

# FACTORS AFFECTING ANDALIMAN EXPORTS IN NORTH SUMATRA PROVINCE

**Mulia Maniar Hutapea<sup>1\*</sup>, Siti Mardiana<sup>2</sup>, Erwin Nyak Akoeb<sup>3</sup>**

<sup>1,2,3</sup>Postgraduate Agribusiness Masters Universitas Medan Area

Corresponding E-mail: noblemantaft@gmail.com

## Abstract

*One of the typical spice plants found in North Sumatra is andaliman. Apart from being offered in conventional shops, Andaliman has also penetrated foreign markets. a significant increase in exports is certainly good news and a symbol of hope. The research locations are Laerias District (Dairi Regency) and Raya Haluan District (Simalungun Regency). These two sub-districts are the main andaliman producing sub-districts recorded at the Kuala Namu postal Quarantine Center, Medan. The Andaliman farmers sampled were 135 people consisting of 63 farmers in Dairi Regency and 75 farmers in Simalungun Regency. The research results show that production factors, land area, export prices and local prices do not have a significant effect on the export value of andaliman at the research location which is the main andaliman producing area in North Sumatra province*

**Keywords:** Andaliman, Exports, Production, Prices, Land Area

## 1. Introduction

Indonesia is a country with fertile land and high biodiversity. One of the biodiversity that needs to be developed is spice plants. From data from the North Sumatra Province Central Statistics Agency (2022), agricultural products in the form of spices reached 78,231 tonnes in 2021 with an FOB (Free on board) value of US\$327,316 which is equivalent to Rp. 507.452.727.240. This is a potential that needs to be considered along with the development of people's lifestyles to return to nature, where many plant products are increasingly popular and able to compete in entering the global market. One of the typical spice plants found in North Sumatra is andaliman (*Zanthoxylum acanthopodium*). The economic value of andaliman, which has long been traded in various traditional markets, is quite promising for the Batak ethnic community. This is thought to be because the andaliman's range is still limited to the hills of North Sumatra (Wijaya and Napitupulu, 2019). The distribution areas for andaliman in North Sumatra are Sigonting Village (Simalungun Regency), Dolok Nauli Village (North Tapanuli Regency), Matio Village (Toba Samosir Regency), Batu Nabolon Village (Toba Samosir Regency), Pegagan Julu Village (Dairi Regency) (Khairunnisyah, 2018).

Andaliman fruit is widely used as a cooking spice to add flavor to food because it contains bioactive compounds in the form of limonene which produces a citrus aroma and has a spicy taste like pepper so it can increase appetite (Khairunnisyah, 2018). Apart from being offered in conventional shops, Andaliman has also penetrated foreign markets. Specifically, the Asian Food Store sells it at a price of US\$14.99/ounce or Rp. 140,990/ounce. In countries such as China, Japan, Korea, India and Germany, andaliman is very popular abroad. Apart from being used as decoration, andaliman fruit is also used in Japan and South Korea to add a spicy taste to soupy foods. (Opusunggu and Irawati, 2021). The top 5 countries with the highest volume and value of spice exports are Thailand, Brazil, Turkey, India and Kenya. It can be seen that the volume and value of Andaliman commodity exports experienced ups and downs in the 2015-2019 period. The lowest exports of andaliman occurred in 2015 with a volume of 10,000 kg and an export value of 54,040 EUR or the equivalent of Rp. 840,053,046.

The highest increase in andaliman exports in Indonesia was in 2018 with a volume of 77,000 kg and an export value of 220,124 EUR or the equivalent of Rp. 3,421,832,654. This shows that the higher the volume of andaliman commodities, the higher the export value that will be generated, and vice versa. As with andaliman plants, crop area is an important element in supporting agricultural production. The development of the number of andaliman plantation

# FACTORS AFFECTING ANDALIMAN EXPORTS IN NORTH SUMATRA PROVINCE

Mulia Maniar Hutapea<sup>1\*</sup>, Siti Mardiana<sup>2</sup>, Erwin Nyak Akoeb<sup>3</sup>

areas in North Sumatra in the 2014-2018 period experienced ups and downs. The area of andaliman plantations in 2014 reached 7.37 hectares with production of 1.85 tonnes, whereas in 2015 there was no data on farmers who had andaliman plantation areas. As the years go by, more and more farmers are returning to develop andaliman plants, such as in 2018 which reached 62 hectares with a production of 11 tons (North Sumatra Province Central Statistics Agency, 2022).

