

# SUSTAINABILITY STRATEGY FOR DEVELOPMENT OF TILAPIA FISH SEED CULTIVATION BUSINESS WITH BIOFLOC SYSTEM

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## Abstract

The purpose of the study was to determine the sustainability strategy of tilapia seed cultivation with a biofloc system followed by a SWOT matrix so that it was known whether this business could be continued with certain strategies that could be applied. The application of new technology in the form of biofloc technology has been tried in the process of tilapia seed cultivation in Jegu Village, Penebel District, Tabanan Regency, but it is also necessary to study whether the new technology can be implemented sustainably by analyzing it using the SWOT Matrix. This study uses a descriptive method by determining the location by purposive sampling with the consideration that the research site already uses a biofloc system. The results of the SWOT analysis show that the position of cultivators is in quadrant III Turn Around/Stability (Change Strategy) followed by a SWOT matrix based on IFAS (Internal Strategic Factor Analysis Summary) and EFAS (External Strategic Factor Analysis Summary) so that the right strategy is obtained is the WO Strategy namely taking advantage of existing opportunities by improving the internal weaknesses of Mina Ayu group members. So that what needs to be implemented: (1) Cultivators to be able to make maximum use of the capital provided by the capital providing institution, (2) Cultivators to be able to make alternative feeds as a substitute for pellet feed, (3) Cultivators to utilize natural resources that support optimally for increase the number of seeds produced, (4) Cultivators to look for alternative markets other than marketing in Lake Batur to guard against disturbances for cultivators in Lake Batur so as not to interfere with the distribution of the seeds produced, and (5) Cultivators to take advantage of local government policies which supports hatchery activities.

**Keywords :** *SWOT analysis; Tilapia Seeds; SWOT Matrix; Sustainability Strategy.*

## 1. INTRODUCTION

Tabanan Regency, which has been known as an agricultural area, has various fishery potentials, both regional potential, natural resources and marine resources. The availability of many springs and river flows that flow throughout the year as well as relatively low-pollution water conditions have encouraged the growth and development of freshwater fishery agribusiness in the form of fish cultivation in ponds, rice fields, irrigation canals as well as the development of fish farming in Jakapung (floating bag net). (Fisheries and Marine Service of Tabanan Regency 2019). Furthermore, the Tabanan Regency Fisheries and Maritime Service (2019) determined that the type of tilapia developed in Tabanan Regency was a superior type of tilapia. Among them are Gift tilapia, Nirvana tilapia, Gesit tilapia and Taiwanese tilapia. Tabanan's tilapia seeds are currently in great demand by jakapung farmers in Lake Batur (Bangli). Meanwhile, consumption of tilapia is mostly absorbed by restaurants in Badung and Denpasar. The center for tilapia development is in Baturiti District (Lake Beratan, Candi Kuning Village), Penebel District (Pentahanan Village, Tengkidak and Pitra), Marga District (Petiga Village, Ole Village), Selemadeg District (Tying Gading Village), East Selemadeg District (Megati Village).

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. It 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 can indicate that tilapia has a fairly low fat (2.7%) and a fairly high protein content of 17.8%

(Kusumawardhani, 1988). Tilapia is one of the leading fishery 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). In line with the above, fish farming includes growth and development. Fish farming aims to obtain more or higher and better yields when compared to the fish left naturally (Ambia Erusyuni and Irwanmay, 2015). Tilapia cultivation generally uses high costs, because the highest cost component in aquaculture 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). Biofloc system circular pond technology as an alternative to solve the problem by increasing the stocking density of fish, reducing the need for commercial feed, increasing fish uniformity, increasing productivity with reduced mortality and even distribution of fish growth (Kurniawan and Asrini, 2016).

