PROSPECT OF DEVELOPMENT OF TILAPIA SEED CULTIVATION BUSINESS WITH BIOFLOC SYSTEM

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Abstract

Biofloc technology is a technology that uses bacteria. both heterotrophs and autotropes. These bacteria can convert organic waste intensively into a collection of microorganisms in the form of flocs. The floc formed is utilized by fish as a food source. So it is urgent to research the extent to which biofloc technology is suitable for tilapia hatchery business in the long term. The aim of this study is to be able to provide information to farmers about the feasibility of tilapia aquaculture with a biofloc system. The method used in this research is descriptive method and location determination by purposive sampling with the consideration that the research location has used a biofloc system which previously used conventional cultivation methods. developed in the long term based on a total weighted score of 4,75. The conclusion obtained in this study is that tilapia hatchery efforts feasible are recommended from four aspects. There are several obstacles in aquaculture, including: water quality for tilapia hatchery business with a biofloc system that is polluted due to household waste, obstacles during the rainy season, constraints on feed prices that often increase, disease attacks on tilapia seeds that are stocked, and price games between cultivators.

Keywords: ***Prospects, Aquaculture, Tilapia Seeds, Biofloc System***

1. INTRODUCTION

Background Research

Tilapia is an animal that lives in water which is one of the many food ingredients needed by humans, fish is very useful for humans and contains various substances needed by the human body such as: protein, vitamins, and minerals. As a source of protein there is a composition contained in tilapia. The composition is the chemical composition of tilapia per 100 grams of meat which can show that tilapia has a fairly low fat (2.79) and a fairly high protein content of 1.8% (Kusumawardhani. 1988).

Tilapia is one of the leading fisheries commodities with a high level of market demand. Therefore, the productivity of consumption tilapia must be driven intensively by considering the nature of tilapia which is able to live at high densities (Ombong and Salindeho , 2016).

Tilapia cultivation generally uses high costs. because the highest cost component in cultivation is the feed component. Feed is one of the important components in aquaculture activities because feed is a source of material and energy to support the survival and growth of fish (Yanuar, 2017).

This can be seen through preliminary research in conventional cultivation sites in ponds and rice fields, it turns out that the yield of seeds marketed to Lake Batur is not uniform, in fact there are seeds that are small in size so they are consumed by frying crispy by cultivators, also there is a disturbance of the stork that preys on tilapia seeds in ponds or rice fields. In addition, the cost of purchasing feed is relatively high when the seed is cultivated, relatively high because during seed cultivation the cultivator uses artificial feed in the form of pellets whose price continues to increase which will affect the cultivator's lower net income. Based on this background, the Mina Ayu Budidava Group is interested in using the biofloc system circular pond technology as an alternative to solve the problem by increasing the stocking density of fish, suppressing the need for commercial feed. increase fish uniformity, increase productivity with reduced mortality and even distribution of fish growth (Kurmiawan and Asrini, 2016).

Research Objectives

The specific objective of this study was to determine the prospects for tilapia seed cultivation with biofloc technology in terms of market, technical, social and financial aspects, then concluded whether this business is feasible to be carried out in a sustainable manner and the constraints faced during the cultivation process.

2. THEORY BASIS

Morpology of Tilapia

The morphology of Tilapia fish has a cheek shape, a high back, on the body and tail fins that are determined in a straight line (vertical) and also has a dorsal fin that is determined by a straight line lengthwise. This fish has five fins, namely dorsal fin, pectoral fin, pelvic fin, anal fin and caudal fin. The presence of these fins greatly helps the movement of tilapia more quickly in freshwater waters (Saanin. 1984).

Another sign that can be seen from tilapia is that it has a black body color and is slightly whitish, some are pink. The body parts of the gills are white, while the local fish have a yellowish color. Tilapia fish have fish scales that are quite large, rough and neatly arranged. The head of this fish has a relatively small size compared to the mouth at the tip of the head and has large eyes (Saanin, 1984).

Biofloc Cultivation System

Biofloc technology is a technology that uses bacteria, both heterotrophs and autotrophs. These bacteria can convert organic waste intensively into a collection of microorganisms in the form of flocs. The floc formed is utilized by fish as a food source. In the floc there are organisms in the form of planktonic bacteria, fungi, algae and suspended particles that affect the structure and nutritional content of the biofloc. Bacteria are the dominant microorganisms in floc formation (Avnimelech, 2012).

