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EFFORTS TO INCREASE FAMILY INCOME INDEPENDENTLY THROUGH HOME AGRICULTURAL ECONOMY: CONTRIBUTION OF PINE TAPPING (PINUS MERKUSII)

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Abstract

Pine resin (Pinus merkusii) is one of the non-timber forest products (NTFPs) that plays an important role in increasing the income of rural communities. This study aims to analyze the level of income and contribution of pine resin tapping to family income in Cane Toa Village, Rikit Gaib District, Gayo Lues Regency. The method used was a census of 55 pine resin tapper respondents. Data were analyzed quantitatively using the contribution formula and household income analysis. The results showed that the average income from pine resin tapping was IDR 3,319,818.4 per production, while income from other sectors reached IDR 4,156,370.85. The total average income of tapper families was IDR 7,476,189.31 per production. The contribution of pine resin tapping to total family income was recorded at 44.4%, included in the "good" category according to the classification of Kepmendagri No. 690,900,327 in 1996. These results confirm that pine resin tapping plays a significant role in supporting the household economy in the region, although technical assistance is still needed so that tapping practices are more sustainable and efficient.

Keywords: ***Pine resin, income contribution, NTFPs, Pinus merkusii, rural economy***

INTRODUCTION

Forests are one of the natural resources that provide various benefits, both directly and indirectly, for human survival. Forest products are not only in the form of wood, but also include non-timber forest products (NTFPs) such as rattan, honey, and sap. The use of NTFPs is considered more sustainable than the use of forest products in the form of wood, because it does not require cutting down trees. One of the NTFPs that has high economic value and has strategic potential is pine resin (Pinus merkusii). This product has high commercial value because it can be processed into gondorukem and turpentine for industrial needs (Suharisno, 2009).

Pinus merkusii is a type of conifer tree that is widely distributed in tropical Southeast Asia, including Indonesia. This plant is known to have ecological advantages, fast growth, and multifunctionality in producing wood and resin (Indrajaya & Handayani, 2008). Pine resin tapping can be done without cutting down trees, thus providing sustainable economic benefits for communities around the forest. This potential makes pine a leading commodity in reforestation programs and improving the welfare of communities around the forest (Santosa, 2010). In addition, environmentally friendly tapping practices also support long-term forest conservation.

Gayo Lues Regency in Aceh Province has extensive pine forest cover, making the forestry sector, especially NTFPs, the mainstay of the community's economy. Rikit Gaib District is one of the areas that depends on forest products, with pine resin being the main source of income for many families. The shift from cultivating citronella to tapping pine occurred due to falling prices and high production costs of citronella after the COVID-19 pandemic. This condition encourages the community to utilize the available natural potential efficiently, one of which is through tapping pine resin. Cane Toa Village is one of the villages that produces pine resin with a pine land area reaching 238 hectares (RPJM Cane Toa Village, 2022).

Pine resin tapping contributes significantly to community income, although family income generally does not come from just one sector. In addition to tapping, people also earn income from agriculture, livestock, and non-agricultural sectors such as laborers or traders. Diversification of income sources is a strategy to overcome price instability and resin production results. However, there has not been much research that systematically measures the specific contribution of pine resin to family income. Therefore, quantitative analysis is needed to provide empirical data as a basis for policy making. The production level and selling price of pine resin tend to fluctuate

from year to year, which has an impact on the income of tappers. Data from the RPJM of Cane Toa Village (2022) noted that production decreased from 5,527 tons in 2019 to 3,000 tons in 2023, while the selling price also decreased from IDR 12,000/kg to IDR 7,000/kg. This decline was influenced by the intensity of tapping without good management, which caused a decrease in the resin content. This situation shows the importance of more efficient and sustainable pine forest management to maintain the stability of community income. On the other hand, economic dependence on NTFPs such as pine resin shows how important it is to diversify and improve the skills of tappers.

The economic contribution of pine resin tapping has not been fully scientifically evaluated in a local context such as Cane Toa Village. In fact, this information is very much needed to design rural and forestry development policies based on local potential. Previous studies have shown that the contribution of pine resin can reach more than 70% of total household income in some areas (Makmur, 2022; Andi, 2023). However, similar data is not yet available for Cane Toa Village in detail. Therefore, this contribution study is important to fill this knowledge gap.

