ANALYSIS OF CAPTURE FISHERIES DEVELOPMENT TRENDS IN WEST JAVA PROVINCE

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ABSTRACT

The fisheries sector is an important sector for Indonesian people and can be used as a prime mover of the national economy. One region of Indonesia that has potential of fisheries and could be developed as a major driver of regional and national economy is West Java Province. Marine fisheries sector have their respective advantages of each regency in West Java Province. The development of fisheries in West Java led to the development trend. Trend shows the change in value of the main indicators of relatively stable population changes, price changes, changes in technology, and increased productivity. This study has purpose to analyze trend of the development of fisheries in West Java Province. The method used in this study is a survey litelature method to determine the development of capture fisheries in ten regencys and one city in West Java Province which has a sea area. Once all the data is processed, the data will be analyzed descriptively. Primary data in the form of expert judgment regarding the proportion of competitiveness of capture fisheries. Secondary data is statistical data from the Office of Maritime Affairs and Fisheries of West Java Province. The results of this study indicate that the development of capture fisheries in the regencies/cities of West Java Province experienced fluctuating changes during 2002 to 2017.

Keywords: Fishing, West Java, Trends, Developments

INTRODUCTION

West Java Province has an area of 37.087,92 km with a coastline of 832,69 km. Based on marine management authority 0-12 miles, the sea area of West Java Province is 1.552.890,67 ha, and has 19 small islands.The physical condition of the northern coast of West Java base consisting of coastal plains and alluvial coastal swamps with a slope of 0% -5%, is a sloping topographic area, shallow waters, has mud, sandy and swampy substrate, current patterns are influenced by the Java ocean currents, and vegetating mangroves and coral reefs. The topography of the West Java South Beas Region is mountains and steep hills, deep waters with many rocks and sandy beaches, strong sea current patterns that are influenced by the presence of the Indonesian Ocean (Bappeda Jabar 2018)..

Administratively, the area of West Java Province is divided into 27 regencys/cities, covering 18 regencys 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 Banjar. Sukabumi regency is the largest regency in West Java Province with an area of 4.145,70 km^2 (11.72 percent of the total area of West Java Province), while the smallest area is the city of Cirebon which is 37,36 km^2 (0.11 percent of the total area of West Java Province). West Java Province consists of 627 regencys, 645 villages and 5.312 villages (Bappeda Jabar 2018).

West Java has the potential for marine and fisheries economic development, especially in the development of capture fisheries on the south coast, marine aquaculture businesses, marine biotechnology, and various marine environmental services. However, the conditions and potential of these large fisheries and marine resources have not been followed by the development of good fisheries and marine business and businesses. The level of investment in facilities and infrastructure supporting the marine business and the production of fisheries and marine resources is still far from the existing potential. On the other hand, the weak condition of farmers and fishermen as producers causes the underdevelopment of activities and management of the fishery and marine products processing industry (West Java Bappeda 2013). Maritime Affairs and Fisheries Office of West Java Province (2009) stated that in 2009, West Java Province has recorded a production potential of fishing reaches 180.402,4 tons from various coastal areas of West Java Province. Maritime Affairs and Fisheries Office of West Java Province (2016) reported capture fisheries production of West Java province in 2016 amounted to 276.303 tonnes, an increase of approximately 1.95% from production in 2015.

Adisasmita (2006) stated that exploiting the potential of marine strongly affected by capital constraints, production facilities, knowledge and skills as well as limited services and provision of facilities by the government. Of the several factors that become strategic issues in the management of marine potential is the low quality of human resources, especially marine communities. To improve the quality of marine human resources can be done in several ways. According to Dahuri (2004) improving the quality of human resources in the marine field is carried out through education, training, comparative studies, field practice and research (in Setiawan 2010).

Maryati (2010: 129) stated a trend is a movement (tendency) up or down in the long term, which is obtained from the average change over time. On average these changes could increase or can be reduced. If the change in the average increases, it is called positive trend or trend have a tendency to rise. Conversely, if the average change is decrease so-called negative trend or trend have a tendency to decline.

Trend shows changes in the value of a relatively stable variable changes in population, changes in price, changes in technology, and increased productivity. Narafin (2013: 196) said

forecast revenue (sales) is a process of estimating the activity of the product to be sold or leased in the future in certain circumstances and based on historical data that have occurred or may occur.

METHOD

This research was conducted at the Maritime Affairs and Fisheries Office of West Java Province in May 2019 - December 2019 which aims to analyze the development trend of capture fisheries in West Java Province. The method used in this study is a survey litelature method to determine the development trend of capture fisheries in ten regencys and one city in West Java Province. The data used secondary data that is realized in the form of numbers and analyzed using descriptive statistics. The technique used to retrieve secondary data is obtained from statistical data of Marine Affaris and Fisheries Office of West Java Province.

DATA ANALYSIS

Data analysis was performed by using qualitative descriptive analysis. Qualitative descriptive analysis in this study is intended to obtain the development trend of capture fisheries in the Regency/City of West Java Province.

1. Determine the main indicators and variables including human resources, facilities and infrastructure, production and production value, the application of science and technology for capture fisheries products, and productivity. The stage of the research is to take secondary data on statistical data of capture fisheries in West Java Province from 2002 to 2017.

