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Cultivation Development Vaname Shrimp (*Litopenaeus Vannamei*) in Randangan District

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Abstract: This study aims to determine the appropriate policy in the use of pond land for vaname shrimp (*Litopenaeus vannamei*) cultivation. The method used in this research is using Process Hierarchy Analysis (AHP). The results showed that the sequence of strategic plans for the development of vaname shrimp (*Litopenaeus vannamei*) in Randangan District was the availability of human resources with a value of (0.489), venture capital loans (0.235), infrastructure (0.111), market demand (0.094), and suitability of cultivated land (0.071).

Keywords: Development, white shrimp, and policy.

INTRODUCTION

Aquaculture business has long been developed by the community, especially those who have potential of public waters such as in various regions in Indonesia. They develop various types and businesses of aquaculture, including aquaculture with an area of 667,083 ha in 2014 (KKP, 2015). Pond aquaculture business is an activity that utilizes coastal areas that are able to provide a large enough contribution to people's income coastal areas, job providers, and potential foreign exchange earners. Gorontalo Province is one of the provinces with a quite promising fishery sector, especially in Pohuwato Regency, in this case Pohuwato Regency, is used as a fishery production center (Athirah et al., 2012).

Pohuwato Regency is one of the regencies in Gorontalo Province whose fisheries sector is quite promising to be cultivated and developed. Aquaculture that has been cultivated in Pohuwato Regency is pond cultivation, cage cultivation, marine cultivation, and pond cultivation.

Aquaculture in Pohuwato Regency is found in several sub-districts including Paguat, Marisa, Randangan, Lemito, and Popayato sub-districts. According to Bahsoan et al., (2014), in Randangan sub-district, especially Patuhu village, it has a pond area of 555.15 ha, and Siduwonge village has a pond area.182.13 Ha.

The problem faced by pond cultivators is that the ponds in Randangan District have relatively low productivity. The cause of this decline in production is triggered by many factors, including a decrease in environmental quality, as well as ignoring aspects of land suitability. To maintain production levels and ensure the development of a better aquaculture business.

RESEARCH METHODS

This research was conducted in Randangan District, Pohuwato Regency, in 2 (two) villages, namely Patuhu Village and Siduwonge Village from February to May 2022.

Process Hierarchy Analysis (AHP)

Analysis of the Analytical Hierarchy Process (AHP) was carried out to determine the priority of analytical tools in determining superior aquaculture commodities and to determine the priority of supporting parameters for land suitability. The sampling method used is purposive sampling, with the criteria of respondents being those who are experts, know and are directly involved in the field of aquaculture. The respondent's criteria are intended so that the answers obtained can reflect more realistic conditions in determining superior commodities and land suitability for aquaculture development.

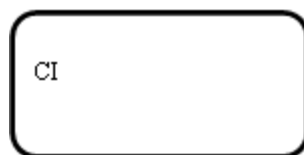
The AHP approach uses the Saaty scale (1993), ranging from weight values 1 to 9. The Saaty scale can be seen in Table 1. below.

Table 1. Value of Importance Scale and Its Explanation for AHP Analysis

Level interest	Definition	Explanation
1	Both elements are equally important	Two elements have the same great influence on the goal
3	One element is slightly more important than the other	Experience and judgment slightly favor one element over the other
5	One element is more important than the other elements	Experience and judgment strongly favor one element over another
7	One element is clearly more important than the other elements	One element strongly supported and dominant is seen in practice
9	One element is absolutely more important than the other elements	Evidence in favor of one element against other elements has the highest level of affirmation that might amplify
2, 4, 6, 8	The values between two adjacent value considerations	This value is given when there are two compromises between the two options
opposite	If for activity i gets one point when compared to activity j, then j has the opposite value when compared to i	

Source: Saaty, (1993)

In the multi-criteria analysis, qualitative criteria are also taken into account that allow for inconsistency in the assessment of the comparison of criteria or alternatives. One way of measuring consistency is proposed by Saaty through a consistency index (CI), which is defined as follows:



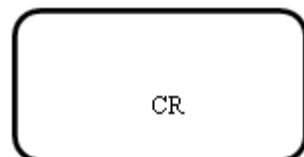
(Walangare et al., 2012)

Information:

CI : consistency index

maximum : the largest eigenvalue of matrix order n : number of criteria

Calculating the Consistency Ratio (CR) according to Walangare et al., (2012).



Where the Random Index (RI) value is based on Saaty's calculation, it can be seen in Table 2 below.

Table 2. Random Index Value

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Score RI	0.00	0.00	0.50	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57	1.59

DISCUSSION RESULT

Overview of Research Sites

Randangan District is one of 13 sub-districts in Pohuwato Regency. This sub-district is bordered by Wanggarasi and Taluditi sub-districts in the north, Patilanggio sub-district in the east, Teluk Tomini in the south and Wanggarasi sub-district in the west.

Randangan sub-district has an area of about 331.18 km². The village with the largest area is Imbodu Village and the smallest area is Patuhu Village (BPS, 2016).

