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ANALYSIS OF INCOME AND FEASIBILITY OF RICE-FISH ORGANIC FARMING (CASE STUDY IN JABUNG VILLAGE, TALUN DISTRICT)

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ABSTRACT

In order to increase agricultural production, especially food crops, it can be done by diversification. Where one form of diversification is by trying to combine food farming with other farming businesses, fish or more precisely called an integrated farming system. An integrated farming system is a method of fish cultivation combined with rice farming in the same land which must lead to increased efficiency of land use, because various types of businesses are applied. This integrated farming system or rice-fish farming is a novelty that is being tried at the research site. The purpose of this study is to analyze the level of production costs, income and profits in this organic rice-fish farming business. This research was conducted in Jabung Village, Talun District, Blitar Regency and used farming business analysis (costs, income and efficiency). The results of the study showed that the total production cost of pattern I was Rp 11,346,982 per ha and pattern II was Rp 9,313,160 per ha. The average total income of pattern I was Rp 32,440,000 per ha and pattern II was Rp 27,700,000 per ha. The average income of pattern I was Rp 20,233,018 per ha and pattern II was Rp 17,526,840 per ha. The R/C Ratio results obtained values in pattern I (2.96)> 1 and pattern II (2.97)> 1. Thus, this organic fish and rice farming business is efficient and profitable, so it is worth continuing the farming business.

Keywords: *acceptance, cost, efficiency, rice-fish farming*

BACKGROUND

Food security is a very important issue, where food security indicates the availability of access to food sources to meet the food needs of the community (Pitaloka et al., 2022). To increase agricultural production, especially food crops, diversification can be pursued. One of the main considerations of diversification efforts is the stabilization of agricultural income and avoiding dependence on one type of commodity. One form of diversification is the integration of food crop farming with other types of farming activities. Pesticides are considered a major input in modern agriculture, but they are also a major cause of environmental pollution and a health threat to living organisms (Suryani et al., 2020). This is very reasonable because small animals, whether pests or biological agents, will die due to excessive pesticide application. Indirectly, this will harm the farmers themselves and future generations. Within this framework, it has been shown that agricultural practices that diversify crops can contribute to the ecological intensification of agriculture by providing a range of ecosystem services, promoting biological pest control (Redlich et al., 2018; Wan et al., 2018).

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Jabung Village, Talun District, Blitar Regency has a very large agricultural potential of approximately 2,349 hectares (BPS, 2023), but the agriculture that is cultivated is still around planting rice and secondary crops. Farmers often complain about the many pest attacks that make the rice and secondary crop yields not as expected, so that farmers' income is less than optimal. Based on this, several farmers have tried an integrated agricultural system, namely by cultivating rice plants while cultivating fish in their agricultural land or what is called mina padi. This mina padi system is a cultivation concept that integrates fish and rice cultivation in a cultivation system, there is a mutually beneficial relationship between fish and rice, where fish can provide nutrients for rice and provide fertilizer and improve soil structure through metabolic products (feces) and unconsumed feed residues, while rice provides oxygen and shelter for fish. Thus, this mina padi farming system is an organic farming system that does not use pesticides. The fish that are cultivated are koi fish and majalaya fish, because these two types of fish have the advantage of being able to adapt easily to the environment, have strong immunity, and are resistant to various diseases. With the establishment of organic rice-fish farming, can make maximum use of water availability and be more efficient in the use of fertilizers and pesticides. It is hoped that the implementation of pesticide-free rice-fish farming will be able to add value to the sale of pesticide-free rice production (Bobihoe et al., 2015). The sale of rice is directed towards middle to upper-class consumers, where the type of rice cultivated in organic pesticide-free farming is safer for consumption (Surdianto et al., 2015). Thus, the implementation of organic mina paddy farming will be able to apply sustainable agricultural continuity (Sa'adah et al., 2015).

Integrated fishery systems are a method of fish cultivation combined with agricultural activities on the same land, which should lead to increased land use efficiency, as various types of activities are implemented. Fish farming yields harvest after approximately 2-3 months of maintenance. During this time, farmers receive minimal income, often resulting in debt. This situation can be avoided with the implementation of integrated farming methods, as income sources come not only from fisheries or rice but also from other sources with shorter maintenance periods, thus reducing idle land. This rice-fish farming can also minimize the risk of losing income sources, as it does not rely solely on one type of business which can be substituted with another type of business.

