



# Business Development Strategies for Processing Derivatives of Non-Timber Forest Products Pine Resin in Groups of Tappers in West Sumatra Province

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**Abstract:** West Sumatra Province has pine forest areas that have not been maximized as regional economic potential in increasing community income. The study was conducted to analyze the current state of the pine resin NTFP utilization business and the feasibility analysis of the pine resin NTFP derivative product processing business. For the development and improvement of a sustainable regional economy, a processing business development strategy is needed by analyzing related internal and external factors and formulating priority strategies for developing pine resin NTFP derivative processing businesses. The research method is using quantitative and descriptive qualitative analysis using IE Matrix analysis, SWOT analysis, and QSPM analysis to obtain strategic priorities. The analysis data used are primary and secondary data. The results of the study showed that the utilization and processing of pine resin NTFPs is feasible to run with a positive NPV of IDR 10,090,058,000 with an investment of IDR 6,108,024,000, IRR 55%, and Gross B/C 1.23. The resulting strategic priority is the diversification of pine resin products to increase added value. The conclusion of the study is that the utilization and processing of pine resin NTFPs plays a strategic role in supporting economic development in West Sumatra Province.

**Keywords:** Forestry economics; Non-timber forest products (NTFPs) pine sap; Regional economic development

## Introduction

Indonesia is one of the countries with considerable forestry natural resources as a country with tropical rainforests located on the equator. This natural resource is one of the sectors that has good resilience and is able to survive during a pandemic. This sector has great development potential which is able to contribute to foreign exchange and is a livelihood sector for people in isolated forests. As a source of industrial raw materials derived from NTFPs this sector is referred to as the forest chemical industry. Satradi et al. (2022) provide a definition of NTFP from ITTO (International Tropical Trade Organization) as Non Timber Forest Products (NTFP) are non-timber forest products. And the Government through the Minister of Forestry has also

regulated the definition of NTFPs through Minister of Forestry Regulation number P.35/Menhut-II/2007, stating that Non-Timber Forest Products are biological forest products both vegetable and animal along with derivative products and cultivation except wood originating from forests.

Economic development presents intricate challenges, including insufficient income levels in communities, elevated rates of joblessness, and sluggish economic advancement within regions (Mukhlis et al., 2023; Rohani et al., 2024). Agriculture in Indonesia is a vital component of the nation's economic framework. The strategies for developing agriculture influence agricultural regulations in Indonesia. The authorities have enacted policies related to intensification, extensification, diversification, and rehabilitation in a

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manner that is both equitable and balanced to bolster the agricultural sector (Sutanto, 2002; Mukhlis et al., 2024; Mubarokah et al., 2024). Agribusiness refers to a sector that encompasses farming, system support, crop cultivation, food manufacturing, food commerce, food logistics, and textiles for end users. (Wowor et al., 2023; Kaunang et al., 2024).

National and regional economic development in the forestry sector is in line with the government's mandate as stipulated in PermenLHK No. P-83/Menlhk/Setjen/Kum.1/10/2016 that forest management as an upstream sector must have a sustainable forest ecosystem perspective, prioritizing the participation of the forest community itself and good interaction is an absolute requirement for the sustainability of economic development in the forestry sector. Utilization of sap NTFPs is a form of community empowerment that synergizes with the concept of sustainable forests. As a form of active participation, the government has issued a number of regulations in the context of better NTFP management. Through Permenhut number P.49/MenLHK/Setjen/Kum.1/9/2017 of 2017 which regulates Forest Utilization Cooperation by providing space for cooperation and opening access to communities around the forest in optimizing forest resources.

