



Examining Income Patterns and Time Allocation in Nutmeg (*Myristica Fragrans*) Farming: A Case Study of Padang Selatan District, Padang, West Sumatra, Indonesia

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ABSTRACT

This research study, conducted from September to November 2022, aims to assess the income and profits associated with Nutmeg (*Myristica Fragrans*) products and analyze the allocation of working time among farmers in Padang Selatan District. The research used descriptive method, employing a survey approach. Data collection included both primary and secondary data, with 34 farmers selected as respondents through a simple random sampling method. Nutmeg trees yield seeds, mace, and fruit meat, which are subsequently processed into various products, notably Nutmeg syrup. Among these, seeds and mace are the most commonly produced by farmers. The analysis reveals that among the three primary Nutmeg products, seeds yielded the highest average income, accounting for Rp. 3,209,252 (70.53%) of the total income. It is followed by Nutmeg syrup followed with Rp. 767,310 (16.86%), while mace products generated the lowest income at Rp. 573,356 (12.60%). The highest working time allocation was observed in the processing of Nutmeg seed products, totaling 8.85 working time allocations per year, representing 54.16% of the total time spent. Mace products required 5.83 working time allocations per year, constituting 35.68% of the total time allocation, while Nutmeg syrup products demanded the least time, with 1.66 working time allocations per year, accounting for 10.16% of the total. These findings underscore the importance of adhering to recommended cultivation practices and diversifying fruit meat processing to enhance farmers' income.

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1. INTRODUCTION

Padang Selatan District, a part of Padang City in West Sumatra, boasts an area of approximately 10.03 square kilometers, comprising 12 sub-districts. This region is rich in natural resources, with a predominant focus on plantation products. Notably, nutmeg (*Myristica Fragrans*) cultivation is a prominent agricultural endeavor, positioning Padang Selatan as a central hub for nutmeg production within Padang City.

Nutmeg holds significant economic importance for farmers in Padang Selatan District, with various parts of the nutmeg tree being utilized, including the seeds, mace, and fruit

meat. Seeds and mace, due to their higher market value and simpler processing, are the primary focus of most farmers. These parts are typically sun-dried to enhance their market value. In contrast, a smaller subset of farmers processes the fruit meat into nutmeg syrup, a more time and energy-intensive endeavor.

This study seeks to explore the income and profitability associated with different nutmeg products. It aims to answer questions such as: What are the varying income levels and profit margins for each nutmeg product? Which nutmeg products are most commonly produced, and how do their production processes impact the allocation of working time?"

2. METHOD

The research was carried out within Padang Selatan District, located in Padang City, between September and November 2022. This study employed a descriptive research methodology using a survey approach. The collected data comprised two categories: primary and secondary data sources. Respondent selection was conducted through a simple random sampling method, resulting in a sample size of 34 farmers. Subsequently, the gathered data underwent a comprehensive analysis, encompassing both qualitative and quantitative approaches.

The data utilized in this study cover the period of one year's worth of nutmeg production. Data processing focuses on quantifying nutmeg plant productivity, with each data point representing the output from 30 nutmeg plants. The variables involved in this study include: (1) working hours allocated to produce the nutmeg products; (2) total production of nutmeg products; (3) selling price; (4) production cost; and (5) income.

Total net income is calculated using the following formula:

$$\pi = TR - TC$$

Where:

π = net income (rupiah/ha/year)

TR = Total revenue (rupiah/ ha/ year)

TC = Total costs incurred during the production process
(Rupiah/ha/year)

3. RESULTS AND DISCUSSION

3.2. Nutmeg Farming Profile

Nutmeg is a plantation characterized by its tall stems, typically exceeding 10 meters in a healthy growth state. It begins to bear fruit at around 5 to 10 years of age, with each mature tree yielding approximately 100 kilograms of nutmeg. Flowering commences as early as the fourth year. Nutmeg plants exhibit considerable variation in productivity, influenced by factors like maintenance practices and soil conditions. They are recognized for their dense, shady crowns adorned with glossy green leaves, ranging from 5 to 15 centimeters in length and 3 to 7 centimeters in width.