Farmers choose certain farming patterns with the aim of meeting family consumption needs, obtaining cash income, distributing labor evenly, reducing the risk of failure, and saving on production costs. Additionally, engaging in various farming activities should be able to allocate the same resources towards achieving the intended goals. Rice-fish farming can reduce pollution and ensure environmental sustainability by reducing the use of pesticides and chemical fertilizers, increasing rice farmers' income, and enhancing soil fertility (Samal, 2017; Ujoh et al., 2016). There are many objectives to achieve, as seen in the diverse farming patterns. Thus, the purpose of this study is to analyze the level of production costs, income and profits in this organic rice-fish farming business.

RESEARCH METHODS

Location and Time of Research

The research was conducted in Jabung Village, Talun District, Blitar Regency. The research location was chosen intentionally (purposively) with the consideration that the area is a potential area for rice-fish farming, besides that Jabung Village also has a fairly large area used for rice-fish farming,

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and the production per hectare is relatively high. The research was conducted from early March to May 2024.

Sampling Method

The sample in this study were farmers who were engaged in fish and rice farming on the cultivated land. The sample determination was carried out using a purposive sampling technique. According to Arikunto (2017) who said that if the subject is less than 100, then the entire population becomes the research sample. But if the subject is more than 100, then 10-15% or 15-25% of the population can be taken. The respondents from each stratum are as follows:

1. For pattern I (rice - fish - rice) : 25 respondents from 51 farmers.
2. For pattern II (rice - fish) : 20 respondents from 26 farmers.

So, the total sample in this study was 45 samples. This is because the number of farmers in Jabung Village is not all willing to be used as research samples due to various factors.

Data Collection Method

The data collected are primary data obtained directly from farmers. Interviews were also conducted with parties knowledgeable about rice-fish farming issues (how to get good and profitable results by spending as little money as possible, such as reducing the cost of seeds, labor, asset maintenance, fertilizer and others), such as agricultural extension workers and village officials.

Data Analysis Method

The analysis of income from organic rice-fish farming is as follows (Aryanto et al., 2016; Soekartawi, 2016).

Total Cost

Total cost is the total amount of fixed costs and variable costs incurred for the rice farming business, which can be calculated using the following formula (Soekartawi, 2016).

$$TC = TFC + TVC$$

Information:

1. TC : Total Cost (Rp)
2. TFC : Total Fixed Cost (Rp)
3. TVC : Total Variable Cost (Rp)

Revenue

To calculate the gross income or revenue, the following formula can be used (Aryanto et al., 2016).

$$TR = P \times Q$$

Information:

1. TR : Total Revenue (Rp)
2. P : Price per Unit of Production (Rp/kw)
3. Q : Quantity of Production (kw)

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Income

Farm income/profit is the difference between total revenue and total cost, include implicit costs because they can help calculate overall profit, formulated as Aryanto et al. (2016).

$$\pi = TR - TC$$

Information:
1. π : Income/Profit (Rp)
2. TR : Total (Gross) Revenue (Rp)
3. TC : Total Cost (Rp)

Revenue and Cost (R/C) Analysis

According to Suratiyah (2015), R/C is the comparison between revenue and total costs, formulated as:

$$R/C\ Ratio = TR/TC$$

Information:
1. R/C Ratio : Efficiency Level
2. TR : Total Revenue
3. TC : Total Cost

There are three criteria in the calculation, namely:
1. If R/C Ratio < 1 : The farming business is considered inefficient or loss-making.
2. If R/C Ratio = 1 : The farming business is considered break-even.
3. If R/C Ratio > 1 : The farming business is considered efficient (profitable).

RESULT AND DISCUSSION

In Jabung Village, Talun District, Blitar Regency, it is one of the villages that has a large rice field area. Generally, the residents of Jabung Village have a livelihood as food crop farmers who also produce inland fisheries such as: catfish, gourami, koi, goldfish and others. Previously, they did farming and fish farming with separate land. However, gradually they tried to combine their farming with fish farming and there were several farmers who succeeded with this rice-fish farming method, so that many farmers finally chose to do rice-fish farming. Of course, this is one of the supporters in the agricultural development efforts in the village, the main one being the effort to increase food crop production and fish farming in the same land. With the increase in rice-fish production, it is hoped that it will also improve the welfare of the farmers themselves and the community in general. Mina padi is one of the agricultural cultivation that combines rice planting with fish farming. Mina padi cultivation is one of the innovations developed with the aim of diversifying agricultural businesses so that they do not only carry out conventional rice farming, but also fish farming (Kriska et al., 2022). Mina padi is also an effective agricultural intensification effort, combining and contributing ecosystem services in agricultural production and increasing production sustainably (Bai et al., 2019). However, in carrying out farming, the issue of costs and income is inevitable. Costs in this context

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refer to all sacrifices made in the form of various production inputs during the process, while the difference between the output received and the costs incurred is called farm income. Every business is run with the aim of maximizing profits and achieving sustainability.This can be done by minimizing the costs incurred (Mulyadi et al., 2020).

