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CATFISH CULVATION (*Pangasianodon hypopthalmus*) BUSINESS INCOME WITH PRODUCTION RISKS IN BANJAR DISTRICT, SOUTH KALIMANTAN PROVINCE

Pendapatan Usaha Budidaya Patin (Pangasianodon hypopthalmus) Dan Risiko Produksi Di Kabupaten Banjar Provinsi Kalimantan Selatan

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ABSTRACT

Catfish (Pangsianodon hypopthalmus) is a type of economical fish that is quite popular with the public. Production of Catfish cultivation in Banjar Regency has decreased, due to flooding as a factor influencing production risk. The existence of production risks in the Catfish cultivation business also greatly influences the income of Catfish cultivators. The aim of this research is to analyze the income of Catfish cultivation businesses in the presence of production risks. This research was conducted in Martapura District and West Martapura District, Banjar Regency. The number of Catfish cultivators in the sample was 41 respondents. The type of data used in This research was used panel data. Business income is analyzed using the R/C ratio and the value of expected income when production risks occur is measured using expected return. The results of the analysis show that the Catfish cultivation business has an R/C ratio > 1 and the expected return value is positive, namely IDR 5,431,767.27. *The probability that there is a production risk, namely flooding, shows that the Catfish cultivation business in Banjar Regency is efficient and therefore feasible to run.*

Keyword: business income, catfish cultivation, risk production

ABSTRAK

Patin merupakan salah satu jenis ikan ekonomis yang cukup digemari oleh masyarakat. Produksi budidaya patin di Kabupaten Banjar mengalami penurunan, disebabkan adanya bencana banjir sebagai faktor pengaruh risiko produksi. Adanya risiko produksi dalam usaha budidaya patin juga sangat berpengaruh terhadap pendapatan pembudidaya patin. Tujuan dari penelitian ini adalah untuk menganalisis pendapatan usaha budidaya patin dengan adanya risiko produksi. Penelitian ini dilakukan di Kecamatan Martapura dan Kecamatan Martapura Barat, Kabupaten Banjar. Jumlah pembudidaya patin yang menjadi sampel berjumlah 41 responden. Jenis data yang digunakan dalam penelitian ini adalah data cross section. Pendapatan usaha dianalisis menggunakan R/C ratio dan nilai pendapatan yang diharapkan pada saat terjadi risiko produksi diukur menggunakan expected return. Hasil analisis menunjukkan bahwa usaha budidaya patin memiliki nilai R/C ratio > 1 dan nilai expected return bernilai positif, yaitu sebesar Rp 5,431,767.27*. Probabilitas dengan adanya risiko produksi yaitu banjir, menunjukkan bahwa usaha budidaya patin di Kabupaten Banjar sudah efisien sehingga layak untuk dijalankan.*

Kata Kunci: pendapatan, budidaya patin, risiko produksi

INTRODUCTION

In Indonesia, the type of Catfish that is widely culvated is Catfish (*Pangsianodon hypopthalmus*) (Putra et al., 2022). Catfish is one type of fish that is quite economical and popular with the public (Paidi & Hermawan, 2019). To fulfill market demand, Catfish can currently cultivated in a an intensive way using ponds, cages, and nets. In Indonesia, national Catfish production has fluctuated in the period 2014-2017, this is due to the small number of cultivators and the cultivation area is still not maximally integrated which causes annual productivity to always not reach the target (Kementerian Kelautan dan Perikanan, 2022).

South Kalimantan is one of the provinces that has the second contribution to Catfish production in Indonesia (Kementrian Kelautan dan Perikanan, 2022). South Kalimantan is one of the provinces that contribute greatly to national Catfish production. South Kalimantan fisheries production in 2021 is 218,547 tons, consisting of 157,646 tons of capture fisheries and 60,901 tons of aquaculture.

