



OPTIMIZING THE VALUE CHAIN AND PRODUCT INNOVATION OF NUTMEG (*MYRISTICA FRAGRANS*) TO EMPOWER FARMERS AND MSMES IN SUKABUMI

OPTIMALISASI RANTAI NILAI DAN INOVASI PRODUK PALA (*MYRISTICA FRAGRANS*) UNTUK PEMBERDAYAAN PETANI DAN UMKM DI KOTA SUKABUMI

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Abstract

The nutmeg farming sector in Sukabumi City has great economic potential. However, it still faces various obstacles, including low productivity, low farm-level selling prices, and dependence on intermediaries that limit income growth. This study aims to analyse the nutmeg value chain from production by farmers to processing by SMEs and traders, and to assess the value added generated at each stage. The research method is a survey, with primary data collected via questionnaires and interviews with farmers and nutmeg-processing entrepreneurs in Sukabumi. The results indicate an imbalance in the distribution of value added, with processors earning higher margins than farmers. Processed products such as paladang, nutmeg powder, and nutmeg ice cream can generate significant value-added, so developing these products has the potential to improve the welfare of farmers and small businesses. However, limited market access and dependence on intermediaries remain major challenges. Therefore, it is necessary to enhance the capacity of farmers and SMEs through processing technology training, the development of shared processing centres, and the implementation of digital marketing to expand market access and improve supply chain efficiency. Government policy support and collaboration with relevant institutions are also crucial to address issues related to raw material supply, land constraints, and infrastructure, thereby fostering sustainable economic benefits in the nutmeg sector of Sukabumi.

Keywords: *Nutmeg, Value chain, Farmers*

Abstrak

Sektor pertanian pala di Kota Sukabumi memiliki potensi ekonomi yang besar, namun masih menghadapi berbagai kendala seperti rendahnya produktivitas, harga jual rendah di tingkat petani, dan ketergantungan pada tengkulak yang membatasi peningkatan pendapatan. Penelitian ini bertujuan untuk menganalisis rantai nilai pala mulai dari produksi oleh petani hingga pengolahan oleh UKM dan pedagang, serta menilai nilai tambah yang dihasilkan di setiap tahapan. Metode penelitian yang digunakan adalah survei dengan pengumpulan data primer melalui kuesioner dan wawancara kepada petani dan pengusaha olahan pala di Sukabumi. Hasil menunjukkan adanya ketimpangan distribusi nilai tambah, di mana pengusaha pengolahan mendapatkan margin yang lebih tinggi dibandingkan dengan petani. Produk olahan seperti paladang, pala bubuk, dan es pala mampu menghasilkan nilai tambah yang signifikan, sehingga pengembangan produk ini berpotensi meningkatkan kesejahteraan petani dan pelaku usaha kecil. Namun, keterbatasan akses pasar dan ketergantungan pada tengkulak masih menjadi tantangan utama. Oleh karena itu, diperlukan peningkatan kapasitas petani dan UMKM melalui pelatihan teknologi pengolahan,



pembangunan pusat pengolahan bersama, serta penerapan digitalisasi pemasaran untuk memperluas akses pasar dan meningkatkan efisiensi rantai nilai. Dukungan kebijakan pemerintah dan lembaga terkait juga penting untuk mengatasi masalah pasokan bahan baku, keterbatasan lahan, dan infrastruktur agar tercipta pemerataan manfaat ekonomi yang berkelanjutan di sektor pala Kota Sukabumi.

Kata Kunci: Pala, Rantai nilai, Petani

INTRODUCTION

The agricultural sector is one of the main pillars of economic growth in Indonesia, including nutmeg production in Sukabumi City, which has great potential but still faces significant obstacles. The main problems that need to be solved are low productivity and relatively low nutmeg prices at the farmer level, coupled with limited market access that limits farmers' opportunities to earn a decent income. Additionally, the distribution of value added in the nutmeg value chain is uneven, with the greatest value added occurring in downstream processing and marketing, while farmers receive a small margin. This has implications for farmers' low welfare and the limited competitiveness of nutmeg products in both domestic and international markets (Isini *et al.*, 2022; Umroh *et al.*, 2024). Several efforts have been made to address this issue, such as training farmers in nutmeg processing, forming farmer groups, and diversifying nutmeg processing products, such as paladang, nutmeg powder, and nutmeg ice, which can increase the economic value of the product (Juliandi *et al.*, 2022). The government is also trying to intervene in the market and promote the adoption of value chain-based agribusiness so that the increase in value added can be distributed more evenly among farmers, small business owners, and wholesalers (Kaplinsky & Morris, 2002). However, direct intervention in the nutmeg commodity has not been optimal, and the digitalisation and modernisation of the nutmeg subsector's supply chain remain minimal.

