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ANALYSIS OF THE COMPETITIVENESS OF MINAPADI FACILITIES AND INFRASTRUCTURE IN WEST JAVA PROVINCE

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ABSTRACT

The fisheries sector is an important sector for the people of Indonesia and can be used as a prime mover of the national economy. Minapadi aquaculture is a fisheries sector with a system of rice and fish aquaculture which is cultivated together in a rice field. West Java Province as one of the largest producing regions of Minapadi fisheries in Indonesia, and is considered as a potential area for Minapadi aquaculture. Facilities and infrastructure support the continuation of minapadi aquaculture activities, the availability of adequate facilities and infrastructure will affect the high yield of minapadi production. Minapadi aquaculture competitiveness can be used as a benchmark for regional development, regional mapping, and regional development planning. This study has the aim to analyze the competitiveness facilities and infrastructure of Minapadi aquaculture in West Java Province. The method used in this study is the litelature survey method to determine the competitiveness of minimum aquaculture in 18 regencies and nine cities in West Java Province. After all data has been processed, the data will be analyzed descriptively. The technique used to retrieve primary data in this research is expert judgment. Whereas secondary data was obtained from statistical data of the Office of Maritime Affairs and Fisheries of West Java Province. The results of this study indicate that the regencies with very high competitiveness are Ciamis Regency, Garut Regency, Cianjur Regency, and Tasikmalaya Regency. While the regencies with low competitiveness are regencies/cities in the central region.

Keywords: Minapadi Aquaculture, Competitiveness, West Java, Facilities and Infrastructure, Fisheries Sector

INTRODUCTION

West Java Province has an area of 37.087,92 km^2 (Source: Spasial Plants of West Java Province, Geographic Information System calculation) with a coastline of 832,69 km (Source: Map of zoning plans for coastal areas and small islands of West Java Province). Based on the sea management authority of 0-12 miles, the sea area of West Java Province is 1.552.890,67 ha, and has 19 small islands (Regional Planning and Development Agency West Java 2018). West Java Province is a region that has natural conditions suitable for the development of aquaculture, especially freshwater aquaculture. This is supported by the large amount of fresh water resources in West Java because it is supported by high rainfall. Average annual rainfall is generally above 2.000 mm. The amount of rain is estimated to be 180 days / year, so that West Java has many rivers, swamp lakes, situ and other puddles (Suryana 2013).

Administratively, the area of West Java Province is divided into 27 regencies / cities, covering 18 regencies and 9 cities, namely Bogor, Sukabumi, Cianjur, Bandung, West Bandung, Garut, Tasikmalaya, Ciamis, Kuningan, Cirebon, Majalengka, Sumedang, Indramayu, Subang, Purwakarta, Karawang, Bekasi, and Pangandaran as well as the City of Bogor, Sukabumi, Bandung, Cirebon, Bekasi, Depok, Cimahi, Tasikmalaya and the City of Banjar. Sukabumi Regency is the largest regency area in West Java Province with an area of 4.145,70 Km^2 (11,72 percent of the area of West Java Province), while the smallest area is Cirebon City which is 37,36 km^2 (0,11 percent of the total area of the Province West Java). West Java Province consists of 627 regencies, 645 villages and 5.312 villages (West Java Province Planning Agency 2018).

Economic development strategy towards industrialization carried out by an economic development strategy based on comparative and competitive advantages (Yustika 2012). This is based on the fact that firstly, Indonesia has substantial fishery resources both in terms of quantity and diversity. Secondly, the industry in the fisheries sector have linkages with other sectors. Third, the fishery industry is based on national resources or known as national resources based industries, and the fourth Indonesia has a high comparative advantage in the fisheries sector, as reflected on the potential of existing resources. Increased efficiency is done through efforts to increase the economy of scale so as to increase profits and can encourage increased new investment, ultimately able to encourage faster growth (Rustiandi 2009).

Ratnasari (2014) explains that regional development is an integral part of national development. Regional development moreaimed at improving the quality of community affairs, economic growth and the optimal economic equality, the expansion of the workforce, and improving standards of people's living. Economic growth is a major measure of success of the development carried out. Growth should walk side by side as planned, it means creating equal opportunities and the sharing of development results are more evenly distributed.

