



Optimization of Fresh Water Fish Culinary Tourism in Gowa Regency

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| Article History | Abstract |
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| Received: 12 June 2023 Revised: 10 Sept 2023 Accepted: 18 Nov 2023 | <p>This research aims to determine production factors, then analyze the amount of profit and examine the optimization of the freshwater fish culinary tourism business in the Beroanging area of the Bili-Bili Reservoir, Gowa Regency. The research was carried out in February–April 2023 using a survey method and a total sampling method of 15 respondents consisting of business owners. The data obtained was analyzed using the formula for total costs, total revenues, total profits and continued using the simplex linear programming method with POM-QM software. The research results show that the actual profit from the grilled tilapia fish menu in one month is IDR. 5,749,500 and each portion is IDR. 20,000 while the fried tilapia fish menu makes a profit of IDR 2,032,500 and each portion is IDR 13,000 where this value is influenced by the number of tourists. So the solution from the linear programming analysis is that business actors should produce 442 portions of grilled tilapia with an optimal profit of IDR. 8,840,000.</p> |
| CC License CC-BY-NC-SA 4.0 | <p>Keywords: Culinary Tourism, Optimization, Profit, Freshwater Fish, Linear Programming</p> |

1. Introduction

Gowa Regency has the potential for a fisheries sector which is dominated by land fisheries, namely freshwater fish with total production in 2021 for ponds of 362.3 tons, minapadi 135.8 tons, floating net cages (KJA) 209.0 tons. Types of freshwater cultured fish are dominated by goldfish with 228.8 tonnes, tilapia with 295 tonnes and catfish with 182.7 tonnes (Gowa Regency Fisheries Service, 2022). The types of fisheries businesses in this area are generally land fisheries cultivation, such as ponds, ponds, rice fields, swamps, rivers and reservoirs. The location is strategic because it borders directly on Makassar City and apart from that, it is also included in the National Strategic Area (KSN) Mamminasata Urban Area which supports easy access as well as facilities and infrastructure (Sifaturu, 2019). This place has potential in the tourism sector which is synonymous with pristine natural beauty and strong culture, thus attracting many local and foreign tourists.

The Indonesian tourism sector is considered capable and ready to face the Asean Economic Community (AEC) because of the large tourism potential (Sabon et al, 2018). Tourism science which discusses the relationship between tourists and tourist attractions and has the scope of studying motives and behavior. The development of the tourism concept by looking at the expansion of business products and employment which has an impact on national income (Simanjuntak et al, 2017). Tourist visits in Gowa Regency continue to improve as seen from data on the number of tourists during the Covid-19 pandemic in 2021, reaching 230,281 domestic tourists and 225 foreign tourists, and in 2022 the increase is quite drastic, reaching 909,670 domestic tourists and 3,566 foreign tourists.

Fisheries agrotourism is the science of tourist attractions with the aim of gaining knowledge, gaining experience, recreation and turning it into a business that has direct economic benefits to the local community (Ahmadi, 2017). In Gowa Regency, it is famous for the Bili-Bili Dam which is fed by the Je'ne Berang River, where the main function is to prevent flooding in several areas of South Sulawesi Province, but this dam has added value due to the potential for land fisheries and tourism in the area. The Bili-Bili Dam is used as a tourist attraction because it is a passive agrotourism activity which

emphasizes reactive activities, where tourists prefer to enjoy the view. In general, agrotourism is seen as an innovation that has a major economic and social impact (Jaunis, et al. 2022)

The transformation of the local community is influenced by environmental conditions and visitor demand to form an area consisting of several culinary tourism lesehan places that are synonymous with freshwater fish on the menu because of the potential for inland fisheries. In the culinary business, production optimization is very important to implement because it can maximize profits and minimize production costs. One way to analyze this is using linear programming with POM QM software.

In fact, the problem for lesehan bili-bili culinary business actors is that firstly they do not know in detail how much profit they make each month, secondly there is no inventory management and production planning due to fluctuating raw material prices. So a maximization design is needed to obtain optimal profits using a mathematical model. Based on this background and problems, researchers were interested in conducting research entitled "Optimizing Freshwater Fish Culinary Tourism Businesses in Gowa Regency" a case study in the Bili-Bili Dam Culinary Tourism Area.