This can be seen through the first year of research on the prospects for developing tilapia seed cultivation with the Biofloc system. It has good prospects and deserves to be recommended for development in the long term based on a total weighted score of 4.75 which consists of: market feasibility analysis, a weighted score of 1,800, social feasibility weighted score of 0.982, technical feasibility weighted score of 0.965 and financial feasibility (financial) weighted score of 1,000. So that researchers are interested in continuing research in the first year regarding the strategy of sustainable development of tilapia seed cultivation with a biofloc system in the second year using SWOT Analysis and SWOT Matrix based on IFAS (Internal Strategic Factor Analysis Summary) and EFAS (External Strategic Factor Analysis Summary) in order to obtain The right strategy is used in the development of tilapia seed cultivation at the research location.

### **Classification and Morphology of Tilapia**

Classification of Tilapia according to Saanin, (1984) can be classified as follows:

Kingdom : Animalia  
 Phylum : Chordata  
 Sub Phylum : Vertebrates  
 Class : Osteiches  
 Sub Class : Acanthopterygii  
 Order : Percomorphi  
 Suborder : Percoidae  
 Family : Cichilidae  
 Genus : Oreochromis  
 Species : Oreochromis niloticus

The morphology of tilapia has a flat shape, high back, on the body and caudal fin found a straight line (vertical) and also has a dorsal fin found 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 and some is pink. The body parts of the gills are white, while the local fish have a yellowish color. Tilapia has 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 bacteria, plankton, 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).

## SWOT Analysis

SWOT analysis is the identification of various factors systematically to formulate a company strategy. SWOT analysis is based on a relationship or interaction between internal elements in the form of: strengths and weaknesses, and external elements in the form of: opportunities and threats (Rangkuti, F., 2015).

Strengths, Weaknesses, Opportunities, Threats stands for SWOT. SWOT analysis is a strategic planning technique that is useful for evaluating the strengths and weaknesses, opportunities, and threats in a project. Take advantage of opportunities and strengths (O and S). This analysis is expected to produce long-term plans. Overcome or reduce threats and weaknesses (T and W). This analysis is more towards producing a plan in the short term, namely the improvement plan (short-term improvement plan). The initial stage of the strategy-setting process is to be able to assess the strengths, weaknesses, opportunities, and threats of the organization.

## SWOT Matrix Combination Strategy

In a SWOT analysis, you can focus on a combination of two SWOT points to determine strategic steps for business activities. These focus combinations include:

1. Focus on strengths-opportunities (SO) to obtain offensive alternatives by using internal strengths to take advantage of external opportunities.
2. Focus on Weaknesses-threats (WT) to obtain defensive alternatives by exploiting internal weaknesses to reduce external threats.
3. Focus on Strength-threats (ST) by using internal strengths to reduce external threats.
4. Focus on Weaknesses-opportunities (WO) by shoring up internal weaknesses to take advantage of external opportunities.

As a method in general, this SWOT analysis can only help analyze the situation being faced by a company or an organization. This means that in principle this method is not a definite answer that is able to provide a solution to every problem at hand. But at least it will break down the existing problem by breaking it down into small parts that will look simpler (Rangkuti, F., 2015). SWOT analysis also allows organizations to formulate and implement key strategies as an advanced stage of implementation and organizational goals, in SWOT analysis information is collected and analyzed. The results of the analysis can also cause changes to the current mission, goals, policies, or strategies. In preparing a good plan, it is also necessary to know the resources and funds you have when you are going to start a business, to know all the elements of your strengths, or any weaknesses that exist. The data collected about these internal factors is the potential in carrying out the planned business. On the other hand, it is also necessary to pay attention to the external factors that will be faced, namely the opportunities or opportunities that exist or need to be considered for problems that will arise and threats or obstacles that are expected to arise that will affect the business undertaken. It can be concluded that the SWOT analysis is the development of relationships or interactions between internal elements, which are strengths and weaknesses against external elements, namely opportunities and threats.