In lineWith the planting area and production of Andaliman, the volume and value of Andaliman exports also fluctuates. From Andaliman export data for 2022 (Table 2), it shows that in April, Andaliman's export volume decreased compared to March, namely from 3,095 Kg at a price of Rp. 705,254 to 2,961 Kg at a price of Rp. 360,442. The increase in export volume occurred in June and August, namely 4,401 Kg and 5,351 Kg. In contrast to the Andaliman volume, the export value in April was IDR. 360,442 continued to increase until July, namely Rp. 884,080. For Andaliman farmers in North Sumatra, the significant increase in exports is certainly good news and a symbol of hope. This is in line with the plans of Syahrul Yasin Limpo, Minister of Agriculture, who asked all parties involved in the agribusiness industry to jointly carry out coordinated activities aimed at doubling agricultural exports in a planned manner between 2020 and 2024. Bambang, Head of the Agricultural Quarantine Agency (Barantan) , assisting exporters and farmers in implementing the triple agricultural export movement. In Minister of Agriculture Regulation no. 19/2020 concerning the development of exports of agricultural commodities, steps that can be achieved are increasing production, post-harvest quality, promotion and dissemination as well as improving quarantine services.

## 2. Research methods

The research was carried out from April 2023 to February 2024. The research locations were Laerias District (Dairi Regency) and Raya Haluan District (Simalungun Regency). These two sub-districts are the main andaliman producing sub-districts recorded at the Kuala Namu postal Quarantine Center, Medan. There were 63 Andaliman farmers interviewed in Dairi Regency, namely from Perjuangan village, while from Simalungun Regency, namely Goting Raya village and Bintang Raya village, 36 and 39 people respectively.

This research uses a Multiple Linear Regression Model, with the following equation:

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

Where :

Y = export value (Rp)

X1 = production (Kg)

X2 = land area (M2)

X3 = export price (Rp)

X4 = local price (Rp)

To determine the relationship between cultivation variables, the correlation coefficient is calculated. Correlation is in the range 0 -1. An R2 value that is getting closer to 1 means that the correlation between variables is close. On the other hand, if R2 is close to 0, then the correlation between variables is not close. To calculate the correlation coefficient of number of plants, topography and land area on production, the Spearson Correlation formula is used (Nugroho, 2005), namely:

$$r_{xy} = \frac{n \sum x_i y_i - (\sum x_i)(\sum y_i)}{\sqrt{(n \sum x_i^2 - (\sum x_i)^2)(n \sum y_i^2 - (\sum y_i)^2)}}$$

Where :

rx<sub>y</sub> = correlation between x and y

n = the number of samples

x<sub>i</sub> = value x to i

y<sub>i</sub> = y to i value

### 3. Results and Discussion

Observations at the survey location showed that in Perjuangan Village (Dairi), farmers actually implemented an intercropping system at the location where the andaliman plants were harvested. Meanwhile, at the Simalungun survey location, andaliman plants have begun to be planted in monoculture. The relatively better transportation access in Simalungun is thought to be the reason for Andaliman farmers to replant, even without using good crop management.

Table 1. Plant population, plant age, and andaliman production at three research locations

Regency	Wide (range)	Plant Population	Plant Age (years)	Production (kg)
Goting Raya (Simalungun)	180.5	3,609	3	351
Bintang Raya (Simalungun)	590	6,720	3	13,980
Struggle (Dairi)	1,449.5	465	3	498

Information: 1 chain = 400 m

Source: processed from primary data (2024)

The volume of exports trafficked through Kualanamu airport and certified by the Medan Class II Agricultural Quarantine Center from 2019 to 2023 is unstable. In 2019, at the start of the Covid 19 pandemic, the export volume was 50.1 kilograms, but in 2020 it experienced a very drastic decline. This is possibly caused by the unstable condition of global community activities caused by the Covid-19 pandemic. From 2021 to 2022, Andaliman's export volume continues to increase, with the highest export figure in 2022 amounting to 53,258 kilograms. However, in 2023 Andaliman's export volume will actually decrease. This condition is caused by the year 2023 until now there has been a global economic crisis in European countries

#### 3.1 Correlation analysis

Table 2. Correlation between parameters in Perjuangan Village, Laerias District, Dairi Regency

Correlation (r)	Number of Plants	Production	Topography Land	Land area
Number of plants	1			
Production	0.023	1	0.032tn	0.05
Land topography	0.32	0.35	1	0.43
Land area	0.32	0.42	0.33	1

r table at 5% = 0.67

Source: processed primary data, (2023)

From Table 2. in Perjuangan Village, Laerias District, Dairi Regency, it can be seen that there is a correlation between the number of plants and production (0.23) and land topography (0.32). Meanwhile, the correlation between each production and land topography (0.35) and land area (0.42). Likewise, the respective correlations between land topography and production (0.032) and land area (0.33). The respective correlation between land area and production (0.05) and land topography (0.43). The correlation between these parameters is very low/very not close ( $<<r$  table 0.67). This correlation shows that the cultivation of andaliman plants in Laerias District, Dairi Regency is very low. In other words, the main cultivation aspects, namely the number of plants, land topography and land area, do not have a close correlation.

