



Analysis of the Competitiveness of Pond Cultivation Fisheries Production in West Java Province

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study aims to analyze the competitiveness of aquaculture production in West Java Province. The research was carried out from August 2020 – September 2021. The method used was a literature study to determine the competitiveness of aquaculture in 27 districts/cities in West Java Province. After processing the data, the data will be analyzed descriptively. Primary data in the form of expert judgment consisting of 20 people regarding the proportion of competitiveness of aquaculture. Secondary data in statistical data on Pond Cultivation Fisheries 2004 – 2019 Department of Marine and Fisheries of West Java Province. The results of this study indicate that the competitiveness profile of aquaculture in 2019 in West Java Province with the first rank of very high competitiveness is occupied by Indramayu Regency, the second rank of very high competitiveness is occupied by Subang Regency, and Karawang Regency occupies the third rank of very high competitiveness.

Keywords: Pond cultivation fisheries; competitiveness; West Java Province.

1. INTRODUCTION

Astronomically, West Java Province is located between 5°50' - 7°50' South Latitude and 104°48' - 108°48' East Longitude. West Java Province has an area of 35,377.76 km². In 2019, West Java Province consisted of 18 regencies and nine cities with 627 sub-districts and 5,957 villages [1].

Administratively, in 2020, the area in West Java Province is divided into 27 regencies/cities covering 18 regencies, namely Sukabumi Regency, Bogor Regency, Bandung Regency, Cianjur Regency, Tasikmalaya Regency, Garut Regency, Pangandaran Regency, Ciamis Regency, Regency Cirebon, Kuningan, Sumedang Regency, Majalengka Regency, Subang Regency, Indramayu Regency, Karawang Regency, Purwakarta Regency, West Bandung Regency, Bekasi Regency and there are 9 cities which include Sukabumi City, Bandung City, Bogor City, Depok City, Bekasi City, City Cirebon, Cimahi City, Banjar City and Tasikmalaya City [2].

Regions in West Java Province that have potential for pond cultivation fisheries are divided into 12 regencies/cities covering 1 regencies, namely Sukabumi Regency, Cianjur Regency, Garut Regency, Tasikmalaya Regency, Ciamis Regency, Cirebon Regency, Indramayu Regency, Subang Regency, Karawang Regency, Regency Bekasi, Pangandaran Regency, and there is one city, namely Cirebon City [1].

According to the [3] West Java Province has abundant fishery resources both on land and at sea, so that West Java Province is one of the centers of fisheries in Indonesia. West Java Province has an important contribution to the Indonesian economy. The large contribution of the fisheries sector is seen from the volume of fishery production in Indonesia. Fishery resources in West Java Province are quite abundant for capture fisheries and aquaculture.

West Java Province is one of the centers of ponds in Indonesia. According to [4], the management of ponds in Indonesia, especially in Java, still requires better management planning. It can be seen that from the number of abandoned ponds due to crop failure, even the abandoned ponds on the island of Java have reached 70% [5]. According to [6], based on the type of cultivation, the fish pond cultivation company is the largest compared to hatcheries, freshwater, and marine.

Efforts made to increase the production of aquaculture in West Java Province, will involve the expansion of pond land, improvement of pond cultivation installations, increased use of feed and fertilizers and chemicals used in aquaculture activities which include the depth of increasing land and water use. According to [7] stated that the aquaculture business competes economically, socially, physically, and ecologically. The technologies applied by pond cultivators in West Java Province in the field are traditional ponds, intensive ponds, and semi-intensive ponds. According to data from the Department of Marine Affairs and Fisheries (2019), the dominant use of technology in West Java Province is traditional ponds, followed by semi-intensive ponds, and intensive ponds. The difference in the technology used will have implications for the financing needed for aquaculture activities. In addition, differences in the level of technology used by pond cultivators will be related to the availability of available resources in aquaculture activities.

One example of a district that makes a good contribution to pond activities in West Java Province is Indramayu Regency. Indramayu Regency itself is one of the regencies in West Java Province which has been determined by the Ministry of Maritime Affairs and Fisheries (KKP) of the Republic of Indonesia as a minapolitan development location based on the Decree of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number KEP. 32/MEN/2010 concerning Designation of Minapolitan Area. With this policy, in line with the development of fisheries development based on zoning, it aims to create an integrated acceleration of fisheries and marine development involving various fisheries sectors.