Previous research has largely focused on increasing production and supply chain efficiency. However, there are still research gaps, particularly in strengthening processing capacity and innovating nutmeg-based products at the farmer and MSME levels, especially in Sukabumi. The digital aspects of marketing and the use of post-harvest technology to expand market access are also not given enough attention. Additionally, collective involvement of farmers in processing and marketing is not yet a common practice, leaving them still reliant on conventional marketing systems that squeeze profit margins at the farmer level (Amelina *et al.*, 2020; Nitami *et al.*, 2023). To fill this gap, the concept proposed is the integration of the nutmeg value chain system, based on product innovation and digital marketing. This approach includes developing a shared processing centre capable of delivering cutting-edge technology, quality standards, and attractive packaging, as well as intensive training to enhance the technical and business capacities of nutmeg farmers and MSMEs. Additionally, the implementation of e-commerce and digital supply chains can expand market access, reduce reliance on intermediaries, and support the marketing of processed nutmeg products with a strong Sukabumi-specific branding. This strategy will boost value addition and profit margins at the farmer level while also



enhancing the competitiveness of nutmeg products in both domestic and international markets (World Bank, 2020; Sukarman, 2021).

With this approach, it is hoped that there will be an equitable distribution of economic benefits throughout the nutmeg value chain, improved welfare for farmers and small business actors, and a strengthened position of nutmeg as a sustainable flagship commodity in Sukabumi. This study on the nutmeg value chain based on innovation and digitalisation also serves as an important theoretical and practical reference for the development of other agricultural sectors with similar characteristics in Indonesia (Rusiana *et al.*, 2025).

RESEARCH METHODS

This study uses a survey as the primary method to address issues related to the nutmeg value chain in Sukabumi City. The survey was conducted by collecting information through questionnaires and interviews with a selected sample, allowing for a systematic, comprehensive picture of nutmeg cultivation and processing activities to be obtained (Maidiana, 2021). The research was conducted in Sukabumi City, focusing on the nutmeg value chain. The research subjects include nutmeg farmers in Warudoyong District and producers of processed nutmeg products whose businesses operate in Sukabumi City. This location was chosen purposefully, based on strategic considerations, to ensure that the data generated aligns with the research objective: obtaining a complete picture of the nutmeg agribusiness process in the area. Data collection is planned for April 2025.

Data collection consists of: Primary Data (obtained directly from farmers and producers through field observation, interviews, and questionnaire completion). Secondary Data (collected from literature such as books, research journals, articles, and publications from relevant institutions). The purposive sampling technique was used in this study, which involves selecting samples based on specific criteria formulated beforehand, such as farmers with nutmeg farming businesses and producers of processed nutmeg products located in Sukabumi City (Sugiyono, 2020). This research uses descriptive analysis as the primary method to examine the structure of the nutmeg value chain, including aspects of nutmeg and processed product prices. The collected data is processed and presented according to the predetermined variables, without comparing variables or seeking relationships between them. The analysis is conducted to describe the characteristics of each research variable independently (Sugiyono, 2020).

RESULTS AND DISCUSSION

Research Overview: Sukabumi City is located in a low-lying area at the foot of Mount Gede and Pangrango, with an elevation of approximately 584 meters above sea level. The city has a land area of approximately 48.31 km² and is composed of seven districts: Baros, Lembursitu, Cibereum, Citamiang, Warudoyong, Gunungpuyuh, and Cikole. The research focused on three sub-districts: Baros, Warudoyong, and Cibereum, each with unique characteristics that influence the dynamics of the nutmeg value chain. Baros sub-district, with an



area of approximately 5.58 km², is the smallest area but is experiencing rapid population growth, supporting increased demand for processed nutmeg products. Warudoyong, covering 7.56 km², is known for its adequate infrastructure and the highest number of villages, making it a significant potential for local economic development. Meanwhile, Cibeureum, with an area of approximately 9.13 km², is the largest and most densely populated district, contributing significantly to the consumption of processed nutmeg products in Sukabumi City. Sukabumi City is located approximately 120 km from Jakarta and 96 km from Bandung (BPS, 2024).

