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Implementation of Organic Nutmeg Farming Based on Local Wisdom and Market Access Challenges in Simau Village, North Halmahera

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ABSTRACT

This study aims to explore the implementation of organic nutmeg farming based on local wisdom and the associated market access challenges in Simau Village, Galela District, North Halmahera Regency. Conducted from August to October 2024, the research employed a descriptive analysis approach involving 24 nutmeg farmers as respondents, selected purposively to capture in-depth insights into cultivation and post-harvest practices. The results show that 95.8% of farmers apply a monoculture system, avoid synthetic inputs, and implement traditional practices passed down through generations, reflecting strong alignment with organic farming principles. Farmers also use local ecological methods such as intercropping with clove trees for natural pest control. Despite the organic approach, most farmers still rely on local markets dominated by collectors, leading to low bargaining power and no significant price premium for organic products. Only 4.16% of farmers have begun exploring alternative markets. Although all respondents are aware of the growing demand for organic products globally, limited infrastructure and market access continue to hinder the potential benefits of organic certification. The study concludes that while organic nutmeg farming is well-rooted in local practices, strengthening institutional support and improving market connectivity are critical to ensuring its sustainability and economic impact.

Keywords: *Organic nutmeg, local wisdom, market access, sustainable agriculture, North Halmahera*

INTRODUCTION

Nutmeg comes from Indonesia, comes from the Maluku and Banda Islands [1]. North Maluku ranks third in nutmeg production centers, having a significant contribution with the average production during the period 2018 to 2022 of around 6,132 tons [2]. This province ranks first for the area in Indonesia of 65,275 ha with a production of 6,062 tons, also accounting for around 19.89% of the total national nutmeg production. Until now, Indonesia is still the largest producer and exporter of seeds and maces in the world. Countries where Indonesia exports nutmeg include the United States, Germany, Italy, and the Netherlands. Indonesia's nutmeg exports

almost reached 26,490 tons in 2021 with a value of US$ 198,110,000 In the same year, nutmeg production in Indonesia reached 44,555 tons, which resulted from a production area of 265,279 hectares [2]. The nutmeg market, including organic nutmeg, is expected to continue to grow across the globe due to the increasing demand from various industries, including food, beverages, cosmetics, and pharmaceuticals. Between 2023 and 2028, this market is projected to grow at a compound annual growth rate (CAGR) of 5.82% [3]. in April 2023, the price of nutmeg was around USD 9,900 per metric ton, indicating the high value of this type of nutmeg in international trade [4].

North Maluku has been known as the center of nutmeg production, but the approach to organic farming in this region is still not optimal or even lacking. Arnelia Palijama [5], indicates that there is a great opportunity to develop organic farming. When viewed from the nutmeg production centers spread throughout the province in 10 districts and cities, but only 5 districts and cities with the largest production, namely North Halmahera with a production of 1,852 tons, Central Halmahera 1,831 tons, West Halmahera 653 tons, South Halmahera 608 tons and Ternate City 326 tons [2]. This achievement is certainly inseparable from the active role of nutmeg farmers who are members of farmer groups. Farmer groups are one of the institutional forms that are considered to play an important role in sustainable agricultural development [6].

Production Of Nutmeg Plantations Per Regency/City in North Maluku Province 2021

District/City	Production (Ton)	Productivity (Kg/Ha)
Halmahera Utara	1.852	**560**
Halmahera Tengah	1.831	**435**
Halmahera Barat	653	**560**
Halmahera Selatan	608	**418**
Ternate	326	**324**
Maluku Utara	6.062	**419**

Source: National Leading Plantation Statistics 2021-2023 (Ministry of Agriculture)

North Halmahera, precisely in North Galela District, there are 10 villages that have been inspected directly by PT Icert Agro International, Bogor, in 2019. However, during the process, only 2 villages passed the certification of organic nutmeg cultivation [7]. It is unfortunate that the certification did not last long because the farmer group assisted by the North Maluku provincial agriculture office did not continue or update the certification process that had been carried out that year. So that in 2023 the organic farming process will be restarted by BSIP North Maluku in Simau village. Organic farming is an agricultural system that does not use genetically modified organisms (GMOs) and avoids or severely limits the use of synthetic chemicals such as pesticides, herbicides, and artificial fertilizers [8]. In Simau village, awareness of the potential added value and importance of preserving local ecosystems encouraged the switch to organic farming. Farmer groups in this village, with support from various parties, including the North Maluku Agricultural Instrument Standardization Agency (BSIP), began to implement agricultural methods that reduced their dependence on chemicals and utilized more natural and sustainable techniques [9].