Fauzi (2010) states that marine and fisheries development planning is based on the concept of sustainable development, supported by the development of natural resource-based industries and human resources to achieve high competitiveness. Three main things that do related to the direction of fisheries sector development in the future, namely (1) build a fisheries sector that has competitive advantage based on comparative advantage; (2) describe a democratic economic system which is based on fair market mechanisms; (3) accelerate the development of an effective and strong regional economy by empowering regional economic actors and potentials. In the context of the development pattern, there are three phases to be followed in comparative advantage to transform into an advantage in terms of competitiveness, namely (a) the development phase driven by an abundance of natural resources (resources driven); (B) The second phase of development is driven by investment

(investment-driven) and; (C) The third phase of development that is driven by innovation (inovation driven).

The fisheries sector is an important sector for the people of Indonesia and can be used as a prime mover (prime mover) of the national economy. This is based on the fact that the fisheries sector has enormous potential in terms of Indonesian waters which have an area of 5,8 million km^2. In addition, Indonesia has a coastline of 95.181 km, which is largely the basis of fisheries economic activities (Department of Maritime Affairs and Fisheries 2009). The great potential of the fisheries sector can also be seen from the volume of Indonesian fisheries production. Based on the publication of the Directorate General of Aquaculture in 2013 stated that fisheries production in Indonesia has various types of aquaculture, namely aquaculture, ponds, ponds, cages, floating nets and rice fields.

Minapadi Cultivation according to Tupan *et al*., (2013) is a system of how to care for fish on the sidelines of rice plants in the paddy fields, as a slice between two seasons of rice plants and / or rearing fish as a substitute for palawija in paddy fields. Because it can enrich the growing media with organic fertilizer and increase the production of plankton which is a source of eating fish. Even according to Montazeri (2012) Minapadi is one of agricultural land technology to improve the quality of the environment in anticipation of climate anomalies, because Minapadi is an integrated cultivation that can increase the productivity of paddy fields, namely: increasing farmers' income through increasing rice production by 10%; increased diversity of agricultural products due to fish production; increasing soil and water fertility (reducing fertilizer by 30%) can also reduce the pest of Brown Wereng on rice plants.

According to Effendi (2013), Minapadi has several advantages, namely helping to reduce pest and disease attacks, increasing the potential of paddy fields, increasing fish production by pond area and water level and increasing income due to two rice and fish businesses. According to Anwar (2012), the weakness of the minapadi system is that excessive application of pesticides to rice can also affect fish life and the ease of pests such as snakes, frogs, and birds entering the fields.

Types of fish that will be maintained to consider the factors of the fish itself and the environment in his life. According to Supriadi and Setiawan (2005) in Aryanto (2016), fish factors are related to fish quality and its suitability with the environment, while environmental factors are related to good irrigation and fertility levels related to the existence of natural food for fish.

According to Khairuman and Amri (2002 in Aryanto 2016), several types of fish suitable to be raised in the fields include goldfish, tawes, tilapia, carp, dumbo catfish and giant prawns. According to Suharti (2003 in Hanifah 2016) revealed that goldfish and other types of carp are the best types of fish maintained in the fields, because these fish can grow well even in shallow water, and are more resistant to the sun's heat.

Means of cultivation are all facilities that are used for operational activities, both directly and indirectly. Facilities are divided into basic facilities and supporting facilities. Basic facilities are facilities that are used directly for production activities, while supporting facilities are facilities that are not used directly for the production process but strongly support the smooth production. Supporting facilities in question include roads, feed warehouses, mechanical equipment warehouses, vehicles, laboratory facilities, and communication facilities. According to (Kordi 2009) there are several basic facilities in aquaculture, namely water reservoirs, aerators, water pumps, and harvesting equipment. Facility variables observed in this study include the milling, enlargement plots and water pumps.

The concept was popularized by Porter's competitiveness in the book The Competitive Advantage of Nations (Porter 2009) which examines the creation of prosperity and competitiveness in the global economy. This book has influenced supranational, national and

regional policies globally. Furthermore, it is also explained the importance of the productivity of the potential of the region which is sourced from human resources, natural resources, and capital. Furthermore, Porter argues that regional potential is not an element of competitiveness, but is a resource that must be developed and produced to support two elements of competitiveness, namely macroeconomics and microeconomics (Yogi *et al*. 2018).

METHOD

This research was conducted at the Department of Maritime Affairs and Fisheries of West Java Province in May - September 2019 which aims to analyze the competitiveness profile of Minapadi aquaculture fisheries facilities and infrastructure in West Java Province. The method used in this study is the litelature survey method to determine the competitiveness of minapadi cultivation in 19 regencies and eight cities in West Java Province. The data used in the form of primary data and secondary data are realized in the form of numbers and analyzed using descriptive statistics. The technique used to retrieve primary data in this study is expert judgment. Whereas secondary data was obtained from statistical data of the Office of Maritime Affairs and Fisheries of West Java Province.

