The prospect of sea cucumber (Holothuroidea sp) agribusiness development in south Sulawesi Province

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Abstract. Sea Cucumber (Holothuroidea sp) is one of the fisheries commodities that has good prospects to be developed because of its high economic value and potentially promising market demand both in the local and international markets. Data from the Ministry of Maritime Affairs and Fisheries throughout 2012-2016 shows the trend of sea cucumber exports has increased from 900-2000 tons/year. As for China, Singapore and Taiwan remain the main customers. Demand for sea cucumbers, especially for exports, has increased every year so that fishing and hunting in the sea take place more intensively causing a decrease in catches from the sea. Sea cucumbers can be processed into food and traded in various forms in the form of: food supplement products, cosmetic products, and medicinal products which are efficacious for the treatment of various diseases. In the Province, many are engaged in sea cucumbers by implementing the agribusiness system which is not yet optimal. The influence of internal and external factors and the need for sea cucumber development strategies. This study aims to determine the level of financial feasibility, the influence of internal and external factors, sea cucumber agribusiness development strategies. The study was conducted in South Sulawesi Province with locations in Barrang Lompo, Takalar, and Selayar, using survey methods with data collection techniques through direct observation, interviews and observations. Data were then analyzed using financial feasibility analysis, SWOT analysis, and QSPM analysis. The results showed that sea cucumber business is feasible to run, internal factors (strengths: high sea cucumber prices, weaknesses: use of fishing gear not in accordance with work safety standards) and external factors (high market potential opportunities, threats limited stock), Sea Cucumber has good prospects going forward with the Cultivation strategy, the application of processing technology, Optimizing business and market potential, Increasing capital cooperation.

1. Introduction

Indonesia is one of the countries that are rich in sea cucumbers and the biggest producer of sea cucumbers in the world [1]. Based on data from the UN Food and Agriculture Agency (FAO) in year 2000 Indonesia was the largest producer of sea cucumbers in the world (around 2,500 tons) there are 32 species of sea cucumbers. Sea cucumbers can be processed into food and traded in various forms in the form of: food supplement products, cosmetic products and medicinal products which are efficacious for the treatment of various diseases as shown as figure 1.
Figure 1. Diagram of sea cucumber exports per year.

Data from the Ministry of Maritime Affairs and Fisheries throughout in year 2012-2016 shows the trend of sea cucumber exports has increased from 900-2,000 tons/year. As for China, Singapore and Taiwan remain the main customers. Demand for sea cucumbers, especially for exports, has increased every year so that fishing and hunting in the sea take place more intensively causing a decrease in catches from the sea [2].

Sea cucumber fishery commodity has good prospect and high economic value, both in local and international markets. This type of biota is known as the sea cucumber, suala, sea cucumber (English), beche de-mer (French), in international market terms known as the teat fish. Based on the results of the study, high nutrient content of sea cucumbers, namely in dry conditions consisting of 82% protein, 1.7% fat, 8.9% moisture content, 8.6% ash content, and 4.8% carbohydrate. This is what makes sea cucumbers high-selling value [3].

In South Sulawesi, sea cucumber prices range from Rp150,000 / kg to IDR 2,300,000 / kg (8,1). Sea cucumbers have been traded and exported to China since the 17th century. Sea cucumber hunting by Bugis Makassar sailors in Northern Australia has been going on since the 17th century and ended in 1910. After that, the area of its fishing operations only covered the waters of South Sulawesi and its surroundings. The decline in sea cucumber production is due to the fact that the population in nature is decreasing so that it is not proportional to the increasing price and demand of export markets. To meet the export market, one of the paths taken by entrepreneurs in South Sulawesi is to catch on the high seas by diving using sophisticated equipment or by using mini trawling net fishing gear [4].

In the Province South Sulawesi with location in Barrang Lompo, Takalar and Selayar, there are many who are engaged in sea cucumbers by implementing the agribusiness system which is not yet optimal. The influence of internal and external factors and the need for sea cucumber development strategies. Research Objectives are (1) Analyzing the financial feasibility of developing sea cucumber agribusiness, (2) Analyzing internal and external factors that influence the development of sea cucumber agribusiness and (3) Analyzing the strategy of developing sea cucumber (Holothuroidea sp) agribusiness in South Sulawesi Province.

