FACTORS AFFECTING THE INCOME OF MILKFISH FARMERS DURING THE COVID-19 PANDEMIC IN NAPALAKURA VILLAGE NAPABALANO SUB DISTRICT MUNA DISTRICT

Sitti Zulma1), Muhammad Aswar Limi1), La Ode Kasno Arif1)

1) Department of Agribusiness Faculty of Agriculture, University of Halu Oleo, Kampus Hijau Bumi Tridharma Anduonohu, Kendari 93232, Indonesia

*Corresponding author: aswar_agribusiness@yahoo.com

To cite this article:

Received: January 29, 2023; Accepted: July 24, 2023; Published: July 27, 2023

ABSTRACT

This study aims to identify the characteristics of milkfish pond farming, assess the income of milkfish pond farmers, and determine the factors affecting the income of milkfish pond farmers in Napalakura Village, Napabalono District, Muna Regency, in the context of the Covid-19 pandemic. The investigation was conducted from August to December 2021 in Napalakura Village, Napabalono District, Muna Regency. Using a census sampling technique, forty respondents were selected for the study. A descriptive quantitative approach was employed for data analysis, providing insights into aquaculture characteristics, income analysis, and multiple linear regression analysis. The study findings revealed that milkfish farming encompasses breeding, fertilizing, maintaining, and harvesting. Milkfish farmers reported IDR6,368,489 per cycle, equating to IDR1,512,125 per month. With a 95% confidence level (α = 0.05), the variables of production and labor were found to have a positive and significant impact on the income of milkfish farmers. At the same time, land area and capital investment showed no significant effect on the farmers' income.

Keywords: covid 19; income; milkfish.

INTRODUCTION

At the beginning of 2020, we were shocked by the presence of a new virus known as the coronavirus or the Covid-19 virus that attacks the human respiratory system, which initially attacked China and was discovered in the city of Wuhan in November 2019. The coronavirus is considered a disease that comes and goes, and predictions that the virus could kill humans and spread very quickly turned out to be false, with flu-like symptoms, runny nose, coughing, and impaired smell. So far, the cause of the coronavirus is unknown, but it is thought that animals cause the virus, and it can spread from one species to another, including humans (Zaharah et al., 2020).

The rise of the Covid-19 virus has worried the community a lot, which has become an obstacle to the development of milkfish cultivation in Napalakura Village, Muna Regency. The virus outbreak caused the government to temporarily close transportation routes in border areas so that it would be difficult for pond farmers to market milkfish, and even farmers had difficulty getting supplies of milkfish seeds, resulting in pond farmers getting higher prices than usual.

Istiqomah (2021) has formulated a strategy to protect fishermen and fish cultivators from the Covid-19 outbreak, negatively impacting the marine and fisheries sector. In Indonesia, fishermen and fish cultivators in all coastal areas have reported negative impacts, especially for aquaculture, which are feared to reduce the production of various commodities that are the country's backbone. In particular, the shrimp commodity mentioned is included in the production target of up to 250% growth in 2024. The Indonesian government has developed various strategies to predict the negative impact of Covid-19 on aquaculture. This strategy aims to keep production running normally while meeting the 2024 target. Apart from aquaculture, the government has developed a similar approach for the marine and fisheries sectors. Among these strategies is the government purchasing all products from...
fishermen and fish cultivators and distributing fresh and processed raw materials through non-cash food assistance.

Napalakura Village is one of the coastal villages in Muna Regency, and this village has an area of 10.54 km² with a pond area of ± 300 hectares. Milkfish cultivation activities have been carried out by pond farmers since 2017 until now. The cultivation of milkfish pond production carried out by farmers can reach 6 to 7 tons per year. The price of milkfish farmers produce at the market level is ± IDR30,000/kg. The farming community in Napalakura Village is continuously clearing new land to become aquaculture areas.

