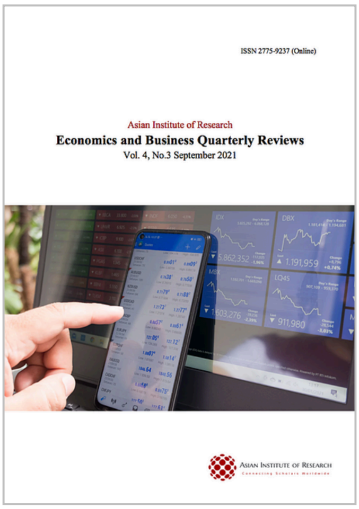

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Profitability and Risk Analysis of Catfish Farming Breeding Business in Sleman District, Sleman Regency, Yogyakarta

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Abstract
This study aims to analyze the profitability and risk of the catfish breeding business in the catfish farmer group in Sleman district, Sleman district, Yogyakarta. Respondents were selected using the census method because the number of population members was less than 30 people. The results of the profitability analysis using the Expense Structure Ratio (ESR), show that the ESR is 0.041, which means that the fixed costs used in production are 4.1% of the total cost. Benefit Cost Ratio (BCR) of 1.304 which shows that every 1 Rupiah in catfish farming investment will generate a profit of 30.4%. The results of the Gross Margin Ratio of 0.265 indicate that the breeding cultivation business provides a gross margin of 26.5% of the remaining income after paying direct costs related to production. From the results of the risk analysis, it was found that the income risk opportunities faced were 14.4% in each harvest season, the magnitude of the risk opportunities due to the increase in feed prices was 5.55%, and the risk of loss due to production fluctuations was 0.28. This study recommends that catfish farming farmers need to ensure the expenditure of production costs and strive to overcome risks both from internal and external factors.

Keywords: Profitability, Risk, Catfish Farming, Breeding

1. Introduction

Current catfish farming is increasingly in demand by the public because it is a profitable business. There are many advantages of catfish farming compared to other freshwater fish. When compared to other types of freshwater fish, catfish have fast growth, are easy to maintain, are resistant to bad water conditions, and have a high nutritional value and economic value. Within 3 months, catfish can be marketed. The market is never empty and the price is relatively stable. From these advantages, the catfish farming business is a good business opportunity and is expected to increase income.

The commercial fish farming business aims to produce fish that can be sold at competitive prices and generate profits. Profit is the biggest motivation for entrepreneurs to move the company (Ajagbe, 2018). Every entrepreneur will invest in a viable and profitable company. Therefore, efficient use of resources becomes very important

because efficient resource management can make the difference between profit and loss in a business (Engle, 2010). The fish farming business has a short turnover period (maximum six months) and is very profitable (Mohammed et al. 2015; Alawode and Jinad, 2014; Olasunkanmi, 2012). Research by Engle and Stone (2014) shows that the majority of fish farming businesses can be classified as small-scale enterprises. The analysis of small-scale fish farming is divided into three main, interdependent analyzes; namely biological performance analysis, financial analysis, and marketing analysis (Ajagbe, 2018). Failure of any of these analyzes can cause losses in the cultivation business. Therefore, prudence in decision-making in catfish farming is needed.

Profitability is a positive difference between total revenue and total cost. Business profitability can be analyzed using the company's report, namely the income statement. Items used in the income statement to analyze profitability are total income, total variable costs or cash expenditures, and non-cash expenses such as depreciation for one production cycle (Engle, 2012). By using profitability analysis, a business can know the amount of income and profits or losses of a business which in this case can help entrepreneurs to assess the feasibility of their business.

Risk is a condition of uncertainty about the income generated in the future. In the fish farming business, the risk of uncertainty can be caused by factors that cannot be controlled by farmers, such as weather factors, feed prices, and selling prices. According to Pappas and Hirschey (2005), risk can be measured by determining the density of the probability distribution. One measure is to use the standard deviation. Measurements with standard deviations describe risk in terms of the likelihood of deviations from the actual observations around the expected mean value. The amount of production, price, or profit that is expected to describe the average amount of production, price, or profit obtained by the farmer, while the standard deviation is the amount of fluctuation in production, price, or profit that may be obtained or is a risk borne by the farmer.

