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POTENTIAL ADDED VALUE OF ARECA NUT PRODUCTS IN ACEH

POTENSI PENINGKATAN NILAI TAMBAH PRODUK PINANG DI PROVINSI ACEH

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ABSTRAK

Pengembangan agroindustri di Aceh dapat mendorong pertumbuhan ekonomi karena sumber utama pendapatan masyarakat Aceh berasal dari sektor pertanian. Penelitian ini bertujuan untuk mencari nilai tambah dan menemukan strategi terbaik untuk meningkatkan nilai tambah produk pinang. Penelitian ini menggunakan analisis nilai tambah, dimana output dikurangi biaya input dan analisis IFAS, EFAS dan SWOT untuk menentukan strategi terbaik untuk pengembangan agroindustry pinang. Hasil penelitian menunjukkan nilai tambah yang diperoleh dengan pengolahan pinnag menjadi tanin mencapai Rp 130.000 sedangkan pewarna alami mencapai Rp 105.000. Berdasarkan hasil analisis faktor internal dan eksternal menunjukkan bahwa factor internal lebih berpengaruh terhadap pengembangan agroindustry pinang dengan skor 3.00. Berdasarkan hasil model strategi kuantitatif, pengembangan agroindustri pinang dapat dilakukan dengan memaksimalkan peluang dan mengatasi segala faktor yang menjadi kelemahan. Oleh karena itu, strategi yang paling tepat untuk pengembangan produk potensial pinang adalah memfasilitasi dan mensosialisasikam informasi tentang produk turunan pinang kepada masyarakat serta mempromosikan dan meningkatkan inovasi teknologi untuk mempercepat adopsi teknologi oleh para petani.

Kata kunci: agroindustri, pinang, nilai tambah, analisis

ABSTRACT

The development and an improvement in agroindustry are essential to boost economic growth because the primary sources of low income's people are from agricultural sectors. This research aimed to measure the value addition and find the best strategy to add value of areca nut. This research used economical value-add formulation, which is the value of output less cost of inputs, IFAS, EFAS and SWOT analysis to ascertain the best strategy for development areca nut agroindustry. The result found out the value addition of areca tannin and natural dye were Rp 130.000 and Rp 105.000, respectively. Based on EFAS and IFAS analysis the total score of internal strategic factor was higher than external strategic factors, which were 3.00 and 2.53, respectively. Therefore, developing the downstream products of areca nut can be improved by focusing on strategies to strengthen internal factors. Furthermore, based on the result of quantitative model of strategy, the development of areca nut agroindustry can be done by maximizing opportunities and overcoming all factors that become weaknesses. Therefore, the most suitable strategies for the development potential products of areca nut are facilitate and improve market information of areca nut downstream product for all of stakeholders and promoting and enhancing technological innovation to accelerate technological adoption of the farmers.

Keywords: agroindustry, areca nut, value addition, SWOT analysis

INTRODUCTION

Aceh regency has broad areca nut plantation areas which grows in all districts in Aceh province. The plantation area of areca nut in Aceh is 40.000 hectares that mainly cultivated by smallholder plantation farmers. In 2019, Indonesia export about 172.055 tonnes of dried nuts and Aceh contributed one-fifth of total areca nut export (Comtrade, 2020). Areca nut is mainly exported to other countries, such as India, Afghanistan, Pakistan, and China (Trade maps, 2020). The production of areca nut increases each year, but unfortunately, the government pays less attention to supporting areca nut cultivation and developing the areca nut industry in Aceh.

Areca nut or betel nut is one of the palm tree species which comprises four major parts, such as root, stem, leaf, and fruit (nut). Areca nut grown well in tropical countries such as Asia, Africa, and Pacific Islands, which is at about 14-36 degrees Celsius (Ali and Khuwaja, 2011). In general, Areca nut can be harvested three times a year, and the nut can live up to 30 years. Areca nut is used for many purposes, such as traditional medicines, furniture, cosmetics, foods, veterinary preparations, and textile industries (Chavan and Singhal, 2013). In Aceh, areca nut is well known for masticatory that chew with betel leaf and lime betel. It relates the betel chewing to social and cultural ceremonies such as the tradition of welcoming guests.

