



The Exchange Rate Analysis of Fish Cultivators (A Case Study in Bayongbong Garut Indonesia)

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The purpose of this study is to analyze 1) the exchange rate of fish cultivators (NTPI) in Garut Regency, and 2) the factors that affect the NTPI in Garut Regency. A case study method including both primary and secondary data was used in the study. Primary data were generated from the interviews with respondents. Secondary data were obtained from the relevant agencies. This study used 45 respondents as research sample based on the purposive sampling. The data analysis used is NTPI and multiple linear regression. The results obtained in this research are the average NTPI in Bayongbong Subdistrict, which is 116%, explaining that fish cultivators' expenditures on household consumption and production cost are lower than their income. So it can be concluded that fish cultivators in Bayongbong Subdistrict are prosperous cultivators. Factors that can affect NTPI are age, education level, work experience, number of family members, income, and expenditure.

Keywords: Cultivation; garut regency; fish cultivators; the exchange rate.

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1. INTRODUCTION

Indonesia is the largest archipelagic country in the world having 17,058 islands with a coastal line of 99,123 km [1]. Indonesia has a marine area of about 5.8 million km² i.e., 75% of the total area of Indonesia which consists of marine waters (territorial) of 0.8 million km², sea waters of the archipelago (archipelago) of 2.3 million km² and the Exclusive Economic Zone of 2.7 million km² [2].

Indonesia has many major fish producing areas, one of which is the West Java Province. According to the Center for Statistical Data and KKP Information [3], the West Java Region has quite abundant fishery resources including both land and sea. So the West Java Province is one of the fishery centers in Indonesia. One of the regencies in West Java Province having high fishery potential is Garut Regency. Garut Regency has an area of about 3,065.19 km² with a southern boundary, namely the Indian Ocean. Geographically, Garut Regency is located in the 6°57'34" LS - 7°44'57" LS dan 107°24'3" BT - 108°24'34" BT [4].

Garut Regency is one of the areas that has a wide potential of land for fisheries. The potential land of Garut Regency is in the form of freshwater bodies of ±26,000 hectares, including calm water ponds (400 hectares), swift water ponds (27 units), mina padi (25,000 hectares), ponds (1000 hectares), and public waters (280 hectares). The use of freshwater aquaculture lands reaches around 11,500 hectares which is 54.8% of the existing potential. Garut Regency itself is one of the centers of aquaculture in West Java with Fisheries Households (RTP) as many as 55,570 people and 110 groups of fish cultivators spreading over 42 subdistricts. The dominant business commodity is freshwater fish, most of which are managed in extensive to semi-intensive manner, integrated in rice fields (mina padi) and calm water ponds on a small scale [5]. Freshwater fish production in Garut Regency during 2015-2019 period tends to increase, where the lowest estimated production was 54,176.28 tons with a percentage of 17% in 2015. On the other hand, the highest production was in 2019 which amounted to 71,013.39 tons with a percentage of 23% [6].

Aquaculture in Garut Regency is very potential to be developed because it is supported by the topography of the area having enough water availability. Bayongbong subdistrict is an area

having the highest water resources (SDA) in Garut Regency. It has a water discharge of 10,464 m³/second originating from the Cimanuk irrigation river [7]. Moreover, in the aspect of human resources (HR), Bayongbong Subdistrict has the highest number of fishery households in Garut Regency, namely 2,669 households, making the Bayongbong subdistrict area very promising for the fish cultivators [8].

Bayongbong subdistrict has an area of about 4,684.6 Ha. Of this area, 190.80 hectares are used for calm water ponds (KAT), 1.49 hectares are used for swift water pools (KAD), and 859 hectares are used for rice minarets. Bayongbong subdistrict is a subdistrict that has the most fish cultivators in Garut Regency, i.e., as many as 114 people. Bayongbong subdistrict has 11 groups of fish cultivators including tilapia farmer, catfish farmer, goldfish farmer, gourami fish, and nillem fish farmer [9].

Tilapia, goldfish, and catfish are superior commodities because they have the most production compared to gourami fish and nillem fish. Data on the production of fish species in Bayongbong subdistrict has been increasing every year, where the lowest production was recorded for tilapia as 1,174.50 tons, goldfish as 1,065.94 tons, and catfish as 38.3 tons in 2015.. While the highest production was in 2019 i.e., 1,399.35 tons for tilapia, 1,220.74 tons for goldfish, and 90.13 tons for catfish [10].

Marketing opportunities in the field of fisheries in Garut Regency are still very wide considering the large number of requests for fishery products for consumption, which continues to increase every year. This can affect fish cultivators in Garut Regency which is increasingly prospective. The Fish Consumption Rate (AKI) of Garut Regency has been also increasing every year. The highest fish consumption rate was 28.46 kg/capita/year in 2019 compared to 25.4 kg/capita/year in 2015 [11].

