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The feasibility insights of organic rice farming from Central Java and Yogyakarta, Indonesia

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[2]Department of Agriculture and Plantation Central Java Province. Komplek Tarubudaya, Jl. Jenderal Gatot Subroto, Bandarjo, West Ungaran, Semarang 50517, Central Java, Indonesia
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Abstract. *Rozaki Z, Al Hadi SS, Rahmawati N, Triyono, Ardila RA, Pamungkas HW, Fathurrohman YE. 2025. The feasibility insights of organic rice farming from Central Java and Yogyakarta, Indonesia. Asian J Agric 9: 122-130.* Agricultural practices are increasingly moving towards environmentally friendly and health-conscious approaches, including organic rice farming. This is also supported by the increasing demand for organic rice among consumers who care about health and the environment. Therefore, this study aimed to evaluate the feasibility of organic rice farming in Yogyakarta and Central Java considering costs, income, profitability, and sustainability among 150 organic rice farmers randomly selected from five districts. The results showed that the average cost incurred for organic rice farming was IDR 11,832,023 per hectare per year, while the income generated reached IDR 14,943,216 per hectare per year. Based on the data, the net income of farmers was IDR 3,111,193 per hectare per year. The feasibility analysis using the R/C ratio showed a value of IDR 1.26, indicating that for every IDR 1.00 spent, farmers earn IDR 1.26, with a profit of IDR 0.26. This implies that organic rice farming is not only environmentally friendly but also financially feasible, with favorable cost-benefit ratios, as it reduces the costs incurred by farmers. In conclusion, the development of organic rice farming has great potential, specifically since consumers, through their demand for organic rice, play a crucial and influential role in its growth.

Keywords: Environmental issue, feasibility, organic farming, sustainability

INTRODUCTION

Organic farming is becoming increasingly popular and widely practiced across various agricultural commodities, including rice. Generally, rice is a staple food for the majority of the Indonesian population, making the presence of organic variety very important (Panjaitan et al. 2020; Bado et al. 2021). Organic rice is crucial in supporting more sustainable and environmentally friendly agricultural practices. It has many advantages compared to conventionally grown rice, including being safer for consumption due to the absence of pesticide residues, having a softer and smoother texture, a longer shelf life, and appearing whiter when cooked (Sujianto et al. 2022). The growing trend of health-conscious consumption has increased the demand for organic rice among the public (Rozaki et al. 2020).

The rising demand for organic rice motivates farmers to transition from conventional to organic farming (Yanakittkul and Aungvaravong 2020). However, this transition is not easy, as the non-usage of synthetic chemicals in organic rice farming requires considerable effort. Many farmers are shifting from conventional to organic farming, particularly in rice production on the island of Java, specifically in Central Java and Yogyakarta (Sujianto et al. 2022). This shift is not only due to the growing organic rice market but also deteriorating soil fertility due to excessive chemical use (Methamontri et al. 2022; Baird 2024). By adopting organic farming practices, farmers are confident to restore soil fertility or at least prevent further degradation (Bado et al. 2021). Organic farming is environmentally friendly and provides economic and social benefits to local communities. From a financial perspective, it provides a more stable income for farmers, helps maintain agricultural sustainability, and reduces community dependence on harmful chemicals.

The sustainability of organic rice farming is often evaluated based on the ability to provide economic, social, and ecological benefits (Bado et al. 2021; Bhatt and John 2023; Bottazzi et al. 2023). From an economic standpoint, the financial feasibility serves as an important indicator of whether this farming practice is self-sustaining in the long term (Nematollahi et al. 2021; Methamontri et al. 2022). Meanwhile, social and ecological benefits may take longer to fully realize, as soil recovery and environmental quality improvement processes require years (Lu and Cheng 2023).

Most farmers who practice organic rice farming rarely keep detailed records of production costs and seldom document the income received from sales (Seufert et al. 2023). Therefore, it is difficult to determine the actual costs and revenues from farming operations (David and Ardiansyah 2017). Many farmers have never calculated farming practices' revenue-cost (R/C) ratio, leading to unawareness of whether organic rice farming is financially viable (Indrasti et al. 2021).