In the Padang Selatan District, nutmeg cultivation has a longstanding history but is often not subject to scientific practices. These plants are typically grown on hillsides to help prevent soil erosion. Nutmeg trees usually emerge from seeds that have fallen to the ground. Once the plants

have matured on the land, farmers harvest the fruits. Unfortunately, the majority of farmers do not engage in rigorous nutmeg plant maintenance, such as fertilization and weed control. Only a small fraction of farmers applied fertilizers to their nutmeg plants.

The absence of proper maintenance renders nutmeg plants susceptible to diseases, leading to abrupt mortality of productive trees. Consequently, this has a detrimental effect on nutmeg production. To date, no specific diseases affecting nutmeg plants have been identified. As a response, many nutmeg farmers opt to replant, while some choose to cultivate alternative crops on their land.

Nutmeg, derived from nutmeg plants, has multiple uses among farmers in the form of seeds, mace, and fruit meat. The preference among most nutmeg farmers leans towards seeds and mace due to their superior economic value when compared to nutmeg meat, which necessitates prior processing. The treatment of seeds and mace is relatively straightforward; peeled nutmeg pods are typically sun-dried to achieve the desired level of dryness, thereby influencing the selling price. Enhanced dryness in seeds and mace generally commands a higher market price. In contrast, processing nutmeg meat is a more time-consuming and capital-intensive work. A smaller subset of nutmeg farmers decide to process nutmeg meat into nutmeg syrup.

The harvest of nutmeg can occur under various conditions, including young fruit, ripe fruit, and 3/4 ripe fruit, each requiring distinct treatment and serving different purposes. Young fruit is typically discarded, while the seeds and mace are preserved through drying. Ripe fruit, even if slightly damaged, can still be utilized. Healthy portions of ripe and pickled ripe fruit are selected, with the seeds and mace being processed. As for 3/4 ripe fruit, the fruit meat can be processed into a variety of products such as syrup, confectioneries, jam, and more.

This study involved a sample of 34 farmers, comprising 22 men (64.71%) and 12 women (35.29%). The average age of the participating farmers spans from 34 to 72 years. Notably, the majority of farmers fall within the age range of 47 to 59 years, constituting 19 individuals or 55.88% of the sample. This age is considered the productive age, as defined by (BPS, 2023), which encompasses individuals aged 15 to 64 years..

Table 1. Characteristics of Nutmeg Farmers

Description	Total	Percentage (%)
Gender		
a. Man	22	64.71
b. Woman	12	35.29
Age		
a. 34 - 46	8	23.53
b. 47 - 59	19	55.88
c. 60 - 72	7	20.59
Education		
a. Elementary	7	20.59
b. Juior high school	11	32.35
c. Senior high school	15	44.12
d. Collage	1	2.94
Number of family dependent		
a. 1 - 3	17	50.00
b. 4 - 6	17	50.00

Table 2. Profile of the Main Job and Land Area

Description	Total	Percentage (%)
Main job		
a. Farmer	15	44.12
b. Trader	6	17.65
c. Driver	3	8.82
d. Fishermen	1	2.94
e. Private worker	1	2.94
f. None (wife)	8	23.53
Side job		
a. Farmer	19	55.88
b. Trader	5	14.71
c. Driver	3	8.82
d. Fishermen	1	2.94
e. Private worker	1	2.94
f. None (wife)	5	14.71
Agricultural area (ha)		
a. 0.1 – 0.7	20	58.82
b. 0.8 – 1.4	0	0
c. 1.5 – 2.1	14	41.18
Number Nutmeg trees		
a. 4 - 53	30	88.24
b. 54 – 102	3	8.82
c. 103 – 151	1	2.94

The educational attainment of the respondents in this study is relatively high. About 44.12% of the sample, have graduated from high school, and 32.35% farmers completed junior high school, while 7 farmers (20.59%) have achieved an elementary school education. Notably, one respondent (2.94%) possesses a university degree. Regarding marital status, the vast majority of the surveyed farmers, totaling 32 individuals or 94.12%, are married, while 2 respondents (5.88%) are widowed.