DATA ANALYSIS

Data analysis was performed using qualitative descriptive analysis. The qualitative descriptive analysis in this study was intended to obtain a profile of the competitiveness of minapadi aquaculture facilities and infrastructure in the Regency / City of West Java Province.

Analysis of Minapadi cultivation competitiveness profiles in the regencies / cities of West Java Province through several stages, as follows:

1. Determine the main indicators and variables from facilities and infrastructure.
2. The stage of the research is to take data on aquaculture minapadi Provinsi Jawa Barat tahun 2000 sampai 2016.
3. Identify priority weights or relative importance between indicators, variables and sub-variables.
4. Taking primary data in the form of expert judgment which gives weight to the main indicators and variables. As for the experts who were respondents as many as 10 people consisting of lecturers from the Department of Social Economics of Fisheries and Marine Sciences Faculty (FMSF) Padjadjaran University and aquaculture lecturers from FMSF Padjadjaran University, Head of Aquaculture in West Java Province, Head of Production and Business Section, Head of Facilities and Infrastructure Section and Head Fish and environmental health section.
5. Calculate the weight of the results of the expert judgment of indicator, variable and sub-variable human resources.
6. Processing data that has been obtained during the study, using secondary data, namely fisheries statistics of West Java Province in 2016 to determine the competitiveness profile of each regency / city.
7. Calculate scores and values of main indicators, variables and sub-variables from secondary data and calculate values based on weights and scores obtained.

   Score $= \frac{Data\ each\ Regency/City}{Total\ Province\ Data}\ x\ 100$

   Value = Weight x score
8. Specifies criteria for the competitiveness of aquaculture minapadi all regencies / cities in West Java by using quartiles. Competitiveness profiles are divided into four categories of competitiveness based on quartiles. Q1 means to have very high competitiveness, Q2 means to have high competitiveness, Q3 means to have sufficient competitiveness, and Q4 means to have low competitiveness.

RESULTS AND DISCUSSION

The results of this study are in the form of a ranking of competitiveness between regencies / cities in West Java. This overall competitiveness ranking shows the relative position of a region to other regions by taking into account all the variables it has and how far the region can realize the potential of its variables. The competitiveness ranking of each regency can be divided into ranks based on each of the main indicators of facilities and infrastructure. Minapadi aquaculture competitiveness from 27 regencies / cities can be known through the quartile calculation that will be obtained the values of Q1, Q2, Q3, and Q4. The value owned by each regency / city of West Java Province will represent a high or low level of competitiveness. Q1 is a very high competitiveness region, Q2 is a high competitiveness region, Q3 is a sufficiently competitive region, and Q4 is a low competitiveness area.

The value obtained is based on the main facilities and infrastructure indicators from each regency / city resulting in a final score that shows the ranking and category of competitiveness of the regency / city. Ranking of regencies / cities in West Java Province in Minapadi cultivation activities can be seen in table 1.

Table 1. Competitiveness Ranking of Minapadi Fisheries in West Java Province / Regency Based on Facilities and Infrastructure Indicators

Regency / City	Final Score	Ranked	Competitiveness Category
Ciamis Regency	27,309	1	Very High
Garut Regency	26,386	2	
Cianjur Regency	26,280	3	
Tasikmalaya Regency	7,303	4	
Tasikmalaya City	5,364	5	High
Bandung Regency	4,729	6	
Kuningan Regency	0,822	7	
Majalengka Regency	0,597	8	
Karawang Regency	0,270	9	Enough
Bandung City	0,227	10	
Bogor Regency	0,199	11	
Banjar City	0,174	12	Low
West Bandung Regency	0,169	13	
Sukabumi City	0,165	14	
Bogor City	0,035	15	
Bekasi Regency	0,008	16	
Sukabumi Regency	0		
Cirebon Regency	0		
Sumedang Regency	0		
Indramayu Regency	0		
Subang Regency	0		
Purwakarta Regency	0	17	
Cirebon City	0		
Bekasi City	0		
Depok City	0		
Cimahi City	0		
Pangandaran Regency	0		

(Source: Data Processing Results)

