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Comparison Of Income From Organic Rice And Non-Organic Farming In Dukuh Village, Delanggu District, Klaten Regency

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Abstract

Organic rice cultivation is a cultivation using organic materials or natural materials that can be renewed as input so that products are produced that are free from chemicals that are harmful to health and ecosystem balance. While the pesticides used are botanical pesticides. The application of organic systems in addition to restoring the soil agro-ecosystem can also increase farm income. The purpose of this study was to determine the amount of income and costs of organic and non-organic rice farming with the same variety in Dukuh Village, Delanggu District. The analytical tools used were cost analysis, income analysis and t-test. The conclusion of the study can be concluded that the costs incurred by farmers for organic rice farming are greater than non-organic rice farming, but the income of organic farmers is greater than that of non-organic farmers. This is shown from the results of the calculation showing an average organic rice farming income of IDR 30,482,568.2 per hectare, while the farm income from the calculation results shows that the income of non-organic rice farming is IDR 21,114,381.9 per hectare. The results of statistical tests show a significant difference. Income from organic rice farming is greater than income from farming with a non-organic rice system.

Keywords: income, rice,organic,farming

Introduction

Indonesia is an agricultural country because most of its population works in the agricultural sector and its economy depends on this sector. The agricultural sector, especially food crops, especially rice, is a commodity that has high value and as a strategic commodity, until now it still plays an important role in the economy. Because most of the Indonesian population consumes rice as a staple food. Sectorally, the agricultural sector consists of the food crop sub-sector, plantations, livestock sub-sector, fisheries sub-sector and forestry sub-sector. Among the food crop sub-sectors, especially rice is the basis of life for the community (Magfira et al., 2020)

According to Sutrisno in (Rahayu et al., 2015) stated that with the increasing population of Indonesia, the need for rice in Indonesia continues to increase. However, this cannot increase food production and farmers' income in real terms. This mode provides a new idea which then gave birth to the green revolution. The green revolution is the use of chemicals such as fertilizers, pesticides and herbicides with the aim of increasing food production. With the green revolution, Indonesia achieved rice self-

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sufficiency. However, along with the progress of the green revolution, it also has negative impacts including:

1. High dependence of farmers on chemical fertilizers, chemical pesticides and chemical herbicides.
2. Damaged land or decreased fertility due to the continuous use of chemicals in high doses.
3. Water and environmental pollution.
4. Threatened human and animal health due to the presence of pesticide residues in rice food products consumed.
5. Explosion of plant pests (OPT).
6. Production costs are very high.

Realizing these negative impacts, it requires a very important and big idea about quality food production and being able to increase farmers' income. Farmers are beginning to be invited to create and understand sustainable food production conditions and agricultural patterns. This means that the farming business continues to be sustainable without decreasing in quality, is rich in nutrition, healthy and generates sufficient income for farmers' lives.

The organic farming system is a sustainable farming system that was born as an alternative solution to improve the conditions of farmers and the environment. Official world institutions such as the International Federation of Organic Agriculture Movement (IFOAM) define organic farming as a process of producing food and fiber that is carried out in ways that are socially acceptable, economically profitable and sustainable in agro-ecosystems.

Organic rice cultivation is a cultivation system that uses organic materials or materials from natural inputs so that the output produced is free from chemicals that can endanger the health of organisms and the balance of the ecosystem, while the pesticides used are plant pesticides. The application of the organic farming system in addition to restoring the condition of the soil agro-ecosystem can also increase the efficiency of farming efforts, namely reducing the production costs of fertilizers and pesticides from the nature around farmers.

Pesticide residues in rice food products consumed.

1. Explosion of plant pests (OPT).
2. Very high production costs.

Realizing these negative impacts, it is necessary to have a very important and big idea about quality food production and being able to increase farmers' income. Farmers are starting to be invited to create and understand the conditions of food production and sustainable agricultural patterns. This means that the farming business continues to be sustainable without decreasing in quality, is rich in nutrition, healthy and generates sufficient income for farmers' lives.