## 2. IMPLEMENTATION METHOD

### Place and Time of Research

Determination of the research location was carried out using the 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). This research was conducted at the Mina Ayu Cultivation Group, Jegu Village, Penebel District, Tabanan Regency. The research time is eight months, starting from research preparation, making research proposals to field surveys, then continuing with data tabulation, data analysis, and writing the final report, from January 2022 to August 2022.

**Research Data****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 the local community which is used as a Focus Group Discussion related to tilapia cultivation. The types of primary data collected include: what are the strengths that can be formulated in the Mina Ayu group, what are the weaknesses that can be formulated, what are the opportunities that can be exploited by the Mina Ayu group, and what are the challenges that must be met. faced by the Mina Ayu group in the process of developing a tilapia hatchery using the biofloc technique. Secondary data is data obtained from indirect sources or second sources which are generally in the form of documentation data, monographs and official archives from related agencies that are directly or indirectly related to the problem of developing tilapia aquaculture, as well as several previous similar research results. .

**Data Collection Method**

The data obtained as mentioned above, will be carried out using several data collection techniques as proposed by Singarimbun and Effendi (1989), namely:

## a) Interview

Interviews were conducted by way of direct question and answer with parties related to this research, namely tilapia cultivators, Focus Group Discussions, field officers and related agencies. This method uses a structured list of questions (questionnaires) to responder farmers. The list of questions used in obtaining primary data is first tested for reliability, where a questionnaire can be said to be reliable or reliable if the respondent's answer to the statement is consistent or stable.

## b) Observation

Observations are carried out by researching and observing directly the activities carried out by the cultivators themselves at the research location.

## c) Documentation

Documentation is done by looking at the records of the cultivators and their groups to find out various notes related to this research problem.

**Research Implementation**

This research was carried out in the Mina Ayu Cultivation Group, Banjar Tegal, Jegu Village, Penebel District, Tabanan Regency by interviewing all cultivation groups related to the research topic, namely the strategy for sustainable development of tilapia seed cultivation with a biofloc system then the data was tabulated to be analyzed based on aspects of strengths, aspects of weakness, aspects of opportunities and aspects of challenges are converted to a SWOT Matrix so that conclusions can be drawn whether this seeding business can be continued to be developed in the long term. Data was also extracted from the results of FGD with related parties to obtain more comprehensive data.