Table 1. Top Five Producing Provinces of Catfish (*Pangsianodon hypopthalmus*) in Indonesia 2018-2021 (Tons)

No	Province	Year			Contribution in 2021(%)
		2019	2020	2021	
1	South Sumatra	122,289.13	74,067.55	72,758.84	21.91
2	South Kalimantan	56,968.46	44,698.89	46,282.00	13.93
3	Central Kalimantan	33,487.19	32,660.82	33,567.14	10.10
4	Riau	27,334.75	30,967.32	31,230.75	9.40
5	West Java	22,424.64	33,268.97	31,176.95	9.38
	Indonesia	384,310.48	327,145.95	332,022.96	

Source: KKP, 2022

Banjar Regency is a district in the province of South Kalimantan. Banjar Regency is designated as a minapolitan area, has potential land for cultivating fish in ponds reaching 39,558.3 ha, of which 538.1 ha of the pond area has been utilized. Pond cultured fish production in 2019 was 45,848.12 tons, of which Banjar district was able to produce 39,974.89 tons, as can be seen in Figure 1.

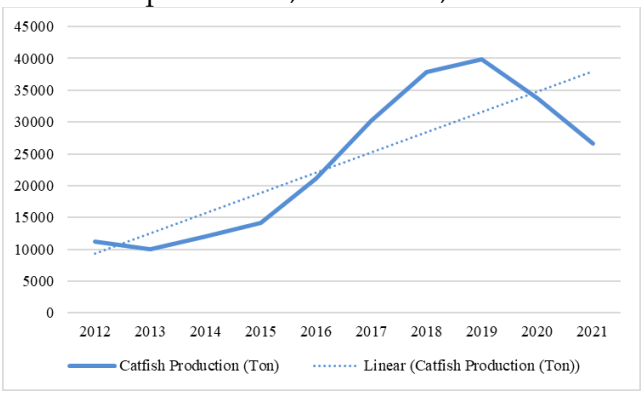

Figure 3 Catfish Production in Banjar Regency 2012-2021
Source: KKP 2022

The production of Catfish culvation in Banjar Regency has decreased in 2020 and 2021. The decline is due to flooding as an influence factor of production risks that occur in Banjar Regency. In general, production risks that usually occur can be caused by internal and external factors. Internal factors include the use of inputs that are not optimal, while external factors are factors that cannot be controlled by farmers in the form of natural factors such as (extreme weather and seasonal changes), pests, and diseases (Fauzan, 2016).

Similar to research conducted by Asaad et al., (2019) & Suharyanto et al., (2015) which states that seasonal changes in the form of flooding are a production risk factor that causes crop failure, with the same risk factors can reduce the income of vanamei shrimp farmers by up to 65% causing crop failure (Mahfud et al., 2021)

In early 2021, South Kalimantan was hit by a flood disaster. Floods in South Kalimantan were caused by extreme weather from January 9, 2021 to January 15, 2021. Based on the South Kalimantan BPDP report in 2021, as a result of this extreme weather, several areas in South Kalimantan were flooded, one of which was Banjar Regency. The area in Banjar Regency affected by flooding is 40,000 hectares, as can be seen in Table 2.

Table 2. Flood Data and Fisheries Losses in Banjar Regency

Region	Affected Households	Fish Loss (IDR)	Damage (IDR)	
			Production Infrastructure	Production Equipment
Banjar Regency	60,654	45,291,227,500	2,028,175,000	1,669,359,750

Source: Banjar Regency Fisheries Office

In Table 2. it can be seen that floods inundated almost all Subdistricts in Banjar Regency. Several flood-affected subdistricts in Banjar Regency are locations of fish cultivation businesses. Sub-districts affected by flooding are Karang Intan Sub-district, Martapura Sub-district and West Martapura Sub-district. In 2021, there were approximately 1,836 fishery households affected by flooding, consisting of 1,211 ponds and 625 floating net cages. The losses incurred were loss of seeds and ready-to-harvest fish worth IDR 45,291,227,500. Damage to production infrastructure such as damaged ponds worth IDR 2,028,175,000 and damage to production equipment such as feed machines and nets worth IDR 1,669,359,750.