Fish cultivators are people whose livelihoods are related to the activities of maintaining, raising, and/or breeding, and harvesting fish in a controlled environment [12]. Families with the main livelihood as cultivators do It is not easy to get a steady income for the fish farmers from this occupation to maintain the daily living expenses for the family. The fishery sector is also considered as one of the sectors that is prone to poverty because most of the fish cultivators only have small lands or only work on other people's

land [13]. Fish cultivators in Garut Regency are the business actors who dominate compared to other related sectors such as fish processing businesses, pond businesses, and fishery marketing businesses. Of the 141 business groups in Garut Regency, there are 110 fish farming business groups, 5 fish processing business groups, 7 pond business groups, and 18 fishery marketing business groups [14].

One approach to see the dynamics of the welfare level of fish cultivators is through the NTPI. According to the Directorate General of Aquaculture [15], NTPI is a measuring tool used to determine the exchangeability of aquacultured fish for goods/services needed for production and household consumption.

Based on the above background, it is assumed that the income and welfare of fish farmers will increase, but so far there has been no research on NTPI by commodity type in Garut Regency. Therefore, it is necessary to do research on the analysis of NTPI in Garut Regency, especially in Bayongbong subdistrict in order to know the factors that affect the welfare of fish cultivators in Garut Regency.

2. MATERIALS AND METHODS

2.1 Time and Place

This research was conducted from July 2020 to August 2021 and the data were collected during March to April 2021 in the Bayongbong Subdistrict, Garut Regency, Jawa Barat Province, Indonesia.

2.2 Types and Data Source

The data used in this study are primary and secondary. Primary data were based on the direct observations and interviews with questionnaire filled by respondents. Questionnaire is a data collection technique that is done by giving a set of questions or written statements to the respondents for answering [16]. Secondary data were obtained from the literature, documents and information from various relevant agencies such as the Department of Fisheries and Livestock, and the Department of Public Works and Spatial Planning (PUPR) of Garut Regency.

2.3 Sampling Techniques

The sampling technique used in this study was purposive which is a sampling technique with certain considerations [17]. As many as 45 fish

cultivators from Bayongbong Subdistrict consisting of 14 tilapia cultivators, 17 goldfish cultivators, and 14 catfish cultivators were acted as respondents in this study. The sample criteria used in this research were: (i) group of fish cultivators living in Bayongbong Subdistrict, (ii) group of cultivators of tilapia, goldfish, and catfish, (iii) group of fish cultivators with land area: narrow (<1.000m²), medium (1.000-2.000m²), and spacious (>2.000m²) [18], (iv) group of fish cultivators having at least five years of business experience, (v) group of fish farmers who are willing to be interviewed.

2.4 Data Analysis Methods

Data processing and analysis were carried out with the help of Microsoft Excel 2019 and Statistical Products and Solution Services (SPSS) Version 22.

The data analysis method used in this research was the descriptive quantitative analysis method which is an analytical method that seeks to explain the condition of the object of study according to certain criteria so that it can provide an overview of what actually happened at the research site [19]. Therefore this method aims to explain several phenomena in the surrounding environment by using numbers to describe the characteristics of individuals or groups [20]. The descriptive method in this research described in general about the business activities of fish cultivators in Bayongbong subdistrict, Garut Regency. Quantitative analysis used for NTPI in Garut Regency explained the factors that affect NTPI in Garut Regency, especially in Bayongbong subdistrict.

2.4.1 Fish cultivator exchange rate analysis

NTPI was used to analyze the welfare of fish cultivators. The formula used in this technique is [15]:

$$NTPI = \frac{I_t}{I_b} \times 100\%$$

Where,

I_t = Fish cultivator exchange rate
 I_t = Price received by fish farmers
 I_b = Price paid by fish farmers

NTPI > 100% means that fish cultivators have a higher income than their expenditure (surplus). NTPI < 100% means that fish cultivators' expenditures for household consumption and

production costs are higher than their income. NTPI = 100% means that income from operations is the same as expenditure for household consumption costs and production needs.