According to Satradi et al. (2022), pine resin NTFP commodities are superior commodities that have proven capable of providing foreign exchange from exports. The export value of pine resin NTFPs and their derivative products as previously mentioned reached Rp 4.1 trillion in 2022. The development of pine resin NTFP derivative product processing businesses integrally includes development in the upstream sector. This sector includes; optimizing the participation of local communities to obtain economic benefits in areas that have Forest Natural Resources for pine resin NTFPs, maximizing pine forest land by intercropping with tuber plants and herbal plants. While in the downstream sector, this derivative product processing business creates a chain effect which includes processing in the gum rosin and essential oil industry, adhesive resin industry, paint resin industry, ink, sizing material for paper, batik and antiseptic processes. The development of pine resin NTFP derivative product processing business is an effort to create added value to economic benefits by processing its derivative products first (Yunianto et al., 2017). With the potential existence of pine resin NTFP raw materials in West Sumatra Province, the opening of derivative product processing business development as an effort to increase added value, a future development strategy is needed to increase economic development in a region. For this reason, this research will explore "How is the business development strategy for processing pine resin NTFP

derivative products in tapping farmer groups in an effort to improve the regional economy in West Sumatra Province?"

## Method

### *Location and Time of Research*

Determination of the location of this research used purposive method (Sugiyono, 2018), so that the area of West Sumatra Province was selected. This is with the consideration that no research has been conducted on the same topic and commodity. This research was conducted for 3 months, from January to April 2025. The research activities included the stages of preparation, data collection, data analysis, and preparation of the thesis report.

### *Sampling Method*

The sampling method used in this study is the purposive sampling method (Rianse & Abdi, 2013). The purposive sampling method was used to determine 5 expert resource persons from stakeholders in the utilization and processing of pine resin NTFPs. The quantitative data that has been obtained is then analysed to obtain the results of the feasibility study of pine resin NTFP derivative processing business using B/C, NPV, IRR and Payback Period (PP) analysis.

### *Data Collection Method*

The data used in this research consisted of qualitative and quantitative data. Qualitative data was obtained through interviews, observations, and documentation to understand the non-metric aspects of the Farmer Tappers Group and the Forest Service. Quantitative data was collected through surveys using questionnaires and data analysis on the Forest Product Management Information System. The data sources used included primary and secondary data. Primary data was obtained through interviews with relevant stakeholders, namely the Ministry of Industry, the Ministry of Forestry, the West Sumatra Provincial Forestry Service, the Indonesian Forest Entrepreneurs Association (APHI), Tappers Farmers, Companies in the Pine Sap NTFP sector. Secondary data comes from BPS reports, information and publications relevant to the pine resin NTFP sector. Data collection was carried out through Focus Group Discussions (FGDs), structured interviews, distribution of questionnaires, and literature review.

### *Data Analysis Method*

Data analysis methods used are qualitative and quantitative methods. Qualitative data were analysed using Strength, Weakness, Opportunity, Threat (SWOT) analysis, and Quantitative Strategic Planning Matrix

(QSPM). The results of the analysis will provide critical insights into the feasibility aspects of the pine resin derivative processing business to determine whether or not to invest in the processing business. SWOT and QSPM analyses aim to evaluate internal and external factors that influence decision-making considerations for sustainability, business development and strategic decision formulation.

*SWOT Analysis*

SWOT analysis (Strength, Weakness, Opportunity, and Threat) is a tool to derive useful or effective strategies that are applied according to the market and public conditions at the time (Galavan, 2014). Opportunities and threats are used to understand the external environment, while strengths and weaknesses are identified through internal company analysis. SWOT compares strengths, weaknesses, opportunities, and threats. Strengths and weaknesses are examined to identify current and future opportunities and threats (Gurel & Merba, 2017; Muala et al., 2024). The approach taken for data examination is SWOT analysis. This analytical technique is a qualitative assessment tool that generates different strategies by evaluating both external and internal elements of the organization. The phases involved in conducting a SWOT analysis are outlined below (David et al., 2017; Mahfud & Mulyani, 2017).

The matrix is an important matching tool to help parties in the organization produce four types of strategies, SO strategy, WO strategy, ST strategy and WO strategy. Before conducting a SWOT analysis, it is necessary to create an IFE and EFE matrix to classify internal and external factors that will be the strengths, weaknesses, opportunities and threats of a company (Rohani et al., 2024).

*QSPM Analysis*

Quantitative Strategic Planning Matrix (QSPM) is a technique that can objectively determine alternative strategies that are prioritized, as a QSPM technique requires good intuitive judgment. QSPM is a tool to evaluate the strategy to be implemented so as to optimize the results (Zulkarnaen & Sutopo, 2013).