2. Materials and Methods

The type of research used is survey research. This research was carried out from February to April 2023 in the culinary tourism area of Lesehan Beroanging Bili-Bili Reservoir, Gowa Regency, South Sulawesi Province. The location was chosen purposively with the consideration that it was the only location managed by the government in the culinary tourism sector and supported by data on the high demand for freshwater fish production in that location. The focus of this research uses total sampling techniques, total sampling is also called census, where all members of the population are used as samples. The samples taken were 15 lesehan business owners in the area. The data collection techniques used in this research are interviews, observation, documentation, literature study and questionnaires. The data analysis method for calculating the profits from grilled and fried tilapia production uses (Agustini, 2018):

The total cost is known by the following formula:

$$TC = TVC + TFC$$

Information:

TVC = Total variable costs (IDR)

TFC = Total fixed costs (IDR)

Total receipts are known by the following formula:

$$TR = Q \times P$$

Information:

Q = Total production of grilled & fried tilapia menu (Portion)

P = Price (IDR/Portion)

Profit calculation equation with the following formula:

$$\pi = TR - TC$$

Information:

π = Business profit Freshwater fish culinary tourism (IDR)

TR = Total receipts (IDR)

TC = Total cost (IDR)

Method for analyzing the optimization of profits from grilled and fried tilapia production using the simplex linear programming method. The initial step is to collect data by determining decision variables, constraint functions and objective functions. The general form of the objective function and constraint function is formulated as follows (Zulyadaini. 2017):

Decision variables (variable decisions), consisting of:

X1 = Grilled Tilapia

X2 = Fried Tilapia Fish

Constrains function in this study:

$$\text{Total Production Cost} = a_1X_1 + a_2X_2 \leq A$$

$$\text{Menu Price} = b_1X_1 + b_2X_2 \leq B$$

$$\text{Portion Sold} = c_1X_1 + c_2X_2 \leq C$$

Information:

a_1X_1 = Total Production Cost (a_1) on product X_1

a_2X_2 = Total Production Cost (a_2) of product X_2

A = Total production cost on products X_1 and X_2

Information:

b_1X_1 = Menu Price (b_1) on product X_1

b_2X_2 = Menu Price (b_2) on product X_2

B = Maximum price on product package menu X_1 and X_2

Information:

c_1X_1 = Portion Sold (c_1) on product X_1

c_2X_2 = Portion Sold (c_2) on product X_2

C = Total portion sold for products X_1 and X_2

Objective Function

$$Z_{\max} = P_1X_1 + P_2X_2$$

Information:

Z_{\max} = Optimal profit that can be obtained on tilapia products (IDR/Portion)

$P_{1,2}$ = Profit on product X_1 and product X_2

$X_{1,2}$ = Decision variables (grilled tilapia and fried tilapia)

3. Results and Discussion

Fixed costs are cost elements that do not change in total when business activities increase or decrease and include costs such as depreciation, wages for permanent employees, and overhead costs. The total fixed costs for the freshwater fish culinary tourism business in the Beranging area of the Bili-Bili Reservoir can be seen in the following table:

Table 1. Total fixed costs for the freshwater fish culinary tourism business

| No | Types of Fees | Total Cost (IDR) |
|-------------------|-------------------|------------------|
| 1 | Depreciation Cost | 2.447.000 |
| 2 | Overhead Costs | 1.208.000 |
| Total Fixed Costs | | 3.655.000 |

Table 1 shows the calculation results of investment equipment divided by their useful life, there are 33 items of goods whose depreciation costs are calculated to obtain an average total cost of IDR 2,447,000 while overhead costs are obtained from average employee wages of IDR 830,000 and monthly electricity costs IDR 378,000 with 6 items of electronic goods so that the total fixed costs are IDR 3,655,000.