Central Java and Yogyakarta are characterized by significant organic rice production compared to other areas in Indonesia (Rozaki et al. 2020; Apriyani et al. 2021). These two areas play an important role in supplying organic rice to local and national markets. With the support of various active farming groups and government and non-governmental organizations, sustainable farming practices are being developed. Moreover, many farmers in these areas are realizing the importance of restoring soil fertility through organic methods, specifically after the land has suffered degradation due to continuous chemical fertilizer use (Bado et al. 2021). Magelang District in Central Java is the area with the largest organic rice production in Indonesia (Provinsi Jateng 2024), underscoring the significant potential for organic rice development in Central Java and Yogyakarta. The fertile soil characteristics and favorable climate in this area are highly suitable for the growth of organic rice. The ease of access and the availability of data are also practical reasons supporting the selection of this area.

Therefore, this study aimed to address the gap in understanding the feasibility of organic rice farming, which has not been extensively explored. The main contribution is the provision of comprehensive data on the costs, income, and profits of organic rice farming in Central Java and Yogyakarta. The increasing demand for organic rice, supported by the (Wang 2023) study, is a testament to consumers' growing awareness of healthier and environmentally friendly lifestyles and their recognition of the long-term health benefits of organic rice. This study also emphasizes the importance of organic farming as a solution for preserving the environment and improving farmers' welfare. The significance lies in the ability to provide clear information to farmers about the feasibility of farming operations and promote the transition toward more sustainable agricultural practices.

MATERIALS AND METHODS

Study area

This study was conducted using a purposive or deliberate sampling method based on several considerations, such as the number of organic rice farmer groups, the size of organic rice farmland, and the availability of organic certification. The selected locations in Central Java Province, Indonesia, include three districts: Magelang District, Karanganyar District, and Sragen District. Meanwhile, in the Special Region of Yogyakarta Province, Indonesia, two districts were selected: Bantul and Sleman (Figure 1).

Sampling procedure and data collection

This study used a descriptive method, and data were collected through interviews using a questionnaire. The samples were selected using proportional stratified random sampling, where the areas were divided into five districts, and the sample size for each area was determined according to the proportion of households. The number of respondents was proportional to the number of households in each district, with 30 respondents per district, resulting in a total of 150. Data collection was focused on assessing the feasibility of organic rice farming in Central Java and the Special Region of Yogyakarta. Generally, the data collected includes farmer characteristics (age, education level, number of family members, farming experience) and all activities or inputs associated with the farming process, such as labor, fertilizers, seeds, agricultural tools, and other related aspects.