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botanical pesticides. The application of an organic farming system, in addition to restoring the condition of the soil agro-ecosystem, can also increase the efficiency of farming efforts, namely by reducing the production costs of fertilizers and pesticides originating from the natural environment around farmers.

The government and farmers need to make an effort to realize sustainable food production, especially rice which is the staple food of most Indonesian people. Klaten Regency is one of the rice center areas in Central Java province which has great potential. This rice potential is shown by the production and land area which generally increases from year to year. Delanggu District is one of the districts in Klaten Regency which has the potential for rice production. The harvest area fluctuates, because the success of farming is influenced by many factors, this is because the government always provides new technology that aims to increase production and productivity. The technology that reaches farmers includes, BLBU (Direct Assistance for Superior Seeds), POC (Liquid Organic Fertilizer) assistance, pumping assistance, agricultural machinery assistance, OPIP (Optimization of Planting Index Improvement), Sustainable Food Agricultural Land Protection (LP2B) and conservation and rehabilitation of agricultural land.

Based on the description above, there needs to be an effort at the farmer level in Delanggu District and the government, especially the Food Security and Agriculture Service, in developing environmentally friendly agriculture, one of the programs of the Food Security and Agriculture Service is Gelora nonik (a movement to step or not to forget to add organic). In Dukuh Village, Delanggu District, there is a rice field area of 88.59 ha. Organic and non-organic farming is the focus because income from organic and non-organic rice cultivation is the main source of income for farmers, bringing financial benefits to farmers and their families.

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Method

This research was conducted in Dukuh Village, Delanggu District. The research location was chosen intentionally (purposive). This research uses primary data and secondary data. Primary data was obtained from sample farmers while secondary data was obtained from related agencies such as the Dukuh Village Hall Government and the Klaten Regency Food Security and Agriculture Service.

The population in this study was divided into two, namely farmers who cultivate rice organically consisting of 4 people and farmers who cultivate rice non-organically 15 people. The data analysis method used in this study is a systematic process to process, interpret, and describe data to produce valuable conclusions. Among them are Cost Analysis, Income Analysis, Revenue/Cost Analysis, and Paired Sample T-Test.

RESULT AND DISCUSSION

This study was conducted on farmers who do organic and non-organic rice farming in Dukuh Village, Delanggu District, Klaten Regency. The study was conducted with two treatments, namely farmers who do organic rice farming and the other treatment is farmers who do non-organic rice farming. The research sample consisted of 4 respondents who did organic rice farming and 15 respondents who did non-organic rice farming. This shows that most farmers still plant non-organic rice.

Production

The discussion of this research covers the results of organic and non-organic rice farming. In the discussion of the results of this study, rice production that has become rice. Farmers in Dukuh Village have been cultivating organic plants for more than 10 years. The process of cultivating organic farmers has stages.

- First land preparation
- Land processing is done to loosen the soil and eradicate weeds. In land processing, organic fertilizer is given as a base fertilizer that functions to provide nutrients before planting.
- Seeding

  Before the seeds are spread, they are soaked. This serves to find out which ones are full and which ones are not. In addition, it also functions to stimulate germination. After soaking for approximately 24 hours, the seeds are spread on the beds that have been processed and loosened. After that, they are covered with thin soil and watered regularly to maintain humidity.

• Planting

Seedlings are planted when the seedlings are approximately 10 days after planting. Planting is done using a tile system with a distance of 25x25 and each planting hole has 1-3 seedlings.

• Rice care

Irrigation

In irrigation, plants are irrigated intermittently. In irrigation before entering the field, the water is filtered first by making a pond approximately the size of a small pond that is given water hyacinth to filter the water from chemical residues. Although in general rice needs water, there are times when rice plants also need to be dried.

Fertilization

The first fertilization at the age of approximately 1 to 2 weeks after planting with organic solid fertilizer.

The second fertilization at the age of 25-60 days with a frequency of once a week at least 4 times spraying. The fertilizer applied uses liquid organic fertilizer, the dose given is 200cc of liquid organic fertilizer dissolved in 15 liters of water. The application method is by spraying it on the leaves of the plant.

