Analysis of grouper business development in Gerokgak District, Buleleng Regency, Bali Province
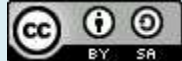
David Hermawan[1,a,*], Ganjar Adhywirawan Sutarjo[1,b], Abdul Aziz[1,c]

[1]Aquaculture Department, Faculty of Agriculture and Animal Science, University of Muhammadiyah Malang, Indonesia.
[a]david@umm.ac.id [b]ganjar@umm.ac.id [c]dultojess18@gmail.com
*Corresponding author

ARTICLE INFO	ABSTRACT
Keywords: Aquaculture Development strategy Fisheries Grouper SWOT	Fisheries development is a human effort in increasing the utilization of all fishery's biological resources which include the fishery capture, aquaculture, and processing sectors. Grouper is a commodity that has high economic value, but the amount of aquaculture production is still low, one of which is in Gerokgak district. This research was conducted from February to March 2018, in Gerokgak District, Buleleng Regency, Bali Province. Data obtained through interviews, observations, documentation, and questionnaires directly with respondents, namely the Department of Maritime Affairs and Fisheries of Buleleng Regency, business owners, managers, and grouper farmers. The analysis used in this study was to obtain a grouper cultivation strategy using a SWOT analysis. From the results of the calculation of the analysis and determination of the SWOT matrix, thew government must increase grouper aquaculture results by increasing the number of hatchery and enlargement businesses. The government is more responsive to the problems faced by farmers.
How to cite:	

1. Introduction

Indonesia is an agrarian tropical country that has great potential in development in the agricultural sector. The agricultural sector in Indonesia has given a role in the economy as a whole. These roles include being a provider of industrial raw materials, community food providers and employment providers. Agricultural activities cover six agricultural subsectors, namely food crop agriculture, horticultural, fisheries, plantation, animal husbandry, and forestry (Rimmer *et al.*, 2004).

Fisheries is one of the subsectors of agricultural activities that have potential in Indonesia. Indonesia is also known as the largest archipelago country with more than 17,500 islands, so it has very large fishery resources. In addition to marine fisheries, Indonesia has a fairly large area of freshwater fisheries. According to Saptoadi (2011), the potential of aquaculture fishery resources in Indonesia is quite large with the diversity of seawater biota types that are economically valuable allows to be cultivated, but its utilization has not been maximized so that the contribution of the fisheries sector to development and the economy in general and an increase in the standard of living of the living community of fish farmers not optimal.

In an effort to increase development in the fisheries sector, there are two concepts of fisheries development, namely national development and regional development. With various assumptions where development in each region or region determines the success of national development. The fisheries sector itself is one of the economic sectors of an area or region which can be used as one of the targets in the development of regional development (Pierre *et al.*, 2008).

Grouper mariculture is most developed in Asia, principally because of the high commercial value of thesefish in the markets of Hong Kong, Singapore and Taiwan in particular. Their robustness in overcrowded conditions as well as their rapid growth at high temperatures, making them good species for aquaculture,and the insufficient supply of wild caught fish needed to satisfy the strong demands of the market, it is motivating the expansion of aquaculture. Most grouper are cultured in floating net cages either in the opensea or at the seaward end of estuaries (Sim et al., 2005).

Grouper are of considerable economic value in tropical and subtropical regions and mostparticularly in south-east Asia. Moreover, it is in Asia, where this fish is highly prized, that thegrouper farming began in the 1980s.2. The organoleptic qualities of the groupers are not the only characteristics to be appreciated; inculture, their robustness in heavily populated conditions, as well as their rapid growth at elevatedtemperatures makes them a good species for aquaculture. However, it is, above all, market demandthat is outstripping the supply of fish, which is motivating the expansion of grouper aquaculture (Pierre *et al.*, 2008).

Bali Province has a potential of 997 ha of marine cultivation with the production of grouper, snapper and milkfish in 2013, respectively, 278 tons, 280 tons, and 22 tons dam (DJBP, 2014). The main commodities of marine culture that are now being developed in Buleleng regency are various types of grouper fish (tiger grouper, tiger grouper, mouse grouper, and several other types of hybrid grouper). Based on the background of the problem, the authors are interested in conducting further research with the title: Strategy for Grouper Cultivation Business Development in Gerokgak District, Buleleng Regency, Bali Province.