Freshwater fish cultivation is well known as a high-risk business, risks can come from crop failure due to disease attack on the fish, resulting in massive mortality of the cultivated fish (Andani et al., 2014). Seasonal and weather changes that occur can affect water quality. Water quality is very influential on cultured fish so that it can cause fish stress, susceptibility to disease, and mass mortality in fish. Apriana (2017) stated that seasonal variables had a significant effect on rice production in Bojonegoro Regency, so that rice production in the second cropping season 2013 (flood conditions) was more at risk than in the second cropping season 2015.

Production risks in the Catfish cultivation is also very influential on business income (Aeni et al., 2021). There is a risk that production will increase deaths in Catfish so that crop failure occurs which will increase fluctuations in Catfish production between cultivators. These production risks are caused, among other things, by the use of production inputs that are not recommended and external influences in the form of seasons so that revenues from Catfish cultivation businesses will fluctuate.

The further impact of fluctuating income from the Catfish cultivation business is that business income also fluctuates (Purnamasari et al., 2022). It is

important to predict this because if ignored, it can lead to higher risks that can affect cultivators' income (Supriyadi et al., 2023). Therefore influence risk production to income business cultivation Catfish in Banjar Regency. The purpose of research is to analyze income business cultivation Patience with its risk production Banjar Regency.

RESEARCH METHOD

This research was conducted in the District Martapura and District West Martapura in Banjar Regency, South Kalimantan Province. The selection of the research location was done in a way purposive with consideration that in the District Martapura and District West Martapura is location cultivator Catfish with pond media affected by flood. The cultivator became the sample in this study amounted to 41 respondents. The type of data used in This research is data panel, namely when harvesting flood conditions in 2021 (June 2021-March 2022) and harvesting non-flood (normal conditions) in 2022 (April 2022-February 2023). Income business cultivation Catfish is the results subtraction from the reception business with costs incurred. Income calculated on research is income as it is risk flood (expected return) is seen from probability or possibility flood.

Expected Return

Income business cultivation Catfish that has included an element of risk is referred to as expected return. Risk production from disaster flood in the calculation of expected return is represented as possible opportunities differentiated by opportunity condition good (p1) and condition bad (p2) (Anderson et al., 1997; Ellis, 1988). Total observed events is an amount from opportunity multiplied by the income in each condition good and bad (Doll & Orazem, 1984; Ellis, 1988). By mathematical, calculation expected return can be written as follows:

$$f(w) = E(R) = \sum P_i \pi_i \quad (1)$$

$$E(R) = p_1 \pi_1 + p_2 \pi_2 \quad (2)$$

notes: E(R) = expected return;
p_1 = opportunity of good condition;
p_2 = opportunity of bad condition;
π_1= income in condition good condition;
π_2= income in condition bad condition

Income Analysis in the Existence of Risk Production

Income is a result of subtraction between receipts and costs. Cultivation business Catfish done by farmers naturally aims to maximize the income they receive for prosperity farmers also increased. Therefore, it is necessary to

analyze income business cultivation Catfish to maximize income. By mathematically, profit (π) from the output (Y) received by using input (X), can be written as follows:

$$\pi = P_y.Y - \sum P_i.X_i \qquad (P_y.P_i > 0) \tag{3}$$

notes: $P_y.Y$= cultivation revenue; $\sum p_i x_{i_i}$= cultivation cost

Income calculated on research is income as it is risk flood (expected return) is seen from probability or possibility flood. The probability of chance is differentiated into two possibilities, namely opportunity moment normal conditions (p_1) and opportunities moment condition flood (p_2) which follow added up entirely (Dillon, 1977). By more detailed income business cultivation Catfish can seen in Table 3.