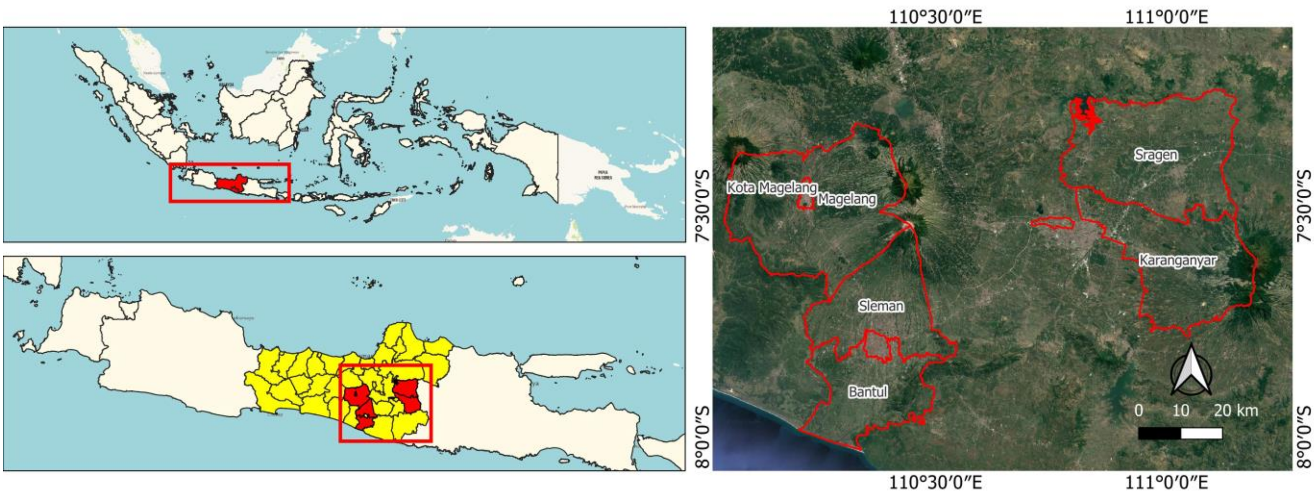

Figure 1. Study sites in Magelang, Karanganyar, and Sragen districts of Central Java Province, Indonesia and Bantul and Sleman districts of Special Region of Yogyakarta Province, Indonesia

Analytical technique

Data were analyzed using descriptive-analytical technique and the characteristics of the respondents were analyzed using percentages. Meanwhile, the feasibility of organic rice farming was assessed using the R/C ratio analysis, described as follows:

Cost analysis

TC= FC + VC

Where:
TC: Total Cost
FC: Fixed Cost
VC: Variable Cost

Revenue

TR= Y × Py

Where:
TR: Total Revenue
Y: Production Obtained
Py: Product Unit Price

Income

R= TR - TC

Where:
R: Revenue
TR: Total Revenue
TC: Total Cost

Revenue cost (R/C) ratio analysis

R/C= Total Revenue/Total Cost

Where:
Revenue: The Amount of Revenue Obtained
Cost: The amount of Costs Incurred

When the R/C ratio has a score greater than one, organic rice farming is considered feasible, but when the score is below one, it is deemed not feasible. The higher the value above one, the greater the feasibility of organic rice farming.

RESULTS AND DISCUSSION

Farmers characteristics

Age

According to Ackerl et al. (2016), age is the span of life or the period since a person is born and is measured in units of time or years. Age plays a crucial role in a person's decision-making ability, which directly contributes to work productivity and impacts the success of farming activities. Farmers within the productive age range tend to perform better compared to those who are no longer in the productive age bracket due to stronger physical abilities and broader perspectives. The productive age range was found to be between 15-64 years old.

Table 1 shows the age distribution of organic rice farmer respondents, with the majority (112 or 74.67%) falling within the productive age range of 15-64 years. Among farmers, there were 76 males and 36 females, showing the majority were still active in working and had the physical strength for farming. Meanwhile, 38 (25.33%) were over the age of 64, consisting of 34 males and four females. At this age, farmers are considered no longer physically productive. From this data, it can be concluded that the average age of organic rice farmers remains within the productive age range, with most respondents being male.

Education level

Education is a process of learning that enables an individual to develop potential and acquire necessary skills. It also plays a role in shaping the mindset, while the level of education refers to the formal stages that must be completed by a person based on the highest obtained diploma. Individuals with higher levels of education tend to have broader perspectives, both in terms of knowledge and insight (Etshekape et al. 2018; Guo et al. 2021; Baga et al. 2023).

Table 2 shows the educational achievements of organic rice farmers. Among the 150 farmers, 60 (40%) only completed 0-6 years of education, failing to continue schooling after elementary school. Additionally, 40 farmers (26.7%) received 7-9 years of education, equivalent to junior high school, and 46 (30.7%) completed 10-12 years of education, graduating from high school or an equivalent institution. Only 4 farmers (2.6%) had education beyond 12 years, reaching a level higher than senior high school. Therefore, a significant number of organic rice farmers have limited educational achievements, with the majority only completing 0-6 years of education. This may impact the method of conducting farming practices, including the understanding of organic farming techniques and the potential to improve agricultural yields. Education is crucial in enhancing farmers' skills and knowledge, which can influence agricultural success.