Experts provide an assessment by comparing each internal and external factor of the company with alternative strategies that have been prepared. QSPM allows strategy makers to evaluate various alternative strategies objectively, based on internal-external factors identified (Fretes et al., 2013; Purwandari, 2015).

QSPM is used to determine alternative strategies generated in the SWOT matrix (David et al., 2009; Mahfud & Mulyani, 2017). QSPM components consist of: alternative strategies; key factors; weights; attractiveness score (AS); total attractiveness score (TAS). The description of the AS score; TAS; and total attractiveness score are described into six steps required to develop QSPM, namely: 1). Listing the various external opportunities-threats and internal strengths-weaknesses in the left column of the QSPM, 2). Give weight to each external and internal factor, 3) Examine the matching results and identify various alternative strategies that the company needs to consider, 4). Determining the attractiveness score (AS) which is defined as a numerical value indicating the relative attractiveness of each strategy considering a single external or internal factor, 5). Calculating the total attractiveness score, and 6). Calculating the overall sum of the total attractiveness scores (David et al., 2017; Indriarti & Nova, 2021).

**Results and Discussion**

*Pine Sap NTFP Utilization Business of Farmer Groups in West Sumatra Province*

West Sumatra Province has a total of 19 district and city administrative areas, there are 47 farmer groups of pine sap NTFP tappers registered as licensed and active during the period 2018 - 2022. The results of data processing SIPUHH (Forest Product Administration Information System) of the Ministry of Forestry for West Sumatra Province can be found that the top three contributions came from Solok City with 26.81% with an average production quantity of 459.37 tons/year, Lima Puluh Kota District with 25.78% with an average production quantity of 441.78 tons/year, Solok District with 18.82% with an average production of 322.53 tons/year.

**Table 1.** Production and Contribution of Farmer Groups in the Period 2018-2022

| No. | Name of Regency/City | Number of Groups | Average production 2020 -2022<br>(ton/year) | Contribution (%) | Activity Status 2025 |
|-----|----------------------|------------------|---|------------------|----------------------|
|     | Agam                 | 7                | 65.37                                       | 3.81             | Active               |
|     | Lima Puluh Kota      | 9                | 441.78                                      | 25.78            | Active               |
|     | Pasaman              | 7                | 59.00                                       | 3.44             | Active               |
|     | Pesisir Selatan      | 3                | 17.67                                       | 1.03             | Active               |
|     | Sijunjung            | 1                | 22.60                                       | 1.32             | Active               |
|     | Solok                | 11               | 322.53                                      | 18.82            | Active               |
|     | Tanah Datar          | 3                | 34.75                                       | 2.03             | Active               |
|     | Kota Payakumbuh      | 1                | 10.00                                       | 0.58             | Active               |

| No. Name of Regency/City | Number of Groups | Average production 2020 -2022 (ton/year) | Contribution (%) | Activity Status 2025 |
|--------------------------|------------------|--|------------------|----------------------|
| Kota Sawah Lunto         | 4                | 280.67                                   | 16.38            | Active               |
| Kota Solok               | 1                | 459.37                                   | 26.81            | Active               |
| Total                    | 47               | 1.713.74                                 | 100.00           |                      |

Regionally, the average production is 1,713.74 tons/year, which means 142.82 tons/month. This average capacity will be the assumption in the Feasibility Study Analysis to determine the profitability of the pine resin derivative processing business with the combined production of all 47 groups of tappers in West Sumatra Province. West Sumatra.

*Feasibility Study of Pine Gum Derivative Processing Business*

Basic assumptions need to be set first before analyzing the numbers in the feasibility study of a business investment. The investment costs of this business include land, factory buildings and administrative offices, procurement of production machinery, infrastructure, and supporting facilities. The total investment cost for this business is Rp 6,108,024,000. The largest investment cost lies in the purchase of land, factory buildings and offices amounting to IDR 3,150,000,000. Variable costs incurred by this business each year are the procurement of auxiliary materials, insurance, tax levies, and electricity and water.

The total variable costs incurred amounted to Rp22,385,898,000 per year. Fixed costs incurred by this

business are indirect labour and depreciation-amortisation which cost Rp 893,352,000 per year. The largest expense in fixed cost incurred is IDR 535,200,000 per year for indirect labour costs.