The concept of "family dependent" in this context refers to family members who rely on the household for support, encompassing both immediate and extended family members residing in the same household but not actively engaged in employment (Ichsan, 2021). Based on the Central Bureau of Statistics classification, the number of dependents is categorized into three groups: small family dependents (1-3 people), medium family dependents (4-6 people), and large family dependents (more than 6 people). Among the nutmeg farmers surveyed, the distribution of dependents is as follows: 17 individuals (50%) have 1-3 dependents, another 17 individuals (50%) have 4-6 dependents.

Table 2 describes the profile of main job and land area of nutmeg. Regarding the respondents' primary occupations, 15 farmers (44.12%) identify farming as their main profession, followed by 6 respondents (17.65%) engaged in trade, 3 individuals (8.82%) working as drivers, 1 participant (2.94%) involved in fishing, 1 private employee (2.94%), and 8 individuals (23.53%) fulfilling the role of a housewife. Furthermore, 19 respondents (55.88%) pursue farming as a secondary occupation, while 5 participants (14.71%) engage in trade, 3 individuals (8.82%) work in construction, 1 respondent (2.94%) serves as a driver, 1 person (2.94%) is employed as a housewife, and 5 individuals (14.71%) do not have secondary employment.

The land area planted with Nutmeg is relatively small. The land area of 0.1-0.7 ha was cultivated as many as 20 people or 58.82%, and 1.5-2.1 ha as many as 14 people or 41.18%. Farmers who have Nutmeg that produce 4-53 stems as many as 30 people or 88.24%, 54 - 102 stems as many as 3 people or 8.82%, and 103 - 151 stems as many as 1 person or 2.94%.

3.2. Income and Benefits of Nutmeg Products

The income generated from various Nutmeg products exhibits significant variability. Nutmeg plants typically yield approximately 4,836 kg per hectare per year (Parliansyah, 2019). Nutmeg can be harvested twice a year, with the optimal harvest time occurring when the fruit is 9-10 months old following flowering (Ministry of Agriculture, 2021).

Based on research findings, 30 trees of Nutmeg yielded approximately 81 kg/year of nutmeg, 7 kg/year of mace, and 130 liters/year of nutmeg syrup. Nutmeg is typically sold at a rate of Rp. 40,000 per kilogram, followed by mace at Rp. 85,000 per kilogram and Nutmeg syrup at Rp. 30,000 per liter. On average, Nutmeg farmers obtain a yield of 2.7 kg/year for Nutmeg products, 0.23 kg/year for mace products, and 4 liters/year for Nutmeg syrup products from a single Nutmeg plant. These yields are relatively low.

This low yield can be attributed to the limited number of plants in the land area, which currently stands at just 30 plants. According to literature, 1 hectare of land can accommodate up to 120 plant stems with a spacing of 9 x 9 meters. Consequently, if an entire field is dedicated to monoculture Nutmeg cultivation, the land area allocated to these 30 plants, which covers approximately 0.25 hectares, should yield around 150-250 kg/year of Nutmeg seeds and 25-40 kg/year of mace. Presently, Nutmeg farmers are only achieving 32% of the expected Nutmeg yield and a mere 18% of the expected mace yield.

Whereas the production of Nutmeg syrup is still very little. This is due to the lack of farmers who use Nutmeg meat to be processed. Nutmeg meat can not only be processed into syrup, but can also be processed into various products such as sweets, jam, and others. Due to the lack of knowledge and skills of farmers, Nutmeg meat, which is the largest part of Pala, is only discarded and considered as waste.

Productivity of Nutmeg in Padang Selatan District tends to be low. This is caused by the number of plants that are attacked by diseases that cause the damage for Nutmeg plant. Some farmers replant dead Pala. So that the replanted plants are still young and their productivity is still low. This decrease in productivity also has an impact on the decline in income and profits of Nutmeg farmers. The income and profits of various products from Nutmeg can be seen in Table 3.