Table 1. Age

Age (years)	Gender		Total	Percent
	Male	Female		
15-64	76	36	112	74.67
>64	34	4	38	25.33
Total	110	40	150	100.00

Table 2. Education level

Duration of education (year)	Freq.	Percent
0-6	60	40.0
7-9	40	26.7
10-12	46	30.7
>12	4	2.6
Total	150	100.0

Table 3. Family dependents

Number of family dependents	Freq.	Percent
2	39	26.0
3	40	26.7
4	37	24.7
5	20	13.3
>5	14	9.3
Total	150	100.0

Table 4. Farming experience

Farming experience (years)	Freq.	Percent
0-7	15	10.0
8-14	20	13.3
>15	115	76.7
Total	150	100.0

Table 5. Land area of organic rice farmers

Land area (hectare)	Freq.	Percent.
<0.5	139	92.7
0.5-2	11	7.3
>2	0	0
Total	150	100

Table 6. Organic rice farmers land tenure

Land tenure	Total (ha)	Percent.
Own Land	22.7	60.2
Swap Land	13.7	36.3
Rental Land	1.3	3.5
Total	37.7	100

Number of family dependents

The number of dependents in a family consists of all members whose needs are supported by the head of the household (Ruhyana et al. 2020; Wulandari et al. 2021; Sulistyo et al. 2022). Family members may include fathers, mothers, children, siblings, or other individuals who are still dependent on the head of the household. The number of dependents can significantly influence household expenses and overall well-being (Utari et al. 2022P). Dependents represent farmers' responsibility for livelihood and significantly affect family income and expenses. Farmers with a larger number of dependents tend to have a greater availability of family labor.

Table 3 shows the number of family dependents of organic rice farmers. From the data, 39 farmers (26.0%) have two dependents, and 40 farmers (26.7%) have three. Additionally, 37 farmers (24.7%) have four dependents, 20 (13.3%) have five dependents, and 14 (9.3%) have more than five dependents. This shows that the majority of farmers have between 2 to 4 family dependents. Farmers with more dependents face challenges in meeting basic needs, such as education and healthcare, as well as greater risk regarding food security.

Farming experience

Farming experience can be categorized into three levels, namely inexperienced (less than 7 years), moderately experienced (8-14 years), and experienced (more than 15 years) (Triyono et al. 2021; Methamontri et al. 2022). Table 4 shows the distribution of organic rice farmers based on their experience level. Among the respondents, 15 (10%) fall into the category of less experienced (0-7 years), while 20 farmers (13.3%) were classified as moderately experienced (8-14 years). The majority, namely 115 farmers (76.7%), were in the experienced category (more than 15 years). Therefore, most farmers were considered experienced in organic rice farming. Farmers with more than 15 years of experience have typically faced various challenges, such as weather changes, pests, and plant diseases, and have developed strategies to address these issues. The expertise possessed enables a better understanding of agricultural practices and the application of techniques that can enhance productivity as well as the sustainability of farming enterprises.

Land area

According to Nkomoki et al. (2019) and Santoso et al. (2023), the area of farmland owned by farmer groups can be classified into three categories: large-scale (owning more than 2 hectares), medium-scale (owning 0.5 to 2 hectares), and small-scale (owning less than 0.5 hectares).

Table 5 shows that 139 farmers (92.7%) have small landholdings (less than 0.5 hectares), while 11 (7.3%) have moderate-sized landholdings (0.5 to 2 hectares). Specifically, no farmers (0%) were categorized as having large landholdings (more than 2 hectares). This data underscores the prevalence of small landholdings among organic rice farmers, with 139 managing less than 0.5 hectares. The limited land can significantly influence farming practices. However, by implementing good soil management and embracing sustainable farming techniques, small-scale farmers can play a crucial role in producing healthy and high-quality organic food, all while preserving environmental sustainability. This highlights the responsibility and commitment of farmers to maintain good soil health for sustainable farming practices.