**Coressponding Author*

The nut is the foremost part because of its trade and use in many industrial sectors. The nut contains some significant constituents such as carbohydrate, lipid, tannin and alkaloid. Areca nut contains a higher level of alkaloid, which will decrease as the nuts ripening. The unripe and ripe nut contains 0.062% and 0.14% alkaloid, respectively (Gupta *et al*., 2020). Alkaloid is mainly used as an antioxidant, astringent, and for many pharmaceutical purposes. Meanwhile, the lipid of areca nut can substitute the cocoa fat in the food industry (Chavan and Singhal, 2013).

Tannin is the most common substituent that can be found in almost all part of the plants. Tannin is a secondary metabolite from plants that primarily use a plant self-defence mechanism from the threats (Elok *et al*., 2010). Nowadays, the demand for natural material is increased because of the soar of back to nature and environmentally friendly substances (Aires *et al.*, 2016). Tanning industries are one of the industrial concerns in reducing pollution and severe environmental damage. It is due to chromium usage in leather tanning processing, which causes a severe effect on human health (Abbas *et al.*, 2013).

Areca nut industry can be developed in Aceh due to the number of benefits from the nuts, by-products, and the great production of areca nut itself. Moreover, an improvement in agroindustry is essential to boost the economic growth in Aceh because the primary sources of Aceh people's income are from agricultural sectors. Unfortunately, the regulation and development planning on agroindustry is not implemented well, and somehow there is still vague. This condition hinders the development of agroindustry products that has high added value in Aceh. Therefore, this research aimed to calculate the amount of added value obtained from each product and identify the strengths, weaknesses, threats, and opportunities to determine the best strategy for development areca nut agroindustry.

RESEARCH AND METHODS

This research was conducted in Aceh province by interviewing areca nut agroindustry's stakeholders, such as farmers, traders, exporters, researchers, and the government. There are some analyses that employed in this research such as value add analysis, External and internal factor analysis, and SWOT Analysis.

Value-added Analysis

The value-added is defined as the difference between the output and input value from the products that has been processed (Sathre and Gustavsson, 2009). Adding value is foremost in the production process, which is generally related to financial value addition. In financial terms, the added value is the economic value generated by the products when they are changed within the production process (Vogel, 2011). To measure the value addition from each product, the author uses added value formulation by Kay (1995) below.

Value addition= Output Price – Input Price

In this research, input means the price of the dried nuts in the market. Meanwhile, the output means the downstream products' selling price, which are tannin and natural dye. If the products have an output larger than input, it denotes as potential products to be developed.

External Factor Analysis (EFAS) and Internal Factor Analysis (IFAS)

The EFAS and IFAS matrices consist of a column of weights, ratings, and total values. For the weight and rating column is filled according to its value which is the result of a grouping of internal and external factors based on their importance. According to David (2009) the IFAS matrix is used to determine the internal factors of the company related to the strengths and weaknesses faced by the company consisting of aspects of human resources, marketing, production and operations, finance and accounting and information systems. The EFAS matrix is used to evaluate the external factors of the company. External data is collected to analyse matters concerning economic, political and governmental, socio-cultural, technological, environmental, demographic, competition in the industrial markets in which the company is located.

SWOT Analysis

SWOT analysis is a method for formulating the strategies by identifying strength, weakness, opportunity, and threat. Rangkuti (2006) claimed that the SWOT matrix could clearly describe how to grasp the opportunities and face the threats by maximising the strengths and realising the weaknesses they have. Adams (2005) divided four types of strategies that can be developed from SWOT analysis, such as:

- SO (Strength-Opportunities)
  Strategies that company use by harnessing or optimising their power to facade existing opportunities.
- WO (Weakness-Opportunities)
  The strategy used by the company to minimise the company's weaknesses by utilising existing opportunities.
- ST (Strength-Threats)
  The strategy to optimise the company's internal strength to avoid or mitigate the impact of external threats.
- WT (Weakness-Threats)
  A defensive strategy developed to cover the company's internal weaknesses when facing external threats.

