LELE MASAMO (*Clarias gariepinus*) CULTIVATION STRATEGY WITH BIOFLOCK TECHNOLOGY IN BONE BOLANGO

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ABSTRACT

The purpose of this study is to find the right strategy in the cultivation of catfish masamo (*Clarias gariepinus*) with biofloc technology in Bone Bolango. The survey was conducted from July to September 2019. Data were collected with questionnaires and analyzed using SWOT. The findings show that: (1) the knowledge level of catfish farmers in using biofloc technology obtained an interval value with an index of 69.63% which means that the community agrees with the cultivation activities with the biofloc system; (2) the social, economic, and cultural aspects of the community of farmers with technology biofloc in terms of age and education are in the high category, (3) the results of the SWOT analysis for the development of catfish cultivation with biofloc technology are a defense strategy.

Keywords: *Biofloc, Cultivation Strategy, Masamo Catfish, SWOT Analysis*

INTRODUCTION

Bone Bolango is one of the districts in Gorontalo directly bordered by the Gulf of Tomini. According to the data of Marine and Fishery Office in Gorontalo 2018, the capture fishery production reached 13,339.1 tons; while the aquaculture production was 137.71 tons. The data imply that aquaculture production including seawater, brackish-water, and freshwater aquaculture production, is lower than the capture fishery production (Lakip DKP Bone Bolango, 2018).

Along with the development of aquaculture, biofloc technology with an intensive system has also been developed to reduce the concentration of ammonia in cultivation media (Ekasari, 2010). Hastuti *et al*. (2014) argue that biofloc technology has been widely applied in fish cultivation. A biofloc method is one of the alternative methods solving the issue of the quality of water (Farida *et al*., 2019). Yuriana *et al*. (2017) clarify that *Clarias gariepinus* is the result of crosses between Hong Kong catfish, *Clarias gariepinus*, and *Clarias batrachus*. Catfish is a fast-growing fish that can adapt to its new environment quickly (Jubaedah, 2017).

Catfish cultivation using biofloc technology has not gained a vast acknowledgment and even not widely implemented in Bone Bolango. Crab *et al*. (2012) conclude that *Clarias gariepinus* cultivation should be developed with an application of technology considering the cultivation principles and environment capacity. Without such consideration, the *Clarias gaeripinus* cultivation with biofloc technology will not be successfully developed (De Schryver, 2018).

The framework found and introduced here is expected to assist the

community in the integrated planning of *Clarias gaeripinus* cultivation with biofloc technology. The expected outcomes are developed fish cultivation in Bone Bolango and an increase in the economy of the community. Meanwhile, the research aims to find the strategies in *Clarias gariepinus* cultivation with biofloc technology.

FINDINGS AND DISCUSSION

In terms of the level of respondents' knowledge, there are two categories i.e. the farmer's age and the farmer's educational level.

1. The age of catfish farmers that are applying biofloc technology

Table 1. The Age of Catfish Farmers that Are Applying Biofloc Technology

No.	Age Span	Number of Respondents	Percentage (%)
1	<30 years old	18	45
2	30-50 years old	17	42.5
3	>50 years old	6	12.5
	Total		**100**

Source: Processed primary data, 2019

2. Education

Table 2. The Description of the Farmers' Educational Level

No.	Respondents' Education	Number of Respondents	Percentage (%)
1	Primary	6	15
2	Secondary	23	57.5
3	Tertiary	11	27.5
	Total	**40**	**100**

Source: Processed primary data, 2019

3. The Farmers' Knowledge Level

40 catfish farmers applying biofloc technology in Bone Bolango are asked to be respondents so that we can analyze whether the technology can be regarded as one of the cultivation alternatives that can be developed in Bone Bolango to increase the income of the farmer community in Bone Bolango. The questionnaire given to the respective respondent comprises ten questions. The result is indicated in Table 3.

Table 3. The Scoring of Farmers' Knowledge Level Using A Likert Scale

Options	Number of Respondents (T)	Scoring (Pn)	(T×n)
Very understand (SM)	77	5	385
Understand (M)	306	4	1224
Rather understand (KM)	81	3	243
Not understand (TM)	101	2	202
Completely not understand (STM)	35	1	35
Total	**600**		**2089**

Source: Processed primary data, 2019

From the data in Table 3, the respondent index score is 69.63%. The score is then interpreted into the index interval used in the Likert scale as follows:

Index interval = 100/the total Likert scores

Referring to the index interval score that is 69.63%, we can conclude that the community **understands** how to cultivate catfish using biofloc technology.