Land tenure

Land tenure is classified into two main categories, namely owned and not owned. Ownership refers to the hereditary rights that an individual has over a piece of land. Non-owned land tenure represents a temporary form of possession, entailing the transfer of cultivation rights from the landowner to another party. Tenure arrangements based on profit-sharing have positive effects on production but can also contribute negatively to risks (Rokhani et al. 2020; Achmad et al. 2022; Rao et al. 2022).

As shown in Table 6, organic rice farmers own 22.7 hectares of land, accounting for 60.2% of the total. Possessing individual land implies that there is no need to pay rent, thereby increasing agricultural profits. Farmers cultivate 13.7 hectares, or 36.3%, of land through sharecropping or using land owned by others without rental costs. In sharecropping, farmers can manage land belonging to another individual in exchange for a share of the harvest or profits. This system is beneficial as it facilitates larger areas of cultivation without incurring costs to purchase land. Meanwhile, those who rent land occupy 1.3 hectares, contributing 3.5%. This rental system is considered less favorable because farmers must adhere to certain rules set by the landowners, which can limit farming methods used. Renting land can also be a financial burden, specifically when the rental costs are relatively high. Therefore, on average, organic rice farmers own individual land for farming. With more farmers managing personal land, there is a significant opportunity to increase organic rice production in the area, thereby supporting environmental sustainability.

Cost

Farming input cost

Production costs refer to the expenses incurred during the production process before yielding a product. These costs include production inputs such as fertilizers, pesticides, seeds, labor, and equipment depreciation Hartono et al. (2019). According to Table 7, the production costs for organic rice farming include IDR 3,047,462 for seeds, which is a significant expense as high-quality seeds can improve crop yields and ensure healthy plant growth. There was also an expenditure of IDR 2,270,752 for animal manure, which is a good source of nutrients for plants as it helps enhance soil fertility. Approximately IDR 54,050 was spent on solid organic fertilizer, for improving soil structure and water retention. At the same time, IDR 46,021 was allocated for liquid organic fertilizer to provide direct nutrition for plants and increase the availability of nutrients. Finally, IDR 103,635 was spent on organic pesticides to control pests and diseases without harming the environment or endangering human health. The highest facility cost in organic rice farming was associated with seed purchases. The proper use of inputs and costs is a factor in achieving optimal productivity in organic rice farming.

Labor

Labor costs refer to the specific expenses paid to workers in the production segment (Resdiana 2022). These costs are divided into two categories, namely family labor (using labor from within the family) and external labor (hiring workers from outside). In addition to human labor costs, labor expenses also include machinery costs incurred for each production cycle. Organic rice farmers still heavily rely on labor, specifically from within the family, as it can reduce the costs incurred. As shown in Table 8, the total family labor was 111,040 days. In comparison, 32,111 days of labor were attributed to external sources outside the family, with the highest requirement occurring during the harvest season, amounting to IDR 1,537,218. This shows that although farmers use labor outside the family, there is a significant dependence on family labor to carry out most agricultural activities.

Depreciation cost

Depreciation costs for agricultural equipment refer to the expenses incurred for the tools used, calculated in Indonesian Rupiah (IDR) per year. The amount of depreciation for agricultural equipment was determined using the straight-line method. The salvage value is the worth of the equipment at the point it can no longer be used or considered to be zero (Nurmala et al. 2017). Table 9 shows that the depreciation costs of agricultural tools include hoe IDR 24,052 (11.21%), sickle IDR 12,233 (5.70%), sprayer IDR 7,587 (3.54%), scale IDR 4,158 (1.94%), shovel IDR 4,145 (1.93%), rake IDR 2,130 (0.99%), tractor IDR 158,596 (73.92%), and other harvesting tools IDR 1,661 (0.77%). Therefore, it can be concluded that the tractor, a crucial tool in farming, has the highest depreciation cost compared to other agricultural tools, amounting to IDR 158,596. This reflects the tractor's importance and the high maintenance costs associated with farming activities.