2.4.2 Multiple linear analysis

The data analysis method used to determine the factors that affect NTPI was the multiple linear regression analysis with several other tests to ensure that the model is valid., to verify the classical assumption and also to test the statistics. Multiple linear regression analysis is a regression analysis with more than one explanatory variable or it can be meaning that there is more than one independent variable that affects one dependent variable [21]. Therefore, multiple linear regression technique was used to determine whether there was a significant effect of two or more independent variables (X_1, X_2, X_3, \dots, k) on the dependent variable (Y). In analyzing the factors that affect NTPI in Garut Regency, the following model is used:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$$

Description:

- Y = Fish cultivator exchange rate
- α = Constant
- β = Coefficient value of each variable
- X_1 = Age of cultivator (Years)
- X_2 = Cultivator's education level (SD/SMP/SMA/Perguruan Tinggi)
- X_3 = Work experience (Years)
- X_4 = Number of family members (Persons)
- X_5 = Cultivator's income (Rupiah/month)
- X_6 = Cultivator's expenditure (Rupiah/month)
- ε_i = Error

3. RESULTS AND DISCUSSION

Respondents in this research were fish cultivators of the Bayongbong Subdistrict. Questionnaires shared with 45 respondents explained the general characteristics of respondents including age, education level, work experience, and number of family members.

3.1 General Characteristics of Respondents

The age of fish farmers affects their labour productivity and efficiency in running aquaculture

farms. The characteristics of the respondents by age consisted of below 15 years, 15-64 years and above 65 years of age (Fig 1).

Fig 1 shows that, out of the total 45 respondents with an average age of 43 years, 42 respondents (93%) are in the age range of 15-64 years. This implies that most of the respondents are of productive age i.e., in the age group between 15-64 years [22]. The age of fish farmers, most of whom belong to the productive age group, indicates that they have good physical ability and mindset and have great potential for aquaculture business development. The productive age groups are generally curious and actively seek information [23].

It is well known that a person's level of education affects the way of he thinks and behaves. Someone who has a higher level of education has better access to information and technology, which is certainly very useful for the management of his business [24]. The characteristics of the respondents based on the level of education are seen in Fig 2.

Fig. 2 shows that the education level of fish cultivators in Bayongbong subdistrict generally has a degree of senior high school (SMA), which is 49% (22 person). The elementary school (SD) and junior high school (SMP) levels had 9 and 14 respondents with a percentage of 20% and 31% respectively, and there were no respondents who were able to obtain a college degree. Cultivators who have both formal and non-formal higher education have a higher chance of increasing their productivity by adopting more effective and efficient technologies or production methods. This will of course affect production and at the same time increase business income [24]. Education improves a person's way of thinking, skills, behavior and attitudes [25].

Work experience is the accumulation of the learning process experienced by cultivators during their business activities, and this business experience determines the interests and needs they feel in dealing with problems in the field [24]. The characteristics of the respondents based on their work experience are shown in Fig. 3.

Based on Fig. 3, fish cultivators in Bayongbong subdistrict generally have medium work experience (5-10 years), 38 people with a percentage of 84%. We found only 7 people with a percentage of 16% having high work experience (>10 years). Fish cultivators with high experience are more skilled and adopt technology faster. High skill has a positive impact

on performance, such as the time required to complete the work and the quality of work will also improve [26]. The number of family members is the total number of people in the family including oneself. A large number of family members affects the needs & welfare of the fish farmers. The Characteristics of respondents based on the number of family members consisted of three groups, namely small family members (1-3 persons), medium family members (4-6 persons), and large family members (more than 6 persons). Characteristics of respondents based on the number of family members are presented in Fig. 4.

From Fig. 4, the number of small family members of the respondents in Bayongbong subdistrict is predominant and in general is 24 persons with a percentage of 53%, while the number of medium family members (4-6 persons) is 21 persons with a percentage of 47%. The large number of family members affects the needs & welfare of fish cultivators, because the more family members, the more household needs must be met, and if the income of fish farmers is not enough to meet the daily needs, it will have an impact on welfare problems in the family [27].

