



## The optimization analyze of input use in the farming of Tapah fish (*Wallago sp.*) in cage, Buluhcina Village, Siak Hulu district, Kampar Regency, Riau

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### Abstract

Optimisation of the use of production factors is in principle how to use these production factors as efficiently as possible. Where economic efficiency is if the aquaculture business achieves technical efficiency and price efficiency. In the production process, tapah fish farmers in Buluhcina Village require various types of resources used in the production process (inputs), such as tapah fish seeds, floating net cages, production tools, labour, and feed. This study aims to analyse the input factors affecting fish farming production and analyse the level of optimisation of input use in tapah fish production. The method used is the survey method. The number of respondents who were used as the object of this research was 30 people considered sufficient to obtain optimisation analysis research data. The types of data collected include primary data and secondary data. This data was obtained from direct interviews using questionnaires and literature. The results of this study were obtained, namely: 1) seed variable obtained t-count value 0.833 t-table 0.059 and sig. 0.04 0.05, variable fish feed obtained t-count value 0.123 t-table 0.059 and sig. 0.020.05, variable feed oyster chicken obtained t-count value 2.252 t-table 0.059 and sig. 0.030.05 at the 5% confidence level; 2) the level of optimisation of the use of inputs for tapah fish farming in Buluhcina Village is not optimal because the results (NPM /PX 1), so that the use of production inputs that are not or not appropriate needs to be added and reduced so that their use is efficient.

**Keywords:** Tapah fish (*Wallago sp.*), Buluhcina Village, farming

### Introduction

Production optimisation is the best achievement in production activities carried out in order to achieve maximum profit. The best situation is achieved by the combination of optimum production levels. The price of production inputs is known with the help of the production function of the optimum production input combination, the ratio of production inputs must be equal to the marginal product value for each input used (Amelia, 2017) <sup>[2]</sup>. Optimisation can only be realised if it is done effectively and efficiently to be optimal (Ali, 2014) <sup>[1]</sup>. The production process can run if the required production input requirements are met. Each input has a different function and is interrelated with each other. If one of the production inputs is not available, the production process or cultivation business will not run. The success or failure of the cultivator is determined by good management, knowing how to cultivate properly, understanding the proper use of production inputs, means of production is a series of capital such as production equipment, seeds, feed and labour or the cultivator who carries out cultivation and determines the production results obtained.

Buluhcina Village is an area with many aquaculture businesses such as fishing, pond aquaculture and cage aquaculture. Aquaculture is one of the solutions that can be done, considering that its production can be controlled both by technological innovation and capacity (Kohar, 2014) <sup>[10]</sup>. Currently, the fish farming business carried out by the community is fish farming in floating net cages. The types of fish cultivated include tapah fish (*Wallago sp*) and baung fish (*Mystus sp*). Many farmers in Buluhcina Village have cultivated tapah fish in floating net cages of approximately 400 cages, which are in the form of four-square and long circular plots with an average size of one cage 8 m long and

2.5 m wide. The cages are formed from quality wood so that they last for a long time, tapah fish seeds are currently still fairly rare because tapah fish cannot be spawned artificially but naturally because tapah fish is one of the predatory fish in the river, tapah fish can only spawn naturally which causes the price of seeds to be quite high.

Tapah fish farmers obtain tapah fish fry from Sorek, Pangkalan Kuras, Pelalawan sub-district, with an average price of Rp 100,000 for a 3-4 inch size. This fish farming is done in response to the high demand in the community so that the selling price is quite profitable. The feed for tapah fish at the age of 0-1 month consists of small fish, while at the age of 2-12 months, the feed used is dead chicken. The process of cultivating tapah fish until it is ready for harvest takes about one year (12 months). The estimated size of mature tapah fish ready for harvest ranges from 4-5 kg per fish, with optimal feeding of dead chicken and small fish during the rearing phase. In one harvest cycle, tapah fish production can reach more than 1 tonne/cage, depending on the harvest time, fish weight, and cage size and stocking density. Farmers then sell the fish to collectors or agents who come directly to the cultivation site, with a selling price of Rp 140,000/kg.