Financial Aspects

Financial analysis of an investment project consists of projected revenues and expenses during the project activity period in order to obtain a financial picture of: (a) Revenue and project costs, (b) The project's financial ability to pay off the credit or business capital invested and (c) the feasibility of the project. For this reason, in the analysis of the financial (financial) aspects of a project, assumptions are usually used based on research and observations of similar activities in the field, as well as input from various related references in order to determine the number of parameters to be used.

Technical Aspects

There are several stages of cultivation technology, namely hatchery, nursery and rearing technology. To support cultivation at various stages, different technologies are required, for example feed and nutrition technology, pest and disease control technology, water quality management technology and harvest and post-harvest technology which is followed by marketing.

Market Aspect

The market aspect in this study will only be discussed regarding supply and demand, where until now there is no institution that provides quantitative data that can describe the demand for tilapia. However, qualitatively, information is obtained that for the local market demand comes from individuals, restaurants and hotels. The tilapia enthusiasts in Bali are mainly local residents and domestic tourists.

Social Aspects

The social aspects referred to in this study are how the attitude of tilapia farmers towards the development of aquaculture in the research location and whether aspects of local customs can accept the existence of a cultivation business with this biofloc technique.

3. IMPLEMENTATION METHOD

Research Place

This research used a descriptive method and was carried out at the Mina Ayu Cultivation Group, Banjar Tegal. Jegu Village, Recamaran Penebel, Tabanan Regency The determination of the location of the research was carried out using purposive sampling method, which is a method of determining the location of the research that was carried out intentionally based on certain considerations (Suyatna and Antara, 2004).

Research Data

1. Types and Sources of Data

The data collected in this study consisted of primary data and secondary data. Primary data is data that comes from the first source, in this case obtained from tilapia farmers themselves and local communities that are used as Focus Group Discussions related to tilapia cultivation. Secondary data is data obtained from indirect sources or other sources, which are generally in the form of documentation data, monographs and resin archives from relevant agencies that are directly or indirectly related to the problem of developing tilapia aquaculture, as well as several previous similar research results.

2. Data Collection Methods

The data obtained as mentioned above, will be carried out using several data collection techniques as proposed by Singarimbun and Effendi (1989), namely : 1) Interviews were conducted by way of direct question and answer with parties related to this research, namely tilapia cultivators, Focus Group Discussion. field officers and related agencies. This method uses a list of structured questions (questionnaires) 2) Observation is carried out by researching and observing directly the activities carried out by the cultivators themselves at the research site. 3) Documentation is done by looking at the records of the cultivators and their groups to find out various notes related to this research problem, as well as research photographs.

Research Variables

There are four aspects observed, among others: financial aspects, technical aspects, market aspects and social aspects. By using financial analysis (financial aspect), the observed variables are: the fotal costs of aquaculture which include fixed costs and variable costs. Fixed costs include: licensing fees, land rent, pool construction, costs for purchasing tarpaulin ponds, supporting tools and other fishing equipment. Variable costs include: the cost of purchasing seeds, the cost of making biofloc. feed costs, electricity costs and labor costs. Another variable is the selling price per tilapia fry, so that total revenue and profits are obtained from the cultivation business. Determination of farmers' attitudes towards technical aspects, market aspects and social aspects were analyzed descriptively based on the measurement results using a Likert Scale. The answers to each instrument item using a Likert Scale have a gradation from very positive to very negative (Sugiyono, 2003).

Data Analysis

1. As an analysis, data tabulation will be carried out, namely processing the raw data obtained in the field into input data needed for analysis. Quantitative analysis was carried out to assess the feasibility of developing tilapia seed cultivation using biofloc techniques. Meanwhile, a qualitative (descriptive) analysis was carried out to identify the constraints faced in the development of tilapia seed cultivation in Jegu Village.
2. Business feasibility assessment system and procedure The business feasibility assessment system and procedure was first proposed by Austin (1981) in the Business Feasibility Study Team of the Bogor Agricultural University (2006), the procedure consists of four weighted criteria, namely marketability (market analysis) weighs 40%. technical feasibility is 20%, social feasibility is 20% and profitability (financial analysis weighs 20%. So to determine the prospects for developing a business, four types of evaluation must be carried out, including market evaluation to determine the potential for commercial applications, evaluation of software technical feasibility to determine performance technology, local social evaluation determines the community for business development and financial evaluation of profitability) to determine the financial benefits of the business. Notes: 1. If the overall weighted score is 4 to 5, it indicates that the development effort of a project is feasible to continue. 2. If the overall weighted score is a. 1 to 1.99 = not highly recommended b. 2 sid 2.99 not recommended c. 3 sid 3.99 = recommended with terms!! d. 4 to 4.99 - recommended!! e. 5 highly recommended.