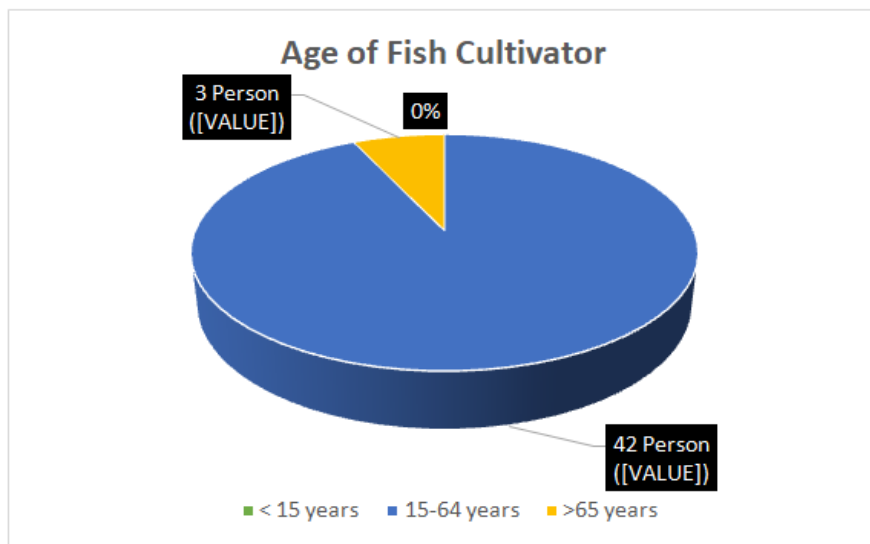


Fig. 1. Age of fish cultivator

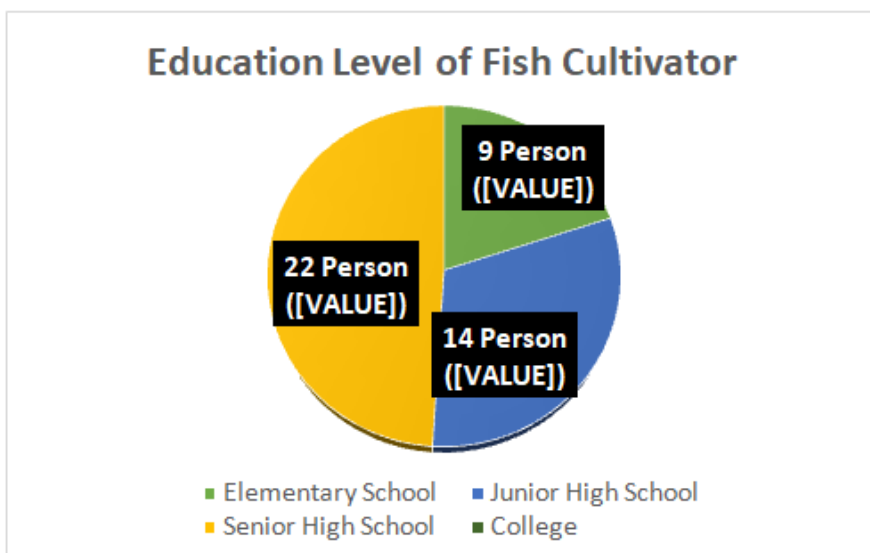


Fig. 2. Respondent's education level data

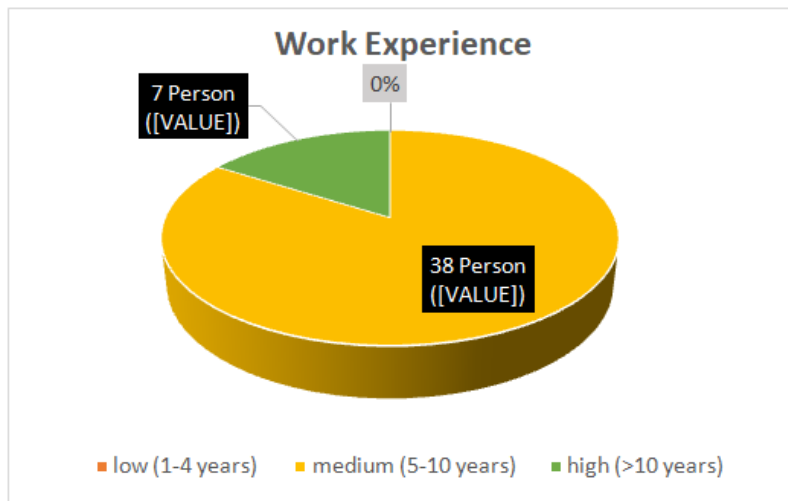


Fig. 3. Respondents' Work Experience Data

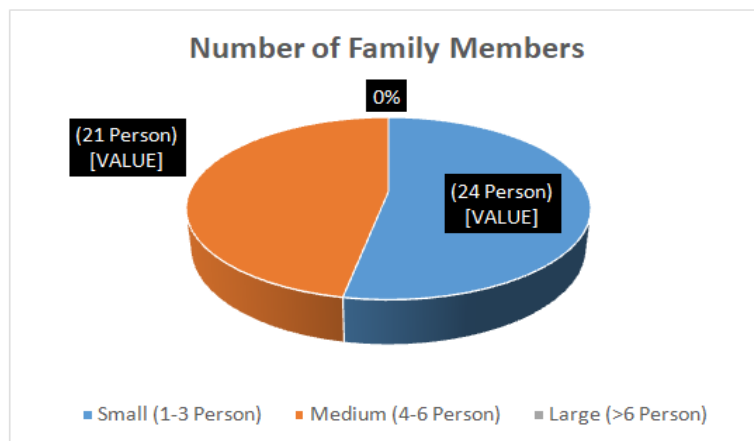


Fig. 4. Data on the Number of Respondents' Family Members

3.2 Fish Cultivator Exchange Rate Analysis (NTPI) in Bayongbong Subdistrict

NTPI in Bayongbong Subdistrict is standardized by land area which is divided into two parts, namely narrow land (<1.000m²) or <0.1 ha, and medium land (1.000-2.000m²) or 0.1-0.2 ha.