The development of the fisheries sector, especially pond fisheries, is supported by the condition of the farmers' area. These potential areas are expected to increase fish production as part of economic development. Milkfish is a well-known species of fish consumed by humans. Milkfish is the result of ponds, where the cultivation of this animal was originally a job for farmers, especially pond farmers—typical diseases affecting aquatic animals. So far, most milkfish cultivation has been managed relatively simply, with deficient production levels. In terms of consumption, milkfish is a healthy source of protein because milkfish is a cholesterol-free protein source, milkfish cultivation will not cause environmental pollution, and water is not dirty and smells bad (Wahyudi, 2019).

Ponds are one of the fisheries businesses that utilize mangrove land as artificial ponds. Ponds are generally located close to the beach, which coastal communities use. Coastal communities make ponds one of their livelihoods. In a business or pond business, to increase income, it is necessary to know the factors of production (Oktari et al., 2021).

According to Saipal et al. (2019), income earned by milkfish producers is influenced by the variables of land area and amount of production with significant values of 0.013 and 0.000 < α 0.05. This is because if the location of ponds owned by farmers is more comprehensive or increases, the greater the amount of production produced, it can increase farmers’ income. In addition, the factors affecting milkfish farmers’ income are land productivity and capital productivity, which have a positive and significant effect on pay with a 90% confidence level with a coefficient of determination (R²) of 0.999 with a significance value of 0.000 < α 0.1. This is because the wider the pond area owned by the farmer, the more is spent by the farmer to manage the business land to increase the income of milkfish farmers (Takbir et al., 2017). A business, especially a milkfish pond cultivation, requires an experienced workforce. The crew’s experience dramatically influences the process of cultivating milkfish. A professional force can be used as learning for better performance to increase milkfish farmers’ production and income (Pezi et al., 2021); (Lim & Dewi, 2022). The distinction between this research and ongoing research is research During the Covid-19 pandemic, various categories of variables and variations in the significance of the variables examined were utilized. This study seeks to determine the characteristics of the milkfish pond business in Napalakura Village, Napabalano District, Muna Regency, the income of milkfish pond farmers in Napalakura Village, Napabalano District, Muna Regency, and the factors that influence the income of milkfish pond farming communities in Napalakura Village, Napabalano District, Muna District.

MATERIALS AND METHODS

The research location was in Napalakura Village, Napabalano District, Muna Regency. The research location was determined purposively. The time of the research was conducted in September-October 2021. The population in this study were all milkfish (*Chanos chanos*) farmers in Napalakura Village, Napabalano District, totaling 40 families. This study used census sampling, namely taking all components of the population to be used as respondents (Rianse & Abdi, 2009), so the number of respondents in this study was 40 families. The research variables consisted of the characteristics of the milkfish pond business (nursery, fertilization, maintenance, harvest), income variables (land area (X₁), production volume (X₂), labor (X₃), and capital (X₄). This study uses three analytical tools. Namely, the first analysis is a qualitative descriptive approach used to determine the characteristics of milkfish pond cultivation. The second is income analysis, according to Soekartawi (2002), with the following formula:

\[ I = TR - TC \]  \tag{1}

Information: \( I \) = income (IDR); TR = Total Revenue (Total Revenue); TC = Total Cost (Total Cost).

All three were analyzed using multiple linear regression analysis with SPSS tools. Numerous linear studies can be formulated (Riyanto & Hatmawan, 2020). as follows:
\[ Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + e \]  

Where \( Y \) = Income of milkfish farmers (IDR/year); \( a = \) Constant; \( b_1, b_2, b_3, b_4 = \) linear regression coefficient of each variable; \( X_1 = \) Land Area (Ha); \( X_2 = \) Total Production (Kg); \( X_3 = \) Labor (Day Man Work); \( X_4 = \) Capital (IDR); \( E = \) error.

