E-ISSN 2477-6939 P-ISSN 0216-0749
AQUACULTURA INDONESIANA
An International Journal of Indonesian Aquaculture Society

Business Suitability Analysis and Development Strategy Paddy Rice Fields in Bantul Regency, Yogyakarta Special Region Province

Arum Tyas Afiati[a,*], Etty Riani[b], Agnes Puspitasari Sudarmo[a]

[a]*Magister of Marine Sciences, Universitas Terbuka, Tangerang, Indonesia*
[b]*Magister or Marine and Fisheries Science, IPB University, Bogor, Indonesia*

Received: August 26, 2024; Accepted: November 3, 2024

Abstract

The limitations of agriculture and aquaculture areas impact the reduction of food availability and farmers' welfare. To fulfill rice and fish consumption demand can be approached through paddy rice field development. This research aims to analyze the financial suitability of both internal and external factors and arrange the strategy for developing paddy rice fields in Bantul Regency. The data collection method was from the interview and direct observation. The development strategy arrangement is based on the SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis and QSPM (Quantitative Strategic Planning Matrix). The paddy rice fields business's resulting net present value is IDR 362.694.656, R/C Ratio= 2.02, and payback period = 5,33 months, which shows the paddy rice fields are worthy and more prospective than a conventional system. The prior internal factors on the paddy rice fields are more profitable; most workers are sharecroppers and require higher capital than the traditional system. The external factors include the stability of the sales price and product market, incentive mentoring from the instructor, the infrastructure assistance policy of paddy rice fields, and the strategic location. The development strategy is strengthening the farmer's behavior from conventional planting rice to paddy rice fields system, increasing the farmer motivation, repairing fence design to minimize pest attack, utilizing mediator as a negotiate media from sharecropper to rice fields owner, developing the paddy rice fields area as ecotourism, and establishing cooperation both with region financial institution and Marine and Fisheries Business Capital Management Institute (LPMUKP) for extensive capital.

Keywords: The suitability business analysis; Bantul; Paddy Rice Fields; QSPM; SWOT

1. Introduction

Indonesia's current food security improvement program focuses on society's food fulfillment. The fisheries and agriculture sector is important in increasing Indonesian food security. The current food security program expects to need fulfillment and creates an independent society by utilizing local resources. Based on these objectives, an effort is required to provide food needs and value-added income for farmers and fish cultivators. The development of fish and agriculture sectors plays a strategic role in improving Indonesia's economy. The agriculture, forestry, and aquaculture business fields have an average contribution to the gross domestic product (PDB) of 13.22% in 2018-2021 and one of the economic support with workforce absorption of around 29-76% (Ministry of Agriculture, 2022). Despite high workforce quantity, the poor productivity value impacting the resulting output of the agriculture and fisheries sector are low value added.

The value added from the agriculture and fisheries business can be improved by applying paddy rice fields. This technique utilizes rice fields for rice planting and fish farming at once. The paddy rice fields can be one solution to fill society's high demand for nutritious food with limited aquaculture production. The implementation strategy by the Ministry of Maritime Affairs and Fisheries to drive the national economy and food security is through improvement of yield, productivity, and competitiveness based on science. One of the programs that can achieve that goal is infrastructure assistance, which can be used as a model for paddy rice fields. This model is expected to provide adaptive, applicative eff, effective and efficient technology transfer along with achieving sustainable fisheries for society.

The Sukabumi Center for Freshwater Aquaculture Fisheries (BBPBAT) developed paddy rice fields with king prawn commodities in the Sukabumi district in 2012, expanded by the Sukabumi and Banyumas districts in 2015, but has stopped operation in both locations. The development of paddy rice fields with tilapia commodities continued in 2017 in Sukabumi, Pangandaran, and Banjarnegara districts. Based on the result of monitoring and evaluation data by BBPBAT Sukabumi in 2019, the program's sustainability was 4.58% in the Sukabumi district, 10% in the Pangandaran district and 23% in the Banjarnegara district. On the other hand, paddy rice fields development with tilapia commodities was carried out in Sukabumi, Tasikmalaya, Pangandaran and Banyumas districts in 2018 with the sustainability of 12.5%, 50%, 21.45% and 28.83%. Then, it expanded in 2019, including Kuningan, Garut, Purbalingga, Malang, Pandeglang, Banjar, Bantul and Cianjur districts. The next development will be located in Bantul and Tasikmalaya districts, where the sustainability level is unknown. The development of Paddy rice fields in Bantul Regency continued in 2020, which means it was the site of Paddy rice fields development for two years.

*) Corresponding author: arumbbpbat@gmail.com

According to Syarifudin (2019), the realization of freshwater fish farming production of Bantul Regency in 2019 only reached 40% of the target of 13,000 tons. This result has not met the Bantul area's consumption needs, so the Bantul Regency Government still brings freshwater fish supplies outside the region to meet 60% of the needs. The application of paddy rice fields is expected to increase fish production without reducing rice production. Research on its development strategy is necessary to optimize the implementation of paddy rice fields in the Bantul district. The level of sustainability of paddy rice fields in some areas is low, so it is essential to conduct research that aims to analyze the financial feasibility of paddy rice fields business in Bantul Regency, analyze internal and external factors that affect the development of paddy rice fields programs in Bantul Regency and develop appropriate strategies for the development of paddy rice fields in Bantul Regency.

2. Theoretical Study

2..1. Paddy rice fields

Paddy rice fields is an integrated fish and rice farming business in one container to increase land productivity and the opinions of farmers who apply it. Paddy rice fields development has several positive impacts, including optimizing land and water resources, increasing diversification, intensification, productivity and business sustainability. The application of paddy rice fields can produce more production without damaging the integrity of the environment and human health (& Roy, 2022). Paddy rice fields is an integrated farming system with a combination of fish and rice commodities to improve the welfare of farmers. The paddy rice fields system combines fish and rice cultivation to ensure farmers' sustainability of production, nutrition, economy, employment and environmental security (Nayak et al., 2020).

According to Ahmadian et al. (2021), paddy rice fields in Indonesia is developing in two ways: (1) simultaneous rice-fish cultivation on the same land at the same time and (2) crop rotation where rice and fish are reared alternately (fish as an interlude between two rice growing seasons). The types of fish kept in the paddy rice fields system are tilapia, goldfish, koi, catfish, prawns and others. (Sularno and Sodiq, 2014).