2. Methodology
This research was conducted in South Sulawesi Province, located in Barrang Lompo, Takalar and Selayar about the prospects for the development of sea cucumber agribusiness carried out from June-September 2019. This study examines:

2.1. Descriptive analysis to examine agribusiness processes and The influence of internal and external factors to determine the effect of internal and external factors using SWOT analysis
* and use Quantitative Strategies Planning Matrix (QSPM) analysis to find out alternative strategies that can be done to develop sea cucumbers to have good prospects in the future in South Sulawesi

2.2. Quantitative analysis is used to calculate business feasibility Sea Cucumbers
The financial feasibility of sea cucumber business is to determine the level of sea cucumber business feasibility. Data analysis methods used are Net Present Value (NPV), Internal Rate of Return (IRR), Net Benefit Cost Ratio (Net B / C Ratio) and Payback Period (PP). Net Present Value (NPV) is the difference between revenue and expenditure that has been present right, is formulated:

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

With the criteria if NPV > 0, the business is feasible to run [5] IRR is an interest rate that shows a project's ability to produce a level of profit that can be achieved, formulated:

$$IRR = i_1 + \frac{NPV_1}{(NPV_1 - NPV_2) \times (i_2 - i_1)}$$

With the criteria if the IRR is greater than the applicable bank interest rate (IRR > DR), the business is feasible [6]. Net B / C aims to find out how much profit compared to expenses during the economic life of the project, formulated [7], namely:

$$\frac{\sum_{t=1}^{n} B_t - C_t}{\sum_{t=1}^{n} (1+i)^t} = \begin{cases} 0, & \text{if } B_t - C_t > 0 \\ 1, & \text{if } B_t - C_t < 0 \end{cases}$$

if Net B / C > 1, the business is feasible.

Payback Period is the period of time needed to return all costs incurred, formulated (16), namely:

Payback period = $L \times 1$ year

With criteria, a business is feasible to run if the business PP is not too near to the end / longer than the age of the business
3. Result and Discussion

3.1. Descriptive Analysis

3.1.1. Subsystem Agribusiness Sea Cucumber in South Sulawesi Province.

- upstream subsystem: capture procure raw materials
- edification subsystem: salting, cleaning, cooking, drying
- downstream subsystem: packaging use box and transportation with truck
- marketing subsystem: sell to large companies and exporters to China, Hongkong, Malaysia, Thailand
- supporting facilities and services subsystem: government support and capital from financial institutions

3.1.2. Strengths weaknesses opportunities threats (SWOT). Matrix The SWOT is matrix illustrates the relationship between power and weaknesses that are owned by adjusting opportunities and threats faced in the development of sea cucumber business in the province of South Sulawesi. This matrix aims to get some alternative strategies used on sea cucumber business development in the area.

Table 1. Matriks internal strategic factors analysis summary (IFAS).

| Internal factor | Weight | Rating | Score |
|----------------|--------|--------|-------|
| **Strengths** | | | |
| Sea cucumber fishing business is profitable | 0.16 | 4 | 0.63 |
| High sea motivation | 0.06 | 3 | 0.19 |
| The availability of sea cucumber resources | 0.25 | 4 | 0.99 |
| **Weakness** | | | |
| Fishing gear not in accordance with standards | 0.10 | 2 | 0.18 |
| Weak utilization of capital assistance | 0.24 | 2 | 0.48 |
| The quality of human resources is still low | 0.19 | 2 | 0.27 |
| **Total** | 1 | | 2.74 |

Based on the table 1 it is known that the total IFAS score of 2.74. This value is above the average value of 2.5. It can be said that the internal conditions in the sea cucumber fisheries in South Sulawesi Province are dominated by forces that can encourage the development of sea cucumber business.

Table 2. Matriks eksternal strategic factors analysis summary (EFAS).

| Eksternal Factor | Weight | Rating | Score |
|-----------------|--------|--------|-------|
| **Opportunity** | | | |
| High market potential | 0.33 | 4 | 1.33 |
| Komoditas eksport yang potensial | 0.11 | 3 | 0.33 |
| Potential export commodities | 0.06 | 3 | 0.17 |
| **Threat** | | | |
| There is no accurate record of the catch of sea cucumbers each year | 0.23 | 2 | 0.47 |
| Product marketing competition | 0.12 | 1 | 0.12 |
| Lack of stock at sea | 0.14 | 2 | 0.28 |
| **Total** | 1 | | 2.7 |
The total EFAS score is 2.7. This total value exceeds the average limit value of 2.5 which means that the business of sea cucumber capture is able to respond to external factors that exist, because of the greater opportunity in developing sea cucumber business.

3.1.3. Development strategy priorities. Ranking strategies for obtaining priority lists are done with using a quantitative strategy planning matrix (QSPM) technique. This technique intended to show the best alternative strategy in development of sea cucumber fisheries in the south Sulawesi Province.