3.2.1 NTPI Tilapia in bayongbong subdistrict

The NTPI of tilapia on narrow land and medium land can be seen in Table 1 and Table 2, respectively.

3.2.1.1 Narrow land area (<1.000m²) or <0.1 ha

Based on Table 1, it is found that the average NTPI of tilapia having a narrow land area

(<1.000m² or <0.1 ha) is 84.6%, which means that the expenditure of fish cultivators on household consumption and production cost is higher than the income from their business, or it can be said that tilapia cultivators in Bayongbong Subdistrict, having a narrow land area (<1.000m² or <0.1 ha) are less prosperous.

3.2.1.2 Medium land area (1.000-2.000m²) or 0.1-0.2 ha

Based on Table 2, it is found that the average NTPI of tilapia having a medium land area (1.000-2.000m² or 0.1-0.2 ha) is 147.5%, which means that fish cultivators have higher income than their household consumption expenditures and production cost (surplus), or it can be said that tilapia farmers in Bayongbong Subdistrict, having a medium land area (1.000-2.000m² or 0.1-0.2 ha) are wealthy.

3.2.2 NTPI Gold Fish in Bayongbong Subdistrict

NTPI goldfish in Bayongbong Subdistrict is standardized by land area, which is divided into two parts, namely narrow land (<1.000m²) or <0.1 ha, and medium land (1.000-2.000m²) or 0.1-0.2 ha. The NTPI goldfish on narrow land and medium land are shown in Table 3 and Table 4.

3.2.2.1 Narrow Land Area (<1.000m²) or <0.1 ha

Based on Table 3, it is found that the average NTPI gold fish having a narrow land area (<1.000m² or <0.1 ha) is 99%, which means fish farmers' expenditure on household consumption and production cost is higher than the income from their business, or it can be said that goldfish cultivators in Bayongbong Subdistrict having a narrow land area (<1.000m² or <0.1 ha) are less prosperous.

3.2.2.2 Medium land area (1.000-2.000m²) or 0.1-0.2 ha

From Table 4, it is found that the average NTPI goldfish with medium land area (1.000-2.000m² or 0.1-0.2 ha) is 144.8%, which means that fish cultivators have higher income than their expenditures on household consumption and production cost (surplus), or it can be said that goldfish cultivators in Bayongbong Subdistrict, who have a medium land area (1.000-2.000m² or 0.1-0.2 ha) are wealthy.

3.2.3 NTPI Catfish in Bayongbong Subdistrict

NTPI catfish in Bayongbong Subdistrict is standardized by land area which is divided into

two parts, namely narrow land (<1.000m² or <0.1 ha), and medium land (1.000-2.000m² or 0.1-0.2 ha). The NTPI of catfish on narrow and medium land are shown in Table 5 and Table 6, respectively.

3.2.3.1 Narrow land area (<1.000m²) or <0.1 ha

Based on Table 5, it is found that the average NTPI of catfish with a narrow land area (<1.000m² or <0.1 ha) is 88.7%, which means that the expenditure of fish cultivators on household consumption and production cost is higher than the income from their business, or it can be said that catfish cultivators in Bayongbong Subdistrict having a narrow land area (<1.000m² or <0.1 ha) are less prosperous.

3.2.3.2 Medium land area (1.000-2.000m²) or 0.1-0.2 ha

Based on Table 6, it is found that the average NTPI of catfish with medium land area (1.000-2.000m² or 0.1-0.2 ha) is 133.9%, which implies that fish cultivators have higher income from their business than their expenses for household consumption and production costs (surplus), or it can be said that catfish cultivators in Bayongbong Subdistrict having a medium land area (1.000-2.000m² or 0.1-0.2 ha) are prosperous.

3.2.4 Overall NTPI in Bayongbong Subdistrict

The overall NTPI is the sum of the average NTPI of tilapia, gold fish, and cat fish. The overall NTPI in Bayongbong Subdistrict is displayed in Table 7.