Table 3. Components of Catfish Cultivation Business Income

No	Component	Information
A	Cash revenue	Price (P) × Catfish product sold (Q_1)
B	Calculated revenue	Price (P) × Catfish product consumed/stored (Q_2)
C	Total Revenue	A+B
D	Cash cost	a. Input production cost b. Labor cost non the family (LCOF)
E	Calculated costs	a. Labor cost in the family (LCIF) b. Equipment depreciation c. Own land value
F	Total Cost (TC)	D + E
G	Income on cost cash	A–D
H	Income on total cost	C–F
I	Income with production risk	p_1H + p_2H

Source: Noviana, 2022

Revenue Cost Ratio Analysis

Revenue Cost Ratio is used to determine the extent to which business results in a certain period of time are quite profitable or not and each rupiah value of costs used in business activities can provide a certain amount of revenue value as a benefit (Abadiyah & Sosiawati, 2022).

R/C (Revenue Cost Ratio) is a comparison between total revenue and total costs with a formula as follows (Soekartawi, 2002).

$$R/C\ ratio = \frac{TR}{TC} \tag{4}$$

notes: $R/C\ ratio$= Revenue cost ratio;
TR= Total revenue;

TC= Total cost Criteria $R/C > 1$: the business is profitable, $R/C < 1$: the business is losing and $R/C = 1$: the business does not make a profit or loss (break-even)

RESULT AND DISCUSSION

Catfish cultivation business income is one measure that can be used to determine the success of Catfish cultivation business. The income of Catfish cultivation business analyzed in this study is seen from two sides, namely the income of Catfish cultivation business on cash costs and the income of Catfish cultivation business on total costs. The average income of Catfish cultivation is calculated based on the average income received per hectare of land in one production cycle of ± eight months. External factors such as flooding certainly affect the production of Catfish and the income earned by cultivators. This was done to determine the effect of flooding on catfish cultivation business income by including an element of risk seen from the expected return value. Risk is the probability of a situation causing a loss, risk has an influence on the decision-making of production activities (Mubarokah et al., 2017).

Characteristics of Catfish Cultivators

The characteristics of Catfish cultivators described are the results of interviews with 41 cultivators in Martapura and Martapura Barat sub-districts. The results of interviews on the characteristics of cultivators can illustrate the existence of relatively diverse socio-economic conditions. The characteristics of the Catfish cultivators described include:

(1) Age of cultivators that most Catfish cultivators are at a productive age with the largest percentage being in the age range of 41 to 50 years, this condition is favorable because with a productive age level, cultivators will be easier to accept new technology that can be applied in order to increase Catfish production (2) Education level of cultivators that most cultivators have a high school education level (3) Business experience of cultivators that the experience of cultivators in the Catfish cultivation business 63. 41 percent are between 11-20 years (4) The number of family members of the cultivator household with the highest percentage is 90.24 percent with the number of dependent family members between one to three people and (5) The ownership status of the Catfish cultivation business 97.5 percent is self-owned and the remaining 2.44 percent is rented land by paying rent to the landowner.

Catfish Cultivation Business Revenue

Catfish cultivation business revenue is calculated based on the average amount of Catfish produced per hectare of cultivated land in one production cycle multiplied by the price of Catfish per kilogram. Catfish cultivation

business revenue is calculated based on two different harvest seasons, namely the 2021 harvest season and the 2022 harvest season. The total revenue of the Catfish cultivation business consists only of cash receipts, which can be seen in Table 4.

Table 4. Revenue of Business Cultivation Catfish Cultivators in Season Harvest 2021 and Seasons Harvest 2022

Revenue	Description	Harvest Season 2021	Harvest Season 2022	Decline Reception Year 2021 (%)
		Revenue (IDR)		
A	Cash revenue	11,823,575.36	1,058,139,761.29	-98.88
B	Calculated revenue Catfish consumption	0.00	0.00	0.00
C	Total revenue	11,823,575.36	1,058,139,761.29	-98.88

Source: Primary Data (2023)

The average revenue of Catfish cultivation in the 2022 harvest season (normal conditions) is much greater than the 2021 harvest season (flood conditions). The huge difference in revenue is influenced by external factors such as floods as a source of risk. The total revenue of cultivators in the 2022 harvest season or during normal conditions much higher than the revenue in the 2021 harvest season when the floods. The huge difference in revenue is influenced by flooding as one of the sources of risk. The decrease in total revenue due to flooding reached 98.88 percent.