This study aims to determine the income of pine resin tappers and their contribution to family income in Cane Toa Village. The results of the study are expected to provide factual information regarding the economic role of NTFPs in the structure of rural household income. In addition, the results can be a reference for policy makers, community empowerment institutions, and researchers in the fields of agribusiness and forestry. Thus, this study has theoretical and practical relevance in the context of local economic development based on natural resources. This study is also expected to provide recommendations to increase the productivity and efficiency of pine resin tapping in a sustainable manner.

LITERATURE REVIEW

The concept of contribution in the context of household economics refers to the extent to which an economic activity contributes to the total family income. Contributions can be direct, such as income from farming or tapping, or indirect through influences on production efficiency. According to Wulandari et al. (2016), income contribution is measured by the percentage contribution of each source of income to the total household income. A significant contribution indicates economic dependence on the activity and is important for policy making. In this case, tapping of pine resin as a non-timber forest product (NTFP) is one of the main sources of contribution in many rural areas.

NTFPs have production characteristics that do not damage the environment because they do not require the felling of entire trees. According to FAO (1995), NTFPs include all forest products other than wood, such as rattan, honey, fruits, and sap. NTFPs products are considered more sustainable because they can be harvested repeatedly and have high economic value if managed properly. Pine sap is one of the NTFPs that has high commercial value and can be processed into gondorukem and turpentine which are used in various industries (Suharisno, 2009). In addition, NTFPs have been proven to provide significant economic contributions in various regions in Indonesia (Baharuddin & Ira, 2009).

Pinus merkusii is a type of conifer tree native to Southeast Asia that is widely planted in Indonesia for reforestation and resin production purposes. This plant is known for its high adaptability and relatively fast production rotation age. According to Indrajaya and Handayani (2008), pine has high ecological, social, and economic value. Pine resin is tapped through a wounding technique on the tree trunk, and the resin that comes out is collected and then sold to collectors. In addition, pine resin is included in the oleoresin category, which is a mixture of resin and essential oils that have a high selling value (Santosa, 2010).

From the household economic perspective, income is defined as the difference between revenue and production costs, both from primary and secondary activities. According to Yunus (2011), household income includes income from farming, non-farming, and transfers from outside the household. In many studies, household income is influenced by various factors such as education level, number of dependents, and area of land managed. Diversification of income sources is often a family strategy to reduce economic risk. Pine resin tapping is one form of diversification that is beneficial for rural households.

Several previous studies have shown that the contribution of pine resin to community income is very significant. For example, Makmur (2022) found that in Seneren Village, the contribution of pine resin reached 85.57% of total household income. Similar results were also found by Andi (2023) in Dabun Gelang District, where the contribution of pine resin reached more than 74% in the three villages studied. This shows that NTFPs such as pine resin play an important role in the income structure of forest communities. However, this contribution can vary depending on local geographic, social, and forest management conditions.

The efficiency of pine resin tapping is largely determined by the technical knowledge of the tapping community. Communities that tap trees with suboptimal diameters or use inappropriate techniques are at risk of

producing less resin. According to Kasmudjo (1992), tapping techniques and the economic life of the equipment greatly affect productivity. Therefore, training and technical assistance are needed to increase the yield and quality of the tapped resin. Increased productivity will have a direct impact on increasing the economic contribution of tapping to family income.

Thus, tapping pine resin as one form of utilization of NTFPs has a strong scientific basis both from an ecological and economic perspective. The contribution of pine resin to household income can be used as an important indicator in rural development planning based on natural resources. Existing literature supports that with proper management, NTFPs such as pine resin can become the main source of livelihood for the community. Further research is needed to adjust the management approach to specific local conditions. That way, economic potential and environmental sustainability can go hand in hand.

METHOD

This study uses a descriptive quantitative approach with the aim of describing and analyzing the magnitude of the contribution of pine resin tapping to family income. The quantitative approach is used to measure income and contribution in the form of numbers that can be analyzed statistically. This method is appropriate for explaining the relationship between income variables from pine resin and total household income. The study was conducted by collecting primary data through questionnaires and interviews. In addition, secondary data was obtained from official sources such as the Central Statistics Agency and village documents.

The research location is in Cane Toa Village, Rikit Gaib District, Gayo Lues Regency, Aceh Province. The location selection was carried out purposively considering that the majority of the population in this village work as pine resin tappers. This area also has a significant area of pine land and is the main producer of pine resin in the district. These conditions make Cane Toa Village a relevant location to study the contribution of pine resin to the family economy. The research was conducted during the period January to March 2024.