The production obtained by tapah fish farmers in Buluhcina Village with satisfactory production results so that the tapah fish farming business is in demand by aquaculture business actors, especially in Buluhcina Village. However, researchers want to examine more deeply the optimisation of input use in cages by farmers. The purpose of this study is to analyse the input factors that influence aquaculture production and analyse the level of optimisation of input use in tapah fish aquaculture production in cages in Buluhcina Village, Siak Hulu District, Kampar Regency, Riau Province.

## Literature review

### Tapah fish (*Wallago sp.*)

Tapah or *Wallago* is a genus of several whiskered fishes (Siluriformes) in the large carnivorous Siluridae family from tropical Asia. Five species are currently recorded, with the most common being the Asian tapah *Wallago attu*. The name 'tapah' is derived from the name of a town in the country of Perak, Indonesia where many *Wallago attu* are known to be found (Gupta, 2015)<sup>[7]</sup>. The morphology of this tapah fish is that the body has a varied colour and the dorsal part is greyish brown and the head is purplish. The body is elongated and laterally compressed. The dorsal profile of the body is almost straight with the abdomen. The head is very large and the width of the head is slightly less than its length and equal to half of its height. The mouth is wide, with large teeth and the lower jaw is slightly longer. The eyes are small and just above the level of the mouth and are not covered by skin. The *wallago attu* is not scaly and has a short, spineless dorsal fin. The ventral fin is smaller, while the anal fin is very long. The pectoral fins are strong and finely serrated and have webbed gills. The anal and caudal fins are slightly blackish in colour.

### Floating net cage farming

Fish farming is one part of fisheries that aims to multiply existing fish individuals in order to avoid shortages of fish stocks, in conducting cultivation must pay attention to factors so that activities in fish farming can run smoothly and well. Factors that need to be considered are the location of the cultivation site (water conditions, soil conditions, soil conditions / elevations, potential natural resources around the location and environmental factors in determining the location (Cahyono, 2015)<sup>[4]</sup>.

### Production

Fisheries production occurs because of the combination of natural/environmental production factors, labour, capital, which are managed by cultivators (humans). In increasing the production and productivity of aquaculture in Indonesia is influenced by the factors of production used by farmers. In the cultivation business, business actors always try to use available natural resources coupled with external production factors so as to achieve the activities carried out in maximising farmers' income (Kasmir and Jakfar, 2012)<sup>[9]</sup>. The production system includes inputs, processes and outputs. Inputs are resources used in the production process. The process is the method used to produce the product and the output is the product to be produced (Setiawati, 2006)<sup>[14]</sup>.

### Production Optimisation

Optimisation models determine the optimal allocation of resources to maximise or minimise certain variables, such as cost or time. Optimisation is the result achieved in accordance with the wishes, so optimisation is the achievement of results as expected effectively and efficiently. The principle of optimising the use of factors of production is, in principle, how to use these factors of production as efficiently as possible (Singiresu, 2009)<sup>[16]</sup>.

### Methods

This research uses quantitative data measurement using the Cobb-Douglas function. This quantitative approach uses optimisation analysis and hypothesis testing. The purpose of

using this approach is to test the theory by detailing the hypothesis specifically and collecting the necessary data so that it can be proven. This research was conducted from April to May 2024 in Buluhcina Village, Siak Hulu District, Kampar Regency, Riau Province. The method used in this research is the survey method with the number of respondents 30 tapah fish farmers (Sugiono, 2022). Data collection techniques include interviews, questionnaires and documentation. Primary data consisted of existing conditions and cage area, amount of feed, stocking density, length of maintenance, maintenance equipment, medicines, and fish prices. Secondary data was obtained through literature, articles, previous research, geographical conditions of the research location, the number of farmers, the main occupation of farmers and the level of education. Relevant data published by institutions in Buluhcina Village and related agencies such as the Central Bureau of Statistics and the Kampar District Fisheries Office.