Production Costs

In any business activity in the agricultural sector, the final assessment will be the results obtained from the costs incurred during the production process. Production costs are all expenses expressed in the form of money during the production process to produce a product. In this analysis, production costs are reviewed from the company's point of view, namely that expenses must be accounted for as costs. Based on their nature, agricultural business costs are classified into fixed costs and variable costs. Variable costs include rice seeds, fish seeds and labor costs. In this study, there were no costs for buying medicines. While fixed costs include land rental costs, capital interest and other costs.

Variable Cost

Production Input Costs

Production input costs are costs incurred to obtain production inputs used in farming. The production input costs used for rice-fish farming include the costs of purchasing rice seeds, fertilizers and fish seeds. The average use and additional production input costs per hectare for rice-fish farming incurred by farmers can be seen in the following table 2.

Table 2. Average Use and Additional Production Input Costs per Hectare

Types of Production Input Costs	Rice-fish Farming Patterns			
	Pattern I		Pattern II	
	Quantity (kg)	Value (Rp)	Quantity (kg)	Value (Rp)
Rice Seeds (kg)	60	300,000	30	150,000
Manure Fertiliser (kw)	9 ton	1,902,700	6,5 ton	1,287,000
Fish Eggs (rean)				
1. Koi	3	1,500,000	2	1,000,000
2. Majalaya	2	200,000	2	200,000
Total Cost		**3,902,700**		**2,637,000**

The price for rice seeds is Rp 5,000,-/kg, the cost of manure fertilizer is Rp 21,000,-/kw and the respective prices for koi fish seeds are Rp 500,000,-/rean, Majalaya fish seeds Rp 100,000,-/rean. The reason farmers in Jabung Village use koi fish and majalaya fish is because both fish are easy to cultivate and are susceptible to disease, so farmers consider both fish to be more profitable to cultivate because they are easy to care for. From table 2, it can be seen that there are differences in the use of rice seeds between Pattern I and Pattern II. The difference is caused by the use of different numbers of seeds between patterns I and II because the land area for cultivating plants and fish has a different area. In Pattern I the average use of rice seeds is 60 kg/ha and in Pattern II it is 40 kg/ha. The use of rice seeds in pattern I is greater. This is because in pattern II there is not too much rice planted, so that the results obtained from the map are also different.

In pattern I the average use of manure is 9 tons/ha. Meanwhile, in pattern II the average use of manure is 6.5 tons/ha. Fertilizer use in the two patterns also shows differences. This is not only

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due to the use of different seeds but also due to different fertilizer doses. The use of fish seeds varies greatly, according to the farmer's wishes. It is considered the most profitable for the farming business, so the use of fish seeds shows a difference between the two patterns. The average use of fish seeds in pattern I for koi and majalaya respectively is 3 rean/ha and 2 rean/ha. Meanwhile, in pattern II the koi and majalaya fish are 2 rean/ha and 2 rean/ha respectively. With differences in the use of production suggestions, the costs of production facilities will also show differences.

Labor Costs

Labor costs encompass expenses incurred for hiring both family and external labor (male and female). Family labor is also accounted for. In the study area, daily wages for male laborers are Rp 30,000 and Rp 17,000 for female laborers. Female labor is converted to Male Standard Work Units (SHKP). One SHKP equals 7:00 AM - 11:00 AM and 12:30 PM - 4:30 PM, valued at Rp 30,000.

Table 3. The Average Labor Usage and Costs Per Hectare for Each Rice-Fish Farming Pattern

Types of work Activity	Labor Costs for Rice-fish Farming			
	Pattern I		Pattern II	
	Quantity (SHKP)	Value (Rp)	Quantity (SHKP)	Value (Rp)
Land Preparation	15	450,000	12	360,000
Seeding	2	60,000	1	30,000
Rice Planting	36	612,000	17	289,000
Fish Seed Stocking	1	20,000	1	20,000
Fertilisation	2	60,000	2	60,000
Harvesting	20	600,000	13	390,000
Total	**76**	**1,802,000**	**46**	**1,149,000**

In farming activities, labor is required to cover almost the entire production process, from land processing to post-harvest handling. workforce, namely people who are looking for work or people who already have jobs that produce goods or services that have met the requirements or age limits that have been set in regulations and laws that have the aim of obtaining compensation to meet daily needs. Labor is one of the most important production factors, because the productivity factor of other production factors depends on the productivity of the workforce itself in producing production (Anggia et al., 2019). The need for labor will also lead to costs for paying the labor used if the labor is insufficient. Table 3 shows that there are differences, both in the use and costs of labor. The average use of labor in pattern I is greater, namely 76 SHKP per hectare. The difference in the use of labor is caused by pattern I having additional work activities, namely rice planting is done twice and pattern II is done only once, so the number of workers needed for each planting pattern is different. Thus, labor wages will also be different because the number of workers used in pattern I is greater than the number of workers in pattern II.