Respondent Characteristics

Table 1. Characteristics of Respondents in the Nutmeg Value Chain in Sukabumi

Occupation	Type of Commodity	Age (years)	Education Level	Experience (years)
Farmer	Nutmeg	56	High School	15
Processor I	Nutmeg Field	60	High School	3
Processor II	Nutmeg Powder	41	Master’s Degree	3
Processor III	Nutmeg Ice	58	Elementary School	1,5
Processor IV	Nutmeg Ice	75	Elementary School	15

1. Characteristics of Farmer Respondents

The nutmeg farmers who were respondents in this study had an average age of around 56 years, with an education level equivalent to high school and approximately 15 years of nutmeg cultivation experience. Nutmeg farming is a secondary commodity for them because the price of nutmeg is relatively high, and nutmeg trees serve ecological functions as soil buffers, help prevent landslides, are long-lasting plants, and require relatively little capital for cultivation. This is consistent with data from previous studies, which stated that nutmeg farmers in Sukabumi usually cultivate nutmeg as a backyard crop with a polyculture system, facing challenges related to post-harvest technology and marketing (Amelina *et al.*, 2020).

2. Characteristics of Nutmeg

Entrepreneur Respondents The nutmeg entrepreneurs who were respondents are MSME actors engaged in processing nutmeg into processed products such as nutmeg candy (palandang), nutmeg powder, and nutmeg ice. The age range of these entrepreneurs is 41 to 75 years, with varying levels of education from elementary school to a master’s degree (S2). They obtain nutmeg raw materials either directly from farmers or through collectors, depending on the type of product being produced. Nutmeg entrepreneurs tend to buy directly from farmers and markets, while nutmeg ice and powder entrepreneurs generally obtain raw materials through collector intermediaries. This information is consistent with reports on the nutmeg supply chain in the area, which indicate that entrepreneurs depend on raw material supplies from farmers and intermediaries, with varying levels of education and experience among business actors (Juliandi *et al.*, 2022; Sondra *et al.*, 2024).



Role of Value Chain Actors

The main actors include several players who play specific roles at each stage of the chain, from upstream to downstream. Here is an explanation of each actor and their role, based on research and mapping of the nutmeg value chain in Sukabumi.

Table 2. Key Actors and Roles in the Sukabumi City Nutmeg Value Chain

Aspect	Farmers	Intermediaries Processed	Food Entrepreneurs
Main Role Raw	Material Producers	Market Connectors	Value Creators
Activities	<ul style="list-style-type: none"> • Cultivation • Harvesting • Traditional Drying 	<ul style="list-style-type: none"> • Purchasing from Farmers • Sorting Temporary Storage • Candied Nutmeg 	<ul style="list-style-type: none"> • Processing • Beverage Processing • Powder Processing
Location	Warudoyong District, Sukakarya	Warudoyong District	Sukabumi City
Volume	2 quintals	-	2 kg – 50 kg (per production)
Dependence	High on Middlemen	-	High on Middlemen and Farmers
Challenges	Price Fluctuations Limited Land	-	Pasokan bahan baku tidak stabil Unstable Raw Material Supply

Farmers are the main producers of raw agricultural nutmeg, responsible for the entire process from cultivation to post-harvest (traditional drying). This activity is carried out in the Warudoyong sub-district. However, in price determination, farmers have less bargaining power because intermediaries, acting as market intermediaries, dominate the market. Intermediaries act as a link between the market and distribute to processing entrepreneurs. Processors are actors who add value to agricultural products. They process raw materials into finished products such as candies, drinks, or powders, which have higher selling value, with production volumes ranging from 2 kg to 50 kg per batch.

This dependence makes farmers highly reliant on intermediaries in the market, and processing entrepreneurs are heavily dependent on raw material supplies from farmers and intermediaries. This dependence forces farmers to be passive recipients of prices, facing price fluctuations and land limitations (Husen *et al.*, 2022; Muharani *et al.*, 2024). Intermediaries have greater bargaining power (Sondra, Sudrajat, and Nurahman, 2024). Processed-food entrepreneurs face the challenge of an unstable supply of raw materials (Sondra *et al.*, 2024). Therefore, multi-stakeholder support from the government and related institutions is crucial in addressing supply issues, infrastructure limitations, and enhancing farmer capacity.



Value-Added Analysis

Next, the value-added analysis of the nutmeg value chain in Sukabumi City. The value chain is defined as the difference between the selling price at one stage and the purchase price at the previous stage. This concept aligns with Michael Porter’s value chain theory (1985). Thus, value-added analysis not only helps identify the distribution of profits among participants but also provides a basis for developing strategies to improve the efficiency and competitiveness of nutmeg products in the market.

