International Journal of
Business Diplomacy and Economy

ISSN: 2833-7468
Volume 2 | No 6 | June -2023

Analysis of Vannamei Shrimp Cultivation Business ((Litopenaeus vannamei) In North Gorontalo District, Gorontalo Province

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Abstract: Traditional and intensive system of vannamei shrimp (Litopenaeus vannamei) cultivation has a high profit potential, with a high risk as well. The potential economic feasibility of the two cultivation systems needs to be studied to determine which cultivation systems are feasible to develop. The purpose of this study was to determine the feasibility level of vannamei shrimp (Litopenaeus vannamei) cultivation applied to intensive and super-intensive systems in traditional and semi-traditional ponds in North Gorontalo Regency. In this study, production technical activities will be analyzed descriptively by providing an overview of the techniques of Vanamei shrimp (Litopenaeus vannamei) cultivation which includes preparation of enlargement ponds, stocking of fry, maintenance, water management to harvesting. Based on the research results, it is known that the intensive system of vannamei shrimp cultivation is feasible compared to the traditional system. The R/C value of the intensive system vannamei shrimp ponds can reach 1.56. Meanwhile, traditional systems are only able to produce the highest R/C ratio of 1.38. The application of cultivation must be supported by the use of a water wheel which is more proportional than semi-traditional, as well assisted with a blower to supply dissolved oxygen. Payback period analysis, traditional ponds show a value of 0.23 meaning that they are able to return the cost of capital within 0.23 years (1 cycle), shorter than the maximum period of 3 cycles. BEP analysis, yields and prices show a value that is acceptable because overall it is above the BEP minimum limit.

Key words: busmetik, SUPM, business feasibility, R/C ratio, business, intensive, vannamei

INTRODUCTION

Shrimp is a fishery sector commodity that has the potential to contribute to improving the economy of fish farmers in Indonesia, particularly in the North Gorontalo region. Not only domestic consumers, but shrimp is also one of the mainstays of export commodities. In 2012-2016 the demand for shrimp in the world contributed to a growth rate of 7.45% per year. It is recorded in International Trade Center data (2017) that in 2012 the total import of shrimp in the world has reached 17.25 billion US dollars. The amount has increased to 22.19 billion US dollars in 2016.

Profitable shrimp farming is indeed very promising in terms of results. Tiger shrimp (Penaeus monodon) was once the prima donna in the world of fisheries. The price is very high, making many shrimp farmers keep it for commercial purposes and generate a lot of profit. Economically, the cultivation of tiger prawns (Penaeus monodon) is actually very profitable, but due to management that pays little attention to the environment, several times in the past there have been mass deaths caused by disease. Vannamei shrimp has the advantage of being cultivated in ponds, namely having a high survival rate, fry having SPF (specific pathogen free) characters, being resistant to high stocking densities, originating from domesticated parents, more disease resistant and generally have a low feed conversion rate. White shrimp is a hyper-hypo osmoregulator, able to live at a salinity between 0.5-40 ‰ (Supono, 2017).

The shape of the plots is generally rectangular with an area of 1 ha to 3 ha per plot. Each plot has a water inlet and outlet gate. Shrimp feed is still from natural food which growth is encouraged by fertilization. In semi-intensive ponds water management is quite good, some of the pond water is replaced with new water so that the quality of the water is maintained and the life of the shrimp is healthy. Pest eradication is carried out when preparing ponds before stocking fry. Intensive cultivation systems, namely plots on intensive cultivation systems are carried out with sophisticated techniques and require large input costs. The plots are generally small, 0.2 ha to 0.5 ha per plot, with the aim of making it easier for water management and supervision. Food is completely dependent on the food provided with an ideal composition for growth. Ponds are given water to increase oxygen levels in the water. Water changes are carried out very frequently, at least once a week.Considering that the two systems have high profit potential, along with high risks, the authors need to conduct research to assess the level of economic feasibility. So that it can be known which one has more potential to be developed optimally.

1.1 Problem Formulation And Approach

The application of vanamei shrimp (Litopenaeus vannamei) traditional and semi-traditional systems has the same objective, namely optimizing production results. The risks faced in high-intensive systems, as well as in super-intensive systems, have an even higher level of risk. Based on the description that has been explained in the background, the formulation of the problem in this study is the extent to which the level of feasibility of vannamei shrimp (Litopenaeus vannamei) cultivation is between intensive and super intensive systems. The level of business feasibility is reviewed from the financial aspect which includes capital, revenue, Revenue Cost Ratio, profit, Break Event Point.