The Sleman sub-district breeder group is one of the Catfish Cultivation Groups located in Sleman Regency, Yogyakarta. Sleman sub-district consists of 5 sub-districts, namely Caturharjo, Pandowoharjo, Tridadi, Triharjo, and Trimulyo. The cultivation that has been carried out so far uses a catfish breeding system using a tarpaulin pond. This fish farming business is a supporting business for the community to improve their welfare. However, some of the problems that become obstacles for cultivators in running a catfish farming business are the high price of seeds due to the relatively remote location of the purchase of seeds, and the lack of public understanding about knowledge of catfish farming that can provide benefits to farmers. Based on the explanation of the background above, the researcher is interested in researching the "Analysis of Profitability and Risk of Catfish Raising Business in Farmers' Groups in Sleman District, Sleman Regency, Yogyakarta. This research aims to provide information on catfish farming business activities in the Sleman sub-district farmer group, regarding the structure of costs, revenues, benefits, and risks faced. Profitability analysis is used to determine the business condition of the Sleman sub-district farmer group by looking at the structure of costs, revenues, and profits. Meanwhile, risk analysis is carried out to determine the magnitude of the risks faced by farmers and how to overcome these risks. It is hoped that this analysis can provide an overview of the diversity of catfish farming businesses, as well as how to overcome the problems faced.

2. Method

This research was conducted on a group of catfish farmers in the District of Sleman Yogyakarta. The sampling technique uses a saturated sample technique (census), where all members of the population will be the research sample. This is done because the number of population members is less than 30 people.

Profitability analysis is aimed at detecting the cause of the profit or loss generated by each type of product in a certain period. This study used total fixed costs, total variable costs, and total revenue in measuring profitability. The profitability of catfish cultivators is obtained by subtracting revenues from costs incurred during the production process (Adebayo et al., 2013).

$$Profit = TR - TC \quad (1)$$

Several ratios that are also used for profitability analysis in this study include (Ajagbe, 2018):

$$Expense\ Structure\ Ratio\ (ESR) = Fixed\ cost/Total\ cost \quad (2)$$

$$Benefit\ cost\ ratio\ (BCR) = Total\ revenue/\ Total\ cost \quad (3)$$

$$Gross\ Margin\ Ratio = Total\ Revenue - Total\ Variable\ Cost/\ Total\ revenue \quad (4)$$

Risk analysis is measured by determining the density of the probability distribution. One measure is to use the standard deviation (Pappas and Hirschey, 2005). Measurements with standard deviations describe risk in terms of the likelihood of deviations from the actual observations around the expected mean value. The amount of production, price, or profit that is expected to describe the average amount of production, price, or profit obtained by farmers while the standard deviation is the magnitude of fluctuations in production, price, or profit that may be obtained or is a risk borne by farmers. The smaller the standard deviation, the denser the probability distribution, resulting in a lower risk.

Measurement of the standard deviation value obtained by the formula (Salvatore, 2005):

$$V^2 = \sum_{i=1}^{n} \frac{(E-E^2)}{n-1} \quad (4)$$

$$V = \sum_{i=1}^{n} \sqrt{\frac{E-E^2}{n-1}} \quad (5)$$

Where V (variance): standard deviation (standard deviation); Ei: possible outcome; E: the average of the expected results (mean).

In its use, there are several problems when the standard deviation is used in the measure of risk. To overcome this problem, the coefficient of variation is calculated by dividing the standard deviation by the average value. If the value of the coefficient of variation (CV) is known, it will be possible to know the magnitude of the production risk, price, and profit that must be borne by the farmer. The CV value is directly proportional to the risk faced by the breeder, where the greater the CV value obtained, the greater the risk that must be taken borne. Conversely, the lower the CV value obtained, the smaller the risk to be borne.

3. Results and Discussion

3.1 Characteristics of Respondents

The catfish farming business carried out by the farmer group in Sleman District began in January 2019 with 26 members. Cultivation carried out by farmers is carried out independently or individually with fish breeding techniques starting from seeds with an average price of Rp. 180,- per head. Fish breeding is done using pond media where 60% of farmers use their land, 20% use leased land with a profit-sharing system, and the rest rent land at a cost of around IDR 600,000 per year. The area of land used for catfish farming is on average about 200 m^2. Fish breeding is carried out in a 3-month cycle, starting from the time the seeds are sown until the fish are harvested.