Table 3. Calculation of the Value Added of the Nutmeg Value Chain in Sukabumi in 2025

Product	Paladang		Ground Nutmeg		Nutmeg Ice
A. Total Revenue (Output value)					
Total product output	2 kg = 2,000 grams		20 kg	15 kg	50 kg
Sales assumption	Sold in 250-gram packages = 8 packages	Sold in 500-gram packages = 4 packages	Number of 50-gram packages in 1 kg = 1000/50 = 20 Selling price per kg = IDR 22,000 x 20 = IDR 440,000/kg	15 kg = 15,000 grams Number of cups produced: 15,000: 400 grams/cup = 37.5 cups Rounded to 37 cups	50,000 grams / 400 grams/cup = 125 cups
Selling price	IDR 35,000/250 grams	IDR 65,000/500 grams	IDR 22,000/20 grams	IDR 5,000	IDR 5,000
Total Revenue	IDR 280,000	IDR 260,000	IDR 8,800,000	IDR 185,000	IDR 625,000
B. Total Raw Material Costs (Input Value)					
Amount of nutmeg raw materials	1 kg		20 kg	15 kg	50 kg
Purchase price of nutmeg per kg	IDR 1,500		IDR 75,000	IDR 10,000	
Total cost of main raw materials		IDR 1,500	IDR 1,500,000	IDR 150,000	IDR 500,000
Operational costs		200,000	5,000.000	200,000	400,000
Value added (A-B)	IDR 278,500	IDR 258,500	IDR 7,300,000	IDR 35,000	IDR 125,000



Value added is calculated as the difference between the output value (the selling price of finished products) and the input value (the cost of raw materials and operations). Based on calculations:

1. Palm oil entrepreneurs gain added value ranging from IDR 278,500 to IDR 258,500 depending on the type of packaging used. This packaging difference will affect the added value and income of the farmer entrepreneurs themselves, as similarity influences selling price and product perception.
2. Nutmeg ice entrepreneurs gain added value of IDR 35,000 to 125,000, depending on how much product the entrepreneur sells and produces. The more product volume is produced and sold, the potential for added value can vary because production scale and cost efficiency play a significant role in profit margins.
3. Nutmeg powder entrepreneurs add a value of IDR 7,300,000. If this value is sold directly to the end consumer without going through a distributor, the entrepreneur will receive the full value. However, if the entrepreneur sells to a distributor, the distributor will usually offer a 2-3% discount under the distribution agreement.

This result is consistent with previous research, including that of Palijama et al. (2024), which showed that nutmeg products are processed into various forms, including nutmeg powder, essential oil, and other products. Seacra significantly increases added value and economic value, particularly for MSMEs. It is important to promote access to post-harvest technology and training so that added value is not only concentrated in the downstream sector but also reaches farmers, the main source of raw materials.

Value Chain Mapping

The distribution activities in the nutmeg value chain include purchasing, transportation, and sales carried out between nutmeg farmers and collectors, entrepreneurs, or factories. Nutmeg entrepreneurs perform processing activities through various production processes.

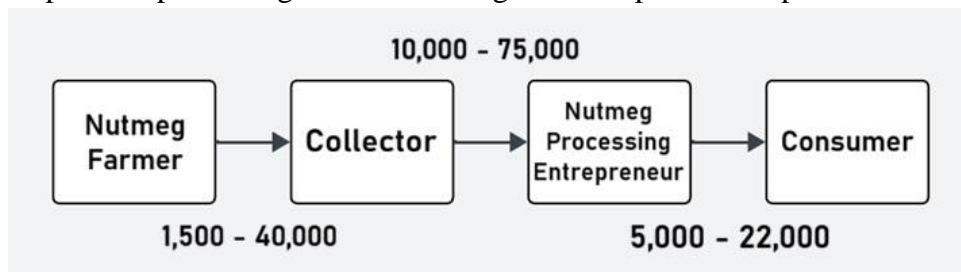


Figure 1. Price Chain of Nutmeg in Sukabumi City (Channel I)

Channel 1: Farmers → Middlemen → Processing Entrepreneurs → Consumers.