2.   Material and methods

The research was carried out in February to March 2018, located in Buleleng Regency, Bali Province. The determination of the location of this study was carried out deliberately with consideration of the site that has the potential for grouper aquaculture in the village of Musi, Banyupoh, Sumberkima, Buleleng Regency, Bali Province. Data were collected through interviews, observations, documentation, and direct questionnaires with respondents, namely Buleleng Regency Fisheries Department employees, and grouper fish farmers. The data obtained are used to carry out an internal and external analysis, which is used as a basic analysis of the formulation of further strategies. Data to be taken includes internal and external data relating to the development of

grouper aquaculture in the Buleleng Regency. The data will then be analyzed using the strength, weakness, opportunities, threat (SWOT) matrix following method from Rangkuti (2013). Data from internal factors will be analyzed using the IFE (Internal Factor Evaluation) matrix, and data from external factors will be analyzed by the EFE (External Factor Evaluation) matrix.

3. Results and Discussion

3.1. Overview of research sites.

Administratively, Gerokgak is a sub-district in Buleleng regency, Bali province, Indonesia. This sub-district is about 35 km from Singaraja which is the capital of Buleleng Regency to the west. The center of government is in Gerokgak Village. Gerokgak is the westernmost and widest district in Buleleng Regency. Gerokgak District has an area of 356.57 km² and has a beach length of 76.98 km. Along the coastline in Gerokgak Subdistrict, there are also many other cultivation businesses. In addition to grouper, there are several types of commodities that are cultivated, namely snapper, milkfish, pearls, and shrimp. The air temperature in Gerokgak District ranges between 27 °C to 32 °C and water temperatures 22 °C to 28 °C with 46 % rainfall and 80 % humidity.

3.2. Grouper fish production in Gerokgak district.

The highest production of grouper aquaculture in the past five years was in 2017 at 303 tons. As for the previous year, 2016 experienced a drastic decline and only produced 190.5 tons. According to the cultivators, a very significant increase in 2017 is due to the very high increase in consumer demand. In addition, the Director-General of Aquaculture, Slamet Soebjakto, said that the increase in grouper fish production in 2017 is due to increased productivity of aquaculture in production centers due to seed support, and infrastructure. production. Whereas in 2016 consumer demand was lacking, the weather was bad, and the disease was attacked by groupers so that the farmers switched to other commodities. The following is the grouper production data at Gerogak district (Figure 1).
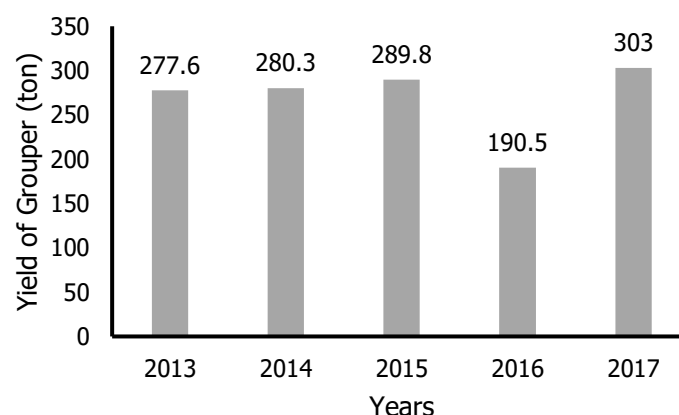

Figure 1. Grouper production in Gerogak district

The spread of disease is also a major cause of death and loss for farmers, to anticipate the cultivation of farmers to siphon and decrease water. Water siphon in the morning and evening after feeding. Environmental manipulation is also carried out by lowering the water level to a height of ± 10 cm and then increasing it to its original height. Every week the farmer also immerses fish in different salinity of the water. Fish soaked in freshwater for one or two minutes. Soaking is done so

that the parasites attached to the fish can be lost due to differences in salinity. In order to anticipate the last illness, the farmers usually give grouper disease prevention using Acriflavine by giving it 1 time for 3 days. The dosage is as much as 5 to 10 ppm when the waters have a low brightness level/the water is turbid. For this treatment is done routinely by giving 1 time a day with the same dose. Newly arrived fish also administered the Yellow Japan Powder (Elbayu). This medicine serves as a sedative so that fish are not stressed.

