Analysis of the welfare level of fish farming groups in Sebulu Ulu Village, Sebulu District, Kutai Kartanegara Regency

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ABSTRACT

Economic development is the process of increasing overall income and per capita income while considering population growth and maximizing welfare for the benefit of families and communities. This study aims to analyze the welfare level of fish farming groups using indicators from the Central Bureau of Statistics (BPS) and the Fish Farmers' Exchange Rate (NTPi). The required data consists of both primary and secondary data in accordance with the research objectives. The research findings indicate that fish farmers in Sebulu Ulu Village, Sebulu District, Kutai Kartanegara Regency, are categorized as prosperous. Based on the 2016 BPS welfare indicators, the average score obtained was 19, with 6 respondents (60%) classified as having a moderate level of household welfare, meaning that their living conditions are fairly prosperous. According to the NTPi indicator, the total income of fishing families was 1.23, while the total income of fish farming businesses was 1.96. Since these values are greater than 1, it indicates that the majority of fish farming families are already prosperous.

INTRODUCTION

Sebulu District, covering an area of 859.50 km², consists of 14 villages spread across the region. One of these villages is Sebulu Ulu, located 17 kilometers from Tenggarong, the capital of Kutai Kartanegara Regency. Sebulu Ulu Village has an area of 125.80 km² and a population of 4,542 people from 1,357 households. It serves as one of the centers for freshwater fish farming in Sebulu District.

Fish farming in floating cages is a secondary business for all members of the Etam Maju fish farming group. The primary fish species cultivated in these cages is Nile tilapia (Oreochromis niloticus) (BPS Kutai Kartanegara Regency, 2020). Observations show that there are 11 fish farmers engaged in cage culture in Sebulu Ulu Village, with 10 members belonging to the Etam Maju group and one individual operating a private Nile tilapia farming business.

Social welfare refers to institutions or organized activities conducted by both government and private entities to prevent and address economic and social issues, ultimately improving the quality of life for all members of society.

One of the recurring challenges faced by fish farmers in Sebulu Ulu, particularly at farming sites, is the fluctuation of river water conditions due to changes in pH and oxygen levels, commonly known as air bangar. This phenomenon leads to mass fish mortality, including those cultivated in floating cages, causing financial losses for farmers.

Additionally, high operational costs can impact the sustainability of farming activities, influencing the economic conditions and welfare of fish farmers in Sebulu Ulu. Therefore, it is crucial to assess data and information regarding the welfare level of the farming community to understand the role of aquaculture in improving their economic conditions.

This study aims to analyze the welfare level of fish farming groups in Sebulu Ulu Village, Sebulu District, using indicators from the Central Bureau of Statistics (BPS) and the Fish Farmers' Exchange Rate (NTPi). The research is expected to benefit business practitioners, government agencies, and other relevant stakeholders in advancing fish farming activities in Sebulu Ulu Village and Kutai Kartanegara Regency as a whole.

METHODOLOGY

Research time and location

The research was conducted over a period of 10 months, starting in May 2022. The stages included a preliminary survey, proposal preparation, proposal seminar, data collection, thesis writing, results seminar, and final examination. The study took place in Sebulu Ulu Village, Sebulu District, Kutai Kartanegara Regency, East Kalimantan Province.

Data types and collection methods

Two primary methods were used to collect data: direct field observations and interviews with respondents, guided by a questionnaire. The required data consisted of both primary and secondary data.

Primary data included respondent identities, fish farming business profiles, business data such as investment costs, operational or production costs, production volume, and selling price of Nile tilapia. It also covered additional income from fish farmers and their family members, household expenditures, welfare indicators based on the 2016 BPS standards, business challenges, solutions implemented, and expected solutions.

Sampling technique

The study employed Purposive Sampling, a method where sample selection is based on specific criteria (Sugiyono, 2015). The criteria for selecting respondents were: 1) Fish farmers actively engaged in Nile tilapia farming in floating net cages. 2) Farming businesses that have been operating for more than five years. Based on these criteria, 10 respondents were selected, comprising all members of the *Etam Maju* group, who have been involved in fish farming since 2018.

Data analysis

1. Welfare Level Analysis

The welfare level of fish farmers is assessed using the BPS (Badan Pusat Statistik) Welfare Indicators.