According to [8], ponds or ponds are bodies of water measuring 1 m² to 2 ha that are permanent or seasonal and are formed naturally or artificial. According to [8], one of the functions of ponds for aquatic ecosystems is the enrichment of aquatic biota species. The increase in types of aquatic biota comes from the introduction of biota that has been cultivated. Pond management is not only limited to efforts to produce fish, but it is also essential to maintain floating environmental conditions, monitor fish harvest and growth, check the success of fish reproduction, and keep unwanted fish (predators/parasites away) [9].

One of the fisheries sectors that make a significant contribution in West Java Province is

the aquaculture sector. According to [10], aquaculture production produced by the Province of West Java is 391,572,892 tons. In 2019 West Java Province had the potential for aquaculture in ponds; its utilization reaches 47,545.52 m² for the area of pond production so that there is still an opportunity to take advantage of the potential of the pond area as well as increase pond productivity in the Regency/City of West Java Province.

To determine the competitiveness of pond cultivation fisheries production, production data is needed consisting of production and production values based on the type of fish and crustaceans. Based on the type of fish in carp tilapia, tilapia, milkfish, mullet, grouper, snapper, and other fish, hard-skinned animals are crabs, clams, tiger shrimp, white shrimp, fiery shrimp, shrimp vanilla, were intended data obtained can be helpful for decision-makers, especially local governments, in formulating plans and strategies for developing the fisheries sector in the field of aquaculture and for other parties, as a reference to add insight, information, and knowledge.

2. METHODOLOGY

The method used in this study is a literature study to determine the competitiveness of aquaculture production in 27 districts/cities in West Java Province. The primary and secondary data used are realized in numbers and analyzed using descriptive statistics. The technique used to collect primary data in this study is expert judgment. At the same time, the secondary data is in the form of statistical data on aquaculture fisheries in 2004 – 2019, which was obtained from the Department of Marine Affairs and Fisheries of West Java Province.

2.1 Research Location

The research took place at the Department of Marine Affairs and Fisheries of West Java Province, located at Jl. Wastukencana No. 17, Babakan Ciamis, Sumur Bandung Regency, Bandung City, West Java 40117. This research was conducted from August 2020 – September 2021.

2.2 Data Analysis Method

The data analysis used in this research is descriptive qualitative data analysis. Qualitative descriptive data analysis was used to describe or analyze the research results on the development

profile of the competitiveness of the aquaculture sector in the Regency/City of West Java Province. Data management and data analysis are carried out using Microsoft Office Excel 2013 software.

2.3 Competitiveness Profile Analysis

Analysis of the competitiveness profile of aquaculture in the Regency/City of West Java Province through several stages, namely:

1. Determine the leading indicators and variables, namely human resources, facilities and infrastructure, production and production value, the application of science and technology for aquaculture products, and productivity.
2. I am collecting data on aquaculture in West Java Province from 2004 to 2019.
3. Identify priority weights or relative importance between indicators, variables, and sub-variables.
4. Taking primary data from expert judgment consisting of lecturers from the Department of Socio-Economic Affairs FPIK Padjadjaran University, aquaculture lecturers at FPIK Padjadjaran University, Head of Aquaculture Division of West Java Province, Head of Production and Business Section, Head of Section Facilities and Infrastructure, and the Head of the Fish and Environmental Health Section in the form of a questionnaire as many as 20 people.
5. I calculated the weight of the questionnaire results from the expert judgment of each indicator, variable and sub-variable.
6. Processing of data that has been obtained during the study, using secondary data, namely statistical data on aquaculture in West Java Province in 2004, 2009, 2014, and 2019 to determine the competitiveness profile of each district/city per 5 years.
7. Calculate the score and value of the leading indicators, variables, and sub-variables obtained from secondary data and calculate the value based on the weights and scores obtained.

$$\text{Score} = \frac{\text{Data each Regency or City}}{\text{Total Province Data}} \times 100$$

$$\text{Value} = \text{Weight} \times \text{Score}$$

The following is the formula for productivity, namely:

a. Production Productivity per Area of Pond Cultivation

$$P_{pt} = \frac{P_{ik}}{T_{ik}}$$

Information :

Ppt: Production productivity per pond area (tons/m²)

Q: Total Pond Production (tons)

The fish produced are in the hatchery and rearing stages, including fish, shrimp, and other aquatic animals.