The relationship between fish and rice is mutually beneficial in improving ecological balance and improvement. The application of paddy rice fields can preserve the environment. Paddy rice fields does not use chemicals because rice is integrated with fish (Sukri & Suwandi, 2016). The application of paddy rice fields can reduce the use of chemical fertilizers from the recycling of nutrients by fish through the remaining feed and excrement that comes out as urine and feces absorbed by the soil. The waste produced from fish feces is beneficial for the growth of rice plants (Lantarasih, 2016).

The constraints faced in implementing paddy rice fields are the amount of capital at the beginning of the implementation of paddy rice fields , land ownership, which is generally very small, flooding during high rainfall, fish theft, and lack of labor due to the migration of villagers to the city. In addition, farmers' skills in managing fish are also an obstacle because farmers are only accustomed to managing rice. In addition, according to Nayak, the main obstacles to the implementation of paddy rice fields are production technology that farmers have not mastered, the small size of rice fields, unclear ownership systems of rice fields in various countries, non-strong farming communities, lack of extension services, and lack of Government attention in the development of paddy rice fields (Nayak et al., 2020). According to Nabi (2008), some technical constraints in implementing paddy rice fields are water management, the farming area, the level of chemicals used, fish seed management and the uncertain climate. In the irrigation process, the constraints faced are proper water management techniques to meet the needs of fish and rice, the lack of irrigation facilities and water control and the potential for polluted water flowing into the cultivation media. Another obstacle is the presence of predators that usually prey on fish, such as otters and wild fish (predators), that enter the cultivation area during fish enlargement. According to Nurhayati (2016), the constraints of the paddy rice fields integration system are limited technical knowledge (42%), natural disasters (floods 19%), high production costs (34%), and low water quality (5%).

2.2. Business feasibility analysis

Business feasibility is an activity that aims to discover in-depth about a successful level of the project (usually an investment project). Some parameters that can illustrate business feasibility analysis are net present value (NPV), payback period (PP) and income over cost ratio (R/C Ratio) analysis. Net Present Value (NPV) Net Present Value (NPV) is the present value of all cash flows from now until the end of the project. The project is accepted if the NPV> 0. If the NPV is negative, then the investment project is not feasible. (Jumingan, 2011). *Payback period analysis* is an investment assessment based on the return of investment costs by net profit. The payback period is the period required to return the capital of an investment. Net cash flow is the difference between income and expenses per year. The purpose of payback period analysis is to determine the length of time of investment and when the break-even point will occur (Giatman, 2017; Darmawan et al., 2018). Revenue per Cost (R/C Ratio) analysis compares total revenue and total cost. A business is feasible if the R/C ratio value exceeds one (Malika et al., 2012).

2.3. Strategy

Strategy is a means of achieving long-term goals, which requires top-level management decisions and the resources of a relatively large company. Strategy affects the company's progress over a long period and its orientation towards the future. It has multifunctional and multidivisional consequences and requires consideration of internal and external factors contained in the company (David & David, 2017).

According to David and David (2017), the process of preparing strategic planning goes through three analysis stages: the data collection stage, the matching stage and the decision-making stage.

a. Data collection stage

The collection stage is the activity of making classifications and pre-analysis. The data collected are internal and external. External data can be obtained from the environment outside the company, including market analysis, community competitors, suppliers, Government and certain interest groups. At the same time, internal data can be obtained from within the company, including financial data, human resources, operational activities and marketing activities (Rangkuti, 2000). According to David and David (2017), the company's internal environment is analyzed by collecting information about management, production, marketing, finance, research and development and company information systems. Internal environmental analysis is useful for knowing the weaknesses and strengths of a company. At the same time, analyzing the external environment is useful for knowing the opportunities that will benefit the company and the threats that the company should avoid. External forces include economic forces; social, cultural, demographic and environmental forces; political, Government and legal forces; competitive forces; and technological forces. In addition to data collection, data classification and pre-analysis are also carried out at this stage.

b. Matching Stage

The matching stage is carried out after all the information that affects the continuity of the company has been collected systematically. In this matching stage, analysis is done by utilizing all information in a quantitative strategy formulation model (Rangkuti, 2000). In the matching stage, the strategy formulation consists of five techniques: the SWOT matrix, BCG matrix, IE matrix, SPACE matrix and grand strategy matrix. These matrices are tools to match the opportunities, threats, strengths and weaknesses that have been obtained in the previous stage (data collection stage). Obtaining the right strategic alternatives is important to matching external and internal factors.

SWOT analysis stands for strengths, weaknesses, opportunities, and threats. SWOT analysis is a method to evaluate strengths, weaknesses, opportunities and threats in a business. SWOT analysis is a classic strategic planning instrument that identifies various factors formed systematically, which are used to formulate a business strategy. In general, SWOT can be used to analyze the internal conditions and external environment of the organization, determine the position of a company among other companies and determine the ability of a company to run its business faced with its competitors (Nur'aini, 2019).

According to David and David (2017), some of the factors set out in the form of a SWOT matrix are as follows:

a. Utilize strengths to take advantage of existing opportunities
b. Overcoming weaknesses that can reduce the benefits of existing opportunities
c. Utilizing strengths to be able to face threats
d. Overcoming weaknesses that can become threats

3. Research Methods

3.1. Time and location

Data was collected in May 2021 in Bantul Regency, Special Region of Yogyakarta. It was conducted at the Farmer Group Association in Sedayu and Banguntapan Sub-districts, Bantul Regency, which is the location of the Paddy rice fields fish farming development system from the Ministry of Maritime Affairs and Fisheries.

3.2. Data collection

The data used in the study consisted of primary data and secondary data. Primary data was obtained through interviews and direct observation. Researchers conducted interviews with farmers, extension workers, the Bantul Regency Marine and Fisheries Service and the person in charge of paddy rice fields activities from BBPBDAT Sukabumi. In the interviews, researchers collected data on aspects related to the feasibility of the paddy rice fields business, as well as strengths, weaknesses, opportunities, and threats in the application of paddy rice fields . Direct observation was conducted to find out the application of paddy rice fields directly. Secondary data in this study will explore information through literature studies on the potential of agriculture and fisheries in Bantul Regency and reports on the implementation of the paddy rice fields cultivation program that can provide a broader picture of the potential of Bantul Regency and the implementation of the paddy rice fields program. The sampling technique is non-probability sampling (purposive), which is done intentionally on respondents who are recipients of the paddy rice fields fish farming program assistance from the Ministry of Maritime Affairs and Fisheries.