Table 1. BPS Welfare Indicators

No	Welfare Indicator	Criteria	Scale
1	Income	High (>Rp.4,000,000) Medium (Rp.3,000,000 - Rp.4,000,000) Low (<Rp.3,000,000)	3 2 1
2	Expenditure	High (>Rp.4,000,000) Medium (Rp.3,000,000 - Rp.4,000,000) Low (<Rp.3,000,000)	3 2 1
3	Housing Condition	Permanent (score 13-16) Semi-Permanent (score 9-12) Non-Permanent (score 5-8)	3 2 1
4	Housing Facilities	Complete (score 27-34) Adequate (score 19-26) Insufficient (score 11-18)	3 2 1
5	Family Member Health	Good (<25% sick) Fair (25%-50% sick) Poor (>50% sick)	3 2 1
6	Ease of Access to Health Services	Easy (score 17-21) Fair (score 12-16) Difficult (score 7-11)	3 2 1
7	Ease of Enrolling Children in Education	Easy (score 9-11) Fair (score 6-8) Difficult (score 3-5)	3 2 1
8	Ease of Access to Transportation Facilities	Easy (score 9-11) Fair (score 6-8) Difficult (score 3-5)	3 2 1

Source: Central Bureau of Statistics (BPS), 2016

Each of the 8 indicators is assigned a score. The total score determines the welfare classification based on the following criteria:

Table 2. Welfare Classification Based on BPS 2016

No.	Score Range	Welfare Level
1	20-24	High
2	14-19	Medium
3	8-13	Low

Source: Central Bureau of Statistics (BPS), 2016

A high welfare level is defined as a total score between 20 and 24. A score between 14 and 19 indicates a medium level, while a score between 8 and 13 indicates a low level of welfare.

2. Welfare Analysis Using NTPi Indicator

The Fish Farmers' Exchange Rate (NTPi) measures the exchange value of aquaculture products against goods and services needed by farmers for both household consumption and production.

The formula for NTPi is:

$$NTPi = Yt/Et$$
$$Yt = YFt + YNFt$$
$$Et = EFt + Ekt$$

Where:

Yft : Total income from fish farming (Rp/year)
YNFt : Total income from non-fishery businesses (Rp/year)
EFt : Total expenses for aquaculture business (Rp/year)
EKt : Total household expenses (Rp/year)
T : Time period (year)

Interpretation of NTPi values:

1. NTPi>1 → Indicates an increase in purchasing power/income, meaning the price increase in production output is higher than the increase in production input costs and household consumption.
2. NTPi<1 → Indicates a decrease in purchasing power/income, meaning the increase in production costs and household consumption is greater than the increase in the price of aquaculture products.

RESULT AND DISCUSSION

Welfare level analysis

The Central Bureau of Statistics (BPS) facilitates the measurement of welfare levels. Based on research findings, several indicators can be used to measure household welfare among fish farmers. The details are as follows:

Table 3. Calculation of Family Welfare Level Based on BPS 2016

No.	Criteria	Scale	Number of Respondents (people)	Percentage (%)
1	High	20-24	4	40
2	Medium	14-19	6	60
3	Low	8-13	-	-
Total			10	100

Welfare level analysis using the NTPi indicator

The ability of fish farmers to exchange the goods they produce for goods/services needed for household consumption and production needs can be measured using the Fish Farmers' Exchange Rate (NTPi) (General Performance Indicator of the Probolinggo City Fisheries Office, 2018). The calculation details are presented in the following tables:

Table 4. Income Calculation

No.	Type of Income	Total Income (Rp/Year)	Average (Rp/Year)
1	Fisheries Income	70,000,000	7,000,000
2	Non-Fisheries Income	345,600,000	34,560,000
Total		415,600,000	41,560,000

Table 5. Expenditure Calculation

No.	Type of Expenditure	Total Expenditure (Rp/Year)	Average (Rp/Year)
1	Fisheries Expenditure	35,595,000	3,559,500
2	Non-Fisheries Expenditure	301,560,000	30,156,000
Total		337,155,000	33,715,500

Sebulu Ulu Village and its freshwater aquaculture potential

Sebulu Ulu Village is one of the villages with freshwater aquaculture potential due to its location along the banks of the Mahakam River. The ease of obtaining equipment for establishing an aquaculture business, such as wood, drums, nets, and other supporting tools, makes the process of freshwater fish farming relatively simple. Cage-based fish farming (karamba) is chosen because it allows fish to grow in conditions similar to their natural habitat using the available environment.

Based on research findings, it was discovered that this cage-farming business operates under joint ownership, meaning it is managed as a group. The fish species cultivated is Nile tilapia (*Oreochromis niloticus*), with production occurring in two cycles per year. On average, respondents produce approximately 1,000 kg of fish per cycle. The tilapia is sold in several markets in Sebulu Village and retailed in surrounding areas at a price of Rp.35,000/kg. Tilapia was chosen as the sole species for cultivation due to high market demand, ease of maintenance, disease resistance, and the availability of fry.

Aquaculture process

The fish farming process begins with stocking fish fry. Before doing so, farmers prepare by checking the condition of the cages, water quality, and fish fry. Farmers purchase 5,000 fry per cycle at a price of Rp.250 per fry. These fry are sourced from fish breeders in Jembayan Village, Loa Kulu District. Stocking is conducted in the morning to ensure the fry remain in good condition and do not experience stress due to sudden water temperature changes. The fish are grown for six months before harvesting. At harvest time, fish are sorted and then sold directly to consumers through retail distribution across Sebulu Village.