Table 3. Income and Profit of Nutmeg Product Business

Description	Nutmeg Seed	Mace	Nutmeg Syrup
Production (kg)	81	7	130
Price (Rp)	40,000	85,000	30,000
Revenue (Rp)	3,232,341	596,225	804,706
Cost (Rp)	23,090	22,869	37,396
a) Fertilizer	6,853	6,632	
b) Firing	735	735	
c) Tax	15,501	15,501	
d) Raw material			23,754
e) Packaging			
f) Power			4,769
g) Water			21
h) Gas			6,875
			1,373
Costs ((Rp))	536,711	356,446	195,013
a) Labor wage	530,753	349,712	91,187
b) Depreciation cost	5,958	6,734	104,235
Income (Rp)	3,209,252	573,356	767,310
Profit (Rp)	2,582,275	148,523	507,011

Based on the calculation of 30 trees of Nutmeg which is equivalence to 0.25 ha, the highest profit comes from Nutmeg seed products of Rp 2,582,275 per year, followed by Nutmeg syrup of Rp 507,011 per year and the lowest is mace income of Rp 148,523 per year.

As can be seen in Table 4 that the highest income range of farmers is Nutmeg seeds in the range of Rp 9,650,000 - 14,400,000 obtained by 12% of farmers. However, most farmers (82%) only received income in the range of Rp.150,000 – Rp.4,850,000. While for the mace product, it was dominated in the range of Rp. 18,400-4310.00, 24 people or 70.59%. Most farmers (57%) obtained the highest income range for Nutmeg syrup (Rp. 3,710,000-4,300,000).

Table 4. The Comparison of Income Range of the Three Nutmeg Products

Product	Income Range (Rp)	Percentage (n = 34)
Nutmeg seed	150,000 - 4,850,000	82.35
	900,000 - 9,649,000	5.88
	9,650,000 - 14,400,000	11.76
Mace	<18,400	2.94
	18,400 - 431,000	70.59
	432,000 - 844,000	11.76
	845,000 - 1260,000	14.71
Nutmeg Syrup	2,550,000 - 3,090,000	14.29
	3,100,000 - 3,700,000	28.57
	3,710,000 - 4,300,000	57.14

The low income earned by farmers in Nutmeg farming is the small number of productive Nutmeg plants due to many diseases attacked by the disease so that Nutmeg farming is a side business for farmers. If farmers want to increase income from Nutmeg farming, it can be done by increasing the number of Nutmeg plants planted and doing better cultivation activities in accordance with the recommendations.

3.3. Working Time Allocation

The labor working time allocation for each Nutmeg product for one year is presented in Table 5.

Table 5. Working Time Allocation of Nutmeg Products per Year

Product	Income (Rupiah)	Working Time Allocation (Hours)
Nutmeg Seed	3,209,252	8.85
Mace	573,356	5.83
Nutmeg Syrup	767,310	1.66

Table 5 provides insights into the comparison between income and labor input across various Nutmeg plant products. Notably, the highest income is attributed to Nutmeg products, totaling Rp. 3,209,252 per year,

although this comes with a substantial labor requirement of 8.85 hours per day per year. When we examine these data, we find that the average monthly income for Nutmeg farmers at Rp. 267,438. On average, Nutmeg farmers support a family of three, resulting in a per capita income of Rp. 89,146.

According to BPS data from 2021, the poverty line per capita in Indonesia is IDR 486,168 per capita. In light of this, the income derived from Nutmeg farming is relatively low. Consequently, Nutmeg farming is primarily undertaken as a supplementary source of income for farmers who also engage in other economic activities.

The labor requirements for Nutmeg fruit production are relatively modest. The main tasks involve harvesting the Nutmeg from the trees and then processing them to obtain the seeds. Nutmeg farmers do not require a large workforce for these activities. This is primarily because the timing of Nutmeg plant harvests is contingent on the age of the plant. Young plants are typically harvested every 3 months, while older ones may be harvested every 6 months. In this study, it was observed that Nutmeg plantations were dominated by younger plants, which were replanted due to disease outbreaks in the study area, resulting in a lower overall profit margin.