The index interval of socio-economy **209.3** is categorized as **medium**. The score is thus in the interval of 166 – 233.

4. SWOT Analysis

Table 8. Internal Factors of *Masamo* Catfish (*Clarias gariepinus*) Cultivation with Biofloc Technology

Analysis of Internal Factors				
No.	**Strength (S)**	**Weight**	**Rating**	**Score**
1	**2**	**3**	**4**	**(3×4)**
1	Catfish is one of the affordable fishes.	0.09	2	0.18
2	It takes a shorter time to cultivate catfish with a biofloc system.	0.13	4	0.52
3	The number of aid recipients in terms of catfish cultivation is high.	0.15	4	0.6
4	Human resources are available.	0.11	3	0.33
5	Good cooperation is established between farmers and interested organizations.	0.10	3	0.3
Subtotal		**0.58**		**1.93**
No.	**Weakness (W)**	**Weight**	**Rating**	**Score**
1	**2**	**3**	**4**	**(3×4)**
1	Quality catfish broodstock and seeds are difficult to find.	0.11	4	0.44
2	Fish feed price is unaffordable.	0.1	4	0.4
3	Catfish is extremely cannibal.	0.08	3	0.24
4	An unsuitable biofloc formula causes mass death in catfish seeds cultivated.	0.07	3	0.21
5	Catfish farmers are incapable of implementing biofloc technology.	0.06	3	0.18
Subtotal		**0.42**		**1.47**
Total		**1**	**S - W = 1.93 - 1.47**	
			X = 0.46	

Table 9. External Factors of *Masamo* Catfish (*Clarias gariepinus*) Cultivation with Biofloc Technology

Analysis of External Factors				
No.	**Opportunity (O)**	**Weight**	**Rating**	**Score**
1	**2**	**3**	**4**	**(3×4)**
1	The local government gives support in the form of policy.	0.14	4	0.56
2	The number of freshwater aquaculture farmers in Bone Bolango is high.	0.09	2	0.18
3	The community has a high interest in catfish cultivation with a biofloc system.	0.12	3	0.36
4	The number of aid given to freshwater aquaculture farmers is high.	0.10	3	0.3

5	Catfish cultivation with a biofloc system is easy.	0.07	2	0.14
Subtotal		**0.52**		**1.54**
No.	**Threats (T)**	**Weight**	**Rating**	**Score (3×4)**
1	**2**	**3**	**4**	
1	The community in Bone Bolango has a relatively low interest in catfish consumption.	0.09	3	0.27
2	The market price is low.	0.13	4	0.52
3	The community in Bone Bolango perceives cultivation as only a supporting job.	0.12	4	0.48
4	The water source relying on irrigation causes limited water supply.	0.14	4	0.56
Subtotal		**0.48**		**1.83**
Total		**1**	**O - T = 1.54 - 1.83**	
			Y = -0.29	

The scoring of external factors and internal factors is used to determine the coordinate point of *masamo* catfish (*Clarias gaeripinus*) cultivation strategy with fiofloc technology in Bone Bolango using a matrix analysis. The horizontal axis (X) signifies the internal factors. The score of coordinate X is the strength factor reduced by the weakness factor of X = 0.46 – (-0.29) = 0.75. Moreover, the vertical axis (Y) constitutes the opportunity factor reduced by the threat factor (external). The score of coordinate y is thus Y = -0.29 – (0.46) = -0.75. The quadrant coordinate point reveals the socio-economic vulnerability of the coastal community in Gorontalo as presented in Figure 1.