RESULT AND DISCUSSION

Value Added Calculation

Added value = Sales revenue (Unit x Price) – Total cost (Raw material + Labour + Other production cost)

- Tanin

Tannin Price	=	Rp 300.000/kg
Raw material (nut)	=	Rp25.000/kg
Production cost	=	Rp 45.000/kg tannin
Value Add	=	Rp 300.000 – [(Rp 25.000x5) + Rp 45.000]
	=	Rp 300.000- Rp 170.000
	=	Rp 130.000

- Natural Dye

Natural dye price	=	Rp 210.000/ Kg
Raw material (nut)	=	Rp 25.000/kg and need 3 kg
Production cost	=	Rp 30.000/kg natural dye
Value Add	=	Rp 210.000 – [(Rp 25.000x3) + Rp 30.000]
	=	Rp 210.000 - Rp 1105.000
	=	Rp 105.000

Value Added Analysis

Based on value-added calculation on Table 1, tannin and natural dye might derive the value addition more than the raw nut. Moreover, adding utility value to raw materials is an important goal of industrial activity. Industrial processing has more excellent exchange value by transforming the raw material into preferred products in the market. Adding exchange value generally accompanies utility value, although the quantification is difficult to compare in heterogeneous goods (Sathre and Gustavson, 2009).

Table 1. Value addition of tannin and natural dye

Products	Input (Rp)	Output (Rp)	Value Added (Rp)
Tannin	300.000	170.000	130.000
Natural Dye	210.000	105.000	105.000

Tannin Potential

Tannin is widely used in the textiles, foods, and pharmaceutical industries. It can utilize tannin as wood adhesive, tanner, and antioxidant sources. Nowadays, the demand for natural material is increased because of the soar of back to nature, and environmentally friendly substances need (Aires *et al.*, 2016). Tanning industries are one of the industrial concerns in reducing pollution and severe environmental damage. It is due to chromium usage in leather tanning processing, which causes a severe effect on human health (Abbas *et al.*, 2013). Vegetable tanning with an appropriate extraction method can replace chromium because of the less harmful and renewable origin. It might be a leeway for the environmental problem caused by the leather tanning industry (Seabra *et al.*, 2018).

Based on Grand View Research (2017) Leather industry has a bright future due to the increasing demand for footwear, jacket, belt and other products based on leather. They forecast it increases at about 9.5% of CAGR from 2016 to 2015. Therefore, the tannin industry also forecasted will reach a significant amount of market demand at about USD 3.39 million by 2025 (Grand View Research, 2017). Currently, leather tanning production processes in Indonesia still use chromium sulphate and vegetable tanners from mimosa as a tanning agent. Chromium sulphate is harmful to the environment, while mimosa is relatively expensive because it is still imported (Ardinal *et al.*, 2013). The areca tannin has a magnificent prospect due to the availability of raw material. Furthermore, the advanced technology might be adopted to improve the yield quality and quantity of areca tannin itself (Aires *et al.*, 2016).

On the other hand, the increasing demand for tannin in the European and North American market provides an opportunity for the tannin industry to expand their business. Tannin has an antioxidant substituent that is foremost to improve the quality of wine production. Meanwhile, the Asia Pacific market shows the fostered tannin market for leather tanning and the food and beverages industry (Grand View Research, 2017).

Natural dye Potential

Natural dyes have been recommended as a colouring-agent that are friendly both for the environment and health. The substituents are low pollution, biodegradable, and not poisonous. Nowadays, the thrive of using eco-friendly material pushes the industries to produce natural based products for various purposes, such as textile colouration, antifeedant finishing textile, cosmetic and pharmaceutical, dye-sensitized, and food colouration. Commonly, natural dyes derived from agriculture's primary products, such as fruits or leaves that potentially produce some colour, by-product of farming or forestry, and waste of food and beverage industries (Shahid *et al.*, 2013).

In the last decades, synthetic dye still dominated the textile industry because of the abundant variation and attractive colour. Moreover, the synthetic dye is more affordable and more applicable in many fabrics make people doubt the sustainability of natural dye (Fangueiro and Rana, 2016). However, there is some drawback from using synthetic dye, particularly for the environment and human health. Therefore, natural dye is such a leeway

to prevent the devastating impact of waste in the industrial industry (Shahid *et al.,* 2013).