The population in this study were all pine resin tappers in Cane Toa Village, totaling 55 people. Given the small population, the entire population was sampled or called the census method. This census technique was carried out so that the research results reflect the real conditions in the field as a whole. Each respondent is the head of a family or household member who is actively involved in tapping. Data were collected using a direct approach through structured interviews.

RESULTS AND DISCUSSION

The results of the study showed that all pine resin tappers in Cane Toa Village were in the productive age range, namely 15–65 years. This indicates that the workforce used in tapping activities is at an optimal age stage physically. The majority of respondents' education levels are at elementary and junior high school levels, which can affect technical knowledge about tapping and product management. The number of family dependents is generally between 1 and 3 people, indicating a relatively light household economic burden. The area of tapping land is generally above 1 hectare, which means that the potential for pine resin production is quite large in aggregate.

Tapping cost analysis shows that the average total production cost per process is Rp184,787, consisting of fixed costs (machete, sprayer, bowl) and variable costs (sacks). The largest cost comes from purchasing a bowl to collect the sap, while transportation costs are not required because collectors come directly to the tapping location. The relatively low production costs make pine resin tapping an efficient business alternative for the community. In addition, the absence of additional costs such as consumption and land rent reduces household expenses. This cost efficiency is the main attraction in the transition from commodities such as citronella to pine resin.

In terms of income, the average monthly production of latex is 1,521.82 kg with a selling price of Rp7,000/kg, generating a gross income of Rp10,652,727.27. If calculated based on production per hectare, the average reaches 500.66 kg with a value of Rp3,504,606.06. After being reduced by production costs, the average net income obtained from tapping pine resin is Rp3,319,818.4 per production. This amount shows that pine resin is a promising source of income, although its value is still smaller than income from other sectors. However, the sustainability and consistency of production make it an important component in the household income structure.

In addition to tapping pine resin, the community also gets income from the agricultural and non-agricultural sectors. From the agricultural sector (lemongrass, livestock), the average income is IDR 2,675,595, while from the non-agricultural sector (laborers, traders, civil servants) it is IDR 8,965,079. Total income from other sectors reaches IDR 11,640,675, which shows that the community still relies on several sources of income to meet their living needs. This diversification is an important strategy in maintaining the stability of the family economy. However, income from other sectors is more varied and depends on the type of work and skills. If all income is calculated, the total average income of tapper families in Cane Toa Village is Rp7,476,189.31 per

production process. Of this amount, income from pine resin tapping contributed Rp3,319,818.4, so its contribution was 44.4%. Based on the classification of Kepmendagri No. 690,900,327 of 1996, this percentage is categorized as "good". This shows that pine resin tapping is a significant source of income, although not the only one. This contribution shows that NTFPs such as pine resin can be a strong economic foundation for rural households if managed efficiently. Comparison with other studies supports this finding. For example, Makmur's (2022) study in Seneren Village showed that the contribution of pine resin was 85.57%, while in Dabun Gelang District the contribution varied between 74.92% and 90.35% (Andi, 2023). Compared to other areas, the contribution of pine resin in Cane Toa Village is relatively lower. This may be due to the large income from the non-agricultural sector and limited technical knowledge about efficient tapping. Therefore, improving technical skills and post-harvest management can significantly increase contributions.

These findings indicate the importance of strengthening community capacity in tapping techniques, tree selection, and sustainable forest management. Many tappers still tap trees that are not old enough or have a trunk diameter that is too small, which results in low volumes of sap produced. Socialization of environmentally friendly and efficient tapping techniques can increase productivity and income. Support from local governments and the private sector is also needed in terms of marketing and increasing access to technology. With this strategy, the contribution of pine sap to household income can continue to increase sustainably.

CONCLUSION

1. The average income of pine resin tappers in Cane Toa Village is Rp. 3,504,606.06/production with a pine resin tapping cost of Rp. 184,787.61/production. So that they get a profit of Rp. 3,319,818.4/production which can increase the income of the community in Cane Toa Village
2. The average income of pine resin tappers in Cane Toa Village is Rp. 3,319,818.4/production, income from other sectors is Rp. 4,156,370.85/production, and the average total income is Rp. 7,476,189.31/production, so that pine resin tapping contributes 44.4% including at a good contribution level.

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