### Result

Buluhcina Village is an area in Siak Hulu District, Kampar Regency, which according to several community leaders, Buluhcina Village is known because in ancient times there was a bamboo mooring place for boats that was stuck on the ground on the edge of the river. The name of the bamboo is Bamboo China in the local language Bamboo = Reed to be called the place / area with Buluhcina. In general, the residents of Buluhcina Village are indigenous to the village, there are two tribes in Buluh Cina Village, namely the Malay Tribe and the Domo Tribe. Buluhcina Village has a population of 506 families with a total of 1,616 people, divided by a male population of 816 people and a female population of 800 people. The area of Buluhcina village is 6,500 hectares. Buluhcina village is bordered by neighbouring villages: to the north by Baru village, to the south by Kapau Jaya village, to the east by Tanjung Balam village and to the west by Pangkalan Baru village. Buluhcina village has four hamlets with each hamlet having one RW and three RTs (Buluh Cina Village Profile Data, 2023).

### Input Characteristics of Tapah Fish Farming Floating Net Cages

Cultivators who have a larger cage size mean more effort and have higher economic capabilities than cultivators with fewer cages (Simanjuntak, *et al.*, 2021)<sup>[15]</sup>. Tapah fish cultivation in floating net cages made of wood-based materials. The cages used have a rectangular shape and consist of three different sizes, namely 4 m x 2.5 m x 1.8 m<sup>3</sup> of one bag, 8 m x 2.5 m x 1.8 m<sup>3</sup> of two bags, and 12 m x 2.5 m x 1.8 m<sup>3</sup> of three bags. The types of wood used by farmers include daru-daru, keruing, and rosa wood, with a price of Rp.35,000,000/m<sup>3</sup>. Cage construction consists of materials such as wood, drums, nets, ropes, and zinc used as a roof to protect the cage surface from damage due to direct sunlight. The materials required by cultivators are easy to find, thus facilitating the implementation of this business. In addition, cage-making services are also available from the local community. The cages are floated in the river within the tapah fish farming area in Buluhcina Village.

### Labour

Labour is all people who work as aquaculturists in floating net cages. Labour in tapah fish farming cages comes from

one's own family of 2-3 people, generally not too calculated (Kartikasari, 2011) [8]. In addition, in Buluhcina Village there are several cages owned by other people as capital owners who employ the local community as labourers in tapah fish farming. The labour is paid according to the number of days worked during one production.

**Seeds and Stocking Densities**

Tapah fish farming in Buluhcina Village is conducted using tapah fish fry obtained from nature. Farmers generally purchase these seeds from the Siak River, Kerinci, Tapung and Sorek. Tapah fish fry or fingerlings obtained from the wild are usually available in certain seasons, and habitat change factors are thought to affect the abundance of tapah fish in their natural waters or habitats. The initial stage of cultivation involves stocking tapah fish fry that average 3-4 inches in size, equivalent to 8-9 cm/head, at a price of Rp 100,000/head based on survey results in several cages. In the cage size of 12 m x 2.5 m x 1.8 m3, there is a mixture of tapah fish and baung fish fry. Meanwhile, the size of 4 m x 2.5 m x 1.8 m3 is used exclusively for baung fish cultivation only. In this study, the main focus was on tapah fish in cages of 8 m x 2.5 m x 1.8 m3, with an average stocking density of 246 fry/cage. This study involved 30 respondent farmers who own cages measuring 8 m x 2.5 m x 1.8 m3 with two bags. This selection of respondents is considered sufficient to evaluate the optimal use of seeds in tapah fish farming in Buluhcina Village.