**Table 3.** Matriks SWOT Sea Cucumber fisheries business development.

| EFAS/IFAS | EFAS STRENGTHS (S) | WEAKNESSES (W) |
|-----------|--------------------|----------------|
|           | Sea cucumber fishing business profitable | Use of tools arrest yet according to the standard work safety |
|           | Fishermen’s fishing motivation is high | Weak utilization capital assistance from government and banks by fishermen |
|           | Availability of resources sea cucumber | • HR quality still low |

| Opportunities (O) | SO STRATEGY | WO STRATEGY |
|-------------------|-------------|-------------|
| High market potential | Optimize effort and sea cucumber commodity market potential (I) | Improved quality SDM (II) |
| Export commodities are potential | | Increase cooperation with banks and government related capital assistance (III) |
| Job opportunities in the field of fisheries | | |

| THREATS (T) | ST STRATEGY | WT STRATEGY |
|-------------|-------------|-------------|
| The state of the environment in Thousand Islands prone disaster | Program restocking teripang (IV) | Supervision of activities sea cucumber fishery business (V) |
| There are no accurate records regarding the catch sea cucumbers every year | | |
| Marketing competition product | | |
Table 4. Matriks quantitative strategic planning management (QSPM).

| Factor | Weight | Alternative strategies |
|--------|--------|------------------------|
|        |        | I  | II  | III | IV  | V   |
|        |        | AS | TAS | AS  | TAS | AS  | TAS | AS  | TAS |
| S      |        |    |     |     |     |     |     |     |     |
| S1     | 0.16   | 4  | 0.64| 1   | 0.16| 4   | 0.64| 1   | 0.16|
| S2     | 0.06   | 2  | 0.12| 2   | 0.24| 2   | 0.12| 1   | 0.06|
| S3     | 0.25   | 3  | 0.75| 3   | 0.50| 2   | 0.50| 3   | 0.75|
| S4     | 0.03   | 1  | 0.03| 4   | 0.06| 1   | 0.03| 1   | 0.03|
| W      |        |    |     |     |     |     |     |     |     |
| W1     | 0.07   | 2  | 0.14| 3   | 0.21| 2   | 0.14| 2   | 0.14|
| W2     | 0.24   | 4  | 0.96| 2   | 0.48| 4   | 0.96| 2   | 0.48|
| W3     | 0.13   | 3  | 0.39| 4   | 0.52| 3   | 0.39| 2   | 0.26|
| W4     | 0.06   | 1  | 0.06| 1   | 0.06| 1   | 0.06| 1   | 0.06|
| O      |        |    |     |     |     |     |     |     |     |
| O1     | 0.33   | 3  | 0.99| 2   | 0.66| 2   | 0.66| 1   | 0.33|
| O2     | 0.11   | 4  | 0.44| 2   | 0.22| 2   | 0.22| 2   | 0.22|
| O3     | 0.06   | 2  | 0.12| 3   | 0.18| 3   | 0.18| 2   | 0.12|
| T      |        |    |     |     |     |     |     |     |     |
| T1     | 0.07   | 1  | 0.07| 2   | 0.14| 1   | 0.07| 1   | 0.07|
| T2     | 0.23   | 2  | 0.46| 3   | 0.69| 1   | 0.23| 3   | 0.69|
| T3     | 0.05   | 3  | 0.15| 1   | 0.05| 2   | 0.10| 1   | 0.05|
| T4     | 0.14   | 1  | 0.14| 3   | 0.42| 1   | 0.14| 3   | 0.42|
| Total  |        | 5.46 | 4.59 | 4.44 | 3.84 | 4.21 |

Based on the SWOT analysis carried out through consideration of internal and external factors, several development strategies were obtained, in which later in determining the priority of implementation determined through the QSPM matrix with the results:

1. Optimizing the business and potential market
2. Increasing cooperation with banks and the government
3. Restocking or cultivation
4. Even though the current sea cucumber business activities still produce large profits, but the sea cucumber restocking program needs to be done for the sake of sea cucumber sustainability and business sustainability.
3.2. Business Feasibility Aspects

3.2.1. Analysis of sea cucumber business.

| Season in a year | trips |
|------------------|-------|
| Top season       | 8     |
| Usual season     | 4     |

| Information              | Amount   |
|--------------------------|----------|
| A. Investation           |          |
| 1 shell (techinal old 8 years) | 25,000,000 |
| 2 point of machine (techinal old 5 years) | 2,500,000 |
| 3 additional machine (techinal old 5 years) | 2,500,000 |
| 4 petromaks lamp 5 (techinal old 2 years) | 1,050,000 |
| 5 masks (techinal old 2 years) | 750,000 |
| 6 flashlight sea 3 (techinal old 3 years) | 1,500,000 |
| 7 compressor (techinal old 3 years) | 3,000,000 |
| 8 regulator+ masks 3 pairs (techinal old 3 years) | 2,250,000 |
| 9 hoses 100 m (techinal old 2 techinal old) | 2,500,000 |
| 10 cooking tools (techinal old 3 techinal old) | 600,000 |
| **Total Investation**    | 41,650,000 |