**RESULTS AND DISCUSSION**

**Respondent Identity**

The respondent's identity describes their socioeconomic status, which also influences their capacity to administer their business. Forty milkfish pond producers from Napalakura Village participated as respondents in this research. This study describes the respondents' age, level of formal education, number of family dependents, and business management experience. Table 1 provides additional specifics.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of Respondents (Person)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (Years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productive (15-54)</td>
<td>32</td>
<td>80.0</td>
</tr>
<tr>
<td>Non Productive (&gt;54)</td>
<td>8</td>
<td>20.0</td>
</tr>
<tr>
<td><strong>Level of Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduated From Elementary</td>
<td>17</td>
<td>42.5</td>
</tr>
<tr>
<td>School/Equivalent</td>
<td>12</td>
<td>30.0</td>
</tr>
<tr>
<td>Graduated From Middle School/Equivalent</td>
<td>6</td>
<td>15.0</td>
</tr>
<tr>
<td>Graduated From High School/Equivalent</td>
<td>4</td>
<td>10.0</td>
</tr>
<tr>
<td>Bachelor/Magister</td>
<td>1</td>
<td>2.50</td>
</tr>
<tr>
<td><strong>Number of Family Dependents (Person)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-2</td>
<td>14</td>
<td>35.0</td>
</tr>
<tr>
<td>3-5</td>
<td>19</td>
<td>47.5</td>
</tr>
<tr>
<td>6-8</td>
<td>7</td>
<td>17.5</td>
</tr>
<tr>
<td><strong>Business Experience (Year)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-4</td>
<td>18</td>
<td>45.0</td>
</tr>
<tr>
<td>5-8</td>
<td>13</td>
<td>32.5</td>
</tr>
<tr>
<td>9-12</td>
<td>9</td>
<td>22.5</td>
</tr>
</tbody>
</table>

Table 1 shows that the milkfish pond farmers in Napalakura Village are still of productive age. This means that the milkfish pond cultivators in Napalakura Village have high physical and mental abilities. In this context, the effective period of the cultivators in the research locations influences work performance, which is related to the physical capacity, experience, and mindset to overcome the problems faced by milkfish cultivators. Soeharjo and Patong (1984) said the productive age is 15-54, and vice versa is non-productive.

The level of education in Napalakura Village is still relatively low. Damayanti (2013) that the level of education in this village is still relatively low. In non-formal education, the higher the level of education. It is easier for farmers to implement and develop their business. A person's education influences the way of thinking and behaving in various ways, such as in the milkfish pond business. The higher a person's education, the quicker he will take action and make more precise decisions, such as when dealing with bad situations during cultivation. Milkfish pond farmers in Napalakura Village mostly carry out education at the elementary level or equivalent so that their knowledge in pond farming is only obtained from generation to generation or based on the experience of local people.

The number of family members can affect productivity in farming. Nurjanah (2018) states that more family members are informing or are not. The number of family members in a farmer's household significantly impacts their ability to fulfill their daily obligations. The greater the number of family members in a farmer's home, the more it can aid in lightening their workload and reducing their labor expenses in administering their farm. The number of family members is an essential factor of production for agricultural productivity, particularly those entering the productive age, i.e., laborers, allowing the vast majority of interviewed farmer families to expand their farming activities. According to the study's findings, the number of dependents in the Napalakura village community falls within the category of small families, so producers also pay less for the operation of milkfish ponds.
Suratiyah (2016) states that the number of workers in a family will have a direct effect on costs. The more use of family labor, the less expenses incurred to pay for work outside the family. However, not everything is like this. Some specific jobs or activities are time-consuming due to the climate, so you must ask for outside labor, which means you must pay a fee.

Milkfish pond cultivators in Napalakula Village, Napabarano District, have been engaged in milkfish production at the production stage. This shows that the more experience the farmers interviewed have in the breeding process, the better the management skills of milkfish pond cultivators. Soeharjo and Patong (1984), five to ten years of agricultural experience is considered quite experienced, ten years or more is considered professional, and less than five years is considered inexperienced.

The more experienced a farmer is, the more careful his actions or decisions are in managing his business. According to this view, Soekartawi (2003), one's farming experience influences the acceptance of innovation from outside. Long-term farmers will find it easier to implement innovation than novice or new farmers.