**Ground Fish Feed**

One of the main elements to determine success is feed (Marta, 2017) [11]. Tapah fish growth is influenced by several factors, one of which is the type of feed given and in the right amount. According to Sari 2014, tapah fish are predatory, namely fish that eat small fish around them and it is proven that tapah fish have very sharp small teeth. Fish feed for tapah fish farming in Buluhcina Village cages is small fish when the tapah fish is about 0-1 month old. The first three days after seed stocking, no fish feeding activities are carried out, due to the adjustment of the fish to the new environment. Runcah fish are purchased from local fishermen at a price of Rp 6,000/kg.

**Tiren Chicken Feed**

During the second month of cultivation and production, the feed used for tapah fish was drilled chicken, which is chicken that has already died, purchased from a slaughterhouse in Pekanbaru at a price of Rp 6,000/kg. Once purchased, the feed was cleaned of feathers and chopped as needed, based on the number of fish in the cages. The portion of minced chicken fed to tapah fish was adjusted according to the size of the fish; the larger the fish, the larger the minced chicken fed.

The feeding schedule was conducted in stages, twice a week in the morning and evening. The amount of feed given ranged from 10-15 kg per feeding, with a stocking density of 100 fish per bag in tapah fish farming cages in Buluhcina Village. Proper feed management is essential to support the growth of tapah fish and maximise aquaculture yields.

**Production**

Tapah fish cultivation until ready to harvest lasts for approximately one year (12 months). The estimated size of a mature tapah fish ready for harvest is between 4-5 kg/head,

which is achieved through optimal feeding of drained chicken and runcah fish during the rearing phase. In one harvest, tapah fish production can reach more than 1 tonne/cage, depending on the harvest time, fish weight, cage size, and stocking density. Fish farmers usually sell the harvest to collectors or agents who come directly to the farming location, with a price of Rp 140,000/kg.

**Production Factors that Modify Tapah Fish Production**

This study uses three cultivation inputs, namely the seed factor, tapered fish feed and tiren chicken feed, which will affect the production of tapah fish cultivation in cages. The production function model used is the CobbDouglas function. The Cobb-Douglas approach is a functional form of the production function widely used to represent the relationship of output to input (Amalia, 2014). Production factors that are thought to be influential in tapah fish farming are seeds (X1), tapered fish feed (X2) and artificial chicken feed (X3). The following are the results of the cobb-douglas analysis that has been regressed between input factors on tapah fish farming production in Buluhcina Village.

**Table 1:** Regression Analysis Result of Tapah Fish Fry, Raw fish feed and artificial chicken feed

Variabel	Koefisien Regresi	Standar error	Beta	T-hitung	Sig. Tolerance VIF
Konstanta	4.158	1.364		3.048	0.04
LnX1	0,286	0.344	0.273	0.833	0,04 0,00 0,678
LnX2	0,106	0.045	0.005	0.123	0,02 0,13 0,432
LnX3	0,754	0.335	0.721	2.252	0,03 0,00 0,866

Sumber: Data Primer Diolah, 2024

From Table 1 above, it can be seen that the Cobb-Douglas function equation of the equation form is:

$$Y = \text{Log } b_0 + b_1 \text{ Ln } X_1 + b_2 \text{ Ln } X_2 + b_3 \text{ Ln } X_3$$

$$Y = \text{Log } 4,158 + 0.286 \text{ Ln } X_1 + 0.106 \text{ Ln } X_2 + 0.754 \text{ Ln } X_3$$

Then the Cobb-Douglas function that has not been alarithmised is:  $Y = 4.158. X_1^{0,286}. X_2^{0,106}. X_3^{0,754}$  Where:

Y = Tapah Fish Production (Kg)

X1 = Seed (Tail)

X2 = Raw Fish Feed (Kg)

X3 = Tiren Chicken Feed (Kg)

From Table 1, the constant value (intercept) of 4.158 can be interpreted that the total production of tapah fish farming will increase by 4.158% when the seed, feed and feed are considered constant. The regression coefficient value of X1 (seed) is 0.286 so that it can be interpreted that every additional seed of 1% with other inputs considered constant, the average production of tapah fish farming will increase by 0, 286%.