3.3. Data analysis

Data analysis was conducted through three stages: a business feasibility analysis consisting of net present value (NPV), revenue per cost ratio (R/C ratio), and payback period (PP). The Paddy rice fields development strategy was prepared with a SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) and QSPM analysis (Quantitative Strategic Planning Matrix) to determine strategy priorities.

3.3.1. Net Present Value (NPV)

Net Present Value (NPV) is the present value generated in the future, obtained from the difference between benefits and costs at a certain discount rate.

Net Present Value formula (Kadariah, 1999):

$$NPV = \sum_{t-1}^{n} \frac{(Bt-Ct)}{(1+i)t}$$

Description:
Bt = Benefit caused by the investment in year t
Ct = Annual cost caused by investment in year t
I = Loan interest rate
T = Project life of a business (t = 0, 1, 2, ... n)
$\sum_{t-1}^{n} \frac{(Bt-Ct)}{(1+i)t}$ = Discount Rate (average deposit interest rate)
Criteria for feasibility in the NPV method:
NPV> 0; the business is feasible
NPV = 0; the business returns the same amount of money invested
NPV < 0; the business is not worth running

3.3.2. Revenue per Cost (R/C Ratio)

R/C Ratio analysis serves to see the profit and feasibility of farming. According to Hajar et al. (2019), the R/C Ratio formula is as follows:

$$\text{R/C Ratio} = \frac{\text{Total Revenue}}{\text{Total Cost}}$$

The eligibility criteria for the R/C Ratio method are:
R/C > 1, the business is worth doing
R/C < 1, business is not worth doing
R/C = 1, break-even business

3.3.3. Payback Period (PP)

The payback period is an analysis method to determine how long an investment can return with a unit of time result. The formula used to calculate the Payback period (Husnan & Muhamad, 2000) is:

$$PP = \frac{I}{Ab}$$

Description:
PP = time (year/period) required to return the investment capital
I = Total investment capital
Ab = Benefit or net result per year/period

3.3.4. SWOT Analysis

SWOT analysis is used to analyze the internal conditions and external environment of the organization, determine the position of a company among other companies and determine the ability of a company to run its business (Nur'aini, 2019). SWOT analysis is carried out through 3 stages: the data collection stage (input stage), the matching stage and the decision stage. The data collection stage is carried out by identifying internal factors (strengths and weaknesses) and external factors (opportunities and threats). The IFE (Internal Factor Evaluation) and EFE (External Factor Evaluation) matrices outline the intensification results. The matching stage uses the IE matrix (Internal External Matrix) and the SWOT matrix.

3.3.5. QSPM (Quantitative Strategic Planning Matrix) Analysis

Quantitative Strategic Planning Matrix is an analytical tool to objectively evaluate various alternative strategies based on external and internal factors previously identified through SWOT analysis (David & David 2017). The steps for preparing strategies through QSPM are: (1) listing opportunities, threats, strengths and weaknesses, and data obtained from the previously compiled EFE and IFE matrices; (2) giving weight to each internal and external factor. The weight value is the same as the weight value in the EFE and IFE matrices; (3) identify alternative strategies that have been obtained from the SWOT matrix; (4) Determine the relative attractiveness score or AS (Attractiveness Score) on each selected strategy. The AS value shows the relative attractiveness of the selected strategy in overcoming internal and external factors; (5) calculate the TAS (Total Attractiveness Score) obtained by multiplying the AS by the weight on each line. TAS is the relative attractiveness value of each alternative strategy; (6) calculate the total TAS by summing up all TAS in the QSPM matrix. The highest TAS value indicates that the strategy is the most appropriate.

4. Results and Discussion

4.1. Business Feasibility Analysis

4.1.1. Net Present Value (NPV)

The net present value (NPV) of the paddy rice fields business in Bantul Regency was calculated with an interest rate of 4.25% (average Bank Indonesia interest rate in 2021) using a hectare/cycle cost structure and calculated for five years of business. NPV is calculated by finding the present value of the estimated profit each year. The NPV of the paddy rice fields business for five years was IDR 362,694,656 (Figure 1). Following the opinion of Wardono et al. (2017), a business that has NPV>0 is a business that is worth developing, so based on the NPV value, the paddy rice fields business is worth creating in the community as a source of income. The NPV of the paddy rice fields business has a higher value than the NPV of growing rice conventionally. The NPV of growing rice conventionally is Rp182,157,400 (Figure 1).

NPV will increase with an increase in business profits and decrease with a decrease in business profits. The profit of the paddy rice fields business of Rp30,027,500/ha (Figure 2) is higher than the conventional rice business, which has a profit of Rp16,990,000/ha (Figure 2), causing the NPV of the paddy rice fields business to be higher. The higher NPV indicates that the paddy rice fields business has a greater profit opportunity than conventional rice cultivation, so paddy rice fields is an alternative business that can be applied by farmers/fish farmers to increase their income. The greater profit in the paddy rice fields business is followed by more capital, both investment costs and operational costs, required for the paddy rice fields business than the capital to grow rice conventionally. According to Prastyo and Kartika (2017), using different capital will produce different production amounts; capital positively affects the output.

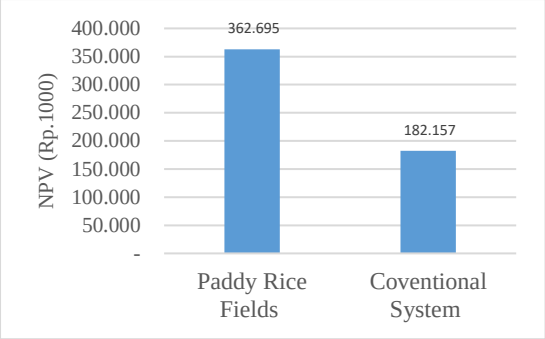

Figure 1. NPV of Rice Paddy Fields and Conventional System

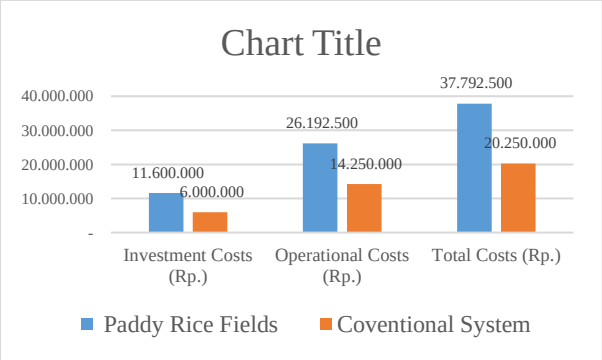

Figure 2. The Cost and Profit of Rice Paddy Fields Business and Conventional System