Most of Randangan District consists of plains, low hills and highlands, while the topography is dominated by a slope of 10–400. Soil conditions that often experience erosion, soil movement and flooding. The slope of the land in Randangan District consists of 0-8%, 0-14% and 0-40%.

Process Hierarchy Analysis

Based on the results of the analysis of several dimensions of the hierarchical process analysis made, values are obtained that can indicate policy priorities that can be used for the development of vaname shrimp cultivation in Randangan District. The focal dimension is the development of vaname shrimp (*Litopenaeus vannamei*) cultivation in Randangan District. This dimension is an aspect that is considered to be able to provide positive sustainability in vaname shrimp cultivation in Randangan District.

The factor dimension is a detailed description that is relevant to the problem of developing vaname shrimp culture, there are five attributes used, namely: (1) Availability of human resources, (2) Business capital loans, (3) Infrastructure, (4) Market demand, and (5) Cultivation land suitability. Based on the results of the process hierarchy analysis (AHP), related to the strategy for developing white shrimp (*Litopenaeus vannamei*) cultivation in Randangan District, it can be seen in Table 3. below.

Table 3. Matrix of priority factors in achieving the development of vaname shrimp culture in Randangan District

Factor	Weight	Priority
HR Availability	0.489	P1
Business capital loan	0.235	P2
Infrastructure	0.111	P3
Market demand	0.094	P4
Cultivation land suitability	0.071	P5
CI/Consistency index	0.063	

Source: Processed primary data, 2022

Based on Table 3. above, it explains that for the development of vaname shrimp culture in Randangan District, the strategy that needs to be carried out successively is the availability of human resources with a value of (0.489), venture capital loans (0.235), infrastructure (0.111), market demand (0.094), and suitability of cultivated land (0.071).

Availability of Human Resources

The main priority to achieve the sustainable development of vaname shrimp culture is how to increase the availability of human resources (quality of knowledge) in each activity of using this aquaculture. This main priority is reasonable, because the knowledge of cultivators in the Randangan sub-district on vaname shrimp cultivation shows a condition that is far from expectations to obtain vaname shrimp production in a sustainable manner, where there are still people with low levels of education. Based on data from BPS (2016), the elementary school education level is 94.54%, while for the junior high school level it is 78.39%, and for the high school level it is 69.75%. This low level of education causes cultivation technology information to be slowly absorbed by the public.

Development through increasing the availability of human resources has priority targets, namely improving the quality of human resources (PKSDM) and increasing employment and business opportunities (PKKB). The target is a process of change, in which the policy direction for the development of vaname shrimp cultivation is expected to increase added value, efficiency and a highly competitive production scale. From the results of the paired attribute comparison matrix analysis, it is obtained sequentially the priority values of policies towards targets for vaname shrimp cultivation, namely improving the quality of human resources (PKSDM) with a value of (0.584), increasing employment and business opportunities (PKKB) with a value of (0.151), This is because most of the cultivators are still in a state of low knowledge of Randangan about vaname shrimp cultivation, showing conditions that are far from expectations to get vaname shrimp production in a sustainable manner, where there are still people with low levels of education. Based on data from BPS (2016), the elementary school education level is 94.54%, while for the junior high school level it is 78.39%, and for the high school level it is 69.75%. This low level of education This causes information on cultivation technology to be slowly absorbed by the public.

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business opportunities (PKKB) with a value of (0.151). This is because most cultivators are still in a state of low knowledge about the development of vaname shrimp culture.

According to Oktindar (2015), the social dimension is considered to be of little importance (0.060) to be considered in sustainable management. This aspect of the social dimension relates to the absorption of labor and human resources in the pond production area. For the priority of social aspects, the most important are labor absorption (CAR) with a level of importance (0.591), and human resources (HR) with a level of importance (0.409).

According to Pariakan (2012), from the results of the paired attribute comparison matrix analysis, it is obtained sequentially the value of policy priorities against targets for *K. alvarezii* cultivation, namely improving the quality of human resources (PKSDM) with a value of (0.232), then followed by an increase in employment and business opportunities (PKKB).) with a value of (0.116).

Business Capital Loan

The results of the respondent's analysis show that business capital is used to increase the income of farmers (PPP) with a value of (0.508), and to build cultivation facilities and infrastructure (MSPB) with a value of (0.257). That in order to achieve an increase in the income of farmers in vaname shrimp cultivation, it can be achieved by providing a revolving capital loan/soft credit (MPMBKL) with a value of (0.235), by an institution formed for the development of white vannamei shrimp cultivation. private sector, non-governmental organizations and cultivators are indispensable in building/establishing cooperatives aimed at the accessibility of soft credit capital that is profitable for groups of vaname shrimp cultivators. Furthermore, with the provision of revolving capital loans / soft loans,