The problem approach scheme proposed in this study is presented in Figure 1.

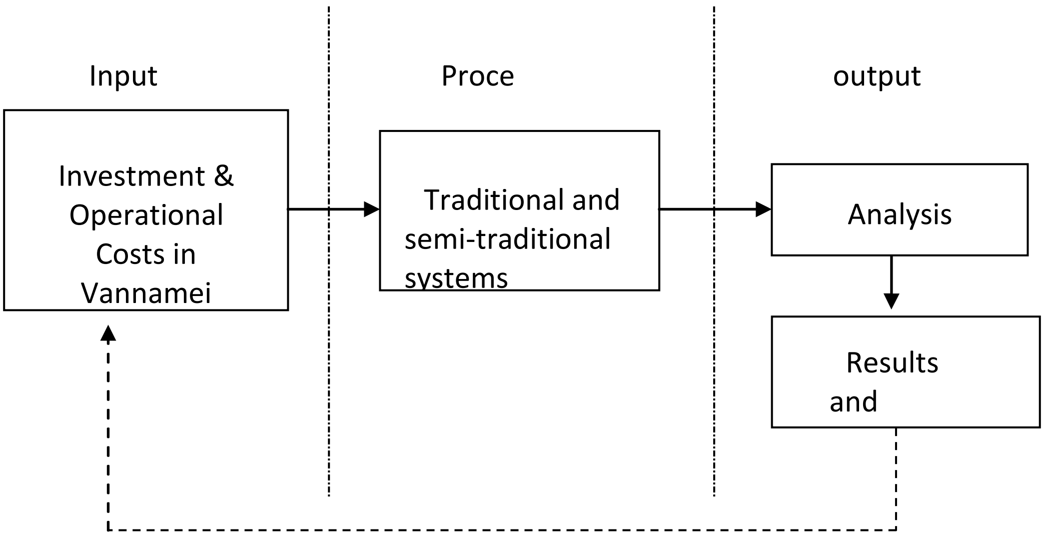

Figure 1.1. Problem Approach Schematic

Information :

: Direct Relationship

: Feedback

: Scheme Boundary

The purpose of this study was to analyze the level of feasibility of vannamei shrimp (Litopenaeus vannamei) cultivation when applied with traditional systems and synthetic systems. Time and place

The research was carried out in January - June 2023. The research locations were Traditional Vanname Shrimp Ponds and Semi-Traditional Vanname Shrimp Ponds in North Gorontalo Regency

The biological characteristics of vannamei shrimp are that they are always active in the dark (nocturnal) and are able to survive in a wide range of salinity (euryhaline), namely 2 to 40 ppt. If it is found in an environment with temperatures below 15º C, the vannamei shrimp will usually die, or above 33º C for 24 hours (Sofyan, 2018).

Next is feeding adjust to the condition of shrimp biomass and control is always carried out using anco checks. In addition, it is necessary to provide additional feed for vannamei shrimp maintenance, namely in the form of vitamin C, omega protein, and probiotics. Further control can be carried out through sampling with a frequency of once a week. This is done to determine the average weight and biomass of vannamei shrimp. Thus, on a daily basis the amount of vannamei shrimp feed can be determined. Sampling is also used as a method for monitoring and knowing the rate of weight development and estimating the feed conversion ratio (FCR) which is temporary (Ghufron, et al, 2017).

Feed management according to Supono (2017), that the protein requirement for vannamei shrimp is 30-35%. Anatomically, the digestive tract of shrimp is very simple, consisting of the mouth, oesophagus, intestine and anus. This anatomical condition affects the pattern of feeding method applied, both in terms of frequency (feeding frequency) and feeding rate applied in both semi-intensive and intensive shrimp farming. Disease can be a major cause of failure in shrimp farming mainly by viruses. To overcome the disease can be done by increasing non-specific immunity and good pond environmental management. In Indonesia, diseases that commonly attack vannamei shrimp are white spot syndrome virus (WSSV), infectious myonecrosis virus (IMNV), and taura syndrome virus (TSV). One of the main causes is derived from the degradation of the pond environment. Environmental quality will cause pathogens and harmful plankton to emerge, such as dinoflagellates and blue green algae (BGA). As well as waste from organic matter produced in shrimp farming affects other water quality. Temperature, pH, pollutants, salinity, ammonia, hydrogen sulfide and dissolved oxygen can also affect shrimp resistance during disease infection (Supono, 2017). Shrimp can be harvested if it has entered the market size of 100 to 30 individuals/kg. Before harvesting, dolomite can be added to harden the shrimp skin at a dose of 6-7 ppm, so as to produce good quality shrimp.