Weeding

Weeding is done using a human power system (hand weeding) and with a special tool in the form of a gasrok. Initial weeding of weeds is done 21 days after planting, subsequent weeding is based on weed density.

Pest and disease control

In plants Pest and disease control is carried out by implementing the concept of integrated pest control. Organic rice pest and disease control is carried out in an integrated manner and the use of traps or bait, and organic pesticides. Organic

pesticides are pesticides whose basic ingredients come from plants. Organic pesticides are relatively easy to make using materials around us.

• Harvest and post-harvest

When the grain has turned 80% yellow and the stalk has bowed, it is a sign that it is ready to harvest. After harvesting, it is put into sacks. After that, threshing is carried out. After threshing, the grain is dried on a clean floor with a thickness of approximately 5-7 cm with turning every 2 hours until the water content is less than 14%. Before milling, the newly dried paddy is aired first to avoid broken grains. The first milling process breaks the skin and then processes it into rice.

In this study, researchers used data on the production of paddy that had been converted into rice with an organic rice planting system, namely using jajar legowo planting, while the non-organic rice planting system used a tegel or regular system. The average land area used for organic rice farming is 0.295 hectares and for non-organic farming is 0.257 hectares. Then the average rice production produced by organic farmers is 3,304.5 kg/hectare and for non-organic it is 3,372 kg/hectare. The organic and non-organic rice production data experienced a slight decrease in the amount of production caused by attacks by rat pests and quite high rainfall resulting in POPT attacks. For more details, production data can be seen in tables 1 and 2.

Table 1. Organic rice production data for Dukuh Village, Delanggu District

Number	Land Area (hectare)	Rice Production (kg)	Rice Production (kg/hectare)
1	0.6	1925	3.208
2	0.21	575	2.738
3	0.15	615	4.100
4	0.22	698	3.172
Amount	1,18	3.813	13.218
Average	0.295	953,25	3.304,5

Table 2. Data on non-organic rice production in Dukuh Village, Delanggu District

Number	Land Area (hectare)	Rice Production (kg)	Rice Production (kg/hectare)
1	0.18	595	3.305
2	0.4	1193	2.982
3	0.32	1118	3.493
4	0.42	1217	2.897
5	0.22	630	2.863
6	0.22	613	2.786
7	0.25	832	3.328
8	0.26	945	3.634
9	0.2	638	3.190
10	0.19	697	3.668
11	0.25	880	3.520
12	0.23	907	3.943
13	0.24	897	3.737
14	0.25	825	3.300
15	0.23	905	3.934
Amount	3,86	12.892	50.586
Average	0.257	859,466	3.372

Production costs

Organic and non-organic rice farming requires production costs consisting of land rental costs, seed costs, fertilizer costs, pesticide costs, post-harvest costs, milling costs and labor costs including land processing, planting and maintenance costs. The average production cost of organic rice farming is Rp22,901,843.84 and the cost of non-organic production is Rp21,242,530.31 as seen in Tables 3 and 4.

Table 3. Production costs of organic rice farming in Dukuh village, Delanggu sub-district

Number.	Production Factors	Average (Rp/hectare)
1	Rent land	4.660.173,2
2	Labor	
	a. Land Cultivation	3.408.360
	b. Seeding and planting	2,194.724,12
	c. Maintenance	3.312.906,14
3	Irrigation	986.742,4
4	Production facilities	
	a. Seed	565.642,9
	b. Liquid organic fertilizer	546.915,6
	c. Solid organic fertilizer	2.571.645,02
	e. Natural Pesticide	82.575,76
5	Post Harvest	
	a. Harvesting	1.756.223
	b. Threshing	825.216,5
	c. Driying	1.282.468
	d. Milling	1.295.643
6	Transportation	399.350,6
	Total production costs	22.901.843,84

Tabel 4. Biaya produksi usaha tani padi non organik di desa Dukuh kecamatan Delanggu