Business revenue is the sale of processed pine resin products, namely Gum Rosin and Turpentine Oil. The price of these products changes according to the prevailing price in the market. The purchase price of pine resin by collectors at the time of this study from tappers was IDR 13,500 per kg with an average production of 1,200 tons/year. The average business revenue in first year is Rp 27,227,520,000. The financial feasibility of the business was calculated using five investment assessment criteria including Net Present Value (NPV), Internal Rate of Return (IRR), Gross Benefit Cost Ratio (Gross B/C), Net Benefit Cost Ratio (Net B/C), and Payback Period (PP). These business investment assessment criteria are calculated by compounding factor (cf) and discount factor (df). The project life used is based on the economic life of the pine resin distillation plant which has the longest economic life of 5 years. The interest rate used is based on the commercial interest rate of a state-owned bank in 2025, which is 12.5 percent per year (BNI, 2025).

**Table 2.** Financial Feasibility Analysis of Pine Sap Processing Business

| Years | Total Revenue (TR)<br>(Rp 000) | Total Cost (TC)<br>(Rp 000) | Income (Net B-C)<br>[2-3] | cf/df<br>12.50% | NPV<br>[4 x 5]  |
|-------|--------------------------------|-----------------------------|---------------------------|-----------------|-----------------|
| 2025  | -                              | (6.,108,024,000)            | (6,108,024,000)           | 0.889           | (3.233.660,000) |
| 2026  | 27,227,520,000                 | 23,328,252,000              | 3,899,268,000             | 0.790           | 2,178,212,000   |
| 2027  | 28,588,896,000                 | 24.,492,245,000             | 4,096,651,000             | 0.702           | 2,406,494,000   |
| 2028  | 30,018,341,000                 | 25,714,364,000              | 4,303,976,000             | 0.624           | 2,649,750,000   |
| 2029  | 31,519,258,000                 | 26,997,515,000              | 4,521,743,000             | 0.555           | 2,908,006,000   |
| 2030  | 33,095,221,000                 | 28,344,746,000              | 4,750,474,000             | 0.493           | 3,181,256,000   |
| Total | 150,449,235,000                | 122,769,099,000             | 15,464,088,000            |                 | 10,090,058,000  |

**Table 3.** Calculation Results of Financial Feasibility of Pine Sap Processing Business

| Criteria  | Unit | Value          |
|-----------|------|----------------|
| NPV       | Rp   | 10,090,058,000 |
| IRR       | %    | 55%            |
| Gross B/C | -    | 1.23           |
| Net B/C   | -    | 4.12           |
| PP        | Year | 1.53           |

Based on the cost data and business revenues that have been obtained, the financial feasibility of pine resin derivative processing business can be calculated. The total revenue of pine resin derivative processing

business for 5 years is Rp 150,449,235,000, - and the total cost of this business for 5 years is Rp 122,769,099,000, -. With the total revenue and costs, the total revenue of this business is IDR 15,464,088,000. With an interest rate of 12.5 percent, the NPV result is IDR 10,090,058,000. Based on these results, the financial feasibility of the pine resin derivative processing business can be calculated based on other investment assessment criteria, namely IRR, Gross B/C, Net B/C, and PP.

Analysis of the calculation results of the financial feasibility of the business in Table 3. The NPV value obtained is Rp10,090,058,000, - which is greater than 0, indicating that this business is profitable and feasible to

continue. The IRR value obtained is 55 percent and this value is greater than the prevailing interest rate so that this business is feasible to continue.

The Gross B/C and Net B/C values obtained are 1.23 and 4.12 respectively and these values are more than 1 which indicates that this business is feasible to continue. The PP value obtained is 1.53 years and is smaller than the economic life of the factory which is 5 years old so that this business is feasible to continue.

*IFE and EFE Factor Analysis*

*IFE Matrix*

The IFE matrix is obtained through respondents' assessments of the extent to which internal strategic factors affect the development of pine resin NTFP derivative processing businesses in groups of tappers in West Sumatra Province. Respondents (experts) provide an assessment of the weight and rating of each internal strategic factor.