4. RESULTS AND DISCUSSION

Background to harvest

Harvesting is carried out on tilapia seed cultivation with a biofloc system by farmers in Banjar Tegal, Jegu Village, carried out selectively and based on the fact that the time for harvesting is 42 days old with a seed size of 7- 9 cm according to market demand in Lake Batur. The time of stocking and harvesting is carried out regularly, starting with 2-3 cm of seed stocking in tarpaulin ponds that have been filled with biofloc liquid, maintenance of one production cycle for 42 days is calculated starting from the first day of stocking.

Tilapia seed marketing system

Harvested from tilapia seeds by farmers in Banjar Tegal, Jegu Village are sold to traders because they are tied to traders and sold at the location of the cultivator (buyers come) with a cash payment system, where the sale of tilapia seeds requires transportation facilities in the form of four-wheeled vehicles equipped with insulated boxes and oxygen to keep the seeds fresh and alive when transported to the grow-out location in Lake Batur. Kintamani District, Bangli Regency. The management of transportation facilities is carried out by the buyer.

Financial (Financial) Aspects

1. Selection of business patterns

Based on the results of research conducted through financing patterns, it was obtained that the tilapia hatchery business at the research location used a single business, namely hatchery in tarpaulin ponds with a monoculture business pattern and using biofloc system technology. The reason for choosing this business pattern is that the cultivation technology is simple, easy and fast to master and the tilapia seed products are produced relatively quickly with good quality which are immediately absorbed by the market at an adequate price. This biofloc seeding system is carried out outdoors using a tarpaulin pool, so the amount of production produced will depend on the weather and from the results of information obtained from respondents in the field. it turns out that the rain will reduce seed production due to rainwater entering the tarpaulin pond will affect the effectiveness of the biofloc liquid.

2. Assumptions

Financial analysis of an investment business consists of projections of revenues and expenses during the period of business activity in order to obtain a financial picture of: (a) Revenues and costs of operations; (b) The financial capacity of the business to return all investment and (c) the viability of the business. For this reason, the financial aspect analysis in this study uses assumptions based on research and observations of similar activities in the field as well as input from various related references to determine the size of the parameters to be used. The project period is assumed to be five years with a business cycle for tilapia harvesting 42 days per cycle for six tarpaulin ponds from initial seeding to harvest. After harvest it takes 7-8 days to prepare the harvested pond for the next seed stocking. Density of seed stocking size 2-3 em as many as 8,000 individuals per tarpaulin pond with a survival rate of 75%.

3. Structural components and investment costs and operational costs

a. Investment costs

The investment costs used in this study are fixed costs consisting of several components such as licensing fees, land rent, pool construction, warehouse buildings, 12 units of tarpaulin pools, blowers, diesel/generators, and fishing equipment. From the results of research in the field, information was obtained that licensing fees were not required for tilapia hatchery, while the total area of land used by cultivators at the study site was 33 acres.

b. Operational costs

Operational costs are variable costs, the amount of which depends on the number and area of seed stocking in each cultivation business activity. The operational cost components consist of purchasing basic seeds, purchasing factory-made feed in the form of pellets, and purchasing biofloc. labor and electricity costs.

c. Production and Gross Income

The production of tilapia hatchery using the biofloc system is tilapia seed size 7-9 cm. The projected gross income from this aquaculture business shows a deficit in year zero of Rp 58,650,000 which is an investment cost and has not yet produced production, but in the following years gross income is obtained for Rp 100,100,000 from 288,000 tilapia seeds of size 7 -9 is generated.

d. Profit and loss projections and Break Even Point

The results of the analysis of the profit and loss projections show that in the zero year the tilapia hatchery has not produced with an investment cost of 58,650,000. The first year the new production with a total production of 288,000 heads with a gross income of Rp. 100,800,000, then the costs incurred during the production process include fixed costs of

Rp.1.347,500 per cycle, so for 8 cycles the fixed costs are Rp. 10,780,000 and variable costs (variable costs) of Rp. 1.420,000 per cycle, so for 6 units of ponds in 8 production cycles, variable costs are obtained amounting to IDR 68,184,000 so that the total cost per year is IDR 78,964,000 so that a net profit per year is IDR 21,836,000 or IDR 1,819,666.67 per month.