Table 1 above show that Ciamis Regency is ranked 1 in the competitiveness of facilities and infrastructure with a final value of 27.32. As well as being in quartile one, which means it has a very high level of competitiveness. Ciamis Regency has ample facilities and infrastructure including the amount of feed used (crumb fish, bran and pellets) of 11.87 tons, fertilizer used (organic and inorganic) as many as 1,208.48 tons, and lime used as many as 109, 88 tons. However, it has a land area that is not too broad which is 97 ha. Although, it is not superior to the land area of Ciamis Regency which has a high level of competitiveness and is very potential for mini-aquaculture activities. This is caused by the amount of fertilizer that is used quite a lot so that it spurs rice to grow quickly. Indirectly, fish get natural food from rice plants.

Garut Regency is ranked 2nd in the competitiveness of facilities and infrastructure with a final value of 26.39. As well as being in quartile one, which means it has a very high level of competitiveness. Garut Regency has a very large Minapadi land area of 25,000 ha. However, Garut Regency does not have the facilities and infrastructure to support these minapadi activities such as feed used (crumb fish, bran, and pellets) and fertilizers used (organic and inorganic). Even so, Garut Regency is able to optimize the existing land to produce high production. This is shown by the Data of the Office of Maritime Affairs and Fisheries in West Java Province 2016 that the minimum production amount in Garut Regency is 16,621.75 tons. This encourages Garut Regency to rank second and have very high competitiveness because it has a very wide land area.

Cianjur Regency is ranked 3rd in the competitiveness of facilities and infrastructure with a final value of 26,280. As well as being in quartile one, which means it has a very high level of competitiveness. Cianjur Regency has quite a lot of facilities and infrastructure including the amount of feed used (crumb fish, bran, and pellets) as much as 5,554 tons and fertilizer used (organic and inorganic) as much as 1 ton, as well as having a wide enough land area of 1,218 ha. This shows that Cianjur Regency has a high level of competitiveness and is very potential for mini-cultivation activities. Ciamis Regency has quite a lot of facilities and infrastructure as well as extensive land area, where the facilities and infrastructure available are also supported by land area. So that it can optimize the use of existing facilities and infrastructure.

Regencies / cities that are ranked 17th out of 27 regencies / cities in West Java Province have 11 regencies / cities. As well as being in quartile four which means that it has a low level of competitiveness of facilities and infrastructure. The majority of regencies / cities that are ranked lowest are occupied by regencies / cities in the central region of West Java Province. As previously stated by the West Java Province Planning Agency in 2013-2018 that the central region is a mountainous region. The regencies / cities in this region on average do not have land for mini-aquaculture activities as well as unsupportive facilities and infrastructure. Almost all regencies / cities in this region have no facilities and infrastructure at all.

Another illustration of the quartile results is that it is located in four districts in the very high bargaining power category, namely Ciamis Regency, Garut Regency, Cianjur Regency, and Tasikmalaya Regency in the south coast region of Java. High competitiveness with one city and three districts namely Tasikmlaya City, Bandung Regency, Kuningan Regency and Majalengka Regency in the central region. Competitiveness is sufficient with one city and two regencies namely Karawang Regency in the north coast region of Java and Bandung City and Bogor Regency in the central region and low competitiveness with nine regencies and seven cities profitable in the central region. The results of the competitiveness category in 27 districts / cities in West Java Province can be seen in Figure 1.