**Table 4.** IFE matrix of Pine resin NTFP Derivative Processing Business Development in West Sumatra Province

| Internal Factor  | Weight | Rating | Score |
|--|--------|--------|-------|
| <b>Strengths</b>   |        |        |       |
| 1. Adequate pine forest potential for pine resin tapping                         | 0.13   | 3.8    | 0.51  |
| 2. Availability of human resources   | 0.11   | 3.6    | 0.39  |
| 3. The existence of an active farmer group as a forum for farmer cooperation     | 0.09   | 3.4    | 0.32  |
| 4. Pine resin derivative products are diverse and high value                     | 0.13   | 3.8    | 0.48  |
| 5. The reputation of West Sumatra pine resin which is known to have good quality | 0.08   | 3.2    | 0.26  |
| Sub Total  | 0.54   | 17.80  | 1.95  |
| <b>Weakness</b>  |        |        |       |
| 1. Suboptimal product quantity and quality                                       | 0.09   | 1.80   | 0.16  |
| 2. Limited access of farmers to capital and business financing                   | 0.09   | 1.40   | 0.13  |
| 3. Implementation of simple processing and post-harvest technology 4.            | 0.11   | 1.60   | 0.17  |
| 4. Partnership between farmers and marketing institutions is not yet optimized   | 0.09   | 1.60   | 0.14  |
| 5. Lack of branding as a renewable natural resource                              | 0.09   | 1.80   | 0.16  |
| Sub Total  | 0.46   | 8.20   | 0.75  |
| Total  | 1.00   | 26.00  | 2.70  |

Based on Table 4, the results of the IFE matrix analysis show that the total internal factor evaluation score is 2.70, which indicates that the internal position of the organization is above average (>2.50). This indicates that West Sumatra Province has quite dominant internal strengths compared to existing weaknesses, so the potential for pine resin processing business development in this region is quite promising. The main strengths are important assets to support the development strategy, although certain weaknesses still require special attention.

The results of the IFE matrix analysis show that the factor with the largest weighted value in terms of strength is the potential of pine land located in the West Sumatra Province area with a weighted score of 0.51. This shows that the availability of pine forest land is a major strength that can be optimized to support the development of pine resin processing businesses. The availability of pine forest land is the main basis for the development of processed pine resin products, such as Gum Rosin and Turpentine Oil and to consistently meet local and regional market needs.

In terms of weaknesses, the factor with the largest weighted score is the application of simple processing and post-harvest technology, with a weighted score of 0.17. This weakness indicates that the application of pine resin processing technology in West Sumatra is a major obstacle in efforts to develop business management in

the future. This factor needs to be a priority to overcome through socialization of improved application of tapping technology and pine resin processing technology into derivative products.

This can be done by opening communication to investors and academics as well as more effective coordination between tappers and supporting institutions. By utilizing the main strength of the availability of pine forest land, tappers and stakeholders in West Sumatra can focus on strategies that encourage increasing production and adding value to pine resin by developing derivative products, as well as market expansion. On the other hand, efforts to overcome the main weakness, namely the absence of the application of harvest and post-harvest technology, can be done by increasing the socialization of technology application, increasing the knowledge capacity of farmers through training, and utilizing modern technology to increase the added value of products.

*EFE Matrix*

The EFE matrix is obtained through respondents' assessments of the extent to which external strategic factors affect the development of pine resin NTFP derivative processing businesses in groups of tappers in West Sumatra Province. Respondents (experts) provide a weight and rating assessment of each external strategic factor.