Nowadays, the global market demands of natural dye explode at about 10.000 tonnes per years (Shivakumar *et al.,* 2010). Businesswire (2020) research forecast that the natural dye industry might generate revenue at about $5 billion by 2024, a growth of around 18% at CAGR. This phenomenon is driven by the increasing of awareness on sustainable environment and highly concern for healthy lifestyles. Likewise, the advanced technology enables natural dye to compete with the synthetic dye industries. The ultrasound method is potentially used to extract natural colourant sources from many parts of various plants (Shivakumar *et al.*, 2010).

Moreover, the textile industry's plasma treatment may enhance the quality of natural dye in the fabrication (Haji and Naebe, 2020). On the other hand, some people are highly concerned about environmental issues, forcing the industry to use the eco-friendly material.

Furthermore, the natural dye industry has a delightful prospect to be developed in Indonesia. This is because of the increasing demand for natural colourant for the batik industry as one of the heritage textile industries that use many colour variations (Purwanto, 2018). Prabawa (2015) proved that the colourant from areca nut seed is a compatible dyeing for the Sasirangan industry, one of the leading regional textile products in South Kalimantan. Furthermore, Yernisa *et al.* (2013) also show that the powder of areca seed potentially uses in transparent soap industry. This finding attests to a promising future for the natural dye industry.

Table 2. EFAS and IFAS Matrix

	EFAS and IFAS Matrix	**Weighted Factors**	**Rating**	**Total Scores**
Opportunity				
1	Market demand of areca nut downstream products	0.05	3	0.16
2	Government Support to SMEs	0.08	3	0.24
3	Enhancement on Technology and exchange information	0.11	4	0.42
4	Research and development on agricultural downstream products	0.13	3	0.39
5	Raising awareness on environmental issues	0.13	4	0.53
	Total			1.74
Threat				
1	Lack of creativity and productivity in SMEs	0.05	2	0.11
2	Areca nut Export should use intermediate countries	0.11	2	0.21
3	Politics and economics issues that influence the investor to invest in Aceh	0.13	1	0.13
4	Competitor from synthetic product	0.13	2	0.26
5	No association of areca nut stakeholder	0.08	1	0.08
	Total	1.00		0.79
	Total EFAS			2.53
Strength				
1	The availability of Raw material	0.09	4	0.36
2	Strategic geographical Area	0.09	3	0.27
3	Government intention to support the agricultural products	0.06	3	0.18
4	The availability of human resources or Labour force	0.15	2	0.30
5	Suitable land for areca nut cultivation	0.06	3	0.18
	Total			1.30
Weakness				
1	Traditional processing which causes post harvested losses	0.15	3	0.45
2	No adequate technology to process raw material into high value add products	0.06	3	0.18
3	Price fluctuation	0.06	2	0.12
4	Low quality of human resource	0.15	3	0.45
5	Lack of market price information	0.12	4	0.48
	Total	1.00		1.70
	Total IFAS			3.00

One potential plant as sources of natural dyes is Areca nut, which has others function as consumption, industrial materials, cosmetics, health, and colouring matter in the textile industry (Miftahorrachman and Maskromo, 2007). Bogariani (2009) found that a mixture of natural dyes from gambier, Betel leaf and areca nut produces light brown to reddish-brown colour. According to Sulastri (2009), dyes from Areca nut seed extract are part of the tannin group highly contained in areca nut seed.

External Factor Analysis (EFAS) and Internal Factor Analysis (IFAS)

The Table 2 below show the result of external and internal factor analysis in the development potential products of areca nut. Based on EFAS and IFAS analysis on the table 2, the total score internal strategic factor is 3.00, whereas the score of external strategic factors is 2.53. Therefore, developing the downstream products of areca nut can be improved by focusing on strategies to strengthen internal factors. The development of the areca nut agroindustry in Aceh has the potential to be improved because of the abundance of raw materials and the availability of human resources or Labour force. So that, it can be the main force for the development of areca nut-based products in Aceh province. However, the lack of market information and also technological mastery should be addressed to enhance areca nut agroindustry in Aceh.