The regression coefficient value of X2 (small fish feed) is 0.106 so it can be interpreted that every addition of small fish feed by 1% with other inputs considered constant, the average production of tapah fish farming will increase by 0.106%. The regression coefficient value of X3 (drained chicken feed) is 0.754 so it can be interpreted that every additional 1% of drained chicken feed with other inputs considered constant, the average production of tapah fish farming will increase by 0.754%.

**Coefficient of Determination**

The coefficient of determination is one of the regression tests that serves to determine how close the relationship between the independent variable and the dependent variable is, the value of the regression coefficient can be seen in the R Square column. The coefficient of determination  $R^2$  essentially measures how far the model's ability to explain the dependent variables (Ghozali, 2016) [5]. A value close to one means that the independent variables provide the information needed to predict the dependent variable as in the following table:

**Table 2:** Coefficient of Determination Based on Cobb-Douglas Analysis

Regression Statistics	
Multiple R	1.000 <sup>a</sup>
R Square	0,915
Adjusted R Square	0,893
Standard Error	0,008
Observations	30

Source: Primary Data Processed, 2024

Based on the results of data processing through SPSS for the coefficient of Determination ( $R^2$ ) in the table above, the resulting R Square value is 91.5% with a corrected  $R^2$  of 89.3%. The corrected value of 89.3% of the  $R^2$  variation of tapah fish can be explained by the factors of seeds (X1), tapered fish feed (X2), tiren chicken feed (X3). The remaining 10.7% is explained by other factors outside the model.

**Test Simultaneously or Together (F Test)**

The F test is used to assess the significance of the effect of each independent variable on the dependent variable (Rahmawati, 2017) [13]. The simultaneous F test (Simultaneous Test) is used to determine whether or not there is a joint or simultaneous influence between the independent variables on the dependent variable (Ghozali, 2018) [6]. Anova statistical testing is a form of hypothesis testing where it can draw conclusions based on the data or statistical groups that are concluded. To find out how the contribution between the independent and dependent variables in tapah fish farming can be seen in the table below:

**Table 3:** F-Test Result Values

ANOVA <sup>a</sup>						
	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.144	3	1.048	15909.033	.000 <sup>b</sup>
	Residual	.002	26	.000		
	Total	3.146	29			

Source: Primary Data Processed, 2024

From the results of the table above based on the simultaneous test, it is known that the F value is 15909.033 while the F table is known  $df_1 = 3$  and  $df_2 = 26$  with a 5% confidence level. Therefore, F count 15909.033 F table 2.98. This indicates that the independent variables of seed, runcah fish feed and tiren chicken feed together have a significant effect on tapah fish production at the 5% real level.

**Partial Testing (t test)**

This partial test is intended to determine whether each independent variable has an influence on the dependent variable (Baroroh, 2008) [3]. In this study, the partial test was used to determine the seed, runcah fish feed and tiren chicken feed partially affect the production of tapah fish farming in Buluhcina Village.

**Table 4:** Regression Coefficient of the Effect of the Use of Production Inputs on Tapah Fish Farming Production

Variabel	Koefisien Regresi	Standar error	Beta	T-hitung	Sig. Tolerance VIF
Konstanta	4.158	1.364		3.048	0.04
LnX <sub>1</sub>	0,286	0.344	0.273	0.833	0,04 0.00 0.678
LnX <sub>2</sub>	0,106	0.045	0.005	0.123	0,02 0.13 0.432
LnX <sub>3</sub>	0,754	0.335	0.721	2.252	0,03 0.00 0.866

Source: Primary Data Processed, 2024

The results of calculations using the SPSS programme can be seen how the relationship between the independent variables (seeds, runcah fish feed and tiren chicken feed) one by one with the dependent variable of tapah fish farming production, the obtained T table value is 0.059 with a 5% confidence level. The following is an explanation of the relationship between production factors and tapah fish farming production.