In grouper hatcheries, massive mortality has been reported at the mouth opening stage and currently there are no grouper hatcheries able to overcome this. Grouper larvae are small in size, they have few reserves and the size of themouth when it opens is around 70–100 mm; consequently the size of the prey during their initial feeding is extremely important (540 % of the mouth) (Glamuzinaet al., 1998b). However, this is not the onlyproblem, as larval feeding with oyster trochophores and small rotifers (SS-type) is not appropriate,resulting in massive mortality during the initial rearing phases (Marinoet al., 1998b). It would appear thatgrouper larvae identify their food by sight and choose their prey by size and not by taste (Spedicato andBoglione, 2000)

3.3. Analysis of internal factor evaluation (IFE) matrix.

The Internal Factor Evaluation (IFE) matrix is used in weighting and scoring by weighting and rating in the form of strength and weakness, as well as determining internal factors by identifying in the internal audit process of grouper aquaculture in grouper in Gerokgak, Buleleng Regency, Bali Province and formulating it into a strategy.

Table 1. Internal factors evaluasi matrix

Strength	Score	Rating	Score x Rating
Support from national, provincial and local governments	0.12	3.5	0.42
amount of harvest	0.15	3.6	0.54
Good environmental conditions	0.12	3.7	0.44
Increased demand for grouper products	0.17	3.6	0.61
Summary	0.56	14.4	2.01
Weakness			
Small business capital	0.16	1.6	0.25
Poor facilities and infrastructure	0.07	1.8	0.12
Low human resources	0.09	1.5	0.13
Availability of seeds is rare	0.12	1.9	0.22
Summary	0.44	6.8	0.72
Total	1.0	21.2	2.73

Relative weights on each indicator contained in internal factors in the form of strength and weakness variables, and on external factors in the form of opportunity and threat variables to be calculated so as to get the total weight to 1 or 100 % (Table 2). The rating value is a value of urgency or an analysis of the authorized internal parties for the possibility that will occur in the short

term. The rating value for the strengths, weaknesses, opportunities, and threat variables will be given a value of 1 to 4 according to the respondent's perception. Given a value of 1 if the likelihood of the indicator decreases and given a value of 2 if the indicator is being, while given a value of 3 or 4 if the indicator is better.

3.4. Analysis of external factor evaluation (EFE) matrix.

Seen in the analysis of the evaluation of external factors, weight and rating have been determined previously which include opportunities and threats to grouper aquaculture in Gerokgak District, Buleleng Regency, Bali Province. The weights are determined by the perception of grouper fish farmers while the rating is determined through the perception of employees of the Marine and Fisheries Office of Buleleng Regency on a scale of 1 to 4.

Table 2 explains that the results of the calculation of an external matrix analysis of factors show that the strategy external factors are opportunities and threats of grouper farmers in Gerokgak District and the Office of Marine and Fisheries of Buleleng Regency, Bali Province.

Table 2. External factors evaluasi matrix

Opportunities	Score	Rating	Score x Rating
Wide land available	0.14	3.4	0.47
Meet the demands of regional and international markets	0.13	3.7	0.48
Increased production	0.11	3.4	0.37
No competitors	0.12	3.2	0.38
Summary	0.5	13.7	1.7
Treath			
Pests and diseases	0.14	1.4	0.19
Poor securities issue	0.10	1.9	0.19
The price of feed continues to rise	0.13	2.3	0.29
Price control by the wholesaler	0.13	1.1	0.14
Summary	0.5	6.7	0.81
Total	1.0	20.4	2.51

3.5. SWOT analysis .

Development of grouper aquaculture strategies in Gerokgak District have an internal factor value with a weight value and strength rating that is greater than the weakness value that is the difference in value of 1.29 (Table 3). The value of external factors with the value of the weight and opportunity rating greater than the value of the weight and raring of a smaller threat that is the difference of 0.81. Then the results from the difference between internal factors and external factors, the results are positive.

Table 3. Difference between internal factors and external factors

Variable	Score × Rating	Difference	result
Strenghts	2.01	1.29	+
Weakness	0.72	1.29	+
Opportunities	1.7	0.89	+
Treath	0.81	0.89	+

3.6. Development strategy of grouper business.

In the SWOT analysis, calculation results can be seen which produces a strategy graph in accordance with the grand strategy image and SWOT matrix, the development strategy that must be applied in the development of aquaculture in Bontang City is located in quadrant position I which means an aggressive growth strategy (growth-oriented strategy).