In Channel I, nutmeg farmers produce nutmeg and then sell it to collectors for a range of IDR 1,500 – IDR 40,000/kg, depending on the type of nutmeg (seeds, fruit, mace, or aril, dried and wet) being sold and the current market price. Then collectors sell it to nutmeg-processing entrepreneurs for IDR 10,000–IDR 75,000/kg. Nutmeg entrepreneurs/MSMEs play a role in

transforming raw nutmeg into ready-to-eat processed products sold to consumers. Raw nutmeg products are cleaned, then processed according to each product and packaged. After that, they are sold at a price increase to IDR 5,000 /cup and IDR 22,000/50 grams.

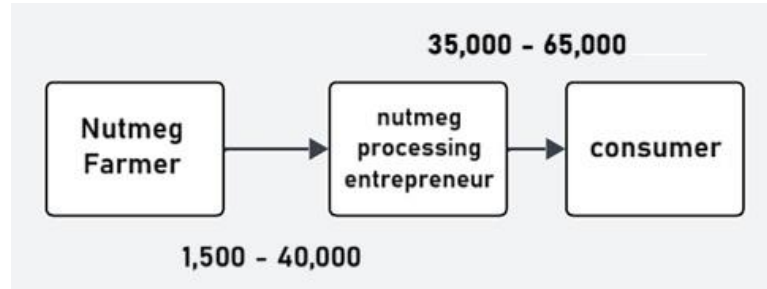


Figure 2. Nutmeg Price Chain in Sukabumi City (Channel 2)

Channel 2: Farmers → Processing Entrepreneurs → Consumers.

In channel II, nutmeg farmers produce nutmeg and then sell directly to nutmeg processing entrepreneurs at a price range of IDR 1,000 – IDR 150,000/kg, depending on the type of nutmeg (seeds, fruit, mace, or aril, dry or wet) sold and the current market price. Nutmeg entrepreneurs/MSMEs play a role in transforming raw nutmeg into ready-to-eat processed products sold to consumers. Raw nutmeg products are cleaned, then processed according to each product and packaged. Sales are then conducted, with the price of nutmeg increasing to IDR 5,000/cup, IDR 35,000/250 grams, and IDR 65,000/gram. This mapping includes identifying product flows, core value chain processes, the roles of each actor, and obstacles such as price fluctuations and land limitations for nutmeg cultivation. Value chain strengthening strategies, including increasing farmer capacity, reducing dependence on intermediaries, and developing supporting infrastructure, are needed to improve efficiency and distribute value-added fairly. (Juliandi *et al.*, 2022)

CONCLUSION AND RECOMMENDATIONS

Based on the nutmeg value chain study in Sukabumi City, the nutmeg sector has significant economic potential but still faces significant challenges. Low productivity and farm-level selling prices, coupled with high dependence on intermediaries, result in farmers earning only a small profit margin. The greatest added value is generated during the processing stage of products such as paladang, nutmeg powder, and nutmeg ice, where the products’ economic value increases significantly. Two main channels in the nutmeg supply chain highlight the central role of processing entrepreneurs in transforming raw materials into high-value products. However, the instability of raw material supply, price fluctuations, and limited processing capacity are major obstacles to the development of a sustainable value chain.



Additionally, the processing of nutmeg products is still dominated by MSMEs, which require better technological support, training, and market access to enable more evenly shared added value, including by farmers, the main source of raw materials. Here is the advice in paragraph form: To improve the welfare of nutmeg farmers and strengthen the value chain in Sukabumi City, it is necessary to enhance capacity and technology through training and technical assistance for farmers and MSME actors to improve the quality of nutmeg cultivation and processing. The application of modern post-harvest technology is also important for extending shelf life and maintaining product quality. Additionally, developing a shared processing centre can provide standardised processing and packaging facilities, enabling products to compete more effectively. Developing market access through digitalisation and e-commerce platforms is essential to ensure that the marketing of processed nutmeg products is not dependent on intermediaries, while also expanding local and international market reach. Strengthening partnerships among farmers, processing entrepreneurs, intermediaries, and the government should be encouraged through fair partnership schemes so that added value is shared equally and the supply of raw materials is more stable. On the other hand, product diversification and the development of Sukabumi's signature nutmeg product branding will increase consumer appeal and market value.

Finally, policy support from the government in the form of subsidies, access to credit for MSMEs, and investment in supporting infrastructure is crucial to overcoming land, supply, and production facility limitations to create sustainable nutmeg sector development. With these steps, it is hoped that the nutmeg value chain can be strengthened, providing greater economic benefits and increasing the competitiveness of Sukabumi nutmeg in both national and global markets.

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