Catfish Cultivation Business Expenditures

The total expenditure of Catfish cultivation is divided into two, namely cash expenditure and calculated expenditure. Cash expenditures in Catfish cultivation consist of costs incurred in cash by cultivators for the purchase of production facilities. Meanwhile, calculated expenditures are all costs that are not incurred in cash by farmers (Prabowo et al., 2021). Harvesting costs are not included in labor costs because the labor used is piecework labor outside of labor during the Catfish cultivation business process. The average expenditure of Catfish cultivation business can be seen in Table 5.

Table 5. Average of Expenditure Business Catfish Cultivation

Cost	Description	Harvest Season 2021 Price (IDR)	Harvest Season 2022 Price (IDR)
D	Cash cost		
	Fish seed	36,489,450.98	26,606,435.84
	Feed	809,362,363.37	724,055,943.10
	Calcium	9,608,308.47	8,337,822.44
	Solar	2,521,768.65	12,969,954.97
	Medicines	559,367.91	2,703,937.50
	LCOF	18,196,977.82	22,276,108.68
	Cost Harvest	560,645.33	19,608,807.61
	Total Cash Costs	877,298,954,53	816,559,010.15
E	Calculated cost		
	LCIF	12,335,489.49	11,118,777.79
	Equipment depreciation	3,114,176.83	3,114,176.83
	Land value (rent)	2,824,242.54	2,472,631.69
	Total calculated cost	18,273,908.86	16,705,586.31
F	Total Cost	895,572,863.39	833,264,596.46

Source: Primary Data (2023)

It can be seen in the Table 5. that the presentation of the highest cultivator expenditure is the cost of feed and Labor Costs Outside The Family (LCOF). Similar to the study that the factors that significantly affect the income of fish cultivators are feed costs, labor costs and vitamin costs (Hidayati et al., 2020).

Percentage cost biggest in cost cash there is in cost use feed, this is because the price of feed is quite expensive, which is around IDR 9,000 per kilogram and is needed in large quantities, making cultivators reduce the amount of feed in kilograms. The ever-increasing price of feed is one of the main obstacles faced by farmers, because the increasing price of feed is not proportional to the selling price of fish (Fajarwati et al., 2023). Similar to the results study (Mulyani, 2017) the cost feed absorb proportion reaches 60-70 percent of cost production. The second largest percentage of cash costs is outside family labor costs (LCOF). The percentage of LOCF costs in 2022 is greater than that of LCOF in 2021. This was due to several reasons, in 2021 there were several farmers who experienced a shorter production period due to flooding so they did not use much LCOF. Similar to the results of research conducted by (Saputra et al., 2018) that non-family labor costs are the largest cost component.

In the calculated costs, the largest percentage of costs is in the cost of land value (rent). In 2022 the land rental value decreased, due to land damaged

by floods that occurred in 2021. The results of this study are in line with (Triyanti & Hikmah, 2015) that the largest percentage of costs calculated is the cost of land value (rent) in vanamei shrimp and milkfish farming.

Catfish Cultivation Business Income

Income business cultivation Catfish is the difference between receipts and expenditures for business cultivation Catfish (Apriadi et al., 2017). Income business cultivation Catfish consists of income business cultivation Catfish on cost cash and income business cultivation Catfish on the total cost. The difference in income between the season 2021 harvest and the season 2022 harvest indicates an influence risk to income.