T: Total area of dirty/clean fish farming land (m²)

i : District i (i = 1, ... , 27)

k: Period

b. Production Productivity per Pond Cultivation Worker

$$P_{pn} = \frac{P_{ik}}{N_{ik}}$$

Information :

ppn: Production productivity per aquaculture worker (tonnes/person)

P: Total Pond Production

The fish produced are in the hatchery and rearing stages, including fish, shrimp, and other aquatic animals.

N: Number of fish cultivator workers (persons)

i : District i (i = 1, ... , 27)

k: Period

c. Productivity Production Value per Pond Land Area

$$P_{npt} = \frac{NP_{ik}}{T_{ik}}$$

Information:

Pnpt: Productivity of production value per pond area (rupiah/m²)

NP: Pond Production Value (rupiah)

The fish produced are in the hatchery and rearing stages, including fish, shrimp, and other aquatic animals.

T: Total gross/clean land area (m²)

i : District i (i = 1, ... , 27)

k: Period

d. Productivity Production Value per Pond Cultivation Labor

$$P_{nnpn} = \frac{NP_{ik}}{N_{ik}}$$

Information:

pnpn: Productivity of production value per aquaculture worker (rupiah/person)

NP: Pond Production Value (rupiah)

The fish produced are in the hatchery and rearing stages, including fish, shrimp, and other aquatic animals.

Q: Number of fish cultivators (persons)

i : District i (i = 1, ... , 27)

k: Period

8. Determine the competitiveness criteria of aquaculture in all districts/cities in West Java Province using quartiles. The competitiveness profile is divided into four categories of competitiveness based on quartiles. Q₁ has very high competitiveness, Q₂ has high competitiveness, Q₃ has sufficient competitiveness, Q₄ has low competitiveness.

3. RESULTS AND DISCUSSION

The result of this research is the ranking of production competitiveness among districts/cities in West Java. The overall competitiveness ranking will show the region's position against other regions by considering all the variables it has and the extent to which the region can realize the potential of these variables. The ranking of the competitiveness of each district/city in West Java Province can be divided into rankings based on indicators of pond production. The competitiveness of aquaculture production from 27 regencies/cities can be determined through quartile calculations to obtain

Q1, Q2, Q3, and Q4. The value possessed by each district/city in West Java Province will represent very high, high, moderate, and low levels of competitiveness. Areas that fall into the Q1 category are very competitive.

The scores obtained based on the leading indicators of pond production from each district/city will produce a final score that shows the district/city's ranking and category of competitiveness of the district/city. The ranking of districts/cities in West Java Province in aquaculture activities can be seen in Fig. 1.

Fig. 1 is the result of data processing per 5 years from production indicators calculated based on production variables and production values based on types of fish and crustaceans. Based on the type of fish in carp tilapia, tilapia, milkfish, mullet, grouper, snapper, and other fish, hard-skinned animals are crabs, clams, tiger shrimp. White shrimp, fiery shrimp, vaname shrimp, and other shrimp. The results of the production competitiveness profile trend show that Indramayu Regency has a production indicator value of 49,319 (2004), 33,743 (2009), 58,528 (2014), and 55,341 (2019) with an average of 49,233. Under these conditions, it can be seen that the decline and increase in the competitiveness of aquaculture based on production indicators that occurred in 2009 decreased from the previous period then, in 2014, there was an increase in pond production indicators. Furthermore, in 2019 there was another decline in the pond production indicators. In 2014 there was the largest most significant increase in the competitiveness of aquaculture based on production indicators. In 2004 Indramayu Regency got the first rank in the pond production indicator; then, in 2009, it decreased to the second rank. However, even though it experienced a decline in ranking Indramayu Regency was still included in the very high competitiveness category (Q1). In 2014 and 2019, the Regency Indramayu is consistent in the competitiveness ranking, placing the first position.