Table 1. NTPI of Tilapia on Narrow Land Area

No	Land Area (m ²)	Total Production Expenditure (Rp/month)	Total Consumption Expenditure (Rp/month)	Total Expenditure (Rp/month)	Total Income (Rp/month)	NTPI (%)
1	500	3.900.000	5.000.000	8.900.000	7.725.000	86.8
2	440	3.200.000	2.000.000	5.200.000	4.308.333	82.9
3	800	4.650.000	6.000.000	10.650.000	8.695.833	81.7
4	570	3.600.000	4.600.000	8.200.000	7.650.000	93.3
5	160	5.900.000	4.000.000	9.900.000	4.008.333	40.5
6	395	2.800.000	3.500.000	6.300.000	5.116.667	81.2
7	700	5.500.000	5.500.000	11.000.000	10.905.833	99.1
8	600	5.400.000	4.200.000	9.600.000	9.350.000	97.4
9	650	6.100.000	3.700.000	9.800.000	9.650.000	98.5
					NTPI Average	84.6

Table 2. NTPI of tilapia on medium land area

No.	Land Area (m ²)	Production Expenditure (Rp/month)	Consumption Expenditure (Rp/month)	Total Expenditure (Rp/month)	Total Income (Rp/month)	NTPI (%)
1	1.800	11.700.000	2.000.000	13.700.000	24.191.667	176.6
2	1.400	7.500.000	4.500.000	12.000.000	18.291.667	152.4
3	1.200	6.000.000	4.670.000	10.670.000	14.750.000	138.2
4	1.100	7.850.000	2.500.000	10.350.000	14.041.667	135.7
5	1.050	6.700.000	3.000.000	9.700.000	13.041.667	134.5
NTPI Average						147.5

Table 3. NTPI of gold fish on narrow land area

No.	Land Area (m ²)	Total Production Expenditure (Rp/month)	Total Consumption Expenditure (Rp/month)	Total Expenditure (Rp/month)	Total Income (Rp/month)	NTPI (%)
1	640	4.800.000	3.000.000	7.800.000	8.266.667	106.0
2	440	3.500.000	5.000.000	8.500.000	7.294.167	85.8
3	700	3.800.000	5.000.000	8.800.000	7.266.667	82.6
4	660	5.700.000	2.500.000	8.200.000	8.941.667	109.0
5	500	3.500.000	2.000.000	5.500.000	5.516.667	100.3
6	300	2.400.000	4.000.000	6.400.000	5.050.000	78.9
7	545	4.100.000	3.000.000	7.100.000	6.275.000	88.4
8	600	3.700.000	5.460.000	9.160.000	7.191.667	78.5
9	900	5.000.000	3.500.000	8.500.000	10.416.661	122.5
10	850	5.400.000	4.500.000	9.900.000	12.036.661	121.6
11	700	4.800.000	3.700.000	8.500.000	10.026.661	118.0
NTPI Average						99

Table 4. NTPI of goldfish on medium land area

No.	Land Area (m ²)	Total Production Expenditure (Rp/month)	Total Consumption Expenditure (Rp/month)	Total Expenditure (Rp/month)	Total Income (Rp/month)	NTPI (%)
1	1.000	5.880.000	4.000.000	9.880.000	13.010.000	131.7
2	1.100	5.700.000	5.000.000	10.700.000	14.358.333	134.2
3	1.800	11.150.000	3.500.000	14.650.000	24.820.833	169.4
4	1.700	10.800.000	2.000.000	12.800.000	20.433.333	159.6
5	1.200	9.600.000	3.400.000	13.000.000	18.358.333	141.2
6	1.050	9.800.000	3.000.000	12.800.000	17.010.000	132.9
NTPI Average						144.8

Table 5. NTPI of catfish on narrow land area

No.	Land Area (m ²)	Total Production Expenditure (Rp/month)	Total Consumption Expenditure (Rp/month)	Total Expenditure (Rp/month)	Total Income (Rp/month)	NTPI (%)
1	260	2.400.000	5.700.000	8.100.000	6.091.667	75.2
2	170	1.350.000	5.800.000	7.150.000	4.470.833	62.5
3	700	4.000.000	3.000.000	7.000.000	7.116.667	101.7
4	600	4.200.000	3.700.000	7.900.000	8.206.667	103.9
5	540	3.000.000	4.000.000	7.000.000	6.356.667	90.8
6	350	4.690.000	4.200.000	8.890.000	7.593.445	85.4
7	650	5.400.000	4.500.000	9.900.000	10.009.334	101.1
NTPI Average						88.7