Variable costs in this case are costs incurred by business owners due to changes in the amount of production so that the total costs will change according to the proportion of changes in activity. These variables consist of raw materials in making tilapia fish menus with packages of rice, vegetables, chili sauce and rice. 'ca the mango. For more details, it can be seen in the following table:

Table 2. Details of variable costs for culinary tourism businesses

| No | Item Name | Sum | Average (IDR) | Percentage (%) |
|----|---------------|---------|---------------|----------------|
| 1 | Large tilapia | 1430 Kg | 3.050.667 | 79,0 |
| 3 | Rice | 140 Kg | 84.000 | 2,2 |
| 4 | Spinach | 82 Ikat | 54.667 | 1,4 |
| 5 | Chilli | 67 Kg | 134.000 | 3,5 |

| | | | | |
|--------------|--------------|------------|------------------|--------------|
| 6 | Curly Chili | 49 Kg | 81.667 | 2,1 |
| 7 | Tomato | 39 Kg | 57.200 | 1,5 |
| 8 | Peanut | 24 Kg | 19.200 | 0,5 |
| 9 | Red onion | 44 Kg | 64.553 | 1,7 |
| 10 | Garlic | 52 Kg | 117.867 | 3,1 |
| 11 | Mango | 76 Kg | 76.000 | 2,0 |
| 12 | Sugar | 15 Kg | 7.500 | 0,2 |
| 13 | Salt | 15 Package | 6.000 | 0,2 |
| 14 | Masako | 15 Package | 6.000 | 0,2 |
| 15 | Vetsin | 15 Package | 8.500 | 0,2 |
| 16 | Coconut oil | 23 Liter | 24.533 | 0,6 |
| 17 | Charcoal | 16 Sack | 26.667 | 0,7 |
| 18 | Gas Cylinder | 30 Kali | 44.000 | 1,1 |
| TOTAL | | | 3.863.000 | 100,0 |

Based on table 2, the average total variable cost for the grilled fish menu is IDR 3,863,000 while for fried tilapia it is IDR. 1,654,000. The factors that differentiate the two values are the cost of charcoal, quantity of cooking oil and gas cylinder filling.

Total costs are all costs incurred in a business. So, the average total costs incurred by the owner of a freshwater fish culinary tourism business in the Beranging area of the Bili-Bili Reservoir is.

Table 3. Details of total production costs for tilapia fish menus

| No | Total Cost (IDR/Month) | Menu Type | |
|-------------------|------------------------|----------------------|--------------------|
| | | Grilled Tilapia Fish | Fried Tilapia Fish |
| 1 | Fixed Costs | 1.827.500 | 1.773.500 |
| 2 | Variable Costs | 3.863.000 | 1.654.000 |
| TOTAL | | 5.690.500 | 3.427.500 |
| Total (IDR/Porsi) | | 20.000 | 22.000 |

Based on Table 3, the total production cost of the grilled tilapia fish menu for each portion is IDR 20,000 and fried tilapia for IDR 22,000, the difference in production costs between these two types of fish menu is only IDR 2,000.

Revenue is obtained from multiplying the selling price of the fish menu by the amount of production sold. Based on the research results, the number of receipts can be seen in the table below:

Table 4. Details of the average revenue from freshwater fish culinary tourism businesses

| No | Menu Type | Jumlah (Porsi/Bulan) | Price (IDR/Portion) | Reception (IDR/Month) |
|--------------|----------------------|----------------------|---------------------|-----------------------|
| 1 | Grilled Tilapia Fish | 286 | 40.000 | 11.440.000 |
| 2 | Fried Tilapia Fish | 156 | 35.000 | 5.460.000 |
| TOTAL | | | | 16.900.000 |

Based on Table 4, it shows that interest in processed grilled fish is higher, and uniform prices are set in the culinary tourism area, because the price of raw food for small size fish for frying is IDR. 25,000/kg (per kg contains 8-9 fish) for a serving of 2-3 fish, while large size fish for grilling costs IDR 32,000 (per kg containing 3-4 heads) served for only 1 head per serving.

Profit is the result obtained from the business carried out. Income is usually called net profit, the profit from the average income from the freshwater fish culinary tourism business can be seen in the following table:

Table 5. Details of the average profits of freshwater fish culinary tourism businesses

| Menu Type | Reception (IDR) | Total Cost (IDR) | Profit (IDR) | Advantage (IDR/Possi) |
|----------------------|-----------------|------------------|--------------|-----------------------|
| Grilled Tilapia Fish | 11.440.000 | 5.690.500 | 5.749.500 | 20.000 |
| Fried Tilapia Fish | 5.460.000 | 3.427.500 | 2.032.500 | 13.000 |

Based on Table 5, it shows a problem with the fried tilapia fish menu because the profit is only IDR 13,000 while for grilled tilapia the profit is high at IDR. 20,000.