No.	Faktor Produksi	Rata-rata (Rp/ha)
1	Sewa lahan	3.922.135,41
2	Tenaga Kerja	
	a. Pengolahan Tanah	3.689.836
	b. Persemaian dan Tanam	2.558.249
	c. Pemeliharaan	2.907.368
3	Pengairan	727.613,7
4	Sarana produksi	
	a. Benih	635.819,9
	b. Pupuk Urea	719.065,4
	c. Pupuk NPK	880.285,5
	d. Pestisida	778.813,3
5	Pasca Panen	
	a. Pemanenan	2.200.515,9
	b. Perontokan	728.202,2
	c. Pengeringan	1.083.798,5
	d. Penggilingan	1.802.700,2
6	Transportasi	410.827
	Total Biaya produksi	21,242.530,31

Income

Farmers' income is obtained from the sale of organic and non-organic rice. The amount of income of organic and non-organic rice farmers can be seen in tables 5 and 6. The selling price of organic rice is IDR 16,500 per kilogram, while the selling price of non-organic rice is IDR 13,200 per kilogram. Farmers who use organic rice have an average income of IDR 54,524,250 per hectare, while farmers who use non-organic rice have an average of IDR 44,513,361 per hectare. This difference shows that organic rice farming is more productive than non-organic rice.

Table 5. Farmers' income from non-organic rice farming in Dukuh Village, Delanggu District

Number	Production (kg)	Price/ kg	Reception (Rp)
1	3.208	16.500	52.932.000
2	2.738	16.500	45.177.000
3	4.100	16.500	67.650.000
4	3.172	16.500	52.338.000
Amount	13.218	66.000	218.097.000
Average	3.304,5	16.500	54.524.250

Table 6. Farmers' income from non-organic rice farming in Dukuh Village, Delanggu District

Number	Production (kg)	Price/ kg	Reception (Rp)
1	3.305	13.200	43.626.000
2	2.982	13.200	39.369.000
3	3.493	13.200	46.117.500
4	2.897	13.200	38.240.400
5	2.863	13.200	37.800.000
6	2.786	13.200	36.780.000
7	3.328	13.200	43.929.600
8	3.634	13.200	47.976.923
9	3.190	13.200	42.108.000
10	3.668	13.200	48.417.600
11	3.520	13.200	46.464.000
12	3.943	13.200	52.047.600
13	3.737	13.200	49.335.000
14	3.300	13.200	43.560.000
15	3.934	13.200	51.928.800
Amount	50.586	198.000	667.700.423
Average	3.372	13.200	44.513.361

Income

One indicator of a successful farming business is the amount of income earned by farmers. The income is obtained from the results of the receipts then reduced by the production costs. Based on table 7 below, it is known that the average income of organic rice is Rp. 30,482,568 and for non-organic rice is Rp. 21,114,381. Overall, the amount of income obtained based on the results of the farming business analysis shows that there is a clear picture of the potential for increasing efficiency and productivity of the business in the future..

Table 7 . Organic and non-organic rice income in Dukuh Village

No	Organic rice			Non Organic rice		
	Reception (Rp)	Total cost (Rp)	income (Rp)	Reception (Rp)	Total cost (Rp)	Income (Rp)
1	52.932.000	21.809.166	31.122.833	43.626.000	26.883.722	16.742.277
2	45.177.000	24.308.333	20.868.666	39.369.000	21.426.875	17.942.125
3	67.650.000	28.689.000	38.961.000	46.117.500	21.924.687	24.192.812
4	52.338.000	21.360.227	30.977.772	38.240.400	19.774.821	18.465.578
5	-	-	-	37.800.000	24.020.818	13.779.181
6	-	-	-	36.780.000	23.199.545	13.580.454
7	-	-	-	43.929.600	22.119.100	21.810.500
8	-	-	-	47.976.923	22.378.461	25.598.461
9	-	-	-	42.108.000	22.946.250	19.161.750
10	-	-	-	48.417.600	24.573.684	23.843.915
11	-	-	-	46.464.000	23.622.000	22.842.000
12	-	-	-	52.047.600	27.140.217	24.907.382
13	-	-	-	49.335.000	20.701.041	28.633.958
14	-	-	-	43.560.000	24.202.600	19.357.400
15	-	-	-	51.928.800	26.070.869	25.857.930
Amount	218.097.000	96.166.727	121.930.273	667.700.423	350.984.694	316.715.729
Average	54.524.250	24.041.681	30.482.568	44.513.361	23.398.979	21.114.381