Table 7. Average of input cost per year

Description	Unit (Kg)	Price/Unit (IDR)	Total (IDR)
Seeds	102.36	29,772	3,047,462
Fertilizer			
a. Manure Fertilizer (kg)	2,674.62	849	2,270,752
b. Solid Organic (kg)	360.33	150	54,050
c. Liquid Organic (Liter)	114.48	402	46,021
Pesticide			
a. Organic (kg)	2.55	40,641	103,635
Total			5,521,919

Table 8. Average of labor cost per year

Description	Average Human Labor			Machine (IDR)	Total (IDR)
	Fam. Lab. (WH)	Non-Fam. Lab. (WH)	Total (IDR)		
Land Processing	5,550	274.56	951,000	1,206,936	2,157,936
Planting	1,876.95	2200.77	1,008,951	19,089	1,028,040
Weed Clearing	44,654.34	128.67	96,621	762	97,383
Harvest	15,773.34	28123.86	1,305,756	231,462	1,537,218
Post - Harvest	28,710.45	443.58	61,023	0	61,023
Transport	14,475.39	939.24	79,860	46,032	125,892
Total	111,040	32,111	3,503,211	1,504,281	5,007,492

Note: WH: Working Hour

Table 9. Average of depreciation cost per year

Types of farm tools	Depreciation costs (IDR)	Percentage (%)
Hoes	24,052	11.20
Sickle	12,233	5.70
Sprayer	7,587	3.54
Scales	4,158	1.94
Shovels	4,145	1.93
Rakes	2,130	0.99
Tractor	158,596	73.92
Harvesting equipment	1,661	0.77
Total	214,562	100.00

Table 10. Other cost

Cost types	Total (IDR)	Percent
Land tax	45,061	4.36
Certification fee	550,847	53.36
Farmer group membership fee	32,525	3.15
Land rent	282,231	27.34
Farm equipment repair	121,694	11.79
Total	1,032,358	100.00

Table 11. Average of revenue per year

Revenue	Total
Production (Kg)	1,530.44
Price (IDR)	9,764
Total	14,943,216

Table 12. Average of on-farm income per year

Description	Total (IDR)
Revenue (A)	14,943,216
Costs:	
Farming	5,521,919
Labor	5,007,492
Tool depreciation	214,562
Other costs	1,032,358
Total cost (B)	11,832,023
Income (A-B)	3,111,193

Table 13. Average non-farm income per year

Non-farm income	Total (IDR)	Percent
Breeders	2,538,384	15.20
Trade	3,115,152	18.66
Laborer	6,618,586	39.64
Odd jobs	727,273	4.36
Pensions	484,848	2.90
Employee	1,236,364	7.40
Services	1,975,758	11.83
Total	16,696,364	100.00

Other cost

The last component of expenses is categorized as other costs, which include land tax, certification fees, membership fees for farmer groups, land rental, agricultural equipment repairs, loan interest, and transportation costs incurred by farmers over a year (Susanawati et al. 2021). Table 10 shows that the various costs incurred by farmers include taxes IDR 45,061 (4.36%), certification IDR 550,847 (53.36%), membership fees for farmer groups IDR 282,231 (27.34%), and land rental IDR 121,694 (11.79%). Therefore, the largest cost faced is certification, reflecting the importance of accreditation in maintaining organic farming standards. Certified organic farms can enhance consumer trust, meet quality standards, and improve access to broader markets.

Revenue

Farmers aim to achieve high production yields in farming activities (Rahayu et al. 2019). When rice harvest is abundant, a portion of the yield will be sold, but when the harvest is not substantial, all will be consumed by the household. Table 11 shows the average physical production achieved over one year, totaling 1,530.44 kg, with each kilogram of rice sold at an average price of IDR 9,764. Therefore, the total income generated amounted to IDR 14,943,216. Farmers' income is significantly influenced by the quantity of production and the selling price of rice per kilogram; hence, the higher the production and selling price, the greater the income.