The Catfish cultivation business in the 2021 harvest season experienced a loss which was characterized by a negative amount of income. In the 2021 harvest season, the average income over cash costs of cultivators experienced a loss while in the 2022 harvest season, the average income over cash costs of cultivators and income over total costs increased. The results of this study are also in accordance with research conducted (Apriana et al., 2017) rice business carried out during the rainy season suffered a loss of IDR 9,010,646 per hectare because there was a natural disaster in the form of floods that damaged most of the farmers' rice crops.

Table 6. Average Income Business Cultivation Catfish Cultivators in Season Harvest 2021 and Seasons Harvest 2022

No	Description	Harvest season 2021 (Flood Condition) (IDR)	Harvest season 2022 (Normal Condition) (IDR)	Percentage Change (%)
A	Cash revenue	11,823,575.36	1,058,139,761.29	98.88
B	Calculated revenue	0.00	0.00	0.00
C	Total revenue	11,823,575.36	1,058,139,761.29	98.88
D	Cash cost	877,298,954,53	816,559,010.15	-7.44
E	Calculated cost	18,273,908.86	16,705,586.31	-9.39
F	Total Cost	895,572,863.39	833,264,596.46	-7.48
G	Income on cash cost	-865,475,379.17	241,580,751.14	458.26
H	Income on total cost	-883,749,288.03	224,875,164.83	493.00
I	R/C ratio cash cost	0.01	1.30	
J	R/C ratio on total cost	0.01	1.27	

Source: Primary Data (2023)

This value shows that income received more a little compared to the costs incurred by the cultivator, so concluded that business cultivation Catfish in the season of the 2021 harvest is inefficient. The R/C value of cash costs and

total costs in harvest 2022 which is more than 1 indicates that the Catfish cultivation business carried out by cultivators in the 2022 harvest season is efficient so it is feasible to run. Research results similar to (Agriansa et al., 2020) business cultivation Catfish in Talang Kelapa District regency Banyuasin own R/C value is 1.33 - 1.81. The magnitude of the R/C value in business cultivation Catfish > 1 so the business is feasible to continue to run.

Table 7. Expected Return of Catifish Cultivation

No	Description	Value (IDR)
A	Possibility of the incident without risk	0.8
B	Income on total cost without risk	224,875,164.83
C	Income without existing risk	179,900,131.86
D	Possibility incident exists a risk	0.2
E	Income on total costs incurred risk	-883,749,288.03
F	Income with existing risk	-176,749,857.60
G	Expected return	5,431,767.27

Source: Primary Data (2023)

The calculation of Catfish cultivation business income by including the element of flood risk is seen from the expected return value. The value of income by including the element of flood risk (expected return) per month is IDR 5,431,767.27. This shows that although the income of Catfish cultivation business during flood conditions is negative (detrimental), the expected value of Catfish cultivation business income is positive. The results of this study are also similar to research conducted by (Noviana & Dian, 2022; Winarti, 2017).

CONCLUSION AND SUGGESTION

Conclusion

The income from Catfish cultivation in Banjar Regency is profitable. The R/C value in the 2022 harvest season (normal conditions) for cash costs is 1.30 and for total costs is 1.27. The R/C value for cash costs and total costs in harvest 2022, which is more than 1, indicates that the business conducted by cultivators is efficient and therefore viable. The value of income by including the element of flood risk (expected return) per month amounted to IDR 5,431,767.27. This shows that even though the income of the Catfish cultivation business during flood conditions is negative (detrimental), the expected value of Catfish cultivation business income is still positive.

Suggestion

Production risk factors that affect cultivation income, it is imperative to recognize that other factors may also influence the profitability of Catfish

cultivation. Hence, cultivators should remain vigilant regarding potential risk factors that could affect their income streams. Future research endeavors should focus on identifying and understanding these additional production risk factors specific to Catfish aquaculture in Banjar Regency. By gaining deeper insights into these factors, stakeholders can develop more robust strategies to mitigate risks and enhance the sustainability of Catfish cultivation businesses in Banjar regency.

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