant effect on the dependent variable (income) if it meets the decision making criteria. If the value of  $t_i$  is greater than  $t_{table}$  or on the basis of decisions based on probability (significance), i.e. if the probability (significance) of less than 0.05. The value of  $t_{table}$  based on the t-table in this study is 2.060.

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Based on Table 7 above, it can be seen that:

1. The value of  $t_i$  the variable area leads ( $X_1$ ) of the income of farmers tappers (Y) is 3,106 >  $t_{table}$  is 2.060 with sig. equal to 0.005 < 0.05 value. So it can be concluded that there is an area of influence of variables leads ( $X_1$ ) of the income of farmers tappers (Y)
2. Value, variable number of trees tapped ( $X_2$ ) of the income of farmers tappers (Y) is 1.654 <  $t_{table}$  that is 2.60 with a sig value. equal to 0.111 > 0.05 value. So, it can be concluded that there is no influence between the number of tapped trees ( $X_2$ ) on the sap tapping farmer's income (Y). This happens because the value of the regression coefficient from the distance variable to the sap collection ( $X_2$ ) is negative, which means that every addition of one tree will result in a decrease in the income of the tappers.
3. The value of  $t_i$  the variable within the collection ( $X_3$ ) of the income of farmers tappers (Y) is 0495 <  $t_{table}$  is 1.710 with sig. equal to 0.625 > 0.05 value. So it can be concluded that there is no influence between the variable collection distance ( $X_3$ ) on the income of the sap tappers (Y). This happens because the value of the regression coefficient from the distance variable to the sap collection ( $X_3$ ) is negative, which means that every additional 1 km of distance to the sap collection, there will be a decrease in income.
4. Value, variable sap production per month ( $X_4$ ) against the income of farmers tappers (Y) is 73 402 >  $t_{table}$  is 2.060 with sig. equal to 0.000 < value 0.05. So it can be concluded that there is an influence between the variable amount of sap per month ( $X_4$ ) on the income of the sap tappers (Y).
5. The value, of wages variable bear ( $X_5$ ) against the income of farmers tappers (Y) is 3,144 >  $t_{table}$  is 2.060 with sig. equal to 0.004 < 0.05 value. So it can be concluded that there is an influence between the variable wage carrier ( $X_5$ ) on the income of the sap tappers (Y).

Based on the results of the regression above, it can be seen that the variables that significantly influence income are the tapping area, sap production and the shoulder wages..

The area of the tappers has a significant effect on the income of pine sap tappers. This happens because based on the t test, the results obtained are significant between the tapping area against the income. This is consistent with what Stiawan et al (2014) [8] found that the factor of land area has a significant effect on income, with an increase in area, income will increase. In its application, the maximum utilized area will have a significant effect on income. Therefore, tappers must be able to utilize the tapped area properly and maximally in order to increase their income.

The production of sap per month has a significant effect on the amount of income received by the tappers because the amount of money to be received by the tappers depends on the amount of sap

obtained. The amount of sap obtained is then multiplied by the current price of sap by considering the distance between the tapping location and the collection point. This is in accordance with what Juliansya and Agung (2018) [9] found, latex production has a significant effect where if there is an additional 1 kg of production, income will also increase. Another opinion is expressed by Sukardi (2017) [10] that the amount of income is caused by production factors. The more sap production obtained by the tappers, the more income that the sap tappers receive will significantly affect the income of pine sap tappers. The wages for carrying sap are obtained based on the distance of the carrying because the distance of the carrying which is close to receive the shoulder wages is less than the distance of the long distance to the place of collecting the sap. However, the farther the sap carrying distance, the longer it takes, so that the time used in tapping is reduced. This is consistent with what was stated by Cahyono (2011) [11] that the farther the tapping location is from the collection point, the smaller the tapping will be. It is relatively easy for tappers who have a close distance to collect sap even though they receive a small amount of sap.

#### 4. Conclusion

1. The sap tappers in Cenrana Baru Village, Cenrana District, Maros Regency use a tapping technique in the form of a koakan or technique *quarre*. This technique is a technique that is very commonly used by tappers, because it is very easy to do and the tools are easy to bring down to the sap tapping location.
2. The average monthly income of sap tappers in Cenrana Baru Village, Cenrana District, Maros Regency is Rp. 2,523,661.27. The income of the sap tappers can be increased by increasing the production of pine sap accompanied by an increase in the price of pine sap.
3. The main factors that affect the income of pine sap tappers in Cenrana Baru Village are the area of the tapping area, the production of the sap obtained per month and the shoulder wages.

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