The development of organic agriculture in North Halmahera through farmer groups is considered an effective strategy to create

sustainable and competitive agriculture. Farmer group support should facilitate farmers' access to better markets, although prices are often uncertain [10]. The role of the government, including land conversion and extension policies, is key in the development of this sector [5].

The North Maluku Agriculture Office has implemented an internal mentoring and inspection program, such as at the Mirimoi Farmer Group in North Galela, to ensure that agricultural practices meet the Organic Farming System Certification (SPO) standards by PT Icert Agro International in July 2024 [9]. However, only 12 of the 24 ha of land in Simau Village have passed the certification. The question arises whether this certification can open up wider market access, including exports [11].

Farmer group certification is important in meeting quality, safety, and sustainability standards, as well as strong marketing tools [12]. Certification increases consumer confidence and opens up export market opportunities [13]. However, in North Halmahera, the legality and impact of certification are still questionable [14].

Despite the many benefits, farmers in North Galela face challenges such as the application of new technologies, lack of product diversification, and high certification costs [15]. Ongoing support from the government and relevant agencies is needed to ensure a smooth transition to organic farming.

MATERIAL & METHODS

This research was conducted from August to October 2024 in Simau Village, Galela District, North Halmahera, with a focus on nutmeg farmers as a population. The sample was part of the population selected to obtain relevant data on organic nutmeg cultivation and post-harvest practices [16]. In this study, a sample of 24 people was determined, there were 19 men and 5 women. The types of data used in this study are primary and secondary data. Primary data is data obtained directly from observations and interviews in the field and has never been processed before. Secondary data is supporting data and is obtained from recording data that is already available in offices or agencies and Organic Farmer Groups. This study uses a descriptive analysis method approach, to determine and assess and identify the organic nutmeg cultivation system in North Maluku.

RESULT

North Halmahera, North Maluku, is famous for its main agricultural commodities, especially nutmeg and coconut. Nutmeg which is prioritized in Ministerial Decree No. 472/Kpts/RC.040/2018 has national strategic value. Simau Village in Galela Induk is a major organic nutmeg hub, supported by suburban soils and a tropical climate that supports the development of bio-businesses.

Source: North Halmahera Regency Communication and Information Office.

A total of 16 of Mirimoi's 24 farmers are in the age group of 45-64 years. The age group of 35-44 years consists of 4 people, while the group of 25-34 years is only one person, and the group of 65-74 years is 3 people. This data shows the dominance of productive age in organic farming in Simau Village, with the involvement of younger (25-34) and older (≥75) age groups. This demographic profile provides an in-depth insight into the dynamics of organic farming, demonstrating the active participation of the Mirimoi farming group in the pre-farming process.

Among the 24 farmers in the study, most had limited education: 9 completed elementary school, 2 completed junior high school, and 13 completed high school. These limitations affect access to modern agricultural information and technology, which impacts productivity and the desire to farm organically. Ongoing training and counseling are essential to improve organic farming practices.

A. Mirimoi Farmer Group's Vision, Mission and Commitment

The Mirimoi Farmers Group, established in 2016 in Simau Village, manages 31 hectares of organic nutmeg land. With 24 members, they market nutmeg under the brand name "Nutmeg Simau", with a focus on sustainable agriculture, farmer welfare, product competitiveness, and eco-friendly practices to strengthen the relationship between organic and non-organic nutmeg producers [9].

The following is the vision and mission of the Mirimoi Farmers Group as the basis for the implementation of group regulations. a) Strengthening and providing a sense of security to all group members. b) Encourage all members to take care of and protect each other so that the right relationship is created. c) Creating a healthy climate between members so that they can compete sportively towards the progress and improvement of the group's economy. d) Encourage farmers' awareness to be honest in terms of product organization. e) Maintain crop stability. f) Encourage and develop mutually beneficial partnerships and entrepreneurship in the management of regional superior products. d) Encourage awareness and honesty of farmers in terms of product organization. e) Maintain crop stability. d) Encourage and develop mutually beneficial partnerships and entrepreneurship in the management of regional superior products based on highly competitive organic products. e) Increasing the competitiveness of nutmeg commodities through improving quality and quantity based on organic products.

To achieve the vision and mission of the Mirimoi Farmers Group, the group is committed to, first, produce good quality organic nutmeg that is safe for consumption, second, improve the welfare of members and the community, and third, support nature conservation. For this reason, the Mirimoi Farmers Group formed an Internal Control System (ICS) which is tasked with providing guidance and supervision of nutmeg production in accordance with organic certification standards and requirements.