Optimal profit is an analysis obtained to calculate how much a processing business produces a menu of tilapia fish to obtain optimal results using linear programming calculations by first analyzing and determining the objective function and constraint function. The solution results from the linear program:

Table 6. Optimal profits from the freshwater fish culinary tourism business

| | Grilled Tilapia Fish (X ₁) | Fried Tilapia Fish (X ₂) | RHS |
|-----------------|--|--------------------------------------|-----------|
| Optimal | 20.000 | 13.000 | |
| Production cost | 20.000 | 22.000 | 9.172.000 |
| Total portions | 1 | 1 | 442 |
| Solusi | 442 | 0 | 8.840.000 |

Based on Table 6, it shows that to obtain optimal production results for one month it is best to increase production and sales of the grilled tilapia fish menu (X₁) by 442 portions. With this increase, optimal profits will be obtained from total production and sales of IDR 8,840,000 per month of production.

Table 7. Analysis of dual freshwater fish culinary tourism businesses

| No | Constraint Function | Availability | Use | Slack /SuIDRlus | Dual Price |
|----|---------------------|--------------|-----------|-----------------|------------|
| 1 | Total Servings | 442 | 442 | 0 | 20.000 |
| 2 | Production Cost | 9.172.000 | 8.840.000 | 332.000 | 0 |

Table 7 shows the results that the total portion of 442 is used up because it shows a slack value of 0. Each additional total unit will increase the maximum profit by IDR. 20,000 (dual price value), while for production costs there is a slack/suIDRlus value of IDR 332,000 from the availability of 9,172,000 so that it can minimize production costs to IDR 8,840,000.

Table 8. Sensitivity analysis of the objective function of freshwater fish culinary tourism businesses

| No | Function PuIDRose | Koefesien PuIDRose Function | Interval Point | |
|----|----------------------|-----------------------------|----------------|-------------|
| | | | Lower Bound | Upper Bound |
| 1 | Grilled Tilapia Fish | 20.000 | 13.000 | Infinity |
| 2 | Fried Tilapia Fish | 13.000 | Infinity | 20.000 |

This analysis shows that the value of the coefficient can be changed according to *the recommended lower bound* and *upper bound* because at that vulnerability the optimal value of the goal function does not change.

Table 9. Sensitivity analysis of the constraint function of freshwater fish culinary tourism business

| No | Constraint Function | RHS | Interval Point | |
|----|---------------------|-----------|----------------|-------------|
| | | | Lower Bound | Upper Bound |
| 1 | Total Servings | 442 | 0 | 459 |
| 2 | Production Cost | 9.172.000 | 8.840.000 | Infinity |

Table 9 shows that in total portions, production can be increased by 455 servings in order to achieve optimal profit, in Table above shows the recommended vulnerability related to changes in the constraint function used so as not to change the optimal solution.

4. Conclusion

The actual average profit obtained from selling grilled tilapia fish menu products in one month is IDR. 5,749,500 from 286 portions produced and the profit for each portion is IDR. 20,000 while fried tilapia products get a profit of IDR 2,032,500 from 156 portions produced so that the profit per portion is 13,000, there is an error in pricing because it can be seen that the profit per portion between grilled tilapia and fried tilapia is very different, whereas for the price of raw fish the price range is not very significant, this error lies in The total costs incurred for fried tilapia are higher than grilled tilapia.

Optimizing the profits obtained from the type of grilled tilapia fish production in one month of sales of IDR. 8,840,000 with a total production of 442 portions. The optimal value obtained for the fried tilapia fish menu is 0, which means that POM-QM in the linear programming results does not recommend increasing production of fried tilapia. Recommendations for vulnerable upper bound and lower bound values for the constraint function are also produced so as not to change the optimal solution.

Suggestion

Based on research that has been carried out on freshwater fish culinary tourism businesses in the Beroanging Reservoir Bili-Bili area, Gowa Regency, the advice given by researchers is for business owners to calculate the costs incurred and manage business finances, and for the government to assist in developing infrastructure. in this area, as well as for other researchers who can continue analyzing optimization on other variables.

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