**Effect of Seed Use on Tapah Fish Farming Production**

Based on Table 11, the regression coefficient of the partial test of the seed variable obtained a t-count value of 0.833 t-table 0.059 and sig. 0.04 0.05 at the 5% confidence level, thus  $H_0$  is rejected and  $H_1$  is accepted, meaning that partially the use of seed variables has a real effect on the production of tapah fish farming. This means that the hypothesis that the number of seeds has a positive effect on the amount of production of tapah fish farming in Buluhcina Village can be accepted (Tajerin, 2007) [20]. The elasticity value of seed use in this study is 0.286. This shows that every additional use of seeds by 1% will increase the production of tapah fish farming by 0.286%. The total use of seeds in tapah fish farming in one period of cage size 8 2.5 1.8<sup>m<sup>3</sup></sup> two bags with an average of 245 fish/cage.

**Effect of the Use of Ground Fish Feed on Tapah Fish Farming Production**

Based on Table 11, the regression coefficient of the partial test of the pointed fish feed variable obtained a tcount value of 0.123 t-table 0.059 and sig. 0.020.05 at the 5% confidence level, thus  $H_0$  is rejected and  $H_1$  is accepted, meaning that partially the use of the pointed fish feed variable has a significant effect on the production of tapah fish farming. This means that the hypothesis stating that the amount of raw fish feed has a positive effect on the amount of tapah fish farming production in Buluhcina Village can be accepted. The elasticity value of feed use in this study is 0.106. This shows that every additional 1% use of seeds will increase the production of tapah fish farming by 0.106%. The average use of runcah fish feed in tapah fish farming in one period is 54 kg during the age of 0-1 month.

**Effect of the Use of Tiren Chicken Feed on Tapah Fish Farming Production**

Based on Table 11, the regression coefficient of the partial test of the variable of drained chicken feed obtained a t-

count value of 2.252 t-table 0.059 and sig. 0.030.05 at the 5% confidence level, thus  $H_{0is}$  rejected and  $H_{1is}$  accepted, meaning that partially the use of drained chicken feed variables has a significant effect on the production of tapah fish farming. This means that the hypothesis stating that the amount of drained chicken feed has a positive effect on the amount of tapah fish farming production in Buluhcina Village can be accepted. The elasticity value of feed use in this study is 0.754. This shows that every additional 1% of seed use will increase the production of tapah fish farming by 0.754%. The average use of feed in tapah fish farming in one period is 4,330 kg during the age period of 2-12 months.

**Elasticity of Input Use in Tapah Fish Farming Production**

Elasticity of production with respect to production factors is a measure of the proportional change in output caused by proportional changes in production factors when other factors of production are constant (Beathe and Taylor, 1994). The use of production factors reaches an efficient point or optimal condition by looking at the ratio between the marginal physical products of production factors (Rahayu & Riptanti, 2007) [12], following is the level of elasticity of the use of production *inputs* for tapah fish farming in Buluhcina Village.

**Table 5:** Regression Analysis Results of Seed and Feed Elasticity Values

Unstandardized Coefficients Model		
	Nilai Koefisien	Standar Error
Constant	4.158	1.364
Seeds	0,286	0.344
Ground Fish Feed	0,106	0.045
Tiren Chicken Feed	0,754	0.335

Source: Primary Data Processed, 2024

From the results of multiple linear regression analysis, the Cobb-Douglas equation is obtained as follows:

$$Y = 104.158 \cdot x_1^{0.286} \cdot x_2^{0.106} \cdot x_3^{0.754}$$

$$\text{Then } 0.286 + 0.106 + 0.754 = 1,146$$

It can be seen from the above calculation that the elasticity value of all production inputs is 1.146 1. From this value, it can be interpreted that the production factors (seeds and feed) mediate the production of tapah fish farming with a position at increasing returns to scale, which means that the increase in the proportion of production factors will result in a greater increase in production (Soekartawi, 2003) [18].

