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Factors Underlying Farmers' Decisions To Convert Aquaculture Pond Land In Banjar Kemuning Village Sedati District Sidoarjo Regency

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ABSTRACT

This study aims to analyze the factors influencing the conversion of aquaculture pond land conversion and changes in farmers' income before and after land conversion in Banjar Kemuning Village, Sedati District, Sidoarjo Regency. Regional development and increasing demand for land for non-agricultural purposes have encouraged changes in pond land use, which also affect the economic conditions of pond farmers. This study employed a descriptive quantitative approach involving 30 pond farmers who had converted their pond land as respondents. The respondents were selected using a census sampling method, in which all 30 members of the population were included as respondents. Data were collected through interviews, questionnaires, observations, and documentation. Data analysis was conducted descriptively to identify economic factors, market pressure and regional development, internal land and production conditions, and social factors. In addition, income analysis was used to compare farmers' income before and after land conversion. Differences in income were examined using a paired sample t-test with SPSS following the Shapiro-Wilk normality test. The results indicate that farmers' decisions to convert pond land were influenced by economic factors, regional development, production conditions, and social factors. Income analysis revealed changes in farmers' income after land conversion, while the paired sample t-test indicated a significant difference in income between the conditions before and after land conversion.

INTRODUCTION

Aquaculture pond land is one of the resources that plays an important role in fisheries production and serves as a source of livelihood for pond farmers (Dewi, 2020). East Java is one of the regions that contributes to aquaculture production. In 2023, brackish-water pond aquaculture production reached 229,174.05 tons out of total aquaculture production of 1,356,321.23 tons, or approximately 16.9% (Hikmana et al., 2022). This contribution indicates that the existence of pond land plays an important role in supporting economic activities and

fisheries production. However, pond land faces increasing pressure due to regional development and the growing demand for land for non-agricultural purposes.

Regional development and increasing demand for land have encouraged changes in the use of pond land for various purposes, including housing, industry, and infrastructure development (Rahmawati, 2021). Such changes may reduce the area used for pond production and encourage farmers to reconsider the sustainability of their farming activities. Farmers' decisions to convert their land may be associated with the economic value of the land, the condition of pond farming activities, and changes in the surrounding environment. Syukur et al. (2020) showed that economic conditions and changes in the social environment may be associated with farmers' decisions to convert agricultural land.

Sidoarjo Regency is one of the areas with substantial aquaculture activities, including Sedati District. With a relatively large pond area and number of pond farmers, Sedati District provides an important setting for examining changes in pond land use. Based on BPS data for 2021–2024, Sedati District had 276 pond farmers managing a total pond area of 3,958.99 hectares. These farmers were distributed across several villages, with Banjar Kemuning Village having 55 pond farmers and approximately 437.00 hectares of pond land. The relatively large pond farming base in Banjar Kemuning makes the village an important location for examining farmers' decisions regarding the conversion of pond land.

Table 1. Pond Land Area by Village, 2021–2024 (Ha)

Nama Desa	Jumlah Petani Tambak (Org)	Jumlah Luas Lahan (Ha)
Segoro Tambak	89	595,70
Banjar Kemuning	55	437,00
Tambak Cemandi	25	300,00
Pepe	38	376,00
Kalanganyar	59	2.231,79
Buncitan	10	18,50
Jumlah	**276**	**3.958,99**

Source: Primary data processed (2026)

The large number of pond farmers and the extensive pond area in Banjar Kemuning Village do not necessarily indicate that all farmers have converted their land. Of the 55 pond farmers recorded, 30 had converted or sold their pond land for non-agricultural use. This group was selected as the research population because its members had direct experience with the decision-making process related to land conversion. Thus, the study did not include all 55 pond farmers as respondents but focused on the 30 farmers who had converted their pond land. All 30 farmers were included as respondents using a census method, allowing the study to describe the factors underlying land conversion decisions among farmers who had directly experienced the process.

Farmers' decisions to convert pond land involve various considerations. From an economic perspective, farm income and the high selling value of land may influence decisions

concerning land ownership. Regional development may also influence these decisions through housing and infrastructure development, as well as offers from developers or investors. From the production perspective, declining yields and increasing operating costs may affect the sustainability of pond farming activities (Masbakha, 2016). Social considerations may arise from the low interest of the younger generation in continuing pond farming and the increasing number of neighboring farmers who sell or convert their land. Fitriani *et al.* (2024) showed that internal and external conditions may be associated with farmers' decisions to convert agricultural land.