Indramayu Regency itself is one of the regencies in West Java Province designated by the Ministry of Maritime Affairs and Fisheries (KKP) of the Republic of Indonesia as a minapolitan location. The location of the Minapolitan area in Indramayu Regency is aquaculture area in Karang Anyar Village, Pasekan (Pond) District, and Krimun Village, Losarang (Polam) District. According to

[11,12-15], the leading commodities developed are vaname shrimp, tiger shrimp, and milkfish.

According to [6] stated that the fishery and marine sector in Indramayu Regency has proven its resilience to the economic crisis and has diverse business segments, both on the farm and off the farm, which are carried out starting from the application of simple to intensive technology scales with employment opportunities consisting of gender, age, and education. In addition, the marketing sector for fishery and marine products in Indramayu Regency has broad market access. Because Indramayu Regency has broad market access, this is in line with the increasing awareness of the community on how important it is to consume fish to meet domestic and foreign demands.

Data from [1] showed that the total area of ponds in the Indramayu Regency reached 47,545.52 ha. Of the land area, Indramayu Regency has the largest additional land area in West Java Province. In general, aquaculture production in Indramayu Regency is in tilapia, tilapia fish, milkfish, grouper, tiger shrimp, fire shrimp, vaname shrimp, and seaweed [16]. Pond aquaculture commodities whose production dominates are milkfish and vaname shrimp.

In contrast to Indramayu Regency, which is categorized into very high production competitiveness, Pangandara Regency is a city with low production competitiveness with an average value of only 0.016. The low competitiveness of Pangandaran Regency's production was caused for 15 years based on existing data at the Department of Marine Affairs and Fisheries of West Java Province, Pangandaran Regency was only recorded from 2015-2019, while data from 2004-2014 data on pond production from Pangandaran Regency was not recorded.

The production competitiveness pond cultivation fisheries profile from the above quartile results in three regencies in West Java Province with very high competitiveness categories, namely Indramayu Regency, Karawang Regency, and Bekasi Regency. There are three regencies in West Java Province with high competitiveness categories: Garut Regency, Cirebon Regency and Subang Regency. There are three fairly competitive regencies, namely ukabumi Regency Cianjur Regency and Tasikmalaya Regency, and there are two Regencies and one City with low competitiveness. namely Ciamis Regency, Pangandaran Regency and Cirebon City.