**Production Optimisation Analysis of Tapah Fish Farming**

According to Singiresu (2009) [16], optimisation is the use of the level of production factors that can maximise the profit from the use of resources. The optimal level of use of production factors can be explained through the production function. optimisation conditions for the use of production inputs for tapah fish farming in Buluh Cina Village. Where the average tapah fish production is 957/Kg harvest season for  $8 \times 2.5 \times 1.8$  m3 cages. With an average selling price of Rp 140,000/kg. Optimal use of production inputs in tapah fish farming when the ratio of marginal product value (NPM) to production input price (PX) = 1.

**Table 6:** Ratio of Marginal Product Value to Production Input Price

Production Inputs	Average Production Quantity	Elasticity	NPM	PX(Rp)	NPM/PX
Fry (fish)	246	0,286	155,7653	140.000	1,112
Runcah fish feed	54	0,106	11,2713	6.000	1,878
Oyster chicken feed	4.330	0,754	0,99987	6.000	0,166

With:

$$NPMX^1 = \frac{(0,286)(957)(140.000)}{(246)} = 155,7653$$

$$NPMX^2 = \frac{(0,106)(957)(6.000)}{(54)} = 11,2713$$

$$NPMX^3 = \frac{(0,754)(957)(6.000)}{(4.330)} = 0,99987$$

$$NPM/PX1 = \frac{155,7653}{140.000} = 1,112$$

$$NPM/PX2 = \frac{11,2713}{6.000} = 1,878$$

$$NPM/PX2 = \frac{0,99987}{6.000} = 0,166$$

**Optimisation of Seed Production Input Use**

To determine the level of optimisation of the use of seed inputs, the Marginal Product Value (NPM) approach is compared to the unit price of production inputs (Soekartawi, 2002). From Table 6 above, it is known that the ratio between the Marginal Product Value (NPM) and the cost of purchasing seeds is 1.112 1. It can be concluded that the use of seed production inputs is not optimal (NPM /PX 1). So it is necessary to increase the seed production factor to increase the production of tapah fish farming in the study area.

**Optimisation of the Use of Fish Feed Production Inputs**

From Table 6 above, it is known that the ratio between the Marginal Product Value (NPM) and the cost of purchasing raw fish feed is 1.878 1. It can be concluded that the use of raw fish feed production inputs is not optimal (NPM/PX 1). So it is necessary to increase the production factor of pointed fish feed to increase the production of tapah fish farming in the study area.

**Optimisation of the Use of Tiren Chicken Feed Production Inputs**

From Table 6 above, it is known that the ratio between the Marginal Product Value (NPM) and the cost of purchasing chicken feed is 0.166 1. It can be concluded that the use of production inputs of chicken feed is not optimal (NPM/PX 1). So it is necessary to reduce the production factor of chicken feed to increase the production of tapah fish farming in the study area.

**Conclusion**

1. Based on the regression analysis of the research results, the Adjusted R Square value of 0.893 is obtained, meaning that the production of tapah fish farming is mediated by seeds, tapered fish feed and 89.3% tiren chicken feed. Partially the use of seed variables, low fish feed and tiren chicken feed has a real effect on the production of tapah fish farming.
2. The level of elasticity of the use of production inputs in tapah fish farming in Buluhcina Village is 1.146>1. The level of optimisation of the use of inputs in tapah fish farming in Buluhcina Village is not optimal because the results (NPM /PX> 1).

### Suggestion

Farmers are expected to be able to increase fish production by using production inputs such as seeds, feed, etc. optimally, namely by increasing the efficient use of these inputs, can help facilitate the provision of production inputs, providing subsidies for the price of seeds that soar and channeling extension workers so that farmers understand more about cultivation.

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