4.1.2. Revenue per Cost (R/C Ratio)

The R/C ratio value of the paddy rice fields business in Bantul Regency is feasible because it has a value of more than 1, which is 2.02 (Figure 3), which can be assumed that every cost of Rp100,000 incurred will generate revenue of Rp.202,000. Several previous studies have stated that paddy rice fields is a profitable business with an R/C ratio indicator that has a value above 1. According to Prasetyo et al. (2018), the paddy rice fields business in Sleman Regency has an R/C Ratio of 1.43. Sudiarta et al. (2016) stated that the paddy rice fields system in Gorontalo has an R/C Ratio value of 2.08. Meanwhile, Sularno and Sodik (2014) stated that the R/C ratio of the paddy rice fields system in Temanggung Regency had an R/C ratio of 2.97.

Conventional rice business in the district has a lower R/C ratio value than the paddy rice fields system of 1.64, which can be assumed that each expenditure of Rp100,000 will generate revenue of Rp164,000. A higher R/C ratio value will result in higher profits, so it can be stated that the paddy rice fields business is economically more prospective than the conventional rice business

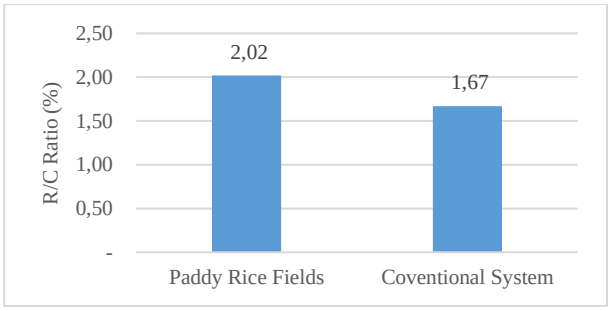

Figure 3 R/C Ratio of Paddy rice fields System and Conventional System

The R/C ratio value of the conventional rice business in Bantul Regency is similar to the research of Nugroho and Indra (2021) in Kebumen Regency, which resulted in an R/C ratio value of 1.4. Meanwhile, research by Azwar et al. (2019) conducted a business feasibility study of the rice business in the Ciamis Regency, resulting in an R/C ratio value of 1.8. The paddy rice fields system, which is more prospective than the conventional system, was also stated by Prasetyo et al. (2018), who examined the paddy rice fields business in Sleman Regency with the results of the R / C ratio of paddy rice fields business was 1.43 while the R / C ratio of conventional rice business was 1.27. Although the Paddy rice fields system requires more capital, with this system, farmers will get more rice products in more volume and additional products in the form of fish. Implementing paddy rice fields in Bantul District produces more rice (8.3 tons/ha) than conventional rice cultivation (7.2 tons/ha) and an additional 890 kg/ha of fish. The higher volume of the rice harvest in the paddy rice fields system was also stated by Setiawan (2019); before implementing paddy rice fields , farmer groups in Sleman Regency were able to produce 6.5 tons of rice, and after implementing paddy rice fields , it increased to 8.5 tons/ha. The higher yield in the paddy rice fields system is due to the role of fish in improving soil fertility, eating pests that commonly attack rice, and eating weeds that interfere with rice growth.

4.1.3. Payback Period

Payback period is an investment assessment based on the return on investment costs divided by net cost benefits. The payback period value of the paddy rice fields business in Bantul Regency is 0.444 years (5.33 months), equivalent to 5 months and 10 days (Figure 4)

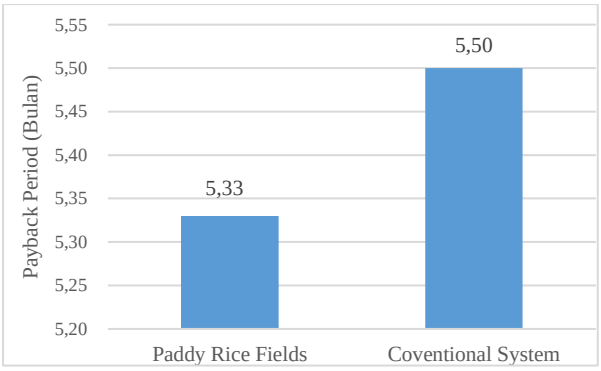

Figure 4. Payback Period of Paddy Rice Fields Business and Rice Business

The payback period of 0.444 years indicates that the period needed to recover the costs at the beginning of the business is five months and ten days. Meanwhile, the conventional rice business has a longer payback period of 0.458 years (5.50 months) or five months and 15 days. Based on the value of the payback period, the costs incurred by businesses with paddy rice fields systems are more efficient than those with conventional systems because paddy rice fields businesses can recover expenses faster. The payback period value of paddy rice fields business, which is below one year, was also stated by Setiawan (2019), who examined paddy rice fields business in 2 farmer groups in Sleman Regency, which had a payback period range of 0.54-0.73 (6 months 14 days - 9 months ten days) and 0.52 - 0.63 (6 months seven days - 7 months 16 days).

4.1.4 .Internal and External Factor Analysis

The results of identifying internal factors are grouped into internal strategic factors, which are opportunities and threats in the development of paddy rice fields . The results of the calculation of weights and ranks are outlined in the IFE matrix. The IFE value obtained according to the weight and ranking is 2.617 (Table 1). According to David and David (2017), a weighted value above 2.5 indicates that the farmer group has a strong internal position. The strength factor with the largest value is the paddy rice fields system, which is the farmer's assumption that the paddy rice fields system generates higher income and profits than the conventional system. Meanwhile, the capital required for paddy rice fields , which is greater, is the main weakness in the application of paddy rice fields , followed by the fact that most farmers are sharecroppers (not rice field owners), so the paddy rice fields system is considered more complicated. Some pests attack rice and fish. These factors should be considered in compiling the SWOT matrix to make the paddy rice fields development strategy more appropriate.