Characteristics of Milkfish Pond Business

The process of cultivating milkfish by farmers has different treatments, such as the process of spreading seeds. A few farmers did not carry out seed nurseries first because they did not have unique land for the nursery process. Still, most of the pond farmers in Napalakura Village, Napabalan District, carried out seedling first, with the seedling process requiring around 1 to 3 months of seed or seed quarantine processes. Nener is about one month old in the nursery pond, then the seeds are released into a large pond, and then the pond is cleaned using a net to catch predators or fish that eat milkfish seedlings until the time when the seedlings move to a large pond (Romadon & Subekti, 2011).

Fertilizer is an important production factor for milkfish pond cultivation (Fahdla, 2019). Fertilizer is an important production factor for milkfish pond cultivation, and fertilization is intended to increase soil fertility at the bottom of the pond. This is done to provide the nutrients needed for natural forage growth, improve soil structure and inhibit water absorption in impermeable soils. Pond bottom soil fertilization is very suitable. Fertilizers containing essential mineral elements, especially organic acids, provide the substances needed to increase soil fertility and plankton growth.

Treatment is the process of maintaining milkfish by changing the water to maintain the security of the pond. Changing the water is carried out two times in 1 month during high tide (Wahyuning et al., 2019). The treatment or maintenance of milkfish dramatically determines the success of business production, treatment carried out by farmers, namely providing adequate or not excessive feed, using fertilizers that are well controlled, pests or types of disease can be held. The level of pond water must be maintained. Poor quality pond water can cause disease in fish. Control of pests such as shellfish in ponds is carried out by administering poison with Bestnoid 60 wp, which is stiffened before cultivation on production land. The treatment process is carried out during cultivation, namely for 4-6 months or after the desired harvest size is reached.

The fish are harvested after 4-6 months of rearing or after reaching the desired harvest-market size. The size of the harvest ranges from 150-300 grams per head. The growth of milkfish depends on the fertility of the pond. Before harvesting, it is advisable to monitor the development of the milkfish by checking the size/weight of the milkfish. The trick is, before the main harvest, a certain number of fish, say 20 heads, are caught using nets or nets in several places. Then weigh and calculate the average weight. Harvesting can be done if the average weight matches the desired size, but if not, the maintenance period must be increased. The best time to fish for milkfish is early morning or late afternoon when the pond water temperature is more relaxed, and the milkfish is less stressed. The method of fishing is to set a long net at the outlet of the water so that the fish can enter the net and be lifted above the water's surface. Romadon and Subekti (2011) Harvest when milkfish is 4 to 5 months old and weighs 200 to 250 grams per head or 4 to 5 leads per 1 kg.

Income

The income of the respondent farmer is the difference between all receipts and all costs incurred by the respondent farmer—an overview of the income received by the respondent farmers in Table 2.

<table>
<thead>
<tr>
<th>No</th>
<th>Production (kg)</th>
<th>Price (IDR)</th>
<th>Revenue (IDR)</th>
<th>Cost (IDR)</th>
<th>Income (IDR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>535</td>
<td>27,250</td>
<td>14,589,375</td>
<td>8.170,874</td>
<td>6.368,501</td>
</tr>
</tbody>
</table>
The average annual income of milkfish producers is displayed in Table 3 at IDR6,368,501. Farmers' income is influenced by the quantity of land, production, labor, and capital they own. The income producers receive the results obtained minus all production-related expenses.

**Factors Influencing Milfish Farmers’ Income During the Covid-19 Pandemic**

Factors affecting milkfish income in Napalakura Village were analyzed using multiple linear regression analysis. These factors consist of land area ($X_1$), amount of production ($X_2$), labor ($X_3$), and capital ($X_4$) as independent variables or independent variables, and income is the dependent variable or dependent variable.