B. Organic Nutmeg Cultivation Business Identification System in Mirimoi Farmer Group in North Halmahera Regency

1) Nutmeg Agricultural Land Preparation Identification System

Table 2. Organic Nutmeg Farmland Preparation Business Identification

No	Respondent Answer Results	Alternative Answers/scale			
		1	2	3	4
1	1 type of variety, Namely The Tobelo Variety	95.83%	4.16%		
2	Do Not Use Fertilisers, Both Organic And Non Organic	95.83%	4.16%		
3	Not Using Pest Control	95.83%			4.16%
4	Experience In Agriculturel System Organik			12.50%	87.50%
5	No Irrigation	100%			

Source: Processed primary data, 2025.

A total of 95.8% of nutmeg farmers in the study area apply a monoculture system by planting one variety of nutmeg. This pattern facilitates management, maintains quality consistency, and supports certification. Monoculture has been passed down from generation to generation and is effectively practiced by local farmers. Each region in North Maluku has distinctive varieties, such as Makian, Patani, Banda, Tidore, and Tobelo with Tobelo being the most dominant in North Halmahera. Each variety has unique characteristics in terms of morphology, productivity and adaptability, and symbolizes local identity that strengthens added value and positioning in the market.

Most large farmers (95.8%) in the study area are known to not use synthetic inputs such as chemical fertilizers and pesticides in their land management. This commitment is in line with the principles of organic farming that ensure natural and sustainable land management. In addition, farmers are also given directions to avoid actions that could potentially damage the agricultural ecosystem, such as burning land, keeping animals (such as cattle or other livestock) on farmland, and disposing of inorganic waste, such as plastic, on farmland. These prohibitions aim to maintain the integrity of the agricultural environment, prevent contamination of non-organic elements, and support the success of the organic certification process. This effort is also an important part of maintaining the overall organic farming system, improving the quality of agricultural products, and strengthening the position of products in the domestic and international organic markets.

95.8% of farmers in the study area do not use inorganic fertilizers, synthetic pesticides, or land burning in nutmeg cultivation. Traditional practices passed down from generation to generation maintain stable productivity. To control pests, farmers plant clove trees around nutmeg. The eugenol content in cloves serves as a natural insecticide that effectively repels pests without harming the environment. This approach reflects local wisdom that supports sustainable organic farming systems and maintains ecosystem balance amidst the challenges of environmental change and modernization.

The majority of farmer group members (87.5%) have implemented organic farming systems since 2019, reflecting adaptation and understanding of sustainable principles. A culture of knowledge sharing among members strengthens the group's capacity to manage the farm organically. Farmers clear new land manually without synthetic chemicals, maintaining the ecosystem and soil fertility. Suggested technical strategies include tree mapping for monitoring and long-term planning and agroforestry. However, due to local knowledge, nutmeg is not suitable for planting with crops such as bananas or peanuts, so farmers prefer to clear the land separately.

All farmer group members in Simau Village rely on rainfall as the only source of irrigation, reflecting the lack of supporting infrastructure such as artificial irrigation or water reservoirs. The geographical location far from water sources is a major obstacle,

especially in the midst of climate change risks. However, the soil in North Halmahera is fertile and supportive of nutmeg cultivation. Farmers still use traditional systems, in contrast to modern practices in Java. Even without irrigation, nutmeg trees still grow well and produce abundant fruit, but dependence on rain remains a challenge to sustainability.

2) Identification of nutmeg business processes at the time of Harvest

The following table presents the results of the survey on nutmeg farmers' perceptions of the marketing dynamics they face, including local market dominance, price differences, the influence of experience, and limited access to the wider market.

Table 3. Identification of Organic Nutmeg Farming Post-Harvest Business Process

No	Respondent Answer Results	Alternative Answers/scale			
		1	2	3	4
1	Local Markets Dominan			95.83%	4.16%
2	No Significant Price Diference	95.83%			4.16%
3	Not So Noticeable Is The Diference Between Experience And Inexperienced Farmers	87.50%	12.50%		4.16%
4	Influence Of Global Market Trends			100%	
5	Limited Market Access To Big Swords			4.16%	95.83%

Source: Processed primary data, 2025.

The marketing mechanism of nutmeg in Simau Village, Galela District, North Halmahera Regency, is still very dependent on the local market. Most of the farmers, around 95.83%, sell their crops to collectors from the city of Tobelo, Ternate, or from outside North Maluku Island. This distribution line has been going on for generations and is the only option that is considered the easiest and fastest. However, this pattern keeps farmers' bargaining positions low, especially when it comes to pricing, as it depends entirely on the terms of the collector. On the other hand, only 4.16% of farmers have started exploring new market alternatives, such as cooperatives, direct sales to large buyers, or utilizing digital networks. Although still limited, this step shows that there is an effort towards market independence. To support this transformation, institutional strengthening, marketing training, and adequate logistics infrastructure are needed so that added value can be enjoyed directly by farmers.