Simalungun Regency shows a correlation between the number of plants and production (0.046) and land topography (0.52), while the correlation between each production and land topography (0.56) and land area (0.42). Likewise, the respective correlations between land topography and production (0.24) and land area (0.33). The respective correlation between land

**FACTORS AFFECTING ANDALIMAN EXPORTS IN NORTH SUMATRA PROVINCE**

*Mulia Maniar Hutapea<sup>1\*</sup>, Siti Mardiana<sup>2</sup>, Erwin Nyak Akoeb<sup>3</sup>*

area and production (0.46) and land topography (0.48). The correlation between these parameters is very low/very not close ( $< r$  table 0.46). This correlation shows that cultivation of andaliman plants in Goting Raya Village, Raya Huluan District, Simalungun Regency is not closely related to cultivation parameters.

Table 3. Correlation between parameters in Goting Raya Village, Raya Hulu District, Simalungun Regency

Correlation (r)	Amount plant	Production	Topography land	Land area
Number of plants	1			
Production	0.046	1	0.24	0.46
Land topography	0.52	0.56	1	0.48
Land area	0.38	0.42	0.33	1

$r$  table at 5% = 0.46

Source: processed primary data, (2023)

Table 4. Correlation between parameters in Bintang Raya Village, Raya Huluan District, Simalungun Regency

Correlation (r)	Amount plant	Production	Topography land	Land area
Number of plants	1			
Production	0.036tn	1	0.32tn	0.42tn
Land topography	0.22tn	0.36tn	1	0.38tn
Land area	0.27tn	0.44tn	0.31tn	1

$r$  table at 5% = 0.53

Source: processed primary data, (2023)

In Table 4 andaliman planting in Bintang Raya Village, Raya Huluan District, Simalungun Regency, you can see the correlation between the number of plants and production (0.036) and land topography (0.22), while the correlation between each production and land topography is (0.36). ), and land area (0.44). Likewise, the respective correlations between land topography and production (0.32) and land area (0.31). The respective correlation between land area and production (0.42) and land topography (0.48). The correlation between these parameters is very low/very not close ( $< r$  table 0.53). This correlation also shows that the cultivation of andaliman plants in Bintang Raya Village, Raya Huluan District, Simalungun Regency has no correlation between cultivation parameters. Multiple linear regression of export value (Rp) which is influenced by each export price (Rp) and local price (Rp) on andaliman originating from Perjuangan Village, Laerias District, Dairi Regency is obtained through the equation:

$$Y = 0.44 + 0.56X_1 + 0.22X_2 + 0.32X_3 + 0.57X_4$$

This equation is not real, in other words, the value of andaliman exports is not significantly influenced by production, land area, local prices and export prices. This equation strengthens andaliman as an export commodity which is not yet a mainstay in Perjuangan Village, Laerias District, Dairi Regency. Even though it is the Andaliman production center in this district, from a production aspect. Land area and price have not shown a real influence on export value. This is in line with cultivation aspects which do not show correlation between variables

Multiple linear regression of export value (Rp) which is influenced by each export price (Rp) and local price (Rp) on andaliman originating from Goting Raya Village, Raya Huluan District, Simalungun Regency is obtained through the equation:

$$Y = 0.02 + 0.27X_1 + 0.20X_2 + 0.28X_3 + 0.47X_4$$

This equation is not real, in other words, the value of Andaliman exports is not significantly influenced by export prices and local prices. This equation strengthens andaliman as an export commodity that is not yet a mainstay in Goting Raya Village, Raya Huluan District, Simalungun Regency. Even though it is the center of Andaliman production in this district, the price aspect has not shown a real influence on export value. This is in line with cultivation aspects which do not show correlation between variables. Multiple linear regression of export value (Rp) which is influenced by each export price (Rp) and local price (Rp) on andaliman originating from Bintang Raya Village, Raya Huluan District, Simalungun Regency is obtained through the equation:

$$Y = 0.03 + 0.30X_1 + 0.222X_2 + 0.24X_3 + 0.40X_4$$

This equation is not real, in other words, the value of Andaliman exports is not significantly influenced by export prices and local prices. This equation strengthens andaliman as an export commodity that is not yet a mainstay in Bintang Raya Village, Raya Huluan District, Simalungun Regency. Even though it is the center of Andaliman production in this district, the price aspect has not shown a real influence on export value. This is in line with cultivation aspects which do not show correlation between variables

#### 4. Conclusion

Production factors ( $X_1$ ), land area ( $X_2$ ), export prices ( $X_3$ ) and local prices ( $X_4$ ) do not have a significant effect on the export value ( $Y$ ) of Andaliman at three research locations, namely Perjuangan Village (Dairi Regency), Goting Raya Village and Bintang Raya village (Simalungun Regency) which is the main andaliman producing area in North Sumatra province. The correlation between cultivation variables, namely production, topography, number of plants and land area for andaliman plants at three research locations, namely Perjuangan Village (Dairi Regency), Goting Raya Village and Bintang Raya Village (Simalungun Regency) is very low.