Hypothesis Test

a. Rice Farming Efficiency Analysis

In an effort to increase agricultural productivity and sustainability, it is necessary to conduct an analysis of rice farming efficiency. This analysis is carried out by measuring and evaluating various factors such as the use of agricultural input data in the form of fertilizers, seeds, pesticides, then data on the number of workers, and data on the technology used. From these data, farmers can determine the extent to which their farming has utilized resources optimally. The use of this analysis method can also help identify sources of inefficiency that are used to provide recommendations for improvement. Thus, efficiency analysis not only aims to increase yields, but can also reduce production costs and environmental impacts, and improve the welfare of farmers as a whole. Based on table 8, it is known that the average R/C ratio of organic rice farming is 2.28 while the R/C ratio of non-organic rice farming is 1.91. These data show that organic rice farming is more efficient than non-organic rice farming.

Table 8. Comparative analysis of the efficiency of organic and non-organic rice farming in Dukuh Village

Number	R/C Organic rice ratio (Rp)	R/C non organic rice ratio (Rp)
1	2,43	1,62
2	1,86	1,84
3	2,36	2,10
4	2,45	1,93
5	-	1,57
6	-	1,59
7	-	1,99
8	-	2,14
9	-	1,84
10	-	1,97
11	-	1,96
12	-	1,92
13	-	2,38
14	-	1,79
15	-	1,99
Amount	9,10	28,63
Avarage	2,28	1,91

b. Comparison Test of Rice Farmers' Income

Hypothesis testing using the t-test in the analysis of farm income is a statistical method that aims to evaluate whether there is a significant difference between the average income generated by organic and non-organic rice. This process involves collecting income data from each type of business, calculating the average and standard deviation, and testing the null hypothesis (H0) which states that there is no significant difference between the average income of the two. The results of this t-test can provide valuable insights for farmers and policy makers in determining strategies to increase income and efficiency of farming businesses. The results of the t-test in this study can be seen in table 18, where a real difference was found because α was less than 0.05, which was 0.028, meaning that there was a real difference in organic and non-organic rice income in farming businesses in Dukuh Village, Delanggu District, Klaten Regency. For more details, see table 9.

Table 9. Paired T-test of organic and non-organic rice in Dukuh Village, Delanggu District

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Padi_Organik - Padi_Non_Organik	11.14750	5.56643	2.78321	2.29008	20.00492	4.005	3	.028

Conclusion

This study provides conclusions based on the results of the analysis of farm income. The results of the analysis show that there is a significant difference in the income of organic rice farming compared to the income of non-organic rice farming. Although it requires higher input costs at the beginning of the business, the final results of the business on organic rice tend to be more stable and increase along with the increasing number of demands in the organic food product market. And for non-organic farming production, although the initial costs incurred tend to be lower, it faces challenges with fluctuating selling prices and has long-term health risks due to the use of pesticides and synthetic chemicals. So it can be concluded that organic rice farming has the potential for higher income and a positive impact on the environment and health in the long term. This can also be an important consideration for farmers to choose the right and sustainable farming methods.

The development of organic rice farming can increase the income of rice farmers in Dukuh Village, Delanggu District, Delanggu Regency, therefore organic rice farming should be maintained and further developed by local farmers. However, to facilitate the development of the organic rice farming system, the facilities and infrastructure needed by farmers should be equipped. In addition, the independence and ability of farmers in making inputs such as fertilizers need to be further improved so that farmers' dependence on others can be reduced. Therefore, counseling from the government (Agricultural Service) to farmers must be further improved.

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