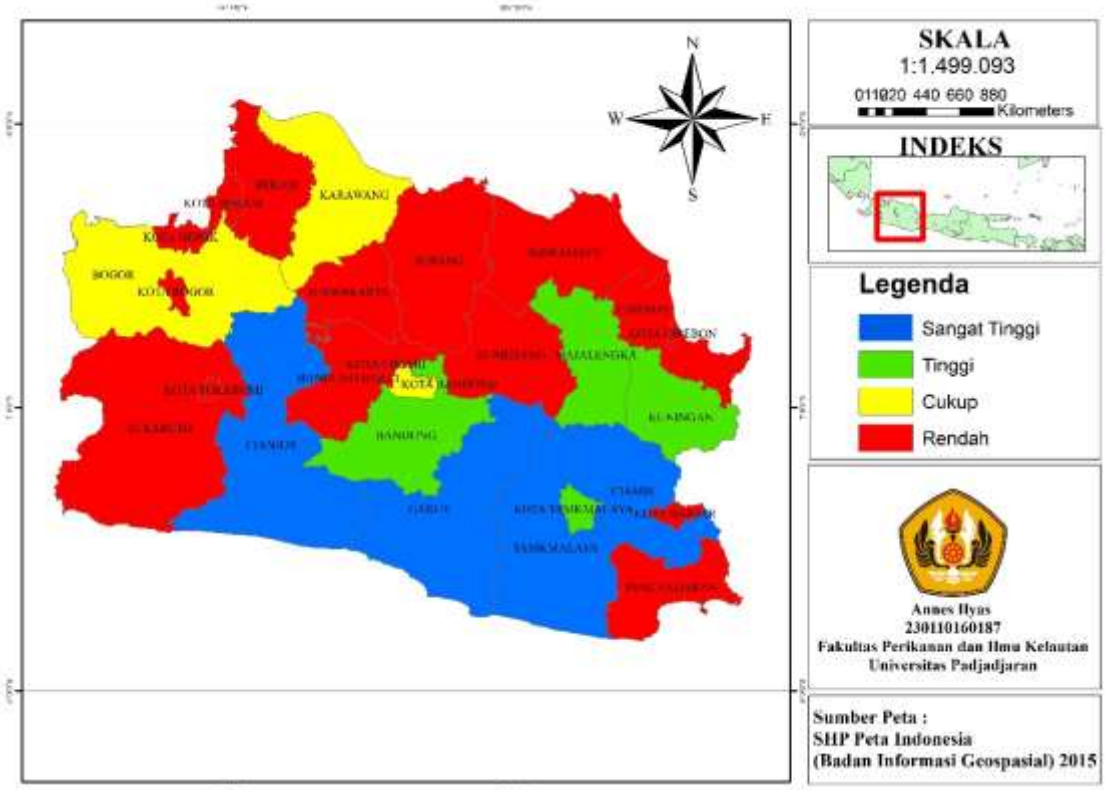

Figure 1. Profile of Minapadi Aquaculture Fisheries Facilities and Infrastructure Competitiveness

Strategies in increasing the production and productivity of mini-aquaculture can be seen from the existing facilities and infrastructure. Increasing the amount of available facilities and infrastructure to support the continuation of minapadi cultivation activities in potential regency / city areas. High human resources if not supported by facilities and infrastructure such as aquaculture equipment, fertilizer, feed, lime, pumps, water, etc. then the mini-aquaculture activities will not take place optimally. The more the number of facilities available, the resulting production will increase. The aspect technological endowment is very important in mini-aquaculture. Agricultural production cannot increase if its implementation does not master technology. The second aspect is institutional endowment. In developing the concept of agribusiness, producers or farmers should also be able to work their own agricultural production, process the results and simultaneously market it at favorable price conditions. The third aspect is the aspect related to cultural endowment, this aspect develops dynamically. Risk and uncertainty factors, the unavailability of farmers to adopt new technologies, farmers do not want to follow agricultural development programs and so on (Atikah *et al* 2018).

Strategies that can be carried out in improving the competitiveness of Minapadi cultivation facilities and infrastructure in West Java Province are based on research conducted, namely:

1. Conduct training and training regarding Minapadi cultivation techniques in improving the knowledge and skills of human resources.

2. Applying the science of development and technology of mini-cultivation in the category of intensive technology in order to increase the production and productivity of mini-rice.
3. The government facilitates and facilitates minapadi cultivation activities in the regency / city areas that are not yet optimal.
4. Cultivators understand the types of facilities and infrastructure used for minapadi activities based on the level of need.

CONCLUSION

Based on the results of research that has been carried out obtained several conclusions as follows:

1. Ciamis Regency is ranked 1 in the category of competitiveness of minapadi aquaculture fisheries facilities and infrastructure in quartile one with a final value of 27,309. It has 11.87 tons of feed (crumbs, bran and pellets), 1,208.48 tons of fertilizer (organic and inorganic), 109.88 tons of lime and 97 ha of land area. Garut Regency is ranked 2nd with a final grade of 26.39, and is in quartile one which has an area of 25,000 ha. Cianjur Regency was ranked 3rd with a final score of 26.28, and was in quartile one. Has the amount of feed (crumb fish, bran, and pellets) as much as 5,554 tons and the fertilizer used (organic and inorganic) as much as 1 ton, and has a fairly large land area of 1,218 ha.
2. There are 16 regencies / cities in the quartile four which means they have a low level of competitiveness. The majority of regencies / cities that are ranked lowest are occupied by regencies / cities in the central region of West Java Province.

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