Income

On farm income. Farm income is the difference between revenue and all costs, is a testament to the resilience and dedication of organic rice farmers. The total funding divided by gross income reflects the overall production value before deducting production costs (Sin et al. 2023). Table 12 shows that the production value achieved by organic rice farmers over one year was IDR 14,943,216, with total costs amounting to IDR 11,705,461. This includes agricultural costs IDR 5,521,919, labor IDR 5,007,492, depreciation IDR 214,562 and other expenses IDR 1,032,358. After all costs were deducted from the total revenue, organic rice farmers obtained a net income of IDR 3,293,447. This shows that, despite the various costs incurred, farmers still profit substantially from organic farming efforts.

Non-farm income. Income outside of farming refers to additional earnings obtained from work unrelated to farming activities. When a farmer has supplementary income from sources other than farming, it is referred to as off-farm income. Table 13 shows the average off-farm income earned by farmers over one year including livestock farming IDR 2,538,834 (15.20%), trade IDR 3,115,152 (18.66%), labor IDR 6,618,586 (39.64%), odd jobs IDR 727,273 (4.36%), pensions IDR 484,848 (2.90%), employment IDR 1,236,364 (7.40%), and services IDR 1,975,758 (11.83%), Therefore, the largest off-farm income was from labor, which totaled IDR6,618,586.

Table 14. Average total income of organic rice farmers per year

Revenue	Value (IDR)	Percentage (%)
Farming (Organic Rice)	3,111,193	15.71
Non-farm	16,696,364	84.29
Total	19,807,557	100.00

Total income. Total income is the sum of yield from agricultural and non-agricultural activities (Ruhyana et al. 2020; Santoso et al. 2023). According to a previous study, the total income of a farmer is the sum of all agricultural and non-agricultural ventures undertaken (Abadega 2021; Sulistyo et al. 2022). Table 14 shows that the total income earned by organic rice farmers in one year was IDR 19,807,557, coming from agricultural and non-agricultural activities, IDR 3,111,193 and IDR 16,696,364, respectively. This shows that farmers earn significantly more from non-agricultural sources than agricultural activities, underscoring the importance of income diversification, as it can help improve economic well-being. Although agriculture is the primary source of income, additional income from other activities is crucial in supporting daily living expenses.

R/C analysis

The analysis of agricultural feasibility aims to determine whether a farming venture is worth pursuing. The feasibility of organic rice farming was calculated using the R/C ratio, which shows the relationship between the income generated and the total costs incurred. Based on the results, the obtained R/C ratio was 1.26, showing that for every IDR 1.00 spent on production costs, farmers will receive a profit of IDR 1.26, resulting in a profit of IDR 0.26. A higher R/C value signifies greater profitability. This high R/C ratio signifies the profitability of organic rice farming, providing reassurance and confidence to farmers and investors (Indrasti et al. 2021).

Discussion

Organic rice farming is economically promising. Farmers can earn a net income of IDR3,111.193 per hectare per year, with an average cost of IDR 11,832,023 per hectare per year and a gross income of IDR 14,943,216 per hectare per year, indicating an income of IDR 1.26 for every IDR 1.00 spent. This R/C ratio not only shows the feasibility of organic rice farming but also instills confidence in its potential for further development. The growing public awareness of the importance of consuming organic food further supports this potential.

The demographic profile of the respondents supports the sustainability of organic farming. Strong physical ability is important for farming activities; hence, most farmers (74.67%) were within the productive age range of 15-64 years. Although only 40% completed six years of schooling, this does not necessarily prevent farmers from adopting new farming techniques. The condition underscores the importance of educational programs that improve farmers' skills and knowledge about organic farming practices. Sustainable farming practices can enhance environmental quality and maintain land conditions. Furthermore, organic farming improves soil and the overall ecosystem by reducing harmful chemicals. Government support in education and input assistance, such as seeds and fertilizers, is crucial for empowering farmers to continue practicing organic farming.