Total Variable Costs

The total variable costs of the rice-fish farming business are the amount of variable costs used in the rice-fish farming business. Total variable costs are the total labor costs, the average total variables incurred by farmers are presented in the following table 4.

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Table 4. Average Total Variable Costs Per Hectare

Cost Category	Cost Breakdown of Rice-fish Farming Patterns	
	Pattern I (Rp)	**Pattern II (Rp)**
Production Inputs	3,902,700	2,637,000
Labor Costs	1,802,000	1,149,000
Total	**5.704,700**	**3,786,000**

From table 4, it shows that the average total variable costs in pattern I are greater, namely Rp 5,704,700 per hectare. Because the various variable costs incurred by pattern I during the production process are also greater. Meanwhile in pattern II it is Rp 3,786,000 per ha, because there are differences between the two patterns, the total variable costs will also show this difference.

Fixed Cost

Fixed costs are a type of cost that does not influence or determine the size of the production value. What is meant by fixed costs in the rice-fish business are land rental costs, capital interest and others.

Land Rental Costs

In the research location, farmers generally have their own land because the farmer's example of land management status is privately owned. However, if the land is calculated as leased land, then the determination of the land rental value varies depending on the location and condition of the land, which is within a period of one year of Rp 14,000,000 : 3 = Rp 4,700,000, - per ha. This is still very cheap for the amount of land rent in the village, so farmers are better off working their own land rather than renting it to others.

Capital Interest

Capital interest in the rice-fish farming business is the costs incurred by farmers, both other people's money and their own money used in the rice-fish farming business. Capital interest costs are calculated based on the amount of money spent during the rice farming business. In this research, capital interest is calculated by multiplying the amount of money used for four months by a percentage of 1.5%. From the calculation results, the average capital interest value for pattern I was Rp 342,282 per ha and pattern II was Rp 227,160 per ha. The capital interest value shows differences, because the costs incurred by each of these patterns are also different. The capital interest value shows a difference, because the costs incurred by each pattern are also different. This is because the planting patterns between the two are different, pattern I plants more rice and pattern II plants less rice.

Other Expenses

Apart from the costs of production facilities, labor costs, land rental and capital interest, there are still other costs incurred by farmers in their farming activities, which include other costs including diesel rental and others. Other costs between pattern I and pattern II are the same, amounting to Rp 600,000 per ha for diesel rental.

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Total Fixed Costs

The total fixed costs of the rice-fish farming business are the total fixed costs used in the rice farming business. The total fixed costs are the total land rental costs incurred by the property and are presented in the following table 5.

Table 5. Average Total Fixed Costs Per Hectare

Cost Category	Cost Breakdown of Rice-fish Farming Patterns	
	Pattern I (Rp)	**Pattern II (Rp)**
Land Rental	4,700,000	4,700,000
Capital Interest	342,282	227,160
Other Expenses	600,000	600,000
Total Cost	**5,642,282**	**5,527,160**

Because the various fixed costs incurred during the production process between the two patterns are different, the total fixed costs will also show differences. Costs that are relatively fixed in amount and continue to be incurred even though the amount of production obtained is high or low are called fixed costs. So, the amount of fixed costs does not depend on the amount of production obtained (Zamrodah, 2020). In pattern I the average is Rp 5,642,282 per ha, the value is greater than in pattern II, namely an average of Rp 5,527,160 per ha.

Total Production Costs

Total production costs in the rice-fish farming business are the total costs incurred for this business, namely the sum of the costs of production facilities, labor, land rental, capital costs and others. The average total production costs incurred by farmers are presented in the following table.