In terms of working time allocation, Nutmeg product cultivation typically demands less than 35 hours per week on average. Consequently, when we consider the average working hours invested by Nutmeg farmers, it becomes evident that Nutmeg farming represents a part-time occupation. According to the Bureau of Statistics (BPS) data from 2020, individuals working less than 35 hours per week are categorized as part-time workers. In the context of this research, Nutmeg farming does not constitute the primary occupation for respondents in the study area. These farmers are engaged in a diverse range of enterprises, including trading, construction work, driving, and cultivating various crops such as cocoa and cloves alongside their Nutmeg farming activities. This multifaceted engagement is facilitated by the fact that Nutmeg cultivation does not require extensive time commitments.

Nutmeg farmers typically cultivate a variety of products, and as a result, their income increases proportionally. Regarding mace products, the average annual income derived from them is Rp. 573,356, involving 5.83 working hours. Mace enjoys a higher selling price compared to other Nutmeg products, typically ranging from IDR 85,000 to IDR 100,000 per kilogram. However, mace production from Nutmeg plants is relatively limited, accounting for approximately 4% of a single nutmeg's size, resulting in

moderate income levels. The labor input required for mace production is relatively low, as it aligns with the seed processing process, primarily involving the removal of mace from the fruit and subsequent drying activities.

Additionally, for syrup products, the average annual income is Rp. 767,310, with an average labor input of 1.66 working hours. In our study, only seven farmers were involved in the processing of Nutmeg into syrup. When considering average income levels, Nutmeg syrup products generate the second-highest income after Nutmeg seeds. These syrup products are sold at Rp. 30,000 per liter, with an average production of 130 liters per year from the sampled group. In this context, processing Nutmeg into syrup emerges as a viable option for farmers seeking to augment their income, given the comparatively high returns and minimal labor requirements compared to other products. The process of Nutmeg syrup production involves stripping the Nutmeg, blending and filtering the fruit flesh, followed by a four-hour cooking period with an average daily production of 11 liters.

A study by Juwita and Tsuchida (2017) found that nutmeg farming allowed farmers to generate an average family income of 10 million IDR per person, even without implementing proper cultivation management or processing techniques. However, engaging in the processing of nutmeg products resulted in significantly higher income and profits. For instance, the value added per kilogram of nutmeg fruit increased by a factor of two when transformed into nutmeg sweets and by a remarkable 23 times when processed into nutmeg oil. Unfortunately, farming and processing practices have inadequate management at every stage of cultivation and processing. These problems included raw material shortages, product rejections, and significant price fluctuations.

In terms of sustainability practices of nutmeg farming, Nasution (2023) found that nutmeg that the nutmeg farming was in a fairly sustainable condition. However, it is less sustainable in the economic dimension, post-harvest practices.

4. CONCLUSIONS

The highest average income earned by Nutmeg farmers is derived from Nutmeg seed with an average annual income of Rp. 3,209,252 (70.53%), followed by Nutmeg syrup of Rp. 767,310 (16.86%) and the lowest income in mace products was 573,356 (12.60%).

The highest working time allocation was found in processing Nutmeg seed products of 8.85 working hours / year (54.16%), mace products of 5.8 working hours / year

(35.68%) and the lowest in Nutmeg syrup products of 1,66 working hours/ year (10.16%).

The cultivation practices employed by Nutmeg farmers currently fall short of optimal standards, resulting in suboptimal production levels. It is imperative for farmers to prioritize the adoption of improved Nutmeg farming practices to enhance their production yields.

We propose that farmers explore value-added processing of Nutmeg into a range of products such as candied Pala, dodol, and jam. This diversification of product offerings has the potential to augment the income streams of Nutmeg farmers significantly.

Furthermore, future research endeavors may investigate the extent to which Nutmeg income contributes to the overall household income of Nutmeg farming households. This inquiry can shed light on the economic significance of Nutmeg farming within these households and inform strategies for income enhancement.

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