Harvest is a sink for water. In the method that uses nets, it is usually applied to small ponds. Meanwhile, the method that is drained must be by sucking the water out through the sluice. After the water is limited to or below the knee, the shrimp must be immediately removed and placed in the place provided, namely in the form of airtight plastic boxes and cooled with ice cubes. This is done so that the shrimp is maintained its freshness. The shrimp that had been removed from the pond were then weighed (Nurhajarini, et al, 2017).

Meanwhile, according to Supono (2017), harvesting is carried out through two methods, namely partial harvesting which aims to reduce the level of density or population level of shrimp so that further shrimp can grow quickly, and the total harvest method, which is the harvest carried out as a whole at the last moment of the rearing period.

MATERIALS AND METHODS

The material for this research is individual cultivators who carry out vannamei shrimp (Litopenaeus vannamei) cultivation using traditional and semi-traditional systems. Vannamei shrimp cultivation which is the research location is the Vannamei Shrimp Pond in North Gorontalo Regency.

Technique Determination of the sample selected by purposive sampling. Namely 2 (two) traditional pools and 2 (two) semi-traditional pools.*Purposive sampling*issampling technique with certain considerationsin Sugiyono, (2016: 85). The reason for using this purposive sampling technique is because it is suitable for use in quantitative research, or studies that do not generalize according to Sugiyono, (2016: 85).

Stocking is done in a way that is not much different from traditional, still applying acclimatization to fry. The number of fry stocked in semi-traditional system ponds is generally between 200 – 300 fish/m2. The land used is generally 600 m2 - 1,000 m2 with a water level between 130-200 cm. According to SNI 8118: 2015 concerning Semi-traditional Vannamei Shrimp Production, the pond area used is between 400 m2 - 1,600 m2. While the stocking density is 250 individuals/m3 (650 individuals/m2) to 400 individuals/m3 (1,120 individuals/m2) with a pond water level of 260 – 280 cm. While intensive system ponds generally apply 100-150 fish/m2 in the field and some even apply 150-199 fish/m2, the area of the pond used is generally 0.5 - 1 hectare with a water level of 100-130 cm. According to SNI 8008: 2014 regarding vanamei shrimp production, in the area of the pond used 1. 000-5000 m2, stocking density of 80-120 fish/m2, with a pond height of 100-150 cm. In essence, the process of cultivating land intensification is to utilize minimal land for maximum results. The pond construction uses an earthen pool covered with HDPE plastic and some uses a wall or concrete structure. The use of windmills as a means of meeting oxygen needs is still being applied, but usually in larger quantities than in intensive systems. Generally using 5-6 units of wheels or even more. The feed used uses the manufacturer's feed in full. There is a feeding method that uses an auto feeder system. The final stage of maintenance is harvesting. Harvesting is usually done in stages or in partial (partial harvest). In essence, the process of cultivating land intensification is to utilize minimal land for maximum results.

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This research method is a qualitative and quantitative descriptive method. In this descriptive method, the aim is to make a systematic, factual and accurate description, picture or painting of the facts, characteristics and relationships between the phenomena being investigated. easy to accept the meaning and meaning of anyone who needs information related to this phenomenon. The implementation of this research was carried out by means of observation and interviews. The details of the types of activities carried out include: While the quantitative descriptive method isQuantitative descriptive research isdescribe, research, and explain something that is learned as it is, and draw conclusions from observable phenomena using numbers.The marketing aspect will be analyzed descriptively qualitatively by providing a general description of marketing activities in intensive and super intensive vannamei shrimp (Litopenaeus vannamei) businesses.

Cost and Revenue Analysis

Cost and income analysis is used to find out what costs are needed in production. In addition, to determine the value of income derived from the business. Production cost calculation formula

According to Suratiyah (2015) to calculate the amount of total cost (Total Cost) is obtained by adding up fixed costs (Fixed Cost/FC) with variable costs (Variable Cost) with the formula:

TC = FC+VC

Information :

tc	=	*Total Cost*(total cost)
FC	=	*Fixed Cost*(total fixed cost)
VC	=	*Variable Cost*(variable costs)

Revenue (total revenue)

According to Suratiyah (2015) which states that the calculation of total revenue (Total Revenue/TR) is the multiplication of the amount of production (Y) and the selling price (Py) and is expressed by the following formula:

TR = Py x Y

Information :