Table 3. SWOT analysis matrix

INTERNAL / EXTERNAL	**STRENGTH** 1. Market demand of areca nut downstream products 2. Government Support to SMEs 3. Enhancement on Technology and exchange information 4. Research and development on agricultural downstream products 5. Raising awareness on environmental issues	**WEAKNESS** 1. Traditional processing which causes post harvested losses 2. No adequate technology to process raw material into high value add products 3. Price fluctuation 4. Low quality of human resource 5. Lack of market price information
OPPORTUNITIES 1. The availability of Raw material 2. Strategic geographical Area 3. Government intention to support the agricultural products 4. The availability of human resources or Labour force 5. Suitable land for areca nut cultivation	**S-O Strategy** 1. Development of various natural-based products of areca nut agroindustry. 2. Stimulate and enhance the ability of SMEs based processing industry.	**W-O Strategy** 1. Facilitate and improve market information of areca nut downstream product for all of stakeholders. 2. Promoting and enhancing technological innovation to accelerate the delivery and adoption process of technology to farmers.
THREATS 1. Lack of creativity and productivity in SMEs 2. Areca nut Export should use intermediate countries 3. Politics and economics issues that influence the investor to invest in Aceh 4. Competitor from synthetic product 5. No association of areca nut stakeholder	**S-T Strategy** 1. Strengthen the coordination among areca nut stakeholders 2. Enhance creativity and productivity in SMEs to create new product and employ local labour forces. 3. Improvement of product competitiveness and diversification	**W-T Strategy** 1. Having a regulation or policy that may convince the investor to invest in Aceh. 2. Development of extension programs based on farmers need.

Table 3. Quantitative model of strategy calculation

IFE/EFE	Strength	Weakness
Opportunities	**S-O Strategy**	**W-O Strategy**
	= Strength + Opportunities	= Weakness + Opportunities
	= 1.30+1.74	= 1.74+1.70
	= 3.04	= 3.44
Threats	**S-T Strategy**	**W-T Strategy**
	= Strength + Threats	= Weakness + Threats
	= 0.79+1.30	= 0.79+1.70
	= 2.09	= 2.49

Quantitative Model of Strategy Formulation

According to the results of the analysis using quantitative model of strategy, WO strategy obtained the highest value of 3.44 (Table 3). Therefore, the development of agroindustry can be done by maximizing opportunities and overcoming all factors that become weaknesses. In such conditions, the stakeholders of areca nut agroindustry have two strategies that can be used, namely facilitate and improve market information of areca nut downstream product for all of stakeholders and promoting and enhancing technological innovation to accelerate technological adoption of the farmers.

CONCLUSIONS AND RECOMMENDATION

Conclusions

To sum up, Areca nut the development of areca nut downstream products in Aceh is feasible. It may prosper of all areca nut stakeholders due to the increasing awareness of sustainable environment and highly concern on healthy lifestyles. Tannin and Natural Dyes are the most potential product to be developed because of the market demand and added value for those relatively high. The result found out the value addition of areca tannin and natural dye are Rp 130.000 and Rp 105.000, respectively. Based on EFAS and IFAS analysis the total score internal strategic factor is higher than external strategic factor, which are 3.00 and 2.53, respectively. Therefore, developing the downstream products of areca nut can be improved by focusing on strategies to strengthen internal factors. The development of the areca nut agroindustry in Aceh has the potential to be improved because of the abundance of raw materials and the availability of human resources or Labour force. So that, it can be the main force for the development of areca nut-based products in Aceh province. However, the lack of market information and also technological mastery should be addressed to enhance areca nut agroindustry in Aceh. Furthermore, based on the result of quantitative model of strategy, the development of areca nut agroindustry can be done by maximizing opportunities and overcoming all factors that become weaknesses.

The development of the areca nut industry might be a leeway to improve farmer prosperity and provide new entrepreneurs opportunities to thrive in their business. Moreover, raising awareness of environmental issues is the key to adding value to areca nut downstream products. On the other hand, Farmers are the main factors that determine the success of agro-industrial development. Therefore, the development of farmer-based extension programs is the most acceptable strategy to support the process of potential actualization and absorption of innovation by farmers to ensure agro-industrial development sustainability. By considering the shortcomings and challenges such as on-farm problems, assessing appropriate technology, providing training so that workers can operate technology, and increasing cooperation between stakeholders might increase the affordability and visibility of the areca nut downstream products industry.

Recommendation

This research provides some alternatives for the development of areca nut potential products based on the simplicity of technology and market demand for tannin and natural dyes. It will be better if there is further research to evaluate the feasibility and viability on other areca nuts products.

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