### Research Flowchart

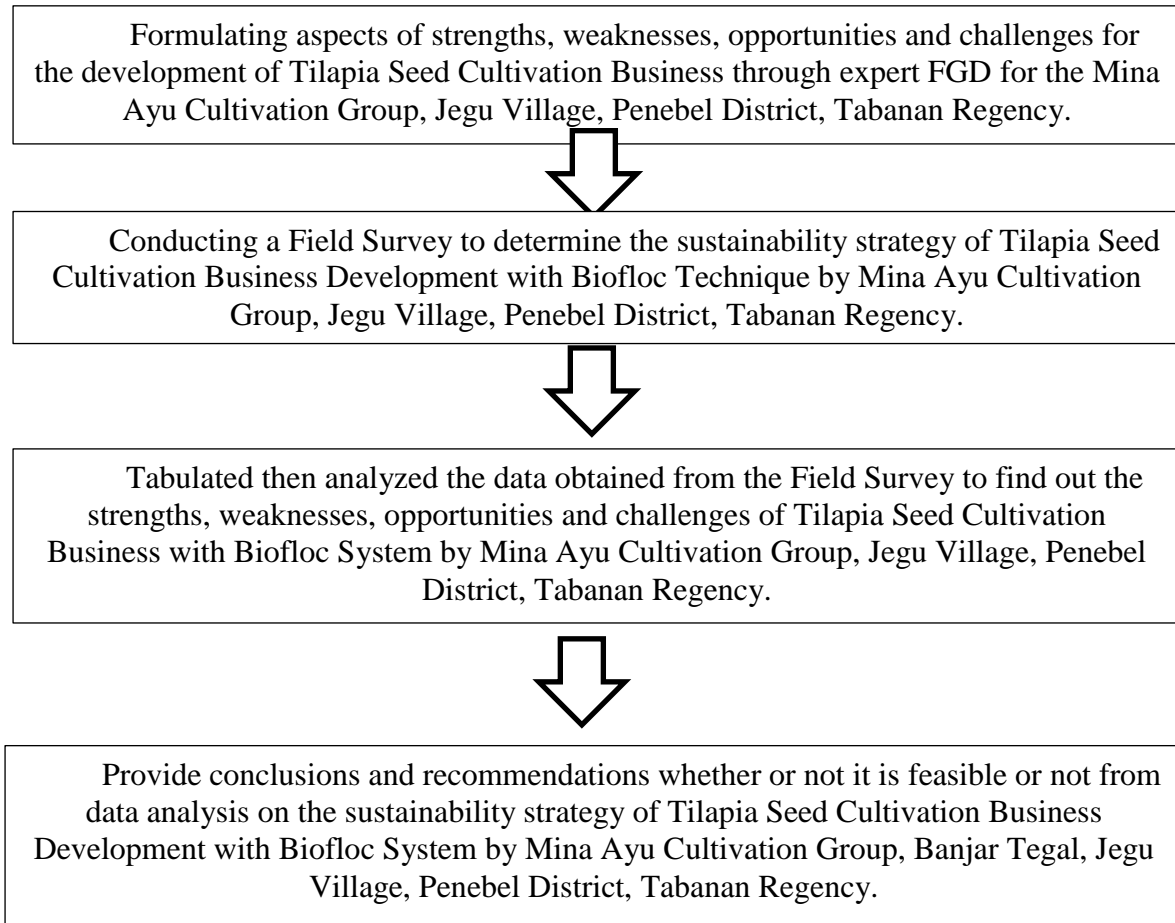


Figure 3.1 Research Flowchart

### Research Variables

In general, there are four aspects that are observed, namely: aspects of strength, aspects of weakness, aspects of opportunities and aspects of challenges. By using SWOT analysis and SWOT Matrix, it can be concluded that each observed aspect is as follows:

1. Aspects of Strength are formulated:
  - a. Strategic cultivation location
  - b. Local government support
  - c. Able to produce quality fish seeds
  - d. Have a good relationship with suppliers
  - e. Have a quality parent / superior
  - f. Having trained Human Resources (HR)
  - g. Profits are adequate
  - h. Complete facilities and infrastructure
2. Weakness Aspects are formulated:
  - a. Lack of working capital
  - b. High price of feed
  - c. Seeds have not been able to meet demand
  - d. One place marketing
3. The Opportunity Aspects are formulated:
  - a. Able to create job opportunities
  - b. There is an increase in the income of group members
  - c. Availability of capital providers



- d. Local government policies to support hatchery activities
- e. Potential Natural Resources in a supportive location
- 4. Aspects of Challenges are formulated:
  - a. High competition
  - b. The presence of pollution in the aquatic environment
  - c. Climatic factors, especially during the rainy season
  - d. Poor security so there is fish theft
  - e. The requirements for borrowing capital are getting more and more difficult.

### Data Analysis

As an analysis, data tabulation will be carried out, namely processing the raw data obtained in the field into the required input data. Data analysis is based on descriptive analysis to identify each strength, weakness, opportunity and challenge which is then converted to a SWOT Matrix to determine the position of the Mina Ayu Cultivation Group in which quadrant so that later appropriate strategies can be suggested for the sustainability of the development of fish seed aquaculture development. tilapia using biofloc technique in Banjar Tegal, Jegu Village, Penebel District, Tabanan Regency.