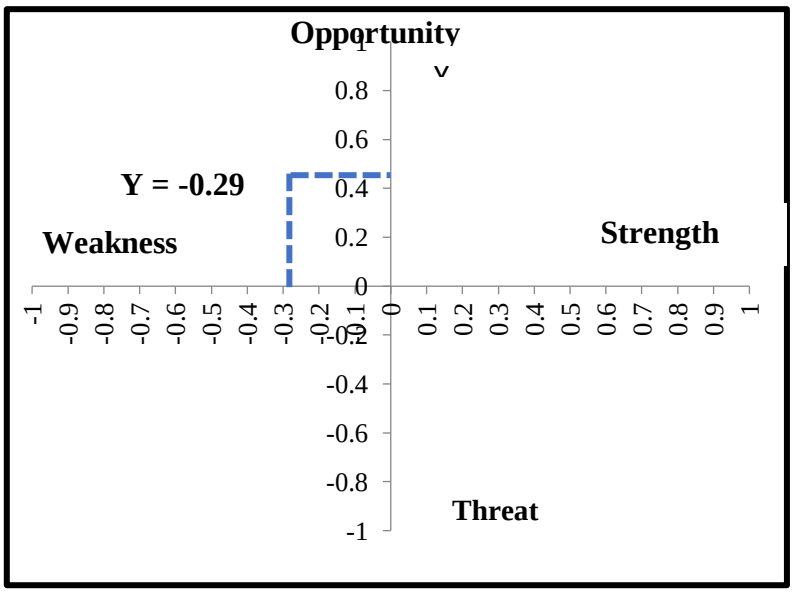

Figure 1. The Map of the Strategy of the SWOT Analysis of Masamo Catfish (Clarias Gaeripinus) Cultivation with Biofloc Technology in Bone Bolango

Source: Processed, 2020

Referring to Figure 1, we can determine the position based on the quadrant point which is Quadrant IV with an X score of -0.29 and Y of 0.46. It means that the recommended strategy of *masamo* catfish (*Clarias gaeripinus*) cultivation with biofloc technology in Bone Bolango according to this research is a defense strategy.

The strategy is recommended because the farmers are currently having an internal condition of dilemmatic alternative. The farmers should thus apply a defense strategy to control their informal performance, preventing it to aggravate. The strategy should be retained along with the improvement of the organizational condition of the catfish farmer group.

The best strategy to cultivate *masamo* catfish (*Clarias gaeripinus*) with biofloc technology is dominated by the opportunity (O) factor and the weakness (W) factor. In the strategy formulation process, not all strategies are reliable and profitable. We thus select several alternative strategies that can be applied. The parameters of opportunity (O) and weakness (W) are presented in Table 10.

Table 10. The parameters of Opportunity and Weakness in *Masamo* Catfish (*Clarias gariepinus*) Cultivation with Biofloc Technology

No.	Opportunity (O)	Weakness (W)
1	Supports from the policy of the local government	Difficulties in finding quality catfish broodstock and seeds
2	A high number of freshwater aquaculture farmers in Bone Bolango	Unaffordable price of fish feeds
3	High interest in catfish cultivation with a biofloc system	Extreme cannibalism in catfish
4	A high number of aid given to freshwater aquaculture farmers	An unsuitable biofloc formula causing mass death in catfish seeds cultivated
5	Easiness in cultivating catfish with a biofloc system	The incapability of biofloc technology application among catfish farmers

According to the SWOT analysis, the strategies of *masamo* catfish (*Clarias gaeripinus*) cultivation with biofloc technology in Bone Bolango are:

1. Developing catfish cultivation with biofloc technology and quality broodstock and seeds.
2. Optimizing the facilities and infrastructures of independent feed movement in Bone Bolango.
3. Providing technical guidance and training for the catfish farmer group with biofloc technology.
4. Assisting the biofloc aid recipients in terms of using the facilities and infrastructures given and giving understanding in terms of how to make a good and correct biofloc formula.

CONCLUSION

The analysis of the knowledge level of the catfish farmer community with biofloc technology indicates the interval value with an index of 69.63%. It means that the community understands how to cultivate catfish with a biofloc

system. The socio-economic aspects i.e. age and education of farmer community that is applying biofloc technology are categorized as medium. Meanwhile, the SWOT analysis of catfish cultivation with biofloc technology proposes a defense strategy, implying that the internal condition of the farmer community is in the dilemmatic alternative. The community is thus suggested to use a defense strategy that can control their informal performance and prevent it to fall. The strategy should be retained while they should also consistently fix their organizational condition.

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