Table 6. Average Total Production Costs Per Hectare

Cost Category	Cost Breakdown of Rice-fish Farming Patterns	
	Pattern I (Rp)	**Pattern II (Rp)**
Production Inputs	3,902,700	2,637,000
Labor Costs	1,802,000	1,149,000
Land Rental	4,700,000	4,700,000
Capital Interest	342,282	227,160
Other Expenses	600,000	600,000
Total Cost	**11,346,982**	**9,313,160**

From table 6, above, it appears that the average total production costs show a real difference between pattern I and pattern II. The difference in the average value of the total production cost is caused by the allocation and the amount of variable costs and fixed costs that are different between patterns I and II. This difference is caused because the first pattern plants rice twice and the second pattern only plants rice once, thus making the production costs differ significantly between the two patterns.

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Revenue

Revenue is the amount of money farmers receive from the sale of the production they obtain. So, revenue is the product of total production times the unit price. Production is the total result of farming expressed in physical form (Soekartawi, 2016). Average production and total income received by farmers are presented in the following table 7.

Table 7. Average Production and Total Revenue Per Hectare

Productions	Rice-fish Farming Patterns			
	Pattern I		Pattern II	
	Quantity (Quintal)	Value (Rp)	Quantity (Quintal)	Value (Rp)
Majalaya	2	2,800,000	1.5	2,100,000
Koi A	200	3,000,000	350	5,250,000
B	550	4,950,000	170	1,530,000
C	450	2,250,000	380	1,900,000
Rice Seeds	54	19,440,000	47	16,920,000
Total Costs		**32,440,000**		**27,700,000**

The price of Majalaya commodities is Rp 1,400,000 per quintal, koi fish A Rp 15,000, B Rp 9,000 and C Rp 5,000 per seed and rice commodities Rp 360,000 per quintal. From table 7 it appears that the average total revenue shows a real difference between pattern I and pattern II. This difference in the average value of total revenue is due to differences in the production produced, and this production is influenced by the production facilities used, namely the difference between pattern I and pattern II (in table II). Although the income between these two planting patterns is different, the fish and rice farming business that is being run is profitable and worth continuing.

Income

Income is the difference between total revenue and total production costs that have been incurred during the production process of the rice farming business. In accordance with the statement of Saputra et al. (2017) that the rice-fish income generated is greater than the income from rice farming.

Table 8. The Average Income

Rice-fish Farming Patterns	Average Income (Rp)
Pattern I	20,233,018
Pattern II	17,526,840

The table shows that the average income shows a real difference between pattern I and pattern II. The difference in income in the table above shows that the farming business run by these farmers is very profitable. Soekartawi (2016) stated that the profit of farming can be measured using the determination of the amount of income that can be received by farmers. This research is in line with research conducted by Mulyadi (2020), that the average income obtained by farmers in one planting season for minapadi farming is Rp 21,549,972/ha, this is very profitable and worth pursuing.

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Revenue and Cost (R/C) Analysis

Profitable results are the goal of every business run by farmers. R/C analysis is conducted to determine the range of the business's profit in a certain period. Meanwhile, from the results of the R/C Ratio in pattern I (2.96)> 1 in pattern II (2.97)> 1. Thus, rice farming is feasible to strive for this according to research conducted by Julistia (2017) that the total revenue from rice-fish farming is greater because there are two outputs, namely rice and fish, and in line with research by Lestari, et al (2019) that it can be said that both farming businesses are profitable or feasible to implement and develop. The R/C values obtained >1 indicate that rice-fish farming cultivation is worthy of development and the rice-fish farming business development strategy should be carried out by strengthening agricultural institutions, controlling pests and nuisance predators regularly as well as increasing the knowledge and skills of human resources (Hardjanto, 2021).

CONCLUSION AND SUGGESTION

The average total production costs incurred by farmers cultivating pattern I is Rp 11,346,982 per ha, while pattern II is Rp 9,313,160 per ha. The average total income received by farmers cultivating pattern I is IDR 32,440,000 per ha, while pattern II is Rp 27,700,000 per ha. The average income received by farmers who cultivate pattern I is Rp 20,233,018 per ha, while pattern II is Rp 17,526,840 per ha. From the results of the R/C Ratio, the value in pattern I (2.96)>1, whereas pattern II (2.97)>1. So, the organic rice farming business can be said to be efficient between the two patterns. Based on this findings, there is a need to provide further education to farmers regarding fish and rice cultivation, so that the farming business they run is more profitable. It is necessary to make efforts to develop the rice-fish farming business, considering that the rice-farming business has not developed much. This needs to be done because rice farming can increase income, expand or absorb more labor, use waste more optimally, and can increase the frequency of supervision or land development by farmers. In connection with the rice-fish farming development effort above, it is hoped that the parties involved in the development effort can consider the socio-economic factors in which the business will be developed.

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