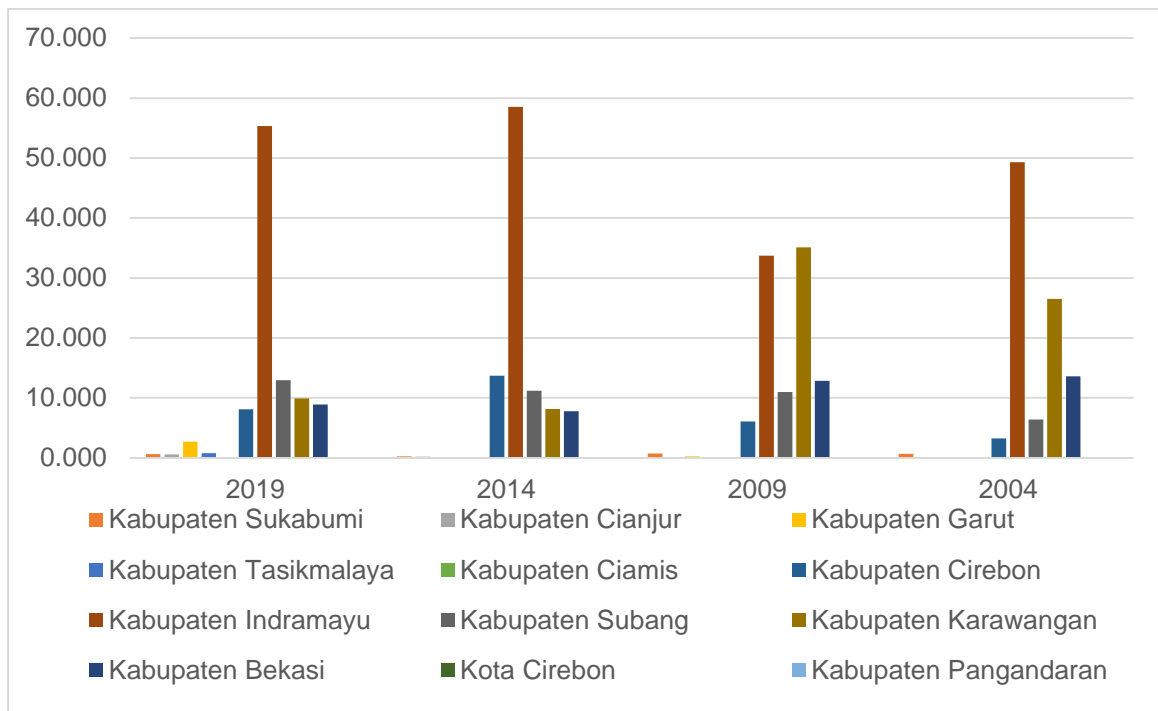


Fig. 1. Trends in Aquaculture Competitiveness Ranking Based on Production indicators

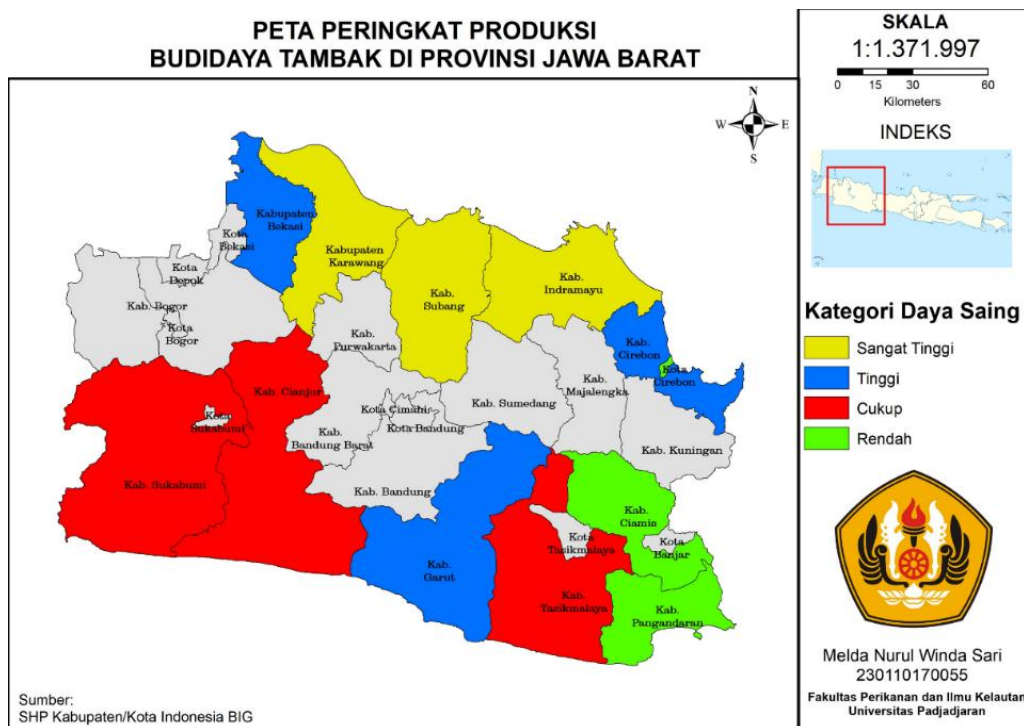


Fig. 2. Profile of Aquaculture Production Competitiveness

4. CONCLUSION

The category of very high production competitiveness of aquaculture in West Java Province is found to have three regencies in

West Java Province with very high competitiveness categories, namely Indramayu Regency, Karawang Regency, and Bekasi Regency. Indramayu Regency was ranked first with a final score of 55.34.

Subang Regency was ranked second with a final score of 12.96. Karawang Regency is in third place with a final score of 9.92.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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