Previous studies on land conversion have discussed land-use changes, regional development, and community economic conditions. However, studies that specifically identify the factors underlying farmers' decisions to convert aquaculture pond land at the household level and relate these decisions to changes in farmers' livelihoods and income remain limited. This issue is important because decisions concerning land ownership not only result in changes in land use but may also be followed by changes in farmers' household economic activities. Therefore, this study aims to analyze the factors underlying farmers' decisions to convert aquaculture pond land and to examine differences in farmers' income before and after land conversion in Banjar Kemuning Village, Sedati District, Sidoarjo Regency. The findings are expected to provide empirical information regarding farmers' considerations in making decisions about their pond land and the associated changes in their economic conditions.

METHODS

The research location was determined purposively based on its suitability for the research objectives. The study was conducted in Banjar Kemuning Village, Sedati District, Sidoarjo Regency, East Java Province. The location was selected because it is one of the areas experiencing aquaculture pond land conversion and has pond farmers affected by such changes, making it suitable for examining the factors influencing land conversion. The research population consisted of 30 pond farmers who had experienced land conversion. Since the population was relatively small and all members could be reached, a census method was employed, in which all population members were included as research respondents (Nazir, 2014). The data consisted of primary data obtained through interviews, observations, and direct documentation involving respondents, as well as secondary data obtained from books, scientific journals, BPS publications, and relevant documents from the Banjar Kemuning Village Government.

This study employed a quantitative approach supported by qualitative data presented descriptively to explain the research findings. The research location was purposively selected in Banjar Kemuning Village, Sedati District, Sidoarjo Regency. The respondents consisted of 30 pond farmers who had converted or sold their pond land for non-agricultural purposes. Data were collected through questionnaires and direct interviews with respondents. Data analysis was conducted to identify the factors influencing farmers' decisions to convert aquaculture pond land. The factors analyzed consisted of economic factors, market pressure and regional

development, internal land and production conditions, and social factors. The data were analyzed descriptively using frequency distributions and percentages to identify the factors considered by farmers in their land conversion decisions. The percentage of respondents in each response category was calculated using the formula proposed by Sudijono (2018):

$$P = \frac{F}{N} \times 100\%$$

Where:
P = Percentage (%)
F = Number of respondents in each response category
N = Total number of respondents (30 farmers)

Based on the research framework referring to Afriyadi et al. (2022), the factors analyzed in this study consisted of four main aspects:

1. Economic factors;
2. Regional development factors;
3. Pond production conditions; and
4. Social factors.

These four factors were analyzed based on respondents' answers to identify the factors most frequently stated as considerations in farmers' decisions to sell their pond land. Income analysis was conducted to compare farmers' income before and after land conversion. According to Soekartawi (2002), farm income can be calculated using the following formula:

$$I = TR - TC$$

Where:
I = Pond farming income
TR = Total Revenue
TC = Total Cost
Total revenue was calculated by multiplying production quantity by the selling price of pond products:

$$TR = P \times Q$$

Where:
TR = Total Revenue
P = Selling price of production (Rp/kg)
Q = Production quantity (kg)

Differences in income were analyzed using a *paired sample t-test* after conducting the Shapiro-Wilk normality test. If the data met the normality assumption, the analysis was continued using a *paired sample t-test*, whereas non-normally distributed data were analyzed using the Wilcoxon test. Data processing was performed using SPSS at a 5% significance level ($\alpha = 0.05$) (Handayani et al., 2023).

RESULTS AND DISCUSSION

Factors Underlying Farmers' Decisions to Convert Aquaculture Pond Land

Based on the results from 30 pond farmers who had converted their land in Banjar Kemuning Village, the factors underlying land sale decisions were analyzed descriptively based on four aspects: economic factors, regional development, pond production conditions, and social factors. The percentage of respondents was calculated by comparing the number of respondents in each response category with the total number of respondents. The analysis focused on the four main factors.