TR	=	*TotalRevenues*(Total Acceptance) Py	=	Price product
Y	=	Amount production		

***Revenue Cost Ratio*(R/C Ratio)**

The Revenue Cost Ratio (R/C ratio) method is a calculation that compares the revenue value with the total cost incurred during the production process. Calculating the R/C ratio is also a way to determine whether or not a business action is feasible (Suratiyah, 2015). The formula used to calculate the value of the R/C ratio is as follows:

$$R/C = \frac{\textit{Penerimaan Total}\ (TR)}{\textit{Biaya Total}\ (TC)}$$

Information :

Revenue = The amount of receipts obtained

cost = The amount of costs incurred There are three criteria in the calculation, namely:

a. If R/C > 1 means that the farming is profitable.

b. If R/C = 1 it means that the farm is break even.

c. If R/C < 1 means that the farm is a loss

Profit

Profits can be calculated by reducing the value of all receipts with the value of the total costs that have been used in production. Suratiyah (2015) says that income is the difference between revenue (TR) and total costs (TC) and is expressed by the formula:

I = TR – TC

Information :

I = *Income*(Income)
TR = *TotalRevenues*(Total Acceptance)
tc = *Total Cost*(Total Cost)

***Break Event Points*(BEP)**

According to Rachmina (2017), break even point analysis is management information that describes the level of minimum sales volume that must be achieved so that the company neither loses nor profits. This break-even point is affected by the level of income and expenses. With a break event point, the manager of a company can find out how far the sales level is expected so as not to experience losses and can take the right policy for the coming period.

Break Even Point(BEP) is a condition indicating that a company is breaking even. The point of breaking even here is that financially the company is in a state of neither profit nor loss. BEP also describes the relationship between variable values in the production of a company. The calculation of the BEP can include BEP for prices and BEP for production (Sofyan, 2018).

BEP price = $\frac{TC}{Y}$

BEP price shows the minimum production price that must be

achieved.

Production BEP = $\frac{TC}{P}$

BEP production shows the minimum amount of production that must be achieved.

Information :

tc	=	*Total Cost*(Total Cost)
Y	=	Production Amount
P	=	Price

Payback Period (PP)

The payback period (PBP) method is a method of calculating investment capital to find out the length of time it takes for the capital that has been issued to be returned (Adalina, 2016). Calculation of Payback Period can be done using the following formula:

$$\textbf{PBP} = \frac{\textit{Investasi Awal}}{\text{1 year old}}$$

*period*lower than the maximum payback limit, the business is considered feasible, and vice versa.

RESULTS AND DISCUSSION

The depth of the pond water used in North Gorontalo Regency is between 130 – 150 cm. Water changes are carried out once a day as much as 15-20% of the pool water volume with a frequency of 2 to 3 days. This frequency will be different when the age of the shrimp increases, which is 1 to 2 days or depending on water conditions. While the pond in the pond

The technical aspect is an aspect related to the technical business development process and its operation after the business is completed. This technical aspect can also help determine the initial design of the investment cost estimate. In this aspect, the location of the business is seen, namely the availability of raw materials, the location of the target market, electricity and water, labor supply, and transportation facilities. In terms of production area, it can be seen from the limitations of demand, the number and ability of the workforce, the capacity of the machines, and financial and management capabilities. On different systems but have a lot of similarities in technical terms. Starting from pond preparation, seed stocking, maintenance to harvest

Traditional System

The results of data collection on traditional ponds have been obtained from a number of ponds including:

1. Traditional Ponds

The selected ponds are a number of 2 ponds (cycle 3), namely with the pool code 01 and 02 as much as 1 cycle with the area of the pool

1.0 m2 and pond 15B for 1 cycle with a pool area of 1,000

2.0 m2. The stocking density applied is 150 fish per square meter

3.0 every pool.

Table 1. Traditional Pond Production Data

shooter	Pool Code	Pool area (m2)	spread(tail/ m2)	Feed(kg)	Si product (kg)	Average Size	Average selling price (Rp)
Traditional	01	1,000	150	3,475	1834.6	71	67,400
	02	1,000	150	2,300	2004,2	71	78,225
	Amount			**5,775**	**3,838.9**		

Primary Data, 2023

2. Intensive Pond

Data was also obtained from shrimp ponds in North Gorontalo, ponds owned by individuals. The name of the pond owner did not get permission to be displayed in this research report, so the code was only given, namely traditional pond 2 ponds. And in intensive system ponds there are 2 ponds that can be accessed by data. Namely pool 1 and pool 2, each of which is 900 m2. The stocking density applied to each pond is 83 fish per square meter.