**Table 5.** EFE Matrix of Pine Resin NTFP Derivative Processing Business Development in West Sumatra Province

| External Factor   | Weight | Rating | Score |
|---|--------|--------|-------|
| <b>Opportunity</b>  |        |        |       |
| 1. High market demand, both for raw materials and derivative products                                       | 0.12   | 3.80   | 0.46  |
| 2. Local government policy support for pine resin derivatives development                                   | 0.11   | 3.20   | 0.36  |
| 3. Potential downstream and diversification of pine resin derivative products to increase added value       | 0.10   | 3.20   | 0.32  |
| 4. Partnership opportunities with the private sector and financing institutions for business development 5. | 0.09   | 3.0    | 0.28  |
| 5. Development of information and communication technology  | 0.09   | 2.6    | 0.24  |
| Sub Total   | 0.50   | 15.80  | 1.67  |
| <b>Threats</b>  |        |        |       |
| 1. Climate change that could destabilize the pine resin harvest   | 0.09   | 1.80   | 0.16  |
| 2. Uncontrolled destruction and logging of pine trees can reduce the productivity of pine resin             | 0.10   | 2.00   | 0.19  |
| 3. Competition with more competitive pine resin producers from other regions                                | 0.09   | 2.20   | 0.20  |
| 4. Fluctuations in the price and demand for pine resin 4.   | 0.11   | 3.00   | 0.34  |
| 5. Environmental and sustainability issues  | 0.11   | 3.00   | 0.34  |
| Sub Total   | 0.50   | 11.20  | 1.09  |
| Total   | 1.00   | 27.00  | 2.76  |

Based on the EFE matrix analysis, the total external factor evaluation score is 2.76, which is above the average (>2.50). This shows that West Sumatra Province has a fairly good ability to take advantage of external opportunities and face existing threats.

The development potential of pine resin processing businesses in this region can be optimized through strategies that take advantage of key opportunities while overcoming the most significant threats. The results of the EFE matrix analysis show that the opportunity with the largest weighted value is high market demand both in the form of raw materials and derivatives, with a score of 0.46.

This confirms that the development of pine resin derivative product processing businesses has a high market share and is a major opportunity that can have a significant impact on the growth of pine resin processing businesses in West Sumatra Province. Guaranteed market share is a determining factor for a business to be developed. With this market guarantee, this product must be improved to become a value-added product that can create new business opportunities and expand market access, both locally and regionally.

On the threat side, the largest weighted values are environmental issues and price fluctuations that can limit production capacity and the potential for fluctuating price pressures with a score of 0.34. In accordance with the concept in Permen LHK No. P-83/Menlhk/Secretariat General/Cum.1/10/2016 that forest management as an upstream sector must have a sustainable forest ecosystem perspective, and in general has provided restrictions on the utilization and management of HHK and NTFPs. In terms of prices, fluctuations in the domestic market determined by international market share can put pressure on selling

prices and production costs where Indonesia is generally not a price maker in this forest product sector. To deal with this threat, adaptation strategies are needed through technology to increase tapping productivity, such as the use of efficient tapping systems, effective use of stimulants, and more optimal and innovative pine land optimization techniques against weather restrictions and limitations. And against price fluctuations, anticipatory steps are to expand market access to get alternative markets that are not vulnerable to price changes and increase the productivity of derivative production to increase cost efficiency.

This approach, it is hoped that groups of pine resin tappers in West Sumatra Province can maximize the potential of processing businesses while mitigating existing risks. By taking the right steps, the potential development of pine resin NTFP processing businesses in the upstream and downstream sectors can create sustainable regional economic growth in West Sumatra Province.

*IE Matrix*

Based on the IFE Matrix which shows that the organization is in a moderate position as indicated by a score of (2.70) while the EFE matrix produces a score of (2.76) which means that the organization has moderate external factors. If each of these values is mapped in the I-E matrix, the company's current position is obtained, namely in cell V. In this cell, the company in cell V is a hold and maintain strategy.

In quadrant V, the tappers' group organization is expected to pursue a strategy of market penetration and product development. Market penetration in derivative products is a search for market share in value-added products and diversifying product market share in pine

resin products and derivative products. The two products have different market shares. The pine resin raw material market is the pine resin distillation plant in the North Sumatra region, the Central Java region, East Java, and the export market share. While its derivative products have a market that is the adhesive industry, paper, paint, ink, resin, oil and aroma both domestically and exports. To develop and improve capabilities, cooperation with various parties is needed to support the processing process and market expansion.