Economic Factors

Economic factors are an important aspect of farmers' decisions to sell pond land because they are related to the ability of pond farming activities to generate income and the economic benefits obtained from the land. Farm income is an important consideration in maintaining production activities, particularly when the income generated is insufficient to meet household needs. Under such conditions, a high land selling price may become a consideration for farmers to release their land because it can provide greater economic benefits within a relatively short period. The decision to sell land is therefore related not only to the continuation of pond farming activities but also to the comparison between income generated from pond farming and the economic value of the land.

Table 2. Number of Farmers Selling Land Based on Economic Factors

No	Indicator	Yes	%	No	%
1.	Received offers from developers/investors	9	30,00	21	70,00
2	Land selling price influences the decision to sell	28	93,33	2	6,67

Source: Primary data processed (2026)

The results show that economic conditions were one of the considerations in farmers' decisions to sell their pond land. A total of 21 respondents (70.00%) stated that income from pond farming was insufficient to meet household needs, while 9 respondents (30.00%) stated that it was sufficient. In addition, 28 respondents (93.33%) stated that the high selling price of land influenced their decision to sell, while 2 respondents (6.67%) stated that they were not influenced by the selling price.

The high percentage of respondents stating that land prices influenced their decisions indicates that the economic value of land was an important consideration in the decision-making process. The average selling price of pond land in this study was Rp3,372,266,667 per hectare, with a minimum value of Rp588,000,000 per hectare and a maximum value of Rp9,310,000,000 per hectare. These values provide an economic incentive for farmers to sell their land, particularly when income from pond farming is considered insufficient to meet household needs.

This condition indicates that land sale decisions involve consideration of the benefits of maintaining pond farming activities and the economic benefits that can be obtained from selling the asset. Limited income from pond farming may encourage farmers to utilize the high economic value of their land as a source of funds to meet household needs or develop alternative livelihoods. This finding is consistent with Afriyadi et al. (2022), who identified economic conditions and land value as considerations in land conversion decisions.

Regional Development Factors

Regional development is an important factor in farmers' decisions to sell pond land because changes in land use around the area may increase land demand and economic value. The development of settlements, road infrastructure, and economic activities may encourage land-use changes from agricultural activities to non-agricultural uses. Such conditions can increase the attractiveness of pond land to developers and investors and provide farmers with opportunities to obtain higher selling prices.

Table 3. Number of Farmers Selling Land Based on Regional Development Factors

No	Indicator	Yes	%	No	%
1.	Received offers from developers/investors	26	86,67	4	13,33
2	Regional development influences the decision to sell	29	96,67	1	3,33
3	Land prices have increased in recent years	30	100,00	0	0,00

Source: Primary data processed (2026)

The results show that regional development was frequently mentioned by respondents in relation to their decisions to sell pond land. A total of 26 respondents (86.67%) stated that they had received offers from developers or investors. Meanwhile, 29 respondents (96.67%) stated that regional development influenced their decision to sell, and all respondents (100.00%) stated that land prices had increased in recent years. The high percentages across these indicators indicate that changes in the surrounding area were associated with farmers' land sale decisions. The development of settlements, road access, and economic activities around the area may increase the strategic value of land and demand for pond land. Increasing land prices may provide farmers with an opportunity to obtain greater financial returns from selling their land rather than maintaining it as a production asset.

Offers from developers or investors may also influence farmers' considerations because they provide opportunities to use the land for non-agricultural activities while creating a market for farmers who wish to sell. This condition indicates that regional development can change the economic value and function of land from a production asset for pond farming into an asset that can be sold to obtain capital or support alternative livelihoods. This finding is consistent with

Afriyadi et al. (2022), who stated that market pressure and regional development may increase land value and encourage land-use changes.

Pond Production Conditions

Pond production conditions are another consideration in farmers' decisions to sell their land because production levels are directly related to revenue from pond farming. Declining production may reduce the quantity of output available for sale and potentially decrease farmers' revenue and profit. This condition becomes more important when operating costs continue to be incurred. Production changes may be associated with various conditions encountered in pond farming, including water quality, weather, disease, and environmental conditions.

Table 4. Number of Farmers Selling Land Based on Pond Production Conditions

No	Indicator	Yes	%	No	%
1.	Pond production has decreased	27	90,00	3	10,00
2.	Pond operating costs increased before land conversion	25	83,33	5	16,67

Source: Primary data processed (2026)

Based on Table 4, most respondents stated that pond production had declined before their land was converted. This condition indicates that declining production was experienced by many farmers before they decided to sell their land. Reduced production can result in lower farm revenue and consequently reduce farmers' income from pond activities. Increased operating costs were also experienced by many farmers before land conversion. Higher costs required to maintain pond farming activities can increase the financial burden, particularly when production does not increase accordingly.