The analysis of external factors in the form of opportunities and threats in paddy rice fields development is outlined in the EFE matrix. The total weighted value in the EFE matrix is 3.067 (Table 2), which is above the average weighted value (2.5). According to David and David (2017), a weighted value above 2.5 indicates that the organization can respond to opportunities and threats around it. The highest weighting result in the development of paddy rice fields is the intensive assistance from extension workers. Other factors that have a high weighted value are market opportunities and stable product prices, assistance policies from the Government and the strategic location of paddy rice fields development. These factors should be prioritized when utilizing opportunities to develop paddy rice fields in the Bantul Regency. The weighted values listed in the IFE matrix 2.617 and EFE of 3.067 are combined in the IE matrix. The IE matrix determines the position of farmer groups that implement paddy rice fields to facilitate the selection of strategies based on internal and external factors of farmer groups. The IFE and EFE analysis results in the form of weighted values are outlined in the internal and external (IE) matrix presented in Figure 5. Figure 5 shows that the farmer group is in cell II. According to Rangkuti (2000), market development and product development or integrative strategies (vertical and horizontal integration) can be developed for organizations in cell II.

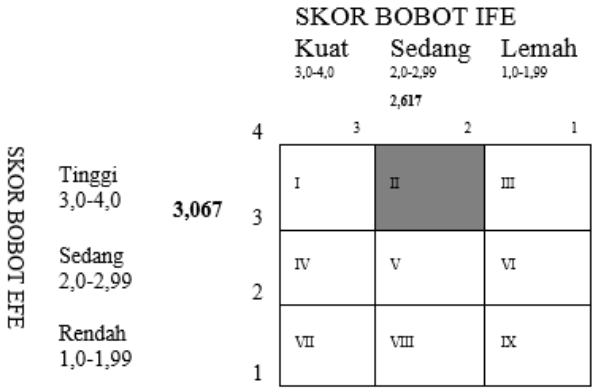

Figure 5. Analysis Results Using the Internal-External (IE) Matri

The development strategy through horizontal integration aims to expand the company by establishing operations in other locations or enhancing the types of products or services. The development carried out aims to increase sales and profit. Improving the performance of farmer groups can be achieved through internal and external integration by utilizing resources from outside. The updates that can be developed within farmer groups involve enhancing the performance and motivation of farmers to implement rice-fish farming supported by local extension workers.

4.2. Formulation of Paddy rice fields Development Strategy

4.2.1. SWOT Analysis

The SWOT analysis systematically compares internal factors, such as strengths and weaknesses, with external factors, such as opportunities and threats, to obtain alternative strategies as outlined in the SWOT matrix (Table 3).

Tabel 1. Matriks IFE (Internal Factor Evaluation)

Code	Internal Strategic Factors	Score	Ranking	Weighted Value
S1	The paddy rice fields system generates higher income and profits than growing rice alone.	0,0798	4	0,319
S2	The agricultural sector supports the family economy	0,0473	3,11	0,147
S3	Farmers have long farming experience	0,0617	3,78	0,233
S4	Family members can be utilized as labor	0,0531	3,44	0,183
S5	There is support from fellow farmers in the group	0,0647	3,78	0,244
S6	Weed growth is reduced after using the paddy rice fields system	0,0587	3,56	0,209
S7	Soil conditions are more fertile after the application of paddy rice fields	0,0700	3,89	0,272
S8	The paddy rice fields location is safe from flooding	0,0696	3,78	0,263
W1	Farmers are used to managing only rice without fish	0,058	1,667	0,097
W2	Farmers are dominated by the older generation	0,054	1,667	0,090
W3	Lack of motivation for farmers to continue paddy rice fields	0,058	1,333	0,078
W4	The capital required for paddy rice fields is greater	0,075	1,111	0,083
W5	Most farmers are sharecroppers (do not own their land)	0,072	1,000	0,072
W6	The paddy rice fields system is considered complicated by farmers	0,070	1,778	0,125
W7	The equipment owned by farmers for paddy rice fields cultivation is still limited	0,044	2,000	0,088
W8	some pests attack rice and fish	0,064	1,778	0,114
	Total IFE score	**1,000**		**2,617**

Tabel 2. Matriks EFE (External Factor Evaluation)

Code	External Strategic Factors	Score	Ranking	Weighted Value
O1	Strategic location for the development of rice-fish farming, by the roadside	0,085	3,778	0,322
O2	Location for the development of rice-fish farming that is close to universities that usually develop rural technology	0,062	3,111	0,193
O3	The rise of ecotourism/agritourism that can be developed in the rice-fish farming area	0,058	3,222	0,187
O4	The abundance of artificial feed types in the market at varying prices	0,081	3,444	0,280
O5	The existence of a rice-fish farming assistance program policy from the Ministry of Marine Affairs and Fisheries	0,097	3,556	0,345
O6	Intensive support from extension workers	0,114	4,000	0,456
O7	Stable selling prices for cultivated products	0,104	3,889	0,404
O8	A clear market for selling cultivated products	0,115	3,889	0,446
T1	An increase in fish feed prices	0,099	1,444	0,144
T2	Lack of response from the surrounding community regarding the existence of rice-fish farming business development	0,080	1,889	0,152
T3	Unstable water inflow for irrigating the fields	0,104	1,333	0,139
	Total EFE score			**3,067**

Table 3. Alternative Strategy Matrix for Paddy rice fields Development in Bantul Regency

	Opportunity (O)	Threats (T)
	SO STRATEGIES	ST STRATEGIES
Strenght (S)	1. Optimize rice-fish production through collaboration among group members with maximum support from agricultural extension workers (O6, S5); 0.639 2. Maintain market stability by preserving product quality (O8, S1); 0.637 3. Add new services to increase prices for customers (e.g., selling cleaned fish, selling fresh fish that has been seasoned with more attractive packaging) (O7, S4); 0.587 4. Develop rice-fish areas as ecotourism with guidance from extension workers by collaborating with universities (O1, O2, O3, S5); 0.947	1. Coordinate with irrigation channel managers through local agencies (S10, T3); 0.383 2. Socialize about rice-fish farming accompanied by testimonials of success from farmers who have successfully implemented rice-fish farming (S1, T2); 0.471
	STRATEGY WO	STRATEGY WT
Weaknesses (W)	1. Strengthening farmers' behavior from conventional rice planting to the paddy rice fields system and increasing farmers' motivation through extension support (O6, W3, W1, W6); 0.766 2. Establishing cooperation with local financial institutions and related agencies (KKP, local Fisheries Office) for further capital (O5, O6, W6); 0.915 3. A mediator (extension worker/local agency/donor) is needed to align perceptions or negotiate between tenant farmers and landowners (O5, O6, W5); 0.730 4. Improving fence design to minimize pest attacks through guidance from higher education institutions with extension mediators (W8, O6, O2); 0.764	1. Maintaining the paddy rice fields production process with flow control and anticipating rising feed prices by optimizing feed usage (W1, T1, T3); 0.379