**Table 6.** IE Matrix of Pine Resin NTFP Derivative Processing Business Development in West Sumatera Province

| Score Total EFE     | Score Total IFE     |                     |                   |
|---------------------|---------------------|---------------------|-------------------|
|                     | Strong<br>4.0 – 3.0 | Medium<br>2.9 – 2.0 | Weak<br>1.9 – 1.0 |
| Strong<br>4.0 – 3.0 | I                   | II                  | III               |
| Medium<br>2.9 – 3.0 | IV                  | V                   | VI                |
| Weak<br>1.9 -1.0    | VII                 | VIII                | IX                |

**Table 7.** SWOT Matrix for Developing Pine Resin Derivative Processing Businesses in West Sumatra Province

|   |   |   |
|---|---|---|
| <p><b>IFE</b></p> <p><b>EFE</b></p>   | <p><b>Strenght</b></p> <ul style="list-style-type: none"> <li>- Adequate pine forest potential for pine resin tapping</li> <li>- Availability of human resources</li> <li>- The existence of an active farmer group as a forum for farmer cooperation</li> <li>- Diverse and high-value pine resin derivative products</li> <li>- Reputation of sumbar pine resin which is known for good quality</li> </ul>  | <p><b>Weakness</b></p> <ul style="list-style-type: none"> <li>- Suboptimal product quantity and quality</li> <li>- Limited access of farmers to capital and business financing</li> <li>- The application of processing and post-harvest technology is still simple</li> <li>- Not yet optimal partnership between farmers and marketing institutions</li> <li>- No branding as a renewable natural resource</li> </ul>   |
|   | <p><b>Strategi S-O</b></p> <ul style="list-style-type: none"> <li>- Optimizing pine forest land and expanding the market share of pine resin derivative products by processing derivative products (S1, S4, O1, O3)</li> <li>- Adding farmer groups to maximize the community around pine forests in unopened locations or optimization on existing land accompanied by assistance or socialization of information and communication technology related to SOPs in the forestry sector (S2, S3, O5).</li> <li>- Bank financing cooperation and other alternative financing mechanisms through strengthening farmer group institutions to process derivative products to meet new market demands (S3, S4, O3, O4)</li> </ul> | <p><b>Strategi W-O</b></p> <ul style="list-style-type: none"> <li>- Active role of the provincial government with farmer groups in licensing, financing, and application of information technology that helps administrative governance and processing businesses (W3, O2, O5)</li> <li>- Strengthening farmer group institutions to increase harvesting and production capacity and negotiate bargaining positions for access to financing and support from local governments and private marketing partners (O1, O4, W2, W4)</li> <li>- Cooperation with the Government / related agencies in the campaign of green sustainable products to open up opportunities for cooperation with the private sector in marketing and financing both domestically / abroad (W2, W5, O1, O3, O4)</li> </ul> |
| <p><b>Threath</b></p> <ul style="list-style-type: none"> <li>- Climate change that can destabilize pine resin harvests</li> <li>- Climate change that can destabilize pine resin harvests</li> <li>- Uncontrolled destruction and logging of pine trees can reduce pine resin productivity</li> <li>- Competition with more competitive pine resin producers from other regions</li> <li>- Environmental and sustainability issues</li> </ul>   | <p><b>Strategi S-T</b></p> <ul style="list-style-type: none"> <li>- Strengthen farmer group institutions by maximizing community participation to be able to maximize the potential of forest land for the demand for derivative product segments that are resistant to price fluctuations. Increase the role of community participation and programs in participating in protecting the forest (S1, S2, T4, T5)</li> <li>- Increase the production capacity and product quality of active groups to start focusing on derivative products to be able to compete with other producer areas (S3, S4, T2, T3)</li> </ul>  | <p><b>Strategi W-T</b></p> <ul style="list-style-type: none"> <li>- Open farmer group partnerships with banks and private marketing and alternative private financing (W2, W4, T3, T4)</li> <li>- Maximizing technology to increase on farm and off farm production (W3, T1, T2)</li> <li>- Synergize farmer group work programs with related agencies for sustainable forest product branding and environmental sustainability (W3, W5, T5).</li> </ul>  |
| <p><b>Opportunity</b></p> <ul style="list-style-type: none"> <li>- High market demand, both for raw materials and derivative products</li> <li>- Local government policy support for pine resin derivative product development</li> <li>- Potential downstream and diversification of pine resin derivative products to increase added value</li> <li>- Partnership opportunities with the private sector and financing institutions for business development</li> <li>- Development of information and communication technology</li> </ul> |   |   |

Based on results of the SWOT Matrix analysis above, it can be obtained that the priority strategy for developing pine resin NTFP processing businesses in the Tappers Farmer Group in West Sumatra is the S-O strategy. This strategy has a score (3.62) on priority 1, then the S-T strategy with a score (3.04) on priority 2. The W-O strategy has a score (2.42) on priority 3 and the W-T Strategy with a score (1.84) on priority 4.