#### References

- Ambarsari, ANMawardi., TESuswatiningsih. 2021. Analysis of factors influencing Indonesian natural rubber exports to Brazil. Agrifitia Journal. Vol. 1, No. 1, March 2021. <https://jurnal.instiperjogja.ac.id/index.php/AFT>
- Directorate General of Plantations. 2022. National Leading Plantation Statistics 2021- 2023. 1114p
- Faisal. A., K. Budiraharjo., Mukson. 2021. Analysis of factors influencing potato exports at PT Bumi Sari Lestari, Temanggung Regency, Central Java. Journal of Agricultural Economics and Agribusiness (JEPA) ISSN: 2614-4670 (p), ISSN: 2598-8174 (e) Volume 5, Number 3 (2021): 714-722.
- Hanny Wijaya, H and I. Napitupulu. 2019. Andaliman (*Zanthoxylum acanthopodium* DC.), Local Functional Spice with Global Potential.. Directorate of Scientific Publications and Strategic Information (DPIS). IPB. No. 01 of 2019. p.28-31
- Harsono, T., Kurniawan, AS, Prakasa, H., Syahfitri, D., Husna, F., & Prasetya, E. (2016). Geography and maximum entropy spatial analysis to determine in situ conservation zones for andaliman (*Zanthoxylum acanthopodium* DC.) in North Sumatra. Proceedings of the National Seminar of the Indonesian Breeding Association (PERIPI) Komda Riau. 224-232.
- Humaira, FA and Di. Rochdiani. 2021. Factors Factors Affecting Indonesian Cinnamon Export Volume. Journal of Scientific Community Thought with an Agribusiness Insight. January 2021. 7(1).p 437-449.
- Kristin Merlina Silaban, L., Y. Damayanti., Y. Fitri. 2020. Factors Affecting Indonesian Natural

**FACTORS AFFECTING ANDALIMAN EXPORTS IN NORTH SUMATRA PROVINCE**

*Mulia Maniar Hutapea<sup>1\*</sup>, Siti Mardiana<sup>2</sup>, Erwin Nyak Akoeb<sup>3</sup>*

- 
- Rubber Exports to the United States (Before and After the Monoter Crisis). Journal Of Agribusiness and Local Wisdom (JALOW) eISSN:2621-1300 (e) ; 2621-1297 (p), Vol. 3 No.2 (July-December 2020,p.22-35.
- Khairunnisyah, AY 2018. Utilization of andaliman (*Zanthoxylum acanthopodium* DC) as an essential oil producing plant.. Cultivation Journal Vol. 17 (1) March 2018.p.537-543.
- Ompusunggu, NP and W. Irawati. 2021 .Andaliman (*Zanthoxylum Acanthopodium* DC.), a Rare Endemic Plant from North Sumatra that is Rich in Essential Oils and Potentially as Antioxidant and Antibacterial. Journal of Tropical Biology, 21 (3): 1063 – 1072
- Riyani., Darsono., M. Ferichani. 2018. Analysis of Export Demand for Indonesian Agricultural Commodities by the Chinese Market. AGRARIS: Vol. 4 No. July 2- December 2018,p.121-128.
- Sibarani, RV, ATHutajulu., SIKusuma.2020. Marketing Analysis of Andaliman (*Zanthoxylum acanthopodium* DC) in the Medan City Market. Agribusiness Study Program, Faculty of Agriculture, University of Sumatra.14p.2020.
- Silalahi, M., Lumbantobing, K., Studi, P., Biology, P., Indonesia, UK, Program, M., Education, S., & Indonesia, UK (2021). Andaliman (*Zanthoxylum acanthopodium* DC) Essential Oil Content and Bioactivity. Pro-Life Journal, 8(1), 22–31.
- Susanti, YD, NHListiana., T. Widayat. 2016. The Influence of Farmer Age, Education Level and Land Size on Sembung Crop Production Results. DOI:[10.22435/toi.v9i2.7848.75-82](https://doi.org/10.22435/toi.v9i2.7848.75-82)
- Sitepu and Butarbutar. 2019. Analysis of Factors Affecting Exports of Crude Palm Oil (CPO) in North Sumatra Province
- Wardhana. 2011. Analysis of factors influencing Indonesian non-oil and gas exports to Singapore 1990-2010