Group-based aquaculture and economic impact

Interviews revealed that operational activities of the Etam Maju Aquaculture Group are carried out by members of the fish farming group in Sebulu Ulu Village. Most members are local residents who have lived in the area for a long time, while some come from outside Kalimantan. This group business was formed by several high school teachers working in Sebulu Ulu as a side business to supplement their income. Since this aquaculture venture is only a side business, the revenue generated is expected to serve as a long-term investment for group members.

Welfare and economic sustainability

Welfare refers to the level of satisfaction achieved from utilizing income. However, welfare is a relative concept because it is based on how satisfied individuals feel after spending their wealth. According to Sunarti (2012), every citizen should be able to work to meet their physical, mental, and social needs in

the best possible way for themselves, their family, and the wider community—provided there is a social, material, and spiritual living environment characterized by safety, morality, and peace.

Based on Table 3, the 2016 BPS Welfare Indicators were used to assess the welfare level of aquaculture group members. After summing the scores from eight indicators, the total score obtained was 19, which falls into the "moderate" category. The respondents were evenly distributed, with 50% (5 respondents) in the moderate category and 50% (5 respondents) in the high welfare category.

The level of income and household expenditure plays a significant role in determining welfare levels. Additionally, access to infrastructure such as housing and transportation also influences living conditions. In terms of education and healthcare, most respondents can access these services easily in terms of both distance and cost, suggesting that overall welfare is relatively optimal.

Household income, mainly derived from the husband's earnings, was accumulated and compared to the 2016 BPS income criteria. Respondents' income falls into the moderate category (Rp.3,000,000–Rp.4,000,000 per month). This highlights the significant impact of income levels on household welfare, even among fish farmers. Higher income allows fish farmers to meet their daily consumption needs. According to Theodorus (2011) in his book *Accounting Theory*, income refers to the amount of money generated through the sale of goods or services over a specific period. Christopher (2017), citing Suroto (2000), defines income as all earnings received in the form of cash, goods from third parties, or self-produced goods valued based on the current economic worth of the owned assets.

Household expenditures

Household expenditures refer to all costs incurred for household needs. These expenses are generally categorized into two types: food-related expenses and non-food-related expenses (Tari, 2013). In this study, fish farmers had low household expenditures (below Rp.3,000,000 per month) because respondents only spent money on basic household needs and other essential expenses.

Research findings indicate that most respondents have easy access to hospitals and clinics using private transportation. Healthcare costs, including medication prices, are still relatively affordable, and some respondents benefit from free healthcare services through health insurance programs. According to Nasution et al. (2021), communities feel more comfortable when they receive high-quality medical care, which can be achieved by providing healthcare services that respect and address patients' needs. People naturally desire responsible, safe, high-quality, fair, and non-discriminatory access to healthcare while maintaining their rights as patients.

Education and transportation accessibility

The indicator for accessing education falls under the "fairly easy" category, as parents play a crucial role in guiding their children to receive proper education. Similarly, the indicator for access to transportation facilities is rated as "easy."

Income and expenditure analysis

Table 4 shows that fisheries income is derived from tilapia sales within a specific period. With a total production of 2,000 kg and an average price of Rp.35,000/kg, the total income of the fish farming group is Rp.70,000,000 per year. This income is divided equally among group members, with each receiving Rp.7,000,000 per year (Rp.583,333 per month).

Non-fisheries income comes from the primary occupations of the household heads, such as civil servant teachers, honorary teachers, and cooperative employees. The total non-fisheries income is Rp.345,600,000 per year, with an average non-fisheries income of Rp.34,560,000 per year (Rp.2,880,000 per month) per respondent. This data is based on the average non-fisheries income of the household heads.

Fisheries expenditures include various costs incurred during the production process. These costs consist of Fixed costs: Depreciation of investment items such as karamba cages, mesh nets, plastic drums,

large ropes, small ropes, metal buckets, and cage maintenance costs, and Variable costs: Expenses for purchasing tilapia fry and floating feed.

Table 5 presents the fish farming group's expenditure, covering both fixed and variable costs. The average total fisheries expenditure is Rp.35,595,000 per year, which is shared among group members at Rp.3,559,500 per year (Rp.296,625 per month). Meanwhile, non-fisheries expenditures, including domestic and non-domestic expenses, amount to Rp.301,560,000 per year, with an average non-fisheries expenditure of Rp.30,156,000 per year (Rp.2,513,000 per month). Thus, the total average household expenditure is Rp.33,715,500 per year (approximately Rp.2,809,625 per month).

CONCLUSION

Based on the Fish Farmers' Exchange Rate (NTPi) study findings, the total household income from fisheries activities was 1.23, and the total fisheries business income was 1.96. These findings indicate that NTPi values exceed 1, meaning that most fish farmers can meet their household needs and improve their welfare through aquaculture activities. Since fish farming is considered a long-term investment, many fish farmers also work as teachers. As a result, the majority of fish farmers in Sebulu Ulu Village, Sebulu District, Kutai Kartanegara Regency, East Kalimantan, are classified as economically well-off.

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