<table>
<thead>
<tr>
<th>Table 3. Results of multiple linear regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>(Constant)</td>
</tr>
<tr>
<td>Land area</td>
</tr>
<tr>
<td>Production Amount</td>
</tr>
<tr>
<td>Labor</td>
</tr>
<tr>
<td>Capital</td>
</tr>
<tr>
<td>R</td>
</tr>
<tr>
<td>R Square</td>
</tr>
<tr>
<td>Adjusted R Square</td>
</tr>
<tr>
<td>Std. The error in the Estimate</td>
</tr>
<tr>
<td>F count</td>
</tr>
<tr>
<td>Sig</td>
</tr>
</tbody>
</table>

Based on Table 3, the effect of each independent variable ($X_i$) on the income variable ($Y$) can be explained. Following data processing results, the regression equation is obtained as follows:

$$Y = -16,103,685.136 + 108,247.734 + 21,441.645 + 49,076.181 + 0.012 + e$$  \hspace{1cm} (3)

The coefficient of determination ($R^2$), which measures the contribution of the independent variable to the dependent variable, is a valuable metric for identifying or observing the influence that variable $X$ has on variable $Y$. The adjusted $R^2$ in this study is 0.801, which indicates that 80.1% of the variability in the dependent variable ($Y$) can be explained by the independent variables of land area ($X_1$), a quantity of production ($X_2$), labor ($X_3$), and capital ($X_4$). In other words, these variables account for 80.1% of the variability in the productivity of the milkfish pond farmers ($Y$). The remaining 19.9% of the variability is attributable to other factors not included in this model.

The F test was utilized to determine if all the independent variables examined simultaneously impacted the demand for milkfish during the Covid-19 pandemic (Ghozali, 2020). Based on the F-test analysis in Table 6, the computed F value is 40,225, with a significance level 0.000. Given a confidence level of 95% or $\alpha = 0.05$, and because the significance value (0.000) is less than 0.05, it can be inferred that the model's variables - land area, labor, production volume, and capital input - significantly influence the income of milkfish pond farmers. This conclusion addresses the queries of the farmers involved in the study.

a. **Land Area ($X_1$)**

The land area variable ($X_1$) displays a t-statistic value (t1) of 0.308, with a significance level of 0.760, which is greater than the 95% confidence level or 5% probability level ($\alpha = 0.05$). This outcome indicates that the land area variable ($X_1$) is insignificant and does not significantly impact the income of milkfish pond farmers in Napalakura Village. The regression coefficient value of the land area variable ($X_1$) stands at 108,247.734. This means that for each additional hectare of land, there would be an income increase of IDR 108,247.734. However, the income of milkfish pond farmers in Napalakura Village remained relatively constant before and during the Covid-19 pandemic. This trend suggests that the farmers are not fully utilizing their available land area.

This research aligns with Lorensa et al. (2018), which stated that the variable land area did not significantly affect income. The results of the regression calculation show that the t-count for the land area is 0.841 with a significance of 0.404 and a confidence level of 90% or a probability of 10% ($\alpha = 0.1$). The significance value is more significant than $\alpha$ (0.404 > 0.1). The variable land area does not have a positive effect, especially for those with large land areas in the process of carrying out farming activities, still using a straightforward strategy from processing to harvesting.
This research is also in line with a study conducted by Faiq et al. (2012) that stated the p-value for the variable land area is 0.337 > (0.05), which means it is not significant. This means that land area has no significant effect on milkfish farming income. This shows that the land area in Tugureho Village, Tugu District, Semarang City, has not been used optimally, with an average land area of 2.69 hectares and an average production of only 756 kg in one growing season. With limited funds, pond farmers cannot utilize the land area for optimal management. Therefore, pond cultivators can utilize the land area to obtain maximum results.

b. Number of production (X2)

The t-test analysis, as presented in Table 3, yields a t-statistic value of 11.581 with a significance level of 0.000, given a 95% confidence level or a 5% probability level (α = 0.05). A significance value that is less than 0.05 (0.000 < 0.05) suggests that the production variable significantly influences the income of milkfish pond farmers. For each additional kilogram of production, revenue will increase by IDR 21,441.645. This indicates that a higher production output increases income from milkfish farming; conversely, a lower output leads to decreased revenue. Essentially, the more milkfish produced in the research area, the higher the income from cultivation; conversely, if the production is lower, the income level from milkfish farming will decrease.