Table 6. NTPI of catfish on medium land area

No.	Land Area (m ²)	Total Production Expenditure (Rp/month)	Total Consumption Expenditure (Rp/month)	Total Expenditure (Rp/month)	Total Income (Rp/month)	NTPI (%)
1	1.100	8.400.000	3.000.000	11.400.000	15.066.667	132.2
2	1.000	6.500.000	2.500.000	9.000.000	12.125.000	134.7
3	1.000	5.500.000	3.000.000	8.500.000	11.125.000	130.9
4	1.050	5.700.000	3.500.000	9.200.000	12.120.000	131.7
5	1.200	8.400.000	3.200.000	11.600.000	16.033.333	138.2
6	1.100	11.600.000	2.800.000	14.400.000	18.808.333	130.6
7	1.150	9.400.000	3.000.000	12.400.000	17.233.333	139.0
					NTPI Average	133.9

Table 7. Overall NTPI in bayongbong subdistrict

No.	Commodity Type	Land Area (m ²)	NTPI Average (%)
1	Tilapia Fish	Narrow (<1.000m ²)	85
		Medium (1.000-2.000m ²)	147
		Total	232
		Average	116
2	Gold Fish	Narrow (<1.000m ²)	99
		Medium (1.000-2.000m ²)	145
		Total	244
		Average	122
3	Cat Fish	Narrow (<1.000m ²)	89
		Medium (1.000-2/000m ²)	134
		Total	223
		Average	111
		Overall Average	116

Based on Table 7, it is found that the average NTPI of tilapia in Bayongbong Subdistrict is 116%, gold fish is 122%, and catfish is 111%. In addition, the overall average NTPI is 116%, which means that fish cultivators' expenditures on household consumption and production costs are lower than their income. So it can be concluded that tilapia, goldfish, and catfish cultivators in Bayongbong Subdistrict are promising farmers.

This is in line with a previous research on the analysis of household NTPI in Cilamaya Wetan, Karawang Regency. The result stated that the farmers in Cilamaya Wetan were generally prosperous with the highest value of 105.54% in 2010, which means that the Fishery Household Exchange Rate (NTRTP) > 100% i.e., the fishing household has a higher income than its expenditure, or has a surplus [28].

The amount of NTPI tends to vary, this occurs because the consumption expenditures are not fixed, as well as the fishery revenues resulted from the production and sales are always changing. NTPI is related to the purchasing

power of the fish farmers in financing their household life. When the increase in income due to the increase in production prices is greater than the increase in the price of the goods purchased, then this indicates an increase in the power and welfare of cultivators [29].

Land area is a very important production factor in a cultivation business which will determine the scale of business and can affect the production factors and also determine the production levels [30]. The narrower the pool, the smaller is the income of the farmer; and the wider the pool, the greater is the income of the farmer [31].

Several factors that affect the calculation of the NTPI [32], namely:

- The amount of current production
- The price of fishery products and commodities produced during the current period
- Expenditures needed to produce fishery commodities
- Prices of consumer goods/services to produce products/commodities

- e) Expenditures incurred for the daily needs
- f) Fish prices that are not easily controlled and influenced by the market situation.

3.3 Analysis of Factors Affecting NTPI Multiple Linear Analysis

The multiple linear analysis model that has been made ideally will be able to determine the factors that are most significant in influencing NTPI in Garut Regency, especially Bayongbong Subdistrict. The results of the NTPI regression model in Bayongbong Subdistrict are described in Table 8 and the model formed is as follows;

$$Y = -0,002 X_1 + 0,038 X_2 + 0,010 X_3 + 0,018 X_4 + 0,085 X_5 - 0,099 X_6 + \epsilon_i$$

Based on the results of the regression equation above, it can be formulated the value of the factors that affect the NTPI in Bayongbong Subdistrict with the following factors:

Description:

- Y = Fish cultivator exchange rate
- α = Constant
- β = Coefficient value of each variable
- X₁ = Age of cultivator (Years)
- X₂ = Cultivator education level (SD/SMP/SMA/Perguruan Tinggi)
- X₃ = Work experience (Years)
- X₄ = Number of family members (Persons)
- X₅ = Cultivator's income (Rupiah/month)
- X₆ = Cultivator's expenditure (Rupiah/month)
- ϵ_i = Error

1. The value of the age coefficient (X₁) is -0.002 with a negative value. This means that for every 1 year increase in age, the NTPI (Y) decreases by 0.002% with the assumption that the other variables are constant.
2. The education level coefficient (X₂) is 0.038 with a positive value. This means that for every 1 level increase in education level, the NTPI (Y) will increase by 0.038% assuming the other variables are constant.
3. The work experience coefficient (X₃) is 0.010 with a positive value. This means that for every 1 year increase in work experience, the NTPI (Y) will increase by 0.010% assuming the other variables are constant.
4. The coefficient value of the number of family members (X₄) is 0.018 with a positive value. This means that for every 1 person increase in the number of family

members, the NTPI (Y) will increase by 0.018% assuming the other variables are constant.