Table 2. Intensive system pond production data

shooter	Pool Code	Pool area (m2)	Spread (heads/ m2)	Feed(kg)	Si product (kg)	Average Size	Average selling price (Rp)
Intensive Pond	1	900	83	2005	1,775	72	72,000
	2	900	83	2020	1,525	72	72,000
	Amount			**4,025**	**3,300**		

Primary Data, 2023

Cost Value and Feasibility Data

As for the results of the study, it can be seen that the cultivation of vannamei shrimp (Litopenaeus vannamei) using traditional systems and semi-traditional systems is as follows

Traditional

Total Cost

The total cost required in the initial capital is as a burden of production costs used is using the following formula:

tc = FC + VC

Information :

tc = *Total Cost*(total cost)
FC = *Fixed Cost*(total fixed cost)
VC = *Variable Cost*(variable costs)

Total costs are all costs incurred from the start of production as capital and all costs related to operations. Total costs consist of fixed costs and variable costs. Fixed costs in this study include salaries, investment depreciation and land rent. While variable costs include the cost of buying fry, consumption, feed, fuel, wages, medicines, electricity and costs incurred during production or cultivation.

Table 3. Fixed Costs of Traditional System Ponds

Location	Wages	shrinkageinvestment (IDR)	Total
Pond 1	7,500,000	68,530,500	76,030,500
Pond 2	6,000,000	45,266,500	51,266,500

Primary Data, 2023

Table 4. Variable Costs of Vannamei Shrimp Ponds

BBM	Benur	Electricity	Drugs & supporting materials	Feed	Wages	Consumption	Other al operations	Total
Traditional Ponds								
3,400,000	13,050,000	29,478,400	38,048,400	84,809,000	8,146,750	-	-	176,932,550
4,500,000	7,050,000	15,000,000	66,375,000	62,307,000	3,300,000	900,000	-	159,432,000

Primary Data, 2023

BBM	Benur	Electricity	Drugs & supporting materials	Feed	Wages	Consumption	Other al operations	Total
Intensive System								
9,000,000	20,160,000	18,500,000	19,400,000	154,413,000	7,769,220	3,000,000	-	232,242,220
4,880,000	7,500,000	11,793,318	3,110,000	45,150,000	4,100,000	1,125,750	3,888,500	81,547,568

Primary Data, 2023

Acceptance, Profits and Feasibility Value in the form of R/C Ratio

Revenue (Total Revenue / TR) is the multiplication between the amount of production (Y) and the selling price (Py). The calculation formula based on Suratiyah (2015) is as follows:

$$TR = Py \times Y$$

Information :

TR = *TotalRevenues*(Total Acceptance)
Py = Product price
Y = Production amount

Profits or income are obtained from total receipts minus total costs (Suratiyah, 2015). The calculation formula is as follows:

I = TR – TC

Information :

I = *Income*(Income)
TR = *TotalRevenues*(Total Acceptance)
tc = *Total Cost*(Total Cost)

The feasibility value is calculated through the R/C ratio analysis method which is an analytical tool to see the relative profit of a business in one year against the costs used in the activity. A business is said to be feasible if the R/C value is greater than one, meaning that the farming is profitable (R/C ratio > 1). If the R/C value is equal to one, it means that the farm is break even (R/C ratio = 1). If the value of the R/C ratio is less than one, it means that the farm is in loss (R/C ratio <1).

To calculate the feasibility value of the R/C Ratio through the following formula (Suratiyah, 2015):

$$R/C = \frac{\textbf{Penerimaan Total}\ (TR)}{\textbf{Biaya Total}\ (TC)}$$

Information :

Revenue = The amount of receipts obtained

cost = The amount of costs incurred

No.	shooter	Investment Value (Rp)	Profit (IDR)	pp
1	Traditional Shrimp Ponds	61,413,000	24,865,745	2.47
2	Intensive Shrimp Pond system	78,996,000	122,454,274	0.65

Table 5. Total Cost, Revenue, Profit and Value of R/C Ratio of Vannamei Shrimp Ponds

Location	Total Cost (TC)	Reception	Profit	Average R/C
Traditional Shrimp Ponds	265,715,550	290,581,295	24,865,745	1.09
Intensive System Ponds	235,462,500	282,000,000	46,537,500	1.20

Primary Data, 2023

Table 6. Break event point (BEP) for Vannamei Shrimp Cultivation Ponds

Location	**BEP Yield (kg)**	**Production (kg)**	**BEP Price (IDR)**	**Price Average (IDR)**
Traditional Vaname Shrimp Ponds	1,854	3,838.94	71,041	72,812.50
Intensive System Vanname Shrimp Ponds	1635,16	3300.00	71,693.37	72,000.00

Primary Data, 2023

Based on Table 6, the BEP value indicates the minimum selling price value and the minimum production value limit that must be achieved. The BEP value is the average production value and the average selling price of each sample pond. It can be seen in the table that each pond has exceeded the minimum production limit and minimum selling price. So that in the BEP analysis, production and prices in each pond are acceptable.