Workers who carry out cultivation are pond owners or landowners themselves assisted by an employee with an average wage cost of Rp. 1.000.000,- per harvest. The average yield is 650 kg and can be sold for IDR 17,000 per kg. Most of the respondents sell their harvests to middlemen, and only 20% of the respondents sell their crops directly to the market. In fulfilling their capital needs, all respondents financed their capital with a capital requirement of around IDR 4,000,000 to IDR 10,000,000. For the initial investment, the investment costs consist of the purchase of tarpaulins, sorting buckets, fish scoops, digital scales, and machines of Rp. 4,160,000.

The characteristics of respondents who are members of the Bolopijah catfish farmer group are shown in table 1 below.

Table 1: Respondent Characteristics Cultivation Catfish Farmers in the district of Sleman

Variable	Number (person)	Percentage (%)
Age: < 31 Years 31 – 40 41 – 50 Years > 50 Years	 5 16 5 0	 19 62 19 0
Gender: Male Female	 26 0	 100
Education: Junior High School Senior High School D3/Bachelor's Degree	 0 18 8	 0 69 31
Length of business: <6 months 6 months – 1 year >1 year	 0 21 5	 0 81 19

3.2 Profitability Analysis

Analysis of business carried out in cultivation Catfish in the Sleman sub-district farmer group is carried out for three months according to the length of time the fish seeds are sown until the fish are ready to be harvested (one cycle of cultivation). Total revenue is obtained from the multiplication of production results for one business cycle with the average price prevailing at the time of the study, which is IDR 17,000 per kg with a fish size of about 7 to 12 fish per kg. The calculated cost component consists of 2 components, namely variable costs and fixed costs. In the farmer group in the Sleman sub-district, the fixed costs consist of land rent and equipment depreciation. While variable costs consist of direct labor costs, electricity costs, costs for seeds, animal feed, medicines, and vitamins. These costs are calculated from the average spent by all respondents.

Table 2 shows an analysis of the income and costs of farmer groups in the Sleman sub-district. The total cost of production is Rp. 124.910.000,- which consists of variable costs and fixed costs.

Table 2: Profitability Analysis in the Cultivation Breeders group in Sleman District

Item	**Cost**
Total income (TR)	IDR 170.000.000
Total variable costs (TVC) (costs of wages, electricity, seeds, fish feed, medicine, and vitamins)	IDR 124.910.000
Total fixed costs (TFC) (land lease and equipment depreciation)	Rp 5,433,750
Total cost (TC)	Rp 129,910,000
Gross margin (TR – TVC)	Rp 45,090,000
Gross profit (TR – TC)	Rp 39,656,250
ESR	0.041
BCR	1,304
Gross Ratio	0.265

The results of the profitability analysis show that the ratio of the cost structure (ESR) in table 2 is 0.041. This means that the fixed costs are 4.1% of the total production costs. The amount of fixed costs to total production

costs reflects that most of the resources used for catfish cultivation in this study are variable resources. The nature of these costs will increase along with the amount of production (Adabayo and Daramola, 2013).

Benefit-Cost Ratio (BCR) is a profitability ratio used to analyze the costs and benefits of a business. The results show that the BCR is 1.304. The value of 1.304 means that for every 1 Rupiah, investment in catfish farming will generate a profit of 30.4%. This shows that the cultivation of catfish carried out by the farmer group using breeding is still quite profitable and feasible to continue Akegbejo-Samsons and Adeoye (2012), Tunde, et al. (2015), and Alawode et al. (2016) in their research stated that the BCR value greater than 1 indicates that the business is carried out is profitable and feasible to continue.

The Gross Margin ratio is a profitability ratio to calculate the percentage of profit gross to revenue from sales minus Cost of Goods Sold (HPP). This measures the company's efficiency in using production raw materials and labor in charge of producing or selling goods. The calculation of the Gross Margin Ratio in this study obtained a result of 0.265. These results indicate that the farmer group in Sleman sub-district has a gross profit margin of 26.5% of the residual income after paying direct costs related to production.

The results of this study indicate that catfish farming with breeding techniques is widely carried out because it is quite profitable for farmers. However, the number of costs associated with feed costs needs to be considered so that the use of feed can be optimized so that there is no wastage. In principle, the enlargement stage is an effort to raise fish seeds into fish that are ready to be sold, around 100 to 150 grams per head or 7 to 10 fish per kg. Thus, the speed of the catfish breeding process to reach a ready-to-sell size is the key to profit. This needs to be supported by proper cultivation management, detailed pond preparation, selection of good quality seeds, and appropriate cultivation techniques, structured feed management, and pest and disease control that is carried out as early as possible to support successful cultivation (Rochman, 2014).