The six strategies with the highest value are:

1. Guidance from extension workers through collaboration with universities.
2. Developing fish-rice farming areas as agro-tourism/ecotourism by strengthening farmers' behavior from conventional rice planting to fish-rice systems and enhancing farmers' motivation through extension support.
3. Establishing partnerships with local financial institutions and the Marine and Fisheries Business Capital Management Agency (LPMUKP) for further capital.
4. Utilizing mediators (counselors/local agencies) to align perceptions or negotiate between tenant farmers and landowners.
5. Improving fence design to minimize pest attacks through guidance from higher education institutions with the help of counselors.
6. Strengthen farmers' behavior from conventional rice planting to the paddy rice fields system and enhance farmers' motivation through support from counselors.

4.2.2. QSPM Analysis

The Quantitative Strategic Planning Matrix (QSPM) was developed to determine the best strategy for developing rice-fish farming. The weighting of external and internal factors in the QSPM matrix is the same as the weights in the IFE and EFE matrices. Based on the attractiveness values obtained from the QSPM analysis using the QSPM matrix, the order of strategy implementation in the development of rice-fish farming is shown in Table 4. According to the QSPM analysis, six appropriate strategies for the development of rice-fish agriculture based on the highest AS value are as follows:

A. Strengthen farmers' behavior from conventional rice farming to the rice-fish system and increase farmers' motivation through extension support.

The change in farmers' behavior from conventional farmers to the rice-fish system can be achieved by developing human resources (members of farmer groups) through intensive socialization and training about rice-fish farming. Research conducted by Sularno and Sodik (2014) shows that human resource development for rice-fish farming activities is crucial for developing rice-fish agribusiness. Socialization can be carried out by both the central and local governments, as well as by skilled farmers and with the support of extension workers.

The socialization carried out includes the technique of rice-fish farming, and it is further emphasized that the advantages of this method result in a higher yield of rice. It can even be promoted that the rice produced is healthier because it uses fewer inorganic materials and includes an additional fish harvest. In addition, the enhancement of the competencies of extension workers in terms of knowledge, skills, and communication techniques with farmers needs to be carried out so that information about rice-fish farming can be conveyed accurately.

Table 4. Strategy Priorities Based on the QSPM Matrix

Strategy Priorities	Strategy	Value of TAS
1	1 Strengthening farmers' behavior from conventional rice farming to t53he paddy rice fields system and enhancing farmers' motivation through extension support 7.3	7,353
2	Improving fence design to minimize pest attacks through guidance from higher education institutions with extension mediators 7.020	7,020
3	Utilizing mediators (extension workers/local agencies) to align perceptions or negotiate between tenant farmers and landowners 6.886	6,886
4	Developing paddy rice fields areas as ecotourism with guidance from extension workers through collaboration with higher education institutions 6.753	6,753
5	Establishing partnerships with local financial institutions and the Marine and Fisheries Business Capital Management Agency (LPMUKP) for further capital funding. 6.596	6,596
6	Adding new services to increase prices for customers (for example, by selling cleaned fish, selling fresh fish with seasoning in more attractive packaging) 6.586	6,586

B. Improving fence design to minimize pest attacks through guidance from higher education with the assistance of extension workers (AS value: 7.020)

The second strategy farmer groups can implement is to improve fence design to minimize pest attacks with an AS value of 7.020. The pests that often attack rice in Bantul Regency are planthoppers, rats, weeds, and birds. The pests such as planthoppers, rats, and weeds decrease using the paddy rice fields system. The pests that disrupt rice planting using the wetland rice system are birds and otters (fish-eating animals). Bird pests can be managed by installing nets over the rice fields. However, the pest that needs to be addressed is the presence of otters that frequently eat fish. Otters are a problem in the rice-fish farming system in several areas. As stated by Kriska et al. (2022) and Dewandini (2020), the abundance of otters is one of the obstacles to developing the rice-fish farming system in Sleman Regency. Ilahi et al. (2019) also stated that otters are one of the fish-eating animals that disrupt rice farming efforts in the 50 Cities Regency, Padang.

Farmers have tried several technologies, including fencing with nets, embankments layered with bamboo, and the sounds produced by bamboo windmills, but they have not yet been able to overcome the beaver attacks that prey on fish. An economical yet effective fence design to prevent otters from entering rice-fish farming areas needs to be developed in collaboration with various universities in Yogyakarta that frequently engage in community service activities in rural areas.

C. Utilizing mediators (facilitators/local agencies) to align perceptions or negotiate between tenant farmers and landowners (Value AS: 6.886)

The third strategy that can be pursued to develop rice-fish farming in Bantul Regency is to utilize mediators to align perceptions or negotiate between tenant farmers and landowners, with an attractive score of 6.886. One of the weaknesses of farmers implementing rice-fish farming in Bantul Regency is that the farmers who cultivate the land are not the landowners. Until 2021, the profit-sharing was 50% for the cultivator and 50% for the owner, with the capital borne by the cultivator. However, since 2023, the profit-sharing has changed to 60% for the cultivator and 40% for the owner, with the capital still borne by the cultivator. With that division, the tenant farmers feel burdened because the costs of planting rice using the paddy rice fields system are considered even heavier, given that their yield is only 60%. The higher costs of paddy rice fields have caused tenant farmers to revert to conventional rice planting. Farmers who own their land make up only 10.52%, so 89.24% only receive 60% of the harvest from rice cultivation.

The tenant farmers hope that the landowners will also provide capital to finance the rice planting in their fields, but that hope has yet to be realized. One solution that can be tried is to utilize mediators from the local Government, such as the village head or the sub-district head, to negotiate between the tenant farmers and the landowners regarding the division of profits and the operational costs of rice planting. The division of profits can refer to the Law of the Republic of Indonesia Number 2 concerning Profit Sharing, as most of the community still needs to be made aware of the existence of this law. This law states that the profit-sharing agreement must be made in writing by the owner and the tenant in the presence of the village head, witnessed by two individuals, and validated by the sub-district head. A profit-sharing agreement that complies with the applicable law can minimize conflicts over profit distribution.