Table 7. Payback Period (PP) for Vannamei Shrimp Ponds

Primary Data, 2023

Table 7 shows the results of calculating the return on investment that has been invested in the traditional system of vannamei shrimp farming in each sample pond. The payback period value that has been obtained is between 0.21 – 2.47. Where the longest period of time is obtained in traditional ponds, meaning that the value of the investment that has been invested will be returned through the production process for 2.47 years or around 30 months (8 production cycles).

Table 8. Break Event Points in Vannamei Shrimp Ponds

Location	**BEP Yield (kg)**	**Production (kg)**	**BEP Price (Rp)**	**Price Average**
Traditional system	15,773.30	18,585.30	41,420.82	48,492.04
Intensive system ponds	38,197.46	45,012.79	54,316.70	65,103.33

Primary Data, 2023

Table 8 shows the value of the break event point (BEP) for traditional and semi-traditional system ponds, where this BEP value is the minimum selling price value and the minimum production value limit that must be achieved. It can be seen in the table that each pond has exceeded the minimum production limit and minimum selling price.

Table 9. Payback Period (PP) in Vannamei Shrimp Ponds

No.	shooter	Mark Investment (IDR)	Profit (IDR)	pp
	Vanname Shrimp Ponds			
1	Traditional System Shrimp Ponds	99,696,000	427,704,716	0.23
2	Intensive System Shrimp Pond	399,184,500	613,401,363	0.65

Primary Data, 2023

Table 9 shows the results of calculating the return on investment that has been invested in traditional and semi-traditional vannamei shrimp farming in each sample pond. Payback period value which has been obtained 0.65 in semi-traditional shrimp ponds and 0.23 in traditional shrimp ponds and has a time of 0.65 years approximately 7 months (2 cycles) to be able to return the value of the capital costs that have been invested in aquaculture. Discussion.

Feasibility AnalysisBreak Even Point (BEP) Analysis

Break Even Point(BEP) for traditional and semi-traditional as a whole can be seen in table Table 4.15 which is summarized in the recapitulation of BEP values for both BEP prices and BEP results which are compared with the results of production data with the average selling price for each pond.

Table 10. Traditional Break Event Point systems and intensive systems

Location	Average Price (Rp)	BEP Price (Rp)	Production(kg)	BEP Yield (kg)
Traditional Ponds	72,000.00	71041	3300.00	1635,16
Intensive Pond	72,812,50	71,693.37	3,838.94	1635,16

Primary data. 2023

Based on Table 10 above, it can be seen that the value of the selling price (average) has exceeded the price BEP value, or it means that the minimum limit for selling shrimp has been exceeded. Likewise, the production value has also exceeded the yield BEP value, meaning that the volume of shrimp sold has exceeded the minimum threshold value. In accordance with the opinion of Rachmina (2017) which states that break even point analysis is management information that describes the level of minimum sales volume that must be achieved so that the company does not lose or make a profit. In other words, the BEP value is the minimum value that must be achieved in order to make a profit. the price is Rp. 71041. Likewise with other ponds. Broadly speaking, in calculating BEP, both prices and yields,

Payback Period (PP) Analysis

The data presented is the acquisition value for calculating the payback period for the capital invested in each pool. The values shown in Table 4.17 below are the average values of each sample pond.

Table 11. Recapitulation of Payback Period Data (PP) for traditional and intensive system ponds

No.	shooter	Investment Value (IDR)	Profit (IDR)	pp
Intensive Pond				
1	Traditional	61,413,000	24,865,745	0.65
2	Semi Traditional	78,996,000	122,454,274	2.47

Primary Data, 2023

The payback period calculation is in the context of 1 year, while the samples taken are production that runs no more than 1 year. So it is assumed that the maximum period is within 1 year or 3 cycles. So, if you want to achieve a return on capital, the minimum profit value is the same as the investment value, even the profit value must be greater so that you can achieve a return on capital within 1 year.

To estimate that the profit value will exceed the investment value, then at the time of sale or harvest, farmers must be able to calculate the estimated minimum production value (yield BEP) and the minimum selling price (price BEP). This will affect the farmers or the marketing division in determining potential buyers/bidders whose bid price is in accordance with the minimum production limit and predetermined selling price. Whereas in traditional system ponds it achieves a payback period value of 0.23. This means that within 0.2 years or approximately 2-3 months, you can return the value of the capital that has been invested. So that in semi-traditional system ponds it is acceptable because it is able to take 1 cycle to achieve a return on investment capital value rather than a maximum period of 1 year (3 cycles).