This aligns with research conducted by Saipal et al. (2019), who noted that the yield variable significantly affects income. Based on the results of statistical tests, it can be seen that the significant probability value is 0.000. The significance value is less than 0.05. This means that production has a positive effect on the income of milkfish pond farmers in Soleko Village, Malanque District.

The same research is also in line with Faiq et al. (2012), which stated that the variable amount of production has a p-value of 0.000 <0.01, which is very significant. This means a substantial positive effect exists between milkfish cultivation production and income. This shows that in Tugureho Village, Tugu District, Semarang City, the greater the output, the higher the milkfish farming income, and conversely, if the production or output is smaller, the milkfish cultivation business income decreases.

c. Labor (X3)

The analysis results reveal that the labor variable (X3) has a significance value of 0.001, given a 95% confidence level or a 5% probability level (α = 0.05). A significance value less than 0.05 (0.001 < 0.05) indicates that the labor variable (X3) has a significant positive impact on the income of milkfish farmers (Y) in Napalakura Village. Each additional labor unit will increase the pond farmers' income by IDR 49,076,181. This result signifies that labor substantially affects the income of milkfish pond farmers, largely because the labor employed in the operation of milkfish ponds in Napalakura Village consists of family labor and hired help. The latter is engaged explicitly during periods of land preparation and harvest. Most milkfish pond farmers manage their cultivation activities, including land preparation, fertilization, seed stocking, maintenance, and water and disease control, independently.

This aligns with research conducted by Hikmawati (2018), which states that the more workers involved in shrimp farming, the more income the shrimp farmers in Tamuku Village receive. On the other hand, if fewer workers are engaged in shrimp farming, the revenue of shrimp farmers in Tamuku Village will decrease.

The same research is also in line with a study conducted by Ridha (2017), which states that the labor variable significantly affects income. Based on the results of the regression analysis, it shows that the labor variable has a t count > t table (2.956 > 2.000), a significant level of 0.006 or less than 0.05, so labor has a positive effect on the income of rice farmers in Nurussalam District, East Aceh Regency.

d. Capital (X4)

The regression analysis results indicate that the capital variable has a significance value of 0.359, given a 95% confidence level or a 5% probability level (α = 0.05). As the significance value is more significant than 0.05 (0.359 > α), this suggests that the capital variable, while positive, does not significantly impact the income of milkfish pond farmers (Y) in Napalakura Village. Each additional rupiah of capital invested in pond cultivation will increase the farmers' income by IDR 0.012. This finding implies that the capital variable does not significantly influence the income of milkfish pond farmers, as the size of the farmer's capital does not affect the quantity of seed stocked in the pond.

This research is in line with Atika (2020), who noted that the capital variable had no significant effect on the income of corn farmers in Labone Village, LaSalaipa District, Muna Regency. This is because the average amount of funds farmers spend is still relatively small. Based on research on corn planting, farmers moderately use their funds.
This study aligns with research conducted by Saipal et al. (2019), which shows that farmer capital has no significant effect on the income of milkfish pond farmers in Soleko village. Based on the statistical test results, a vital probability value of 0.448 > 0.05 was obtained. This is because Gresik farmers still use their funds and do not use bank loans. In addition to high-interest rates, the management process is still tricky for farmers to carry out.

CONCLUSIONS AND RECOMMENDATIONS

The operations of the milkfish pond cultivation business encompass processes such as seeding, fertilizing, maintenance, and harvesting. On average, milkfish pond farmers receive an income of IDR 6,368,489. The factors that significantly influence the income of milkfish pond farmers are the quantity of production, with a significance level of 0.000 < 0.05 (α), and labor, with a significance level of 0.001 < 0.05 (α). To boost their income, farmers can increase the number of seeds dispersed on the cultivated land following the land capacity and the recommended guidelines for milkfish cultivation. This includes the application of fertilizers and the use of feed according to the specified dosage.

REFERENCE