## 3. RESULTS AND DISCUSSION

### Characteristics of Cultivating Groups and FGD Informants

The total number of the Mina Ayu Cultivation group in Jegu Village is ten people with an age range of 38 years to 62 years, so the age of the Mina Ayu group cultivators are all of productive age. While the education level of the Mina Ayu cultivation group is the majority at the level of Vocational High School (high school), which is seven people or 70%, one person has an Elementary School education, and two people have a Junior High School education (SLTP). The main occupations of the members of the various cultivation groups are as many as 4 people or 40% work as fish cultivators, 3 people or 30% work as traders, and 3 other people or 30% work as farmers. While the odd jobs as cultivators are at most 6 people or 60%, and 3 people or 30% of their odd jobs are gardening. The total number of FGD informants was five people with an age range of 45 years to 56 years, so that all FGD informants were in the productive age group. The work of FGD informants was quite diverse, namely as PPL, Kelihan Banjar, Pekaseh and community leaders. While the formal education level of the FGD informants is the majority at the high school level namely three people or 60%, one person has a Diploma one education and one person has a bachelor's degree. So in terms of formal education the selected informants are relatively high.

### Analysis SWOT

The results of the tabulation of data on ten members of the Mina Ayu Cultivation group show that Strength includes 8 aspects of strength, including: strategic cultivation location (1) rating 4, support from the local government rating 1 (2), being able to produce quality fish seed rating 4 (3), good relationship with suppliers (4) rating 4, having a qualified parent (5) rating 4, trained Human Resources (HR) (6) rating 3, adequate profit (7) rating 3, and having complete facilities and infrastructure (8) rating 3. Weaknesses include 4 aspects of weakness, including: Lack of capital (1) rating 4, high feed prices (2) rating 4, seeds have not been able to meet demand (3) rating 3, and seed marketing in one place (4) rating 4. Opportunity covers 5 aspects, among others: being able to create employment (1) rating 4, increasing group member income (2) rating 4, availability of capital provider institutions (3) rating 3, supporting local government policies seeding (4) rating 3, and Natural Resources (SDA) at the location supports (5) rating 4. Threats/Challenges include 5 aspects, including: high competition (1) rating 3, pollution in the aquatic environment (2) rating 1, climate factors especially during the rainy season (3) rating 4, security is not good so there is theft of fish (4) rating 1, and the loan requirements are getting more difficult (5) rating.

The following is a SWOT Tabulation Based on Significant Level, Weight, Rating and Score. Where the internal factors, namely strengths and weaknesses in the SWOT matrix are on the X axis, where the score for strength is 3.4211 and the score for weakness is 3.7619 so that the difference in average value =  $(3.4211-3.7619):2 = -3408:2 = -0.1704$ . Furthermore, the score for opportunities and challenges whose position in the SWOT matrix is on the Y axis, where the score for opportunities is 3.7272 and the score for challenges/threats is 2.0909 so that the difference in the average value is =  $(3.7272-2.0909):2 = 1.6364 : 2 = +0.8182$ . So that the position of cultivators in quadrant III Turn Around/Stability (Change Strategy) means: the organization should change its strategy because it is feared that the old strategy (which has been implemented) will find it difficult to seize opportunities. The WO strategy is to take advantage of existing opportunities by improving the internal weaknesses of Mina Ayu group members (Figure 4.1)

Table 4.1 SWOT Tabulation Based on Significance Level, Weight, Rating and Score:

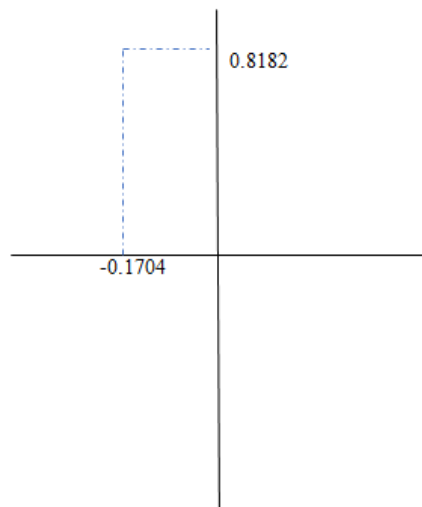


Figure 4.1 Position of Mina Ayu Cultivation Group in Quadrant III with WO . Strategy