Most of the costs incurred for harvesting are borne by the farmers with an agreement of Rp. 2,000 per kilogram of harvest. All needs for harvesting such as equipment have been prepared by the buyer. The farmers only supervise and take part in recording the results of the weighing process until they enter the container box.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the study, it can be concluded that: The feasibility level of intensive system vannamei shrimp farming based on the calculation of the R/C ratio has a difference in semi-traditional system cultivation with an R/C ratio of 1.56, higher than traditional system ponds which have R/C ratio 1.38.

Suggestion

Efforts are needed to increase the pattern of intensification in the vannamei shrimp farming business, from traditional and semi-traditional systems to being more advanced than the two systems, which are supported by well-controlled operational management, especially control over the imposition of production costs which have the potential to be high in absorbing costs. .

REFERENCE

1. Adalina, Y. (2016). Financial Analysis of Honey Bee Businesses Apis mellifera L. Journal of Forest Research and Nature Conservation. 5(3). 217–237
2. Anwar S., M. Arief, Agustono. 2016. The Effect of Commercial Probiotics in Feed on the Growth Rate and Feed Efficiency of Vanname Shrimp (Litopenaeus vannamei). Journal of Aquaculture and Fish Health. Department of Health Management of Fish and Aquaculture, Faculty of Fisheries and Maritime Affairs, Airlangga University. Surabaya. 5(2) : 1-6.
3. Nandi, D. Rohmat, and E. Noviyanti, The Effect of Pond Cultivation Business on the Socio-Economic Conditions of Pond Farmers in Cibuaya District, Karawang Regency, Thesis (Department of Geography Education, Faculty of Social Sciences Education, Indonesian University of Education 2016)
4. Muhammad Irpani and Husni Mubarok, Practical Report on Brackish Aquaculture Management Visit of Pt. Indokor Build Village. Aquaculture Study Program, Faculty of Agriculture, Gajah Mada University 2012
5. Ghufron M., M. Lamid, PDW Sari, and H. Suprapto. 2017. Vaname Shrimp Enlargement Technique (Litopenaeus vannamei) in PT. Central Proteina Prima Tbk in Randutatah Village, Paiton District, Probolinggo, East Java. Journal of Aquaculture and Fish Health.
6. Surabaya: Airlangga University. 7(2) : 70-77. Malang Rachmina, D. and Sari, SW 2017. Management Accounting Theory and Application of the Fourth Matter. Polimedia Publishing. JakartaSNI 8118:2015.
7. Halimah, RW and Dian AS 2006. Vannamei Shrimp. Jakarta : Spreader Swaday
8. Makmur, Hidayat SS, Mat F and Rachman S. 2018. Effect of Number of Aeration Points on Vaname Shrimp (Litopenaeus vannamei) Cultivation. Journal of Tropical Marine Science and Technology. 10(3) : 727-738
9. Purnamasari I, Dewi P and Maya AFU 2017. Growth of Vannamei Shrimp (Litopenaeus vannamei) in Intensive Ponds. Enggano Journal. Marine Science Study Program, Faculty of Agriculture, University of Bengkulu, Bengkulu. 2(1) : 58-67
10. Mudjiartoaliaras wahid, Prospects for the Development of Tiger Shrimp Cultivation in the Context of Increasing the Income of Pond Farmers in Gresik Regency, Thesis (Airlangga University, Faculty of Economics, 2016)
11. Ma'arif Samsul, Analysis of Factors Influencing Traders' Income
12. MM Tajerin, et.al., Data and Information on the Economic Study of the Revitalization of the Shrimp Aquaculture Industry, (Jakarta: Ministry of Maritime Affairs and Fisheries)
13. Nurhajarini DR, TW Tasks, and Funds L. 2017. Development of Shrimp Pond Cultivation on the Tuban Coast 1980-2015.
14. BPNB DI Yogyakarta Tambak Lining. BSN.SNI 8008:2014. Vannamei Shrimp (Litopenaeus vannamei, Boone 1931) Production Intensive In Lining Ponds
15. Suwoyo, H. Suryanto. (2018). Vaname Litopenaeus Vannamei Shrimp Cultivation with Extensive Plus Technology. Research Center for Brackish Water Cultivation and Fisheries Extension Fisheries Research Center (BRSDMKP).