3.3 Risk Analysis

The risks that may be faced by catfish farmers in the farmer group in the Sleman sub-district are production risk, price risk, and income risk. The price of catfish every harvest season often fluctuates, especially during a pandemic. The highest price of catfish obtained by respondent farmers was Rp. 25,000.00/kg and the lowest price was Rp. 15,000.00/kg with an average price of Rp. 20,000.00/kg. Fluctuating prices occur due to various factors such as low demand and unfavorable harvest conditions. Production risk can be caused by environmental stress due to limited media while fish are kept in large numbers, low water circulation, climate change that affects pond temperature, and diseases that attack catfish. This can cause fish production to decline which can lead to crop failure and decreased income. Income risk can also be caused by rising production costs, one of which breeders often complain about is feed prices that are unstable and tend to rise. This causes an increase in production costs and results in a decrease in income.

Table 3: Analysis of Production, Price and Income Risk of Farmer Groups in Sleman District

Condition	Probability	Selling Price (Rp/kg)	Feed Price (Rp/kg)	Production (Kg)
Good	0.43	23.500	288.000	550
Normal	0.27	20,000	305 000	900
Recent	0.30	16,500	327 500	1,250
Total	1.00	60,000	920 500	2,700
Mean		20,000	306,833.3	900
Variance(⌠2)		8710661	286 391 899	79291.91
Standard Deviation(σ)		2951.383	16.923.117	281.59
Coefficient of Variation (CV)		0.144	0.055	0.28

The results of the calculation of the risk of catfish farming in table 3 show that the expected average selling price in each growing season is Rp. 20,000/kg, while the fluctuations in the selling price are may be obtained (standard

deviation) of Rp. 2,951.383/kg. The value of the coefficient of variation on the price is 0.14 which means the amount of income risk opportunities that may be faced by catfish farmers is 14.4% in each harvest season. This shows that farmers face the risk of loss due to fluctuations in income in the future. The average price of feed which is one of the largest components of production costs that farmers often complain about is Rp. 306.833,3 per kg. Price fluctuations that may occur are Rp. 16,923.117 with a coefficient of variation of 0.055. This means that the potential risk due to the increase in feed prices that farmers may face is 0.055 or 5.5% in each harvest season. For catfish farming production, the expected yield in each harvest season is 900 kg, while the production fluctuations that may be obtained are Rp. 281.58 / kg or the value of the standard deviation (standard deviation). The coefficient of variation in production is 0.28, meaning that for every one rupiah generated from catfish farming, the risk of loss faced by respondent farmers is 0.28 kg.

Several factors that cause risk in the catfish farming business faced by farmer groups in the Sleman sub-district come from external factors in the form of changes in weather during transitions, fungal attacks on fish, and feed prices that tend to rise. Some of the efforts that have been made by the Sleman sub-district farmer group in dealing with production risks related to the decrease in production due to fungal attacks on fish are providing vitamins, drugs and maintaining the cleanliness of the pond water. Vitamins and medicine specifically for catfish are purchased at veterinary supply stores. While the cleanliness of the pond is done by keeping the water clean to avoid pollution and environmental pollution because catfish require good water circulation, adequate oxygen distribution, avoid harmful compounds, maintain temperature, and prevent the growth of fungi and parasites. Efforts to reduce production levels are also carried out by maintaining a conducive pond environment so that catfish avoid stress. Environmental stress can cause cannibalism in catfish so that they tend to prey on each other. Associated with the risk of production costs due to the rising price of fish feed, a group of farmers in the Sleman sub-district has worked around this by feeding their own farmed catfish from trash fish. However, this homemade feed affects the duration of the harvest. If using factory feed, catfish can be harvested within 3 months. Meanwhile, if given artificial fish feed, the yield is 14 days adrift.

Conclusion

The results of this study indicate that catfish farming carried out by the farmer group in the Sleman sub-district is still a profitable business and deserves to be continued. From the results of the profitability analysis, it appears that this cultivation business is still profitable and can provide income welfare for farmers. However, the profits obtained from catfish farming are the cumulative gains in the final yield. In this case, farmers must realize that to increase their profits, they must ensure that production costs are as low as possible and minimize the risks that may occur, both risks originating from external and internal factors.

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