In the strategic awareness position I lies in the SO strategy (Strengths - Opportunities), namely in terms of internal strength (S) and in terms of external opportunities (O) so that this strategy can be interpreted to use power to take advantage of existing opportunities, this is in accordance with Dafina's statement (2013) which states the SO strategy (Strength - Opportunity) this strategy is a combination of strength and opportunity, namely by utilizing all the strength to seize and take advantage of opportunities. This strategy is also called an aggressive strategy. Based on the explanation of the factors in each variable regarding the strength and opportunity factors, it can be described as follows:

Based on the translation of the factors on each variable regarding the strength and opportunity factors, it can be explained as follows:

- S1, S2 – O2. Increased grouper aquaculture production. This increase is very clear because of the very high demand, so it is expected that in the future production from the grouper fish farming can increase again. It is seen that from the last 5 years there was a drastic decrease only in 2016, only producing 190.5 tons and the following year it could increase by 303 tons. An increase in production is very necessary to meet market demand so that farmers can increase income and increase production for the years ahead.
- S3 – O1, O3. Gerokgak Subdistrict is the widest Subdistrict in Buleleng Regency with an area of 356.57 km^2 with an area of land used for ponds / aquaculture ponds covering an area of 271 ha. By having a wide enough area and water conditions that support the farmers are expected to take advantage of the land area in order to increase production yields. In addition to their own domestic requests from and several countries namely Hong Kong, Taiwan, Japan, Vietnam, Brunei Darussalam, Cambodia and Singapore.
- W1, W3 – O2. With the increase in production, it will attract human resources to better understand the technology and progress of the times to further develop the grouper aquaculture so as to get results to cover minimal capital. Therefore, with the existence of technology, the development in marketing the results of cultivation can be expanded further to obtain maximum results and profits.
- W2 – O1, O3. Utilizing large enough land to make more hatcheries and multiply hatchery ponds so as not to buy seeds in other areas. Meanwhile, to meet the market needs, facilities and infrastructure must be improved.
- S2, S3 – T1. The government has conducted counseling several times but it is felt that farmers are still lacking there are still many farmers who do not understand very well about pests and

diseases and water quality management, most of the farmers know from the internet and self-taught themselves and from fellow peers. Therefore the government is expected to hold counseling more often not only about pests and diseases and quality management but also with others such as marketing, countermeasures when exposed to bad weather, and others.

- S1 – T2, T3. Maximizing safety in the pond and minimizing the polluted environment so that production can run smoothly because if security is not maximized, theft and damage can occur by competitors around the cultivation site and if the polluted environment will greatly affect the quality of the water used for the cultivation.

4. Conclusion.

From the results of research on internal factors in the development of grouper aquaculture in Gerokgak District on strengths and weaknesses, while the strengths of demand for aquaculture increases every year, the large number of harvests in grouper culture is expected to meet regional and international markets. While the weakness is the lack of business capital, low human resources. From the results of the calculation of the analysis and determination of the SWOT matrix, the government must increase grouper aquaculture results by increasing the number of hatchery and enlargement businesses. The government is more responsive to the problems faced by farmers.

References

DJBP. 2014. Bali Province has a potential of 997 ha of marine cultivation with the production of grouper, snapper and milkfish in 2013

Glamuzina B, Skaramuca B, Glavic N, Kozul V. 1998. Preliminary studies on reproduction and early stage rearing trial of dusky grouper, *Epinephelus marginatus* (Lowe, 1834). *Aquaculture Research*. 29(10): 769–771.

Marino G, Azzurro E, Boglione C, Massari A, Mandich A. 1998. Induced spawning and first larval rearing in *Epinephelus marginatus*. In Proceedings of Symposium International sur les Me´rous de Me´diterrane´e, 5–7.

Pierre S, Gaillard S, Prevot-D'Alvice N, Aubert J, Rostaing-Capaillon O, Leung-Tack D, Grillasca J. 2008. Grouper aquaculture: Asian success and Mediterranean trials. *Aquatic conservation: marine and freshwater ecosystems*. 18(3): 297-308.

Rangkuti F. 2013. SWOT-Balanced scorecard. Gramedia Pustaka Utama. pp. 34-35.

Rimmer MA, McBride S, Williams KC. 2004. Advances in grouper aquaculture. Queensland Department of Primary Industries and Fisheries. Queensland. Australia.

Saptoadi. 2011. potential of aquaculture fishery resources in Indonesia

Setiadi JA. 2006. Peranan dan strategi pengembangan sektor perikanan dan kelautan dalam pembangunan wilayah Kabupaten Subang, Provinsi Jawa Barat. Skripsi FPIK IPB : Bogor. pp. 3–14.

SIM SY, Rimmer A, Williams K, Toledo JD, Sugama K, Rumengan I, Philips MJ. 2005. A practical guide to feeds and feed management for cultured groupers. NACA, ACIAR, Publication No. 2005-02 of the Asia-Pacific Marine Finfish Aquaculture Network.