16. Shah R, Makmur and Fachrur. 2017. Vaname Shrimp Cultivation with High Stocking Density. Research Center for Brackish Water Aquaculture and Fisheries Counseling. Aquaculture Media, Inbudkan Technical Officer. Directorate General of Aquaculture Fisheries. Jepara. 12(1) : 19-26
17. Suriadi, Daniel Itta, Magdalena Yoesran. 2015. Analysis of Costs and Revenues as well as Payback Time for Business Capital of Non-Timber Forest Products in the Form of Ornamental Plants. Journal of Tropical Forests. Lambung Mangkurat University. Banjarbaru. 3(3) : 232-240
18. Sofyan H, Moh., 2018. Feasibility Study of Vannamei Shrimp (Litopenaeus vannamei) Cultivation Business in the Business Development Cultivation Group in Kwanyar District, Bangkalan Regency. Thesis. Faculty of Fisheries and Marine Science. Department of Fisheries and Maritime Socioeconomics. Brawijaya University.
19. Ministry of Maritime Affairs and Fisheries, Economic Studies on the Revitalization of the Shrimp Cultivation Industry, (Jakarta: Center for Socio-Economic Research on Maritime Affairs and Fisheries
20. Rachmina, D. and Sari, SW 2017. Management Accounting Theory and Application. Fourth Printing. Polimedia Publishing. JakartaSNI 8118:2015.
21. Mankiw Gregory N, Principles Of Economics (Introduction to Macroeconomics), (Jakarta: Salemba Empat, 2006)
22. Marbun .BN, Management Dictionary, (Jakarta: Sinar Harapan Library, 2003)
23. Nazir Moh. "Research Method", (Cet. VI ; South Bogor: Ghalia Indonesia, 2005)
24. Nordhaus & Samuelson, Microeconomics, (Jakarta: Media Global Education, 2003)
25. Paena Mudian, et. al, "Validation of Periodic Areas and Determination of Potential Areas of Ponds in North Luwu Regency, South Sulawesi Province Using Remote Sensing Technology and Geographic Information Systems, J. Ris. Aquaculture Vol.3 No.1 of 2008.
26. Rachmatun Suyanto, S, Tiger Shrimp Cultivation Guide, (Cet. 1; Jakarta: Spreader Suadaya, 2009)
27. Rammang, Shrimp Farmer in Benteng Village, Malangke District, North Luwu Regency, June 30 2018.
28. Satriana Firda Made Gusti I, Description of Vannamei Shrimp Farmer Business in Dipasena Sentosa Village, East Rawa Jitu District, Tulang Bawang Regency, 2016, Thesis, (Bandar Lampung: University of Lampung, 2017)
29. Sudradjat Achmad, Cultivation of 26 leading marine commodities, (Jakarta: Spreader Swadaya, 2015)
30. Sugiyono, Business Research Methods., (Bandung, Alfabeta. 2013)
31. Sugiyono, Qualitative Research Methods R & D (Cet. VII; Bandung: Alfabeta, 2009)
32. Sumitro Djojohadikusumo, History of Economic Thought. (Jakarta: Indonesian Obor Foundation, 1990,)
33. Surachman Winamo, Research Engineering Design, (Bandung: Tarsito, 1997)
34. steven J Taylor With Robert B., *Qualitative Fundamentals of Research*,(Surabaya: National Business, 1993)
35. Hadi Sutisno, Research Research Methodology, (Cet. II; Yogyakarta: UGM, 1997)http://www.educationaleconomics.com/2012/11/distribution-pendapatan-dalam-islam. html.

36. Wahyuni Tri, Social Economic Study of Vanamei Shrimp Farmers in Purwodadi District, Purworejo Regency, Thesis (Purworejo: Agribusiness Study Program, Faculty of Agriculture, Muhammadiah University Purworejo 2016)
37. Wikipedia, "*Regency Luwu North*",https://id.wikipedia.org/wiki/Kabupaten_Luwu_Utara (accessed 23 July 2017)
38. Zepriana Doni, Analysis of the Factors of Production and Revenue of Giant Prawn Cultivation in Ciamis Regency, Thesis (Bogor: Department of Agribusiness, Faculty of Economics and Management, Bogor Agricultural University 2010.
39. Yapanto, LM, Harahab, N., & Musa, DT (2021). Alternative income from Tomini Bay Coastal Communities (case study in Bone Bolango District, Gorontalo Province, Indonesia). IOP Conference Series: Earth and Environmental Science, 819(1), 012082.https://doi.org/10.1088/1755-1315/819/1/012082