*QSPM Analysis*

Result of 12 (twelve) alternative strategies from the SWOT matrix, the final stage in strategy formulation is the selection of the best and most appropriate strategy for the development of pine resin NTFP derivative processing businesses in West Sumatra Province farmer

groups through QSPM analysis. QSPM analysis is an objective technique that can determine which strategy priorities are best from subjectivity by research respondents.

Based on the results of the QSPM calculations carried out, it shows that each alternative strategy has a STAS (Sum Total Attractiveness Scores) value which can be sorted from the largest to the smallest STAS value to show the most effective strategy for the organization. The STAS value indicates the relative attractiveness of each alternative strategy by considering the impact of adjacent external or internal critical success factors. The higher the STAS value indicates the more attractive the alternative strategy is. After sorting the STAS values from the highest to the lowest values, the strategy priorities are obtained in Table 8 as follows:

**Table 8.** Strategy Prioritization with STAS Value QSPM Analysis

| Order | Strategy Alternatives  | Score |
|-------|--|-------|
| 1     | Diversify processed pine resin NTFP products to reduce the impact of price fluctuations and demand for raw materials (S4, T4)  | 6.78  |
| 2     | Increase farmers' access to capital and business financing to encourage the application of better cultivation and post-harvest technology (W2, W3, O5)                   | 6.62  |
| 3     | Optimizing the role of farmer groups to support partnerships with the private sector and financing institutions in business development (S3, O4)                         | 6.58  |
| 4     | Develop and promote diverse and high value-added pine resin NTFP derivative products to increase competitiveness in the market (S4, S5, O2, O3, O5)                      | 6.47  |
| 5     | Build effective partnerships between farmers and marketing institutions to ensure continuity and quality of pine resin products (W1, W4, O1)                             | 6.44  |
| 6     | Increase farmers' capacity in business risk management, related to climate change and the threat of damage to pine tree stands (S2, S3, T1, T2)                          | 6.39  |
| 7     | Optimizing pine forest land and human resources of existing farmer groups to increase production and productivity of pine resin NTFPs to meet market demand (S1, S2, O1) | 6.36  |
| 8     | Improve the tapping and post-harvesting system of pine resin NTFPs and improve farmer skills to increase product competitiveness (W3, T2, T3)                            | 6.26  |
| 9     | Developing green sustainable product branding and promotion of West Sumatra pine resin NTFP derivative products to take advantage of large market opportunities (W5, O5) | 6.21  |
| 10    | Build strategic partnerships with local governments and other institutions to overcome farmers' limited access to capital and technology (W4, T4)                        | 6.21  |
| 11    | Strengthening the bargaining position of farmers through farmer groups in facing competition with pine resin NTFP producers from other regions (S3, T3)                  | 6.19  |
| 12    | Develop a green label certification program and sustainable quality assurance to address environmental and sustainability issues (W5, T5)                                | 6.15  |

**Conclusion**

Pine resin NTFP utilization business in West Sumatra Province plays a strategic role in supporting the economic development of the region. This business has the potential to develop into a pine resin NTFP derivative processing business with product diversification, opening access to capital, and applying tapping and post-harvest technology as key steps. The development of this sector has proven to make a significant contribution to the local economy in a sustainable manner. Based on SWOT analysis, various strategies for developing pine resin NTFP derivative

processing businesses have been identified. Through QSPM, the top priority selected was diversification of pine resin products to increase added value. This strategy is supported by other measures such as regional and national market expansion, and restructuring the production system to improve product quality and quantity. Synergy between the government, private sector and local communities is required for effective implementation of this strategy and impact on local economic growth and community welfare.

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