The combination of declining production and increasing operating costs indicates less favorable conditions for some farmers' pond farming activities. Such conditions may become a consideration in deciding whether to continue pond farming or sell the land. When the returns obtained are considered insufficient relative to the costs incurred, farmers may consider selling their land, particularly when the land has a high economic value. This finding is consistent with Afriyadi et al. (2022), who explained that productivity and farm profitability can be considerations in land-use changes.

Social Factors

Social factors are also related to farmers' decisions to sell pond land because they concern the continuity of pond farming within the family and the social environment surrounding farmers. The interest of the younger generation in continuing pond farming may influence landowners' decisions to maintain their farming activities. When children have limited interest in continuing pond farming, the sustainability of the activity across generations

becomes more limited. The social environment may also influence farmers' decisions, particularly when many neighboring farmers have already sold their pond land.

Table 5. Number of Farmers Selling Land Based on Social Factors

No	Indicator	Yes	%	No	%
1.	Children are interested in continuing pond farming	7	23,33	23	76,77
2	Many neighboring farmers have sold their land	28	93,33	2	6,67
3	Changed occupation after selling the land	30	100,00	0	0,00

Source: Primary data processed (2026)

Based on Table 5, 23 respondents (76.67%) stated that their children were not interested in continuing pond farming, while 7 respondents (23.33%) stated that their children were interested in continuing the activity. This condition indicates relatively low interest among the younger generation in continuing pond farming. Limited interest in succession may reduce the continuity of pond farming within the family and become one of the considerations in farmers' decisions to sell their pond land.

Regarding the social environment, 28 respondents (93.33%) stated that many neighboring farmers had sold their pond land, while 2 respondents (6.67%) stated otherwise. The high percentage indicates that pond land sales had become common in the respondents' surrounding environment. This condition may influence farmers' considerations because decisions made by neighboring farmers can shape perceptions regarding land sales as a common practice in the community.

The results also show that all respondents (100.00%) changed occupations after selling their pond land. Respondents moved to various types of employment, including trading, shop-related activities, factory work, driving, salaried employment, and entrepreneurship. This indicates that selling pond land was followed by changes in farmers' livelihoods from pond farming to other sectors. The finding is consistent with Afriyadi et al. (2022), who stated that changes in occupational orientation, limited farmer regeneration, and the social environment may be associated with land conversion decisions.

Changes in Farmers' Income Before and After Land Conversion

Changes in pond land use in Banjar Kemuning Village were followed by changes in farmers' sources of livelihood and income. Before land conversion, pond farming was one of the main sources of income for respondents. After the land was sold and no longer used for pond farming, respondents obtained income from other occupations or businesses according to their respective conditions and capabilities.

Pond farming income is calculated as the difference between total revenue obtained from the sale of production and total costs incurred during the production process. Total revenue is obtained by multiplying production quantity by selling price, while total cost represents all

costs incurred during pond farming activities. In this study, income before land conversion was calculated by subtracting total production costs from total pond farming revenue. Income after land conversion was calculated based on income obtained from occupations or businesses undertaken by respondents after selling their pond land.

Table 6. Production and Income Before Land Conversion

Description	Minimum	Maksimum
Production (kg/cycle)	530	2.800
Revenue (Rp/cycle)	21.200.000	103.600.000
Total Cost (Rp/cycle)	5.770.000	38.450.000
Income (Rp/cycle)	15.230.000	65.150.000
Net Income (Rp/month)	2.538.000	10.858.000

Source: Primary data processed (2026)

Based on Table 6, farmers' income before land conversion varied among respondents. The differences can be observed in production quantity, revenue, production costs, and income obtained during each production cycle. Pond production ranged from 530 to 2,800 kg per cycle, resulting in differences in revenue among farmers. Farm income is influenced by revenue obtained and costs incurred during production (Purwanti, 2020). Farmers' net income ranged from Rp15,230,000 to Rp65,150,000 per cycle, or approximately Rp2,538,000 to Rp10,858,000 per month. The differences in income indicate variations in farming conditions among respondents related to production quantities and production costs. Before land conversion, pond farming remained one of the sources of household income. These income conditions were one aspect that could be considered by farmers when deciding whether to sell their pond land. The economic returns from pond farming could be compared with the economic value of the land if sold. Income before land conversion therefore served as the basis for comparison with income after the land was no longer used for pond farming.