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	STRENGTH:	level. sigf	weight	Rating	Score
1	strategic cultivation location	2	0.1053	4	0.4211
2	local government support	1	0.0526	1	0.0526
3	able to produce quality fish seeds	3	0.158	4	0.6316
4	good relationship with supplier	2	0.1053	4	0.4211
5	have a quality parent	3	0.1579	4	0.6316
6	Trained HR	3	0.158	3	0.4737
7	sufficient profit	3	0.1579	3	0.4737
8	complete facilities and infrastructure	2	0.1053	3	0.3158
		19	1		3.4211
	WEAKNESS:				
1	Lack of capital	2	0.1905	4	0.7619
2	high price of feed	3	0.2857	4	1.1429
3	seeds have not been able to meet demand	2.5	0.2381	3	0.7143
4	one place marketing	3	0.2857	4	1.1429
		10.5	1		3.7619
	OPPORTUNITY:				
1	able to create jobs	2	0.1818	4	0.7273
2	increase in group member income	3	0.2727	4	1.0909
3	availability of capital providers	1	0.0909	3	0.2727
4	local government policies support seeding	2	0.1818	3	0.5455
5	the potential of natural resources at the location supports	3	0.2727	4	1.0909
		11	1		3.7273
	THREATS/CHALLENGES:				
1	high competition	3	0.2727	3	0.8182
2	pollution in the aquatic environment	3	0.2727	1	0.2727
3	climatic factors, especially the rainy season	2	0.1818	4	0.7273
4	security is not good so there is fish theft	2	0.1818	1	0.1818
5	loan requirements are getting tougher	1	0.0909	1	0.0909
		11	1		2.0909
	STRENGTH:	level. sigf	weight	Rating	Score
1	strategic cultivation location	2	0.1053	4	0.4211
2	local government support	1	0.0526	1	0.0526
3	able to produce quality fish seeds	3	0.158	4	0.6316
4	good relationship with supplier	2	0.1053	4	0.4211
5	have a quality parent	3	0.1579	4	0.6316
6	Trained HR	3	0.158	3	0.4737
7	sufficient profit	3	0.1579	3	0.4737
8	complete facilities and infrastructure	2	0.1053	3	0.3158
		19	1		3.4211
	WEAKNESS:				
1	Lack of capital	2	0.1905	4	0.7619
2	high price of feed	3	0.2857	4	1.1429
3	seeds have not been able to meet demand	2.5	0.2381	3	0.7143
4	one place marketing	3	0.2857	4	1.1429
		10.5	1		3.7619



OPPORTUNITY:				
1	able to create jobs	2	0.1818	4 0.7273
2	increase in group member income	3	0.2727	4 1.0909
3	availability of capital providers	1	0.0909	3 0.2727
4	local government policies support seeding the potential of natural resources at the location	2	0.1818	3 0.5455
5	supports	3	0.2727	4 1.0909
		11	1	3.7273
THREATS/CHALLENGES:				
1	high competition	3	0.2727	3 0.8182
2	pollution in the aquatic environment	3	0.2727	1 0.2727
3	climatic factors, especially the rainy season	2	0.1818	4 0.7273
4	security is not good so there is fish theft	2	0.1818	1 0.1818
5	loan requirements are getting tougher	1	0.0909	1 0.0909
		11	1	2.0909

### SWOT Matrix

Based on the tabulation of the SWOT analysis, the position of cultivators is in quadrant III Turn Around/Stability (Change Strategy) followed by a SWOT matrix based on IFAS (Internal Strategic Factor Analysis Summary) and EFAS (External Strategic Factor Analysis Summary) with the results obtained as Table 4.2