According to Pariakan (2012), the results of the respondent's analysis show that business capital is used for PKB (increasing the success of cultivation) with a value of (0.079), and PKKB (increasing employment and business opportunities) with a value of (0.079). The demand to achieve increased employment and business opportunities in the cultivation of *K. alvarezii* can be achieved by providing a revolving capital loan/soft credit (MPMB/KL) with a value of (0.043), by the institution established for the development of *K. alvarezii* cultivation. the government in collaboration with the private sector, non-governmental organizations and cultivators is indispensable in building/establishing a *K. alvarezii* cooperative with a function to facilitate access to soft credit capital that is profitable for the *K. alvarezii* cultivator group. However,

Infrastructure

The level of potential utilization of aquaculture areas for vaname shrimp cultivation is still low, one of the reasons is the availability of infrastructure, such as transportation, feed, hatchery and maintenance facilities and infrastructure. This condition causes cultivators to be less able to produce better products. To respond to this, it is necessary to adjust the scale of aquaculture business which is oriented towards the achievement of increasing farmers' income (PPP) with a value of (0.290), and further increasing, supplying and distributing shrimp (PPDI) with a value of (0.575).

That in order to increase the income of farmers and increase, the supply and distribution of shrimp is also felt by collectors who have the will to carry out a larger industrial business, as a solution to the problems of aquaculture operations that often occur, it is necessary to build complete aquaculture production facilities. Taking into account the enthusiasm for this cultivation need, it is necessary to have an active role from the government for this problem by taking the first step to provide cultivation production facilities (MSPB) with a value of (0.135), which is appropriate for the cultivation method carried out by cultivators in Randangan District. In addition, the cooperation of all parties is expected to provide benefits, including; (1) create job opportunities; (2) local revenue increases;

According to Pariakan (2012), thatTo increase the income of the vaname shrimp farming community in Randangan District, what must be done is to improve infrastructure, so that the cultured shrimp are easily controlled and the results can be marketed quickly. In response to this, it is necessary to adjust the scale of cultivation business which is oriented to the achievement of increasing cultivation success (PKB) with a value of (0.051) and further increasing the supply and distribution of cultivation products (PPDB) with a value of (0.051).

As a solution to deal with the operational problems of cultivation that often occur, it is necessary to build a production facility for cultivation (MSPUB) with a complete value of (0.025). Taking into account the enthusiasm for this cultivation need, it is necessary to have an active role from the government for this problem by taking the first step to provide production facilities (MSPB) with a value of (0.038) that is appropriate for the cultivation method.

Market Demand

Market demand is one of the important factors in the development of vaname shrimp culture, based on the analysis of the market potential of vaname shrimp, it can be concluded that this vannamei shrimp cultivation business is feasible, due to the increase, supply and distribution of shrimp (PPDI) with a value of (0.637). This is because the large market potential for vaname shrimp production can be seen from the demand, supply, and price sides for increasing employment and business opportunities (PKKB) with a value of (0.121). The amount of demand that is not balanced by the amount of supply creates great opportunities in the vannamei shrimp farming business. Besides that,

According to Oktindar (2015), the economic dimension is an important choice (0.319), because the condition of the aquaculture business is very dependent on market demand and the capital issued by farmers in each fish or shrimp production cycle, besides that, harvest yields greatly determine the interests and motives of actors. major in aquaculture activities. In the importance of the economic dimension that is very influential is the sale of production products (PHP) with a level of importance (0.591), while production capital (MP) is the second criterion with a level of importance (0.409).

Cultivation Land Suitability

Land suitability is the relationship between land conditions and their use, besides that land suitability analysis can be taken into consideration in developing optimal land use in accordance with policy directions. Based on the weighting through the Process Hierarchy Analysis (AHP) land suitability is the 5th (five) priority with a weight of 0.071 with several target dimensions being assessed, namely the arrangement and reuse of pond land (PPKT) with a value of 0.461, it is necessary to preserve the environment and pond ecosystem (PLET).) with a value of 0.262, and an increase in farmers' income (PPPM) with a value of 0.277.

The results of the Process Hierarchy Analysis (AHP) show that the main target in the development of vaname shrimp cultivation is the dimension of structuring and reusing coastal pond land (PPKT). Assessment of the suitability of shrimp farming land is a determining factor in the development of shrimp aquaculture business in Randangan District.

Assessment of the suitability of shrimp farming land is a determining factor in the development of shrimp aquaculture business in Randangan District. This is in accordance with the opinion of Mustafa et al., (2014), which states that the results of the evaluation of land suitability are able to assess suitability for certain uses and can predict risks that can occur, as well as knowing the limiting factors to the direction of policies that are directing the community in cultivation. According to land suitability.

Conclusion

Based on the results of the research that has been done, it can be concluded that the sequence of strategic plans that need to be carried out in the development of vaname shrimp (*Litopenaeus vannamei*) cultivation in Randangan District based on AHP analysis is the availability of human resources with a value of (0.489), venture capital loans (0.235), infrastructure (0.111), market demand (0.094), and suitability of cultivated land (0.071).

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