Most of the farmers, 95.83%, stated that there was no significant price difference between organic and non-organic nutmeg at the market level. Although the nutmeg cultivated follows the principles of organic farming, the reality has not been reflected in the determination of the selling price. Currently, the general market price for non-organic nutmeg ranges from IDR 70,000 to IDR 90,000 per kilogram for dried fruit, and IDR 100,000 to IDR 120,000 per kilogram for mace. Only about 4.16% of farmers are seeking higher prices, emphasizing the quality and excellence of the organic nutmeg they produce. However, without the support of a marketing system that clearly distinguishes organic products, these efforts are still limited and have not had a significant impact on increasing farmers' incomes.

As many as 87.50% of farmers have experience in organic nutmeg farming since 2019, so they are considered quite experienced in running this system. Nevertheless, the difference between experienced and inexperienced farmers is not very striking. This is because even though they have been involved for a long time, some farmers still do not fully understand the principles and techniques of organic farming as a whole. Therefore, technical guidance from BSIP North Maluku is still needed to strengthen their

understanding and skills. Meanwhile, as many as 12.50% of farmers have no experience at all in organic farming systems. However, this limitation can be overcome through the role of farmer groups, where there is an active process of sharing experience and knowledge between members, thereby creating a collective learning environment that strengthens the capacity of all farmers.

All respondents (100%) acknowledged the influence of global market trends on their agricultural orientation. The dynamics of global demand that increasingly lead to organic products encourage farmers in Simau Village to be more open to changes in the cultivation system. Awareness of this trend makes farmers feel the need to keep up with market developments and actively seek out relevant information. This encouragement is one of the driving factors for some farmers to switch to organic farming systems, as an effort to increase competitiveness and meet market standards that are more oriented towards sustainability and consumer health.

As many as 95.83% of farmers stated that they still experience limited market access, especially to wholesalers or permanent buyers outside the local area. Until now, most nutmeg products are only marketed in the surrounding area, so the selling value has not had a significant impact on increasing farmers' income. Meanwhile, another 4.16% of farmers have started to look for alternative marketing channels, although still on a limited scale. This condition reflects a serious challenge in a distribution system that is not yet optimal. However, farmers have high hopes of establishing partnerships with more stable buyers, both domestic and foreign, who truly value the quality of their agricultural products at a decent price and reflect the value of the effort that has been poured in.

CONCLUSION

Most of the nutmeg farmers in the study area (95.8%) implemented a monoculture system by planting one variety of nutmeg, which facilitates management, maintains quality, and supports organic certification. They do not use synthetic fertilizers or chemical pesticides, in line with the principles of sustainable organic farming, and avoid environmentally damaging actions, such as land burning. To control pests, farmers grow cloves that serve as a natural insecticide. Most farmers (95.8%) have implemented organic farming since 2019 and share knowledge among members of farmer groups, increasing capacity in organic farming management. However, they rely on rainfall as their only source of irrigation, which is a challenge especially with climate change. In terms of marketing, most farmers still rely on local markets, which limits their bargaining power in pricing. Although they produce organic nutmeg, there is no significant price difference with non-organic nutmeg. Some farmers are starting to look for market alternatives, such as cooperatives and direct sales, although they are still limited. All farmers are aware of the global market trends that lead to organic products, which encourages them to adapt and follow organic farming systems to increase competitiveness and meet sustainable market standards. However, the biggest challenge is limited market access, which hinders their potential revenue increase.

Declaration by Authors

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About the corresponding author:

Wawan is currently a postgraduate student at the School of Business, IPB University, in Bogor, Indonesia, with an academic focus on management and business. His research interests include sustainable agriculture, organic farming, community development, strategic planning, and agribusiness innovation. As part of his final academic project, Wawan conducted an empirical study on the implementation of certified organic nutmeg cultivation systems in North Halmahera Regency. The study aims to provide a comprehensive and in-depth understanding of organic farming practices and their role in enhancing local agricultural sustainability and product competitiveness in the market.

Wawan is also a recipient of the LPDP (Indonesia Endowment Fund for Education) scholarship and has been actively involved in various academic and organizational activities. In 2024, he served as the Coordinator of LPDP Scholars at IPB University. In addition, he is engaged in academic writing, with one of his works titled Event Management in Sport, Recreation, and Tourism: Theoretical and Practical Dimensions (4th Edition) indexed in Scopus. Beyond academic pursuits, Wawan demonstrates a strong commitment to community service and youth initiatives, particularly those focusing on sustainable development in rural areas.

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