Normality Test

The normality test was conducted to determine the distribution of farmers' income before and after the sale of pond land and the difference between the two income values. The Shapiro-Wilk test was applied to 30 respondents. Data were considered normally distributed when the significance value was greater than 0.05, while a significance value below 0.05 indicated that the data were not normally distributed (Ghozali, 2018).

Table 7. Normality Test Results

	Shapiro-Wilk		
	Statistic	df	Sig.
Income Before	.964	30	.397
Income After	.953	30	.206
Difference	.942	30	.103

Source: Primary data processed (2026)

The Shapiro-Wilk test results in Table 6 show that the significance value for income before land conversion was 0.397, income after land conversion was 0.206, and the income difference was 0.103. All three significance values were greater than 0.05, indicating that the income data before and after land conversion and the income differences were normally distributed. These results indicate that the income data met the normality assumption. Since the income observations before and after land conversion were obtained from the same respondents, a *paired sample t-test* was subsequently conducted to determine whether there was a significant difference in farmers' income before and after land conversion.

Paired Sample t-Test

The analysis was conducted to determine differences in farmers' income before and after aquaculture pond land conversion. The test compared the same respondents under two different conditions; therefore, income before and after land conversion constituted paired observations. Based on the normality test results, the *paired sample t-test* was conducted using SPSS at a 5% significance level ($\alpha = 0.05$). The test was used to determine whether there was a significant difference in average farmers' income before and after land conversion (Ghozali, 2021).

Table 8. Paired Sample t-Test Results

Comparison	Mean Difference	t	df	Sig. (2-tailed)
Income Before – Income After	-Rp894.611,11.	-10,029	29	0,000

Source: Primary data processed (2026)

The *paired sample t-test* results for 30 respondents show a *t* value of -10.029, *df* of 29, and a significance value of 0.000. Since the significance value is below 0.05, there was a statistically significant difference between farmers' income before and after land conversion. The mean difference of -Rp894,611.11 indicates that average income after land conversion was higher than before land conversion by Rp894,611.11 per month. The findings indicate that farmers' decisions to convert their land were associated with economic factors, regional development, production conditions, and social factors. After land conversion, farmers moved to various occupations, including trading, shop-related activities, salaried employment, entrepreneurship, and warehouse work. These changes were accompanied by a statistically significant difference in income between the conditions before and after land conversion.

Changes in Livelihoods

The sale of pond land resulted in changes in farmers' sources of livelihood from pond farming to various non-pond occupations. Based on the 30 respondents, several types of occupations became sources of income after the sale of pond land.

Table 9. Farmers' Sources of Income After Pond Land Conversion

No	Source of Income	Respondents	Persentage (%)
1	Shop/business premises	8	26,67

2	Trader	8	26,67
3	Employee	6	20,00
4	Entrepreneur	5	16,67
5	Warehouse worker	3	10,00
	Total	**30**	**100,00**

Source: Primary data processed (2026)

Based on Table 9 , the largest sources of respondents' income after selling their pond land were shop-related activities and trading, each involving 8 respondents (26.67%). This was followed by 6 respondents (20.00%) working as employees, 5 respondents (16.67%) engaged in entrepreneurship, and 3 respondents (10.00%) working as warehouse workers. The composition indicates that after selling their pond land, farmers shifted to various occupations as alternative sources of income. These changes reflect farmers' livelihood adjustments after they no longer obtained income from pond farming.

CONCLUSION AND RECOMMENDATIONS

Based on the research findings, farmers' decisions to sell or convert aquaculture pond land were associated with economic factors, regional development, production conditions, and social factors. Land conversion was also followed by changes in farmers' livelihoods toward non-pond sectors and a statistically significant difference in income between the periods before and after land conversion. Farmers are advised to consider the sustainability of their income sources before selling pond land, while the government is expected to provide assistance in developing alternative businesses and livelihoods for farmers who convert their pond land.

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