D. Developing the paddy rice fields area as agrotourism with guidance from extension workers through collaboration with universities (attractive score: 6.753)

The fourth strategy for developing paddy rice fields is to create the paddy rice fields area as agrotourism, with an attractive score of 6.753. The potential for agro-tourism is increasingly growing in various regions due to the rising demand for family recreation that is considered healthy. The location of rice fields in Bantul Regency, which is close to multiple universities in Yogyakarta, can be utilized to develop agrotourism. Farmers' groups can routinely take advantage of community service activities,

one of the three pillars of higher education, by lecturers involving their students.

Agrotourism is a type of tourism that uses agricultural products, livestock, and plantations as tourist attractions. According to Sznajder, Pzezborska, and Scrimgeour in Kristiana and Stephanie (2016), agritourism can be implemented through traditional and modern agritourism. Traditional agrotourism only offers tour packages to enjoy natural resources in agricultural areas, resulting in farmers receiving only a small additional income. Farmers take more initiative in modern agrotourism to provide agricultural products to maximize their extra income. The development of agro-tourism in the rice-fish farming area in Bantul Regency can be enhanced by:

1) Creating tourism in the rice-fish farming area by arranging the environment aesthetically, equipped with fresh fish holding tanks so visitors can buy fresh fish directly on-site.
2) Expanding the tourism area near the rice-fish farming area, considering that the surroundings have a river with beautiful scenery that can be utilized as a tourist destination.
3) Developing educational tourism within the rice-fish farming area by providing visitors with education about rice-fish farming techniques. Edu-tourism can also be carried out by teaching visitors how to make processed fish products such as nuggets, fish crackers, and fish skin chips.

The development of agro-tourism can be enhanced by supporting local institutions such as village heads, district heads, the local Marine and Fisheries Office, the Ministry of Marine Affairs and Fisheries, and universities in Yogyakarta. Collaboration is carried out to determine strategies for developing agro-tourism, socialization regarding the management and development of agro-tourism, increasing active community participation, and developing partnership networks with tourism industry players, promotional media, and others.

E. Establishing cooperation with regional financial institutions and the Marine and Fisheries Business Capital Management Agency (LPMUKP) for further capital funding. (verses AS: 6,596)

The fifth strategy for developing rice-fish farming in Bantul Regency is establishing partnerships with financial institutions for additional capital in implementing the rice-fish farming system, with an attractive score of 6.596. Capital addition can be done by utilizing the Marine and Fisheries Business Capital Management Agency (LPMUKP) established by the Ministry of Marine Affairs and Fisheries to facilitate financing for the fishing and marine community. In accessing capital from LPMUKP, farmer groups can be assisted by fisheries extension workers who are accustomed to supporting farmers' activities.

In addition to LPMUKP, capital can be sought through non-governmental organizations or private companies willing to provide loans for fish farming facilities, such as feed factories or feed agents willing to collaborate by supplying fish feed to be paid for after the farmer's harvest. In addition, it can take advantage of non-governmental organizations in Yogyakarta that can assist farmers in providing additional capital, namely Dompet Dhuafa. Dompet Dhuafa is a non-profit organization owned by the Indonesian community that operates in social and religious outreach, culture, economy, education, and health. Dompet Dhuafa can support farmers' financing through a grant system in the economic sector.

F. Adding new services to increase product prices for customers.

This strategy aims to generate more income for farmers by adding value to their products. This can be achieved by selling cleaned fish or fish that has been seasoned for consumer convenience and creating fish-based products such as nuggets, fish crackers, and fish skin chips. Additional services can be offered to increase farmers' earnings, such as delivering aquaculture products directly to consumers, thereby providing greater assistance.

5. Conclusion

1. The results of the feasibility analysis of the rice-fish farming business, which consists of a Net Present Value (NPV) of Rp 362,294,650, an R/C Ratio of 2.02, and a payback period of 5.33 months, indicate that the rice-fish farming system is a promising venture for development. Based on the feasibility analysis of the business, the rice-fish farming system is a more prospective method of rice cultivation than conventional rice farming.
2. The internal factor that significantly influences the development of rice-fish farming is the system that generates higher income and profits but requires greater capital, and some farmers are sharecroppers. The most influential external factors are stable selling prices and markets for rice-fish products, intensive support from extension workers, policies for assistance in rice-fish infrastructure, and the strategic location of rice-fish farming.
3. Strategies that can be implemented for the development of paddy rice fields in Bantul Regency are:
   a) Strengthening the behavior of rice farmers towards paddy rice fields , increasing farmers' motivation through continuous extension support and appropriate policy and technology guidance from policymakers.
   b) Improving fence design to minimize pest attacks.
   c) Utilizing mediators (extension workers/local agencies) to align perceptions or negotiate between tenant farmers and landowners.
   d) Developing paddy rice fields areas as ecotourism with the guidance of extension workers through collaboration with universities.
   e) Establishing partnerships with financial institutions for further capital.
   f) Adding new services to enhance product prices for customers.

References

Ahmadian, I., Ayi, Y., Yuli, A, 2021. Produktivitas Budidaya Sistem Minapadi untuk Meningkatkan Ketahanan Pangan Di Indonesia: Review. Jurnal Akuatek. 2 (1), 1-6.

Azwar,T.S., Trisna, I.N., Ernah, E, 2019. Analisis Efisiensi Usahatani Padi Sawah Lahan Rawa di Kabupaten Ciamis (Suatu Kasus di Kecamatan Lakbok Kabupaten Ciamis). Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis. 5(2), 276-292.

Darmawan, F.W., Chumaidiyah, E., Sagita, B.H, 2018. Analisis Kelayakan Revitalisasi Pasar Tradisional

Banjaran Kabupaten Bandung Menggunakan Container Bekas dengan Indikator Benefit Cost Ratio, Payback Period, dan Net Present Value. E-Proceeding of Engineering, 5(2), 2489-2494.

David, F.R., & David, F.R. 2017. Strategic Management, A Competitive Advantage Approach Concepts and Cases. Sixteenth Edition.Perarson Education Limited Edition. England.

Dewandini, S.K.R, 2020. Reson Petani Terhadap Penerapan Minapadi di Kecamatan Seyegan Kabupaten Sleman. Jurnal Ekonomi Pertanian dan Agribisnis Universitas Janabadra (JEPA), 4 (1), 133-144.