Among the respondents, there were different levels of family dependents: 26% had two, 27% had three, 25% had four, and 22% had five or more. Many families rely heavily on farm income to meet daily needs. Hence, farmers with many dependents often prioritize sustainable farming practices to ensure a steady income. Additionally, this study shows that small-scale farming dominates, with nine out of ten farmers (92.7%) owning less than half a hectare of land. Despite the limited land, small-scale farmers can produce high-quality organic crops while contributing to environmental conservation by applying sustainable techniques; through their high-quality organic crops and sustainable techniques, they make a significant contribution to environmental conservation. Land ownership also plays an important role, as 60.2% of the surveyed land is privately owned, providing stability and control over resource use. This arrangement promotes responsible land management and facilitates continued investment in sustainable farming practices.

The results are in line with previous studies underscoring the economic feasibility of organic rice farming. For example (Panjaitan et al. 2020; Bado et al. 2021) showed similar profit margins. Similarly, Rozaki et al. (2020) found increased consumer demand for organic products, emphasizing the importance of sustainable farming practices. Studies focusing on the socio-economic implications of transitioning to organic farming also support the results. Bado et al. (2021) and Panjaitan et al. (2020) discussed soil fertility restoration through organic methods, underscoring environmental benefits. Lu and Cheng (2023) also emphasized the long-term ecological benefits of sustainable farming practices in Ecological Applications, reinforcing the observations about the sustainability of organic rice farming.

In this study, the production costs of organic rice farming were analyzed to identify the potential cost saving for farmers. A study by Dat et al. (2023) found that the average production cost for non-organic farming is IDR 19,994,600 per hectare. In contrast, our findings show that the average production cost for organic rice farming is IDR 10,646,915 per hectare. This indicates that farmers using organic methods can save around IDR 9,347,655 per hectare compared to non-organic methods. Although the initial costs of organic farming may be higher due to the use of organic inputs, in the long term, farmers can achieve significant cost savings by reducing the use of chemical fertilizers and pesticides. Therefore, this comparison confirms that organic rice farming offers greater economic benefits for farmers in the long run.

This study shows that organic rice farming in Central Java and Yogyakarta has positive economic feasibility. However, it is important to delve deeper into the implications and limitations associated with the feasibility. One significant implication of the results is the potential for increased income in transitioning to organic farming. Although the results show promising outcomes, challenges such as market price fluctuations and weather uncertainties must be considered. Limitations in farmers' knowledge and skills regarding organic farming practices could hinder the effective implementation of this method. Further studies are needed to understand how social and economic factors may influence the success of organic rice farming, as well as how support from the government and related institutions can help overcome existing challenges.

The connection between the results on the feasibility of organic rice farming and the broader literature on sustainability policies needs to be strengthened. This study shows that organic rice farming in Central Java and Yogyakarta is not only economically viable but also contributes to environmental sustainability. In this context, the results are in line with previous studies emphasizing the importance of sustainable agricultural practices in supporting food security and preserving ecosystems. By integrating these results into broader agricultural policies, governments, and stakeholders can formulate more effective strategies to promote the adoption of organic farming practices. This would help raise public awareness about the benefits of organic agriculture while promoting investment and support for farmers transitioning to more environmentally friendly farming systems.

This study shows the benefits of transitioning to organic rice farming in Central Java and Yogyakarta. The results show economic feasibility and sustainable farming practices that support environmental preservation as well as improve farmer welfare. It is important to engage all stakeholders in developing these practices. Further studies are needed to create more comprehensive strategies for supporting farmers. With collaboration between farmers, the government, and academics, organic rice farming can continue to grow and positively contribute to healthy food production as well as environmentally friendly agriculture. Therefore, to ensure successful implementation, concrete recommendations are needed from policymakers. First, the government should provide incentives for farmers transitioning to organic farming practices, such as subsidies for purchasing organic inputs and access to training on sustainable farming techniques. Second, a better marketing network for organic rice products should be established to help farmers reach consumers more effectively. Another recommendation is to increase public awareness of the benefits of organic rice through educational campaigns, which can help drive market demand. Finally, there is a need to acquaint farmers with modern technologies, such as digital platforms, to help record and analyze financial data, as well as innovation capabilities to increase agricultural yields with reduced costs.

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