Based on the results of the analysis to obtain the value of the break even point (Break Even Point = BEP) is Rp 33,302,440 or equivalent to 95,150 tilapia fish size 7-9 cm. When viewed from the BEP the average operational cost is IDR 236 per head and the total cost is IDR 276 per head on average. If you look at the requirements of the BEP, which is that the total cost is equal to the total revenue, it can be said that the average revenue per head to achieve BEP is IDR 276. So when the price of tilapia fry is IDR 276 per head, the break-even point is reached (BEP).

e. Cash flow projection and project feasibility

Based on the cash flow analysis, the calculation of Net Benefit Cost Ratio (Net B/C Ratio), Net Present Value (NPV), Internal Rate of Return (IRR) and Pay Back Period (PBP). The results of calculations and analysis show that the tilapia hatchery business in Jegu Village is profitable, because at an interest rate of 15%% per year, the net B/C ratio is 1.25, PBP is obtained 2 years 7 months or 2.59 years and NPV is 15. % obtained Rp. 14,544,272.00 with an IRR value of 25.075%, meaning that this cultivation business activity is financially feasible to carry out at an interest rate of up to 25,07596.

1) Feasibility from the Financial Aspect

   The procedure for assessing business feasibility is based on the financial aspect (financial) with a weight of 20% with the assessment criteria including: (1) Pay Back Period (PBP) deserves a score of 5 with a weight of 5% weighted score 0.25 , Net Present Value (NPV) deserves a score of 5, the weight is 5%, the score is 0.25, the Internal Rate of Return (IRR) is worth the score, 5, the score is 5%, the score is 0.25, and the Vet B/C Ratio is worth a score of 5, the score is 5%. weighted 0.25 so that a weighted score from the financial aspect was obtained.

2) Feasibility of the Market Aspects

   The market feasibility procedure for tilapia fry in this study was given an assessment weight of 40%, in which the assessment component consisted of three criteria, namely: (1) potential demand for tilapia fry a score of 5, a score of 10%, a weighted score of 0.5, (2) a healthy competition for similar products, a score of 5, a score of 20, a weighted score of 0.8, and (3) the existence of a product and the availability of a potential market for tilapia seeds score of 5 a weighted value of 10%, a weighted score of 0.5, so that a weighted score of 1.8 is obtained from the market aspect.

3) Feasibility from the Social Aspect

   The procedure for assessing tilapia hatchery business from the social aspect, in addition to involving the cultivators themselves, also involves a Focus Group Discussion (FGD) selected as informants who will then provide an objective score (assessment) on the feasibility of this aquaculture business. This social aspect also has an important meaning in the feasibility of a business so that the value of this social aspect is 20%. The assessment of social aspects in general includes three criteria, namely: (1) the suitability of the tilapia hatchery business with the biofloc system to local customs or local customs which has a score of 5, a weighted value of 10% weighted score of 0.5, (2) its influence on local institutional development a score of 4.71 weighted value of 5% weighted score of 0.236

and (3) its influence on job creation has a score of 4.93 weighted value of 5% weighted score of 0.246 so that the total weighted score for the social aspect is 0.982

4) Feasibility of the Technical Aspect

The components of the technical feasibility assessment are carried out on two things, namely: (1) the suitability of the technology used has a score of 4.85, a weighted value of 15% score weighted 0.729 and (2) suitability to the local environment score 4.71 weighted value 5% score weighted 0.236 sc so that the total score is weighted from the technical aspect. So the weighted score for all aspects is 4.747, meaning that the tilapia hatchery project is feasible to be recommended.

5. CONCLUSION AND RECOMMENDATIONS

Conclusion

Tilapia hatchery business in Jegu Village has good prospects and deserves to be recommended for development in the long term based on a total weighted score of 4,747 which consists of: market feasibility analysis, weighted 1.800, social feasibility, weighted 0.982, feasibility technical score weighted 0.965 and financial feasibility (financial) weighted score 1,000. However, there are obstacles that need attention, including: Constraints as a result of water quality for tilapia hatchery business with polluted bioflok systems due to household waste, weather constraints especially during the rainy season due to rainwater will directly enter the tarpaulin pool, it will affect the acidity level of the water in the tarpaulin pool which is placed in an open or outdoor space, the constraint on the price of feed which is often increasing so that it will affect operational costs, constraints due to disease on the stocked tilapia seeds, and the constraint of price games between cultivators.

Suggestions

1. It is necessary to conduct further research on the quality of the water used by cultivators because water as a cultivation medium with a biofloc system is suspected to be polluted by household waste so that there is a solution for the polluted water is it still feasible to use for cultivation in the long term or there are other alternatives by using groundwater by making wells so that the expectations of cultivators so that the survival rate can be further increased can be realized.
2. Further studies are needed during the rainy season, the condition of the water in the tarpaulin has decreased quality so that there is a solution during the rainy season so that the survival rate of only 60% can be increased so that seed production can be increased.

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