B. costs

|                  | Amount   |
|------------------|----------|
| 1 care of shell 3 x 300,000 | 1,200,000 |
| 2 care of machine 3 x 200,000 | 1,600,000 |
| 3 care of additional machine 3 x 200,000 | 1,600,000 |
| 4 care of help tools 2 x 100,000 | 600,000 |
| 5 shrinkage of shell | 3,125,000 |
| 6 shrinkage of machine | 500,000 |
| 7 shrinkage of additional machine | 500,000 |
| 8 shrinkage of petromaks lamp | 525,000 |
| 9 shrinkage of mask | 375,000 |
| 10 shrinkage of flashlight | 500,000 |
| 11 shrinkage of compressor | 1,000,000 |
| 12 shrinkage of regulator + mask | 750,000 |
| 13 shrinkage of hose | 1,250,000 |
| 14 shrinkage of cooking tool | 200,000 |
| **Total costs**     | 13,725,000 |

C. Variable Cost

|                         | Amount   |
|-------------------------|----------|
| 1 rations and fuel in a year | 30,000,000 |
| 2 the cost of sent sea cucumber in a year | 1,200,000 |
| **Total variable cost** | 31,200,000 |
| **Total costs**         | 44,925,000 |

3.2.2. Investment capital. Investment capital is the expenditure or capital used to run a capture fisheries business. In the business undertaken, total business investment is IDR 4150,000. This capital is used for
ship investment of IDR 25,000,000, 2 machines with 23 PK strength of IDR 2,500,000 each, and in fishing aids such as 5 petromax lamps in the amount of IDR 1,050,000 each, 5 pieces of masks amounting to Rp750,000, 3 marine flashlights amounting to IDR 1,500,000 each, compressors IDR 3,000,000, regulators and masks 3 pairs of IDR 750,000, intervals of 100 m IDR 2,500,000, and cooking equipment IDR 600,000. Investment can be seen in Appendix 5.

3.2.3. Business costs. Business costs are costs incurred to carry out fishing operations. The total costs incurred amounted to IDR 44,725,000, consisting of fixed costs and variable costs. Fixed costs are costs that must be incurred and a fixed amount. The use of these costs is for ship maintenance, engine maintenance, ship depreciation, engine depreciation, petromax lamp depreciation, glasses depreciation, cooker shrinkage, and cooking equipment depreciation. Variable costs or also called variable costs are costs incurred when carrying out arrest operations and the amount can change according to operational needs of capture. Use this fee to buy fuel, oil, fisherman or ration consumption, the cost of shipping goods, and revenue sharing.

3.2.4. Business revenues. Business revenues are the results obtained from fishing operations. The amount of revenue obtained from the sale of catches for 1 year is IDR 321,350,000. Business revenue is obtained from 2 seasons, namely the torch season and the medium season. The total revenue in the torch season is IDR 209,150,000 with a total production of 429 kg in the form of dried sea cucumbers. Total revenue in the medium season is IDR 112,200,000 with a total production of 219 kg in the form of dried sea cucumbers.

3.2.5. Business Analysis. Based on the calculation, it is known that the profit obtained by the business owner is IDR 78,405,000 which is greater than the total cost. The R / C value of 1.32 shows that the business done is profitable. The period or time needed to cover investments or PPs worth 6.37 months. This PP value is lower than the maximum technical life of 8 years. ROI analysis results show a value of 188%, which means that every rupiah invested in the sea cucumber fishery business will provide a profit of Rp. 188. Calculation of business analysis can be seen in Appendix 5.

4. Conclusion

In the business feasibility analysis, the benefits obtained are IDR 78,405,000, the value of revenue-cost ratio (R / C) of 1.32. Capital return or payback period (PP) for 6.37 months, and return on investment (ROI) 188%. Fishing business sea cucumber is feasible to be developed. Internal factors (strengths: high sea cucumber prices, weaknesses: use of fishing gear not in accordance with work safety standards) and external factors (high market potential opportunities, threats limited stock). Sea Cucumber has good prospects going forward with the Cultivation strategy, the application of processing technology, Optimizing business and market potential, Increasing capital cooperation.

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