Table 4.2 SWOT Matrix for Positioning and Determining Strategy (WO)

	IFAS	STRENGTHS (S)	WEAKNESSES (W):
		NGT	
EFAS		H	1. Lack of capital 2. High price of feed 3. Seeds have not been able to meet demand 4. One place marketing
OPPORTUNITY (O):			1. Make maximum use of the capital provided by the capital provider institution.
1.	Able to create job opportunities		2. Able to make alternative feed as a substitute for pellet feed so that the income of group members can be increased
2.	Increased income of group members		3. Take advantage of supporting natural resources to increase the number of seeds produced so that they can meet market demand in Lake Batur
3.	Availability of capital providers		4. Look for alternative markets other than marketing in Lake Batur to guard against disturbances for cultivators in Lake Batur so as not to interfere with the distribution of the seeds produced.
4.	Local government policy supports seeding		5. Take advantage of local government policies that support hatchery activities so that they are able to absorb more of the workforce of local residents.
5.	Natural resource potential in supporting locations		
CHALLENGE (T)			

Based on Table 4.2, it can be seen that the position of cultivators in quadrant III with the WO Strategy is to take advantage of existing opportunities by improving the internal weaknesses of Mina Ayu group members. So that what needs to be implemented include: (1) Cultivators to be able to make maximum use of the capital provided by capital providers, (2) Cultivators to be able to make alternative feeds as a substitute for pellet feed, (3) Cultivators to take advantage of Natural Resources (SDA) which supports optimally to increase the number of seeds produced so as to be able to meet market demand in Lake Batur, (4) Cultivators to look for alternative markets other

than marketing in Lake Batur to guard against disturbances for cultivators in Lake Batur so as not to interfere with the distribution of seeds that are needed. produced, and (5) Cultivators to take advantage of local government policies that support hatchery activities so that they are able to absorb more of the workforce of local residents.

#### 4. CONCLUSION

Based on the results of the research that has been described in Chapter IV and refers to the main problem, it can be drawn several conclusions from this research, namely:

1. Through a SWOT analysis based on Significant Level, Weight, and Rating, the score for strength is 3.4211, weakness score is 3.7619, opportunity score is 3.7273 and challenge/threat score is 2.0909. This means that the difference in internal scores between strengths and weaknesses is negative on the X axis. While the difference in scores between opportunities and challenges is positive which is located on the Y axis. So it can be concluded that the position of cultivators is in Quadrant III ( Turn Around/Stability /Change Strategy) meaning: the organization should change the strategy because it is feared that the old strategy (which has been implemented) will be difficult to capture opportunities.
2. Based on the SWOT Matrix analysis based on IFAS (Internal Strategic Factor Analysis Summary) and EFAS (External Strategic Factor Analysis Summary) , it is found that the strategy that is suitable for cultivators is the WO Strategy, namely: (a) Cultivators in order to make maximum use of the capital provided by the provider institution. capital, (b) Cultivators to be able to make alternative feed as a substitute for pellet feed, (c) Cultivators to utilize natural resources (SDA) that support optimally to increase the number of seeds produced so as to meet market demand in Lake Batur, (d) Cultivators are to look for alternative markets other than marketing in Lake Batur to guard against disturbances for cultivators in Lake Batur so as not to interfere with the distribution of the seeds produced, and (e) Cultivators to take advantage of local government policies that support hatchery activities so that they are able to absorb more local workforce.

#### Suggestions

Based on the results of research on the Sustainability Strategy of tilapia hatchery business development with a biofloc system in Jegu Village, several suggestions can be made as follows:

1. It is necessary to supervise the application of the WO Strategy applied by cultivators so that the development of tilapia seed cultivation with a biofloc system can be sustainable in the long term.
2. There needs to be assistance to cultivators both by related parties so that the strategy used for the sustainable process of developing tilapia seed cultivation with a biofloc system can run smoothly so that it can be sustainable.

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