5. The value of the income coefficient (X₅) is 0.085 with a positive value. This means that for every 1 rupiah increase in income, NTPI (Y) will increase by 0.085% assuming the other variables are constant.
6. The value of the expenditure coefficient (X₆) is -0.099 with a negative value. This means that for every 1 rupiah increase in expenditure, NTPI (Y) decreases by 0.099% assuming the other variables are constant.

R square is the result of the information from the multiple regression model that has been created. R Square will provide a value that can describe the accuracy of the independent variable. R square also shows the magnitude of the diversity of the dependent variable and the influence of the independent variable on the dependent variable [21]. In this case, the influence of (1) age, (2) education level, (3) work experience, (4) number of family members, (5) income, and (6) expenses, on NTPI in Bayongbong Subdistrict can be known. The results of R Square is presented in Table 9.

The value of the coefficient of determination will produce a number between zero and one. If the value is close to one, it can explain the effect of the independent variable on the dependent variable. However, if the result obtained is close to zero, it can be said that the model is less suitable to explain the influence of the independent variable on the dependent variable [22]. The R square obtained from this model is 0.98, meaning that 98% of the predictor variables can affect the NTPI and the remaining 2% is the influence of other variables that are not included in the model. This result is closer to one and it can be said that the model formulated can explain the effect of the independent variable on the dependent variable.

The F test or overall t-test is carried out to determine whether the independent variables together or simultaneously (overall) have a significant effect on the dependent variable or in this case NTPI in Bayongbong Subdistrict. The result of the F test in this model are explained by the significance value obtained, which is 0.0000. This means that the value is smaller than by 5% or 0.05. This means that the model made can be said to be valid and significant. The results of the F test is shown in Table 10.

Table 8. Multiple linear regression results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.962	.065		14.807	.000
	Age	-.002	.001	-.058	-2.146	.038
	Level of education	.038	.012	.103	3.087	.004
	Work experience	.010	.004	.077	2.827	.007
	Number of Family Members	.018	.008	.064	2.335	.025
	Income	.085	.004	1.527	20.877	.000
	Expenditure	-.099	.009	-.778	-11.661	.000

Description: *Real at 5% level

Table 9. R square

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.990 ^a	.980	.976	.04528

Table 10. F test results

Model		Sum of Squares	Df	Mean Square	Fhitung	Ftabel	Sig.
1	Regression	3.733	6	.622	303.420	2,26	.000 ^b
	Residual	0.078	38	.002			
	Total	3.811	44				

Table 11. t-test results

No	Independent Variable	Thitung	t-tabel	Decision
1.	Age (X ₁)	-2.146		Take effect
2.	Education Level (X ₂)	3.087		Take effect
3.	Work Experience (X ₃)	2.827	1,686	Take effect
4.	Number of Family Members (X ₄)	2.335		Take effect
5.	Revenue (X ₅)	20.877		Take effect
6.	Expenditure (X ₆)	-11.661		Take effect

The F test produced an F arithmetic value of 303.42 with F table 2.26, explaining the hypothesis that F arithmetic > F table. This shows that the independent variables tested on the model simultaneously have a significant effect on the dependent variable.

The t-test or partial test was conducted to determine the effect of each of the existing independent variables. The predictor variables in this study were (1) age, (2) education level, (3) work experience, (4) number of family members, (5) income, (6) expenditure, individually or not simultaneously, which has a real or non-significant effect on the dependent variable, namely NTPI. All the t-test variables are described in Table 11.

Based on the results of the t-count above Table 11, it can be compared with the t-table of 1.686.

So the independent variables having an influence on NTPI are age (X₁), education level (X₂), work experience (X₃), number of family members (X₄), income (X₅), and expenses (X₆) with a t value of -2.146, 3.087, 2.827, 2.335, 20,877, and -11,661, respectively. This value states that t count > t table. Therefore, it can be concluded that all the predictor variables have significant effect on NTPI in Bayongbong Subdistrict.

4. CONCLUSION

Based on the results of the analysis of NTPI in Garut Regency, the following conclusions can be drawn:

1. The average NTPI in Bayongbong Subdistrict, Garut Regency is 116%, which means that fish cultivators' expenditures

for household consumption and production costs are lower than their income. So it can be concluded that fish cultivators in Bayongbong Subdistrict are prosperous cultivators. So it can be concluded that fish cultivators in Bayongbong Subdistrict are prosperous cultivators.

2. Factors that can affect NTPI are age, education level, work experience, number of family members, income, and expenditure.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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