Dey, A., Sarma, K., Kumar, U., Mohanty, S., dan Kumar, T, 2019. Prospects of rice-fish farming system for low lying areas in Bihar, India. Organic Agriculture 9, 99–106.

Giatman, M., 2017. Ekonomi Teknik. Jakarta. Rajawali Pers.

Hajar, I., Amabar, S., Hari, P., 2019. Analisis Pendapatan Usaha Tani Tebu (Studi Kasus di Desa Munung Kecamatan Jatikalen Kabupaten Nganjuk. Agrosaintifikas: Jurnal Ilmu-Ilmu Pertanian, 1 (2), 51-57.

Husnan, S., dan Muhamad, S., 2000. Studi Kelayakan Proyek (Edisi keempat). Yogyakarta. AMP YKPN.

Ilahi, M.K., Sri W., Yusri, U, (2019). Analisis Perbandingan Pendapatan dan keuntungan Usaha Tani Minapadi dengan Padi Konvensional di Nagari Talang Maur Kecamatan Mungka Kabupaten Lima Puluh Kota. Jurnal of Socio Economic on Tropical Agriculture, 1 (1), 18-27.

Jumingan, 2011. Studi Kelayakan Bisnis. Teori dan Pemahaman Proposal Kelayakan. Jakarta. PT. Bumi Aksara.

Kadariah., Karlina, L., Gray, C., 1999. Pengantar Evaluasi Proyek. Jakarta.Lembaga Penerbit Fakultas Ekonomi Universitas Indonesia.

Kementerian Pertanian, 2022. Analisis PDB Sektor Pertanian 2022. Pusat Data dan Informasi Pertanian.

Kriska, M., Harsoyo, Rezki, P.S., Novam, T.W.P., Yenni, K., 2022. Keberlanjutan Usaha Tani Mina Padi Di Kalurahan Sumberagung Kapanewon Moyudan Daerah Istimewa Yogyakarta. Jurnal Sosial Ekonomi Pertanian dan Agribisnis, 18 (2), 225–232.

Kristiana, Y., dan Stephanie, TM., 2016. Strategi Upaya Pengembangan Pariwisata Berkelanjutan Agrowisata Berbasis Masyarakat Kampung Doma Terpadu Jugut, provinsi Banten. Jurnal Ilmiah Widya,3,166-172.

Malika, U.E., Tejasari., dan Evita, S.H., 2012. Perumusan Strategi Peningkatan Mutu Teknik Produksi Ikan Gurame (Osphronemus gouramy) berdasarkan Metode Force Field Analisys (FFA). Jurnal Sosial Ekonomi Pertanian Universitas Jember. Vol. 6 (1). 1-6.

Mishra, A., James, B.K., dan Anand, O.S.B., 2014. Conservation ang Efficient Utilization of Rainwater in the Rainfed Shallow Lowland Paddy Field of Estern India. Paddy and Water Environment Journal, 12, 25-34.

Nabi, R., 2008. Constraints to The Adoption of Rice-Fish Farming by Smallholders in Bangladesh: a Farming Systems Analysis. Aquaculture Economis & Management. 12(2), 145-153.

Nugroho, R.J., Indra, N.R., 2021. Analisis Pendapatan dan Kelayakan Hasil Usahatani Padi Sawah di Desa Mrentul Kecamatan Bonorowo Kabupaten Kebumen. Jurnal Kridatama Sains dan Teknologi, 03 (01), 2685-6921.

Nurhayati, A., Walim, L., Titin, H., Indah, R., 2016. Derivatif Analysis of Economic and Social Aspect of Added Value Mina padi (Paddy-Fish Integrative Farming) a Case Study in the Village of Sagaracipta Ciparay Sub District, Bandung West Java Province, Indonesia. Aquatic Procedia. 7, 12-18.

Nur'aini, F., 2019. The Guide Book of SWOT. Mengelola dan Memanfaatkan Kekuatan, Ancaman dan Kelemahan secara Efektif dan Efisien. Yogyakarta. Quadrant.

Prasetyo, M.N., Slamet, H., Masyhuri, 2018. The Analysis of Business, Risk and Development Strategy of Minapadi (Paddy-Fish Integration Farming System) in Sleman District. Agro Ekonomi. 29 (1), 64-82.

Prastyo, D., Kartika, I.N., 2017. Analisis Faktor-Faktor Yang Mempengaruhi Produksi Ayam Boiler Kecamatan Marga Kabupaten Tabanan. Jurusan Ekonomi Pembangunan Fakultas Ekonomi dan Bisnis Univesitas Udayana PIRAMIDA. XIII (2), 77–86.

Rangkuti, F., 2000. Analisis SWOT Teknik Membedah Kasus Bisnis. Jakarta. PT. Gramedia Pustaka Utama.

Sathoria, P., dan Roy, B, (2022). Sustainable Food Production through Integrated Rice-Fish farming in India: a brief review. Cambridge University Press. 527-535

Setiawan, H., 2019. Peningkatan Produksi Petani Melalui Budidaya Mina Padi untuk Mewujudkan Ketahanan Pangan di Kabupaten Sleman. Yogyajkarta. Universitas Muhammadiyah Yogyakarta.

Sudiarta,,I.M., Elkawakib, S, Rajuddin, S., 2016. Pertumbuhan Produksi Tananam Padi serta Produksi Ikan Nila pada Sistem Tanam Jajar Legowo. J. Sains dan Teknologi, 16 (1):70-80.

Sukri, M. dan Suwandi, 2016. Kelompok Tani Program Intensifikasi Sistem Minapadi (Insismidi). Jurnal Pengabdian Masyarakat J-Dinamika. 1(1), 53-59.

Sularno, S., & Sodik, J., 2014. Peluang usaha melalui agribisnis mina padi untuk meningkatkan pendapatan

petani. SEPA: Jurnal Sosial Ekonomi Pertanian dan Agribisnis, 10(2), 268–274.

Syarifudin, A., 2019. Bantul Masih Kekurangan Produksi Ikan. Diambil 2 Desember 2020, dari situs: https://jogja.tribunnews.com/2019/09/01/bantul-masih-kekurangan-produksi-ikan.

Wardono, B., Ririk, R., dan Tajerin, 2017. Analisis Resiko Usaha Pakan Mandiri. Jurnal Sosial Ekonomi Kelautan dan perikanan, 2 (2): 16