2. Identify priority weights or relative importance among indicators, variables and sub-variables.

3. Taking the primary data in the form of expert judgment that gives weight to the main indicators and variables. The experts who were interviewed as many as 10 people consisting of lecturers from the Department of Social Economic FPIK Padjadjaran University and lecturers from the Department of Water Resources FPIK Padjadjaran University, and 4 people from Marine Affairs and Fisheries Office of West Java Province consisting Head of Capture Fisheries, Head of Section of Management of Fish Resources and Fishermen of West Java Province, Head of Section of Fishing Vessels and Fishing Equipment and Head of Section of Fisheries Port.

4. Calculating the weight of the result of expert judgment questionnaire on each indicator, variables and sub-variables.

5. Processing data that has been obtained during the study, using secondary data, statistical data of capture fisheries in West Java Province in 2017 to determine the competitiveness profile of each regency/city.

6. Calculate scores and values of main indicators, variables and sub-variables from secondary data and calculate the value based on weight and score.

$$\text{Score} = \frac{Data\ each\ districts/city}{Total\ data\ of\ Province} \times 100$$

Value = Weights x score

As for productivity is calculated back from fishery statistical data of West Java Province. Here's the formula productivity is calculated for the main indicators of competitiveness of fisheries (Yulistyo 2011):

a. Productivity Production per Trip

$$Ppt = \frac{Pik}{Tik} \quad \text{... (1)}$$

Information :
ppt : Manufacturing productivity per trip (ton / trip)
P : Total Production (tonnes)
T : Total Trip (trip)
i : Regency i (i = 1, …, 11)
k : period of time

b. Productivity Production per Fishermen

$$Ppn = \frac{Pik}{Nik} \quad \text{... (2)}$$

Information :
PPN : Productivity per fisherman production (tons / person)

P   : Total Production (tonnes)
N   : The total number of fishermen (people)
i   : Regency i (i = 1, ..., 11)
k   : period of time

c.   Productivity Production Value per Trip

$$Pnpt = \frac{NPik}{Tik}$$ .... (3)

Information :
Pnpt :   The productivity of the production value per trip (IDR / trip)
NP   : Values Production (Rupiah)
T   : Total trip (trip)
i   : Regency i (i = 1, ..., 11)
k   : period of time

d.   Productivity Production Value per Fishermen

$$Pnpn = \frac{NPik}{Nik}$$ .... (4)

Information :
Pnpt :   The productivity of the production value per fisherman (IDR / person)
NP   : Values Production (Rupiah)
T   : The total number of fishermen (people)
i   : Regency i (i = 1, ..., 11)
k   : period of time

7.   Warned of the competitiveness of fisheries among all regencys / cities in West Java Province based on the value weighted.

8.   Specifies criteria for the competitiveness of fisheries throughout the regencys / cities in West Java Province using quartiles with Minitab application. The criteria are divided into four quartiles, Q_1 is an area with very high competitive, Q_2 is an area with high competitiveness, Q_3 is an area with sufficient competitive, Q_4 is an area with low competitiveness.

9.   Analysis of fisheries development index in the Regency / City of West Java Province uses the development index formula uses the development index formula used according to the Annual Fisheries Index book by the Province 2006-2009 (Yulistyo 2011). The development index calculated is:

a.   Production of Capture Fisheries Development Index

$$IPPijk = \frac{Qijk}{Qijkl} \ x \ 100$$ .... (1)

Information :
IPP : Production of Capture Fisheries Development Index
Q   : Production Volume (tons)
i   : Regency i (i = 1, ..., 11)
j   : Type Classification of Fishing
k   : period of time
kl   : 1 years prior to the period of time

b.   Facility of Capture Fisheries Development Index

$$IPSijk = \frac{Sijk}{Sijkl} \ x \ 100$$ .... (2)

Information :
IPS : Facility of Capture Fisheries Development Index
S   : Means of Fishery Enterprises (ship)
i   : Regency i (i = 1, ..., 11)
j   : Type Classification of Fishing
k   : period of time
kl   : 1 years prior to the period of time

c.   Fishermen Development Index

$$IPNijk = \frac{Nijk}{Nijkl} \ x \ 100$$ .... (3)

Information :
IPN : Fishermen Development Index
N   : Number of Fishermen Overall (vote)
i   : Regency i (i = 1, ..., 11)
j   : Type Classification of Fishing
k   : period of time
kl   : 1 years prior to the period of time

d.   Work Productivity per Labor Development Index

$$IPPTijk = \frac{Qnijk}{Qnjkl} \ x \ 100$$ ....(4)

Information :

IPPT : Development Index Productivity per Labor

Qn : Production is divided Fisherman (tons / person)

i : Regency i (i = 1, ..., 11)

j : Type Classification of Fishing

k : period of time

kl : 1 years prior to the period of time

RESULTS AND DISCUSSION

Based on research that has been done, the final values obtained from the primary indicator of each regency/cities that shows the ranking of competitiveness and categories among regions of regencys/cities in West Java. The ranking of competitiveness as a whole indicates the relative position of an area to another area with regard to all of its variables and how far the region can realize the potential of its variables. Calculation and competitiveness rankings conducted on 11 regencys / cities in West Java province produce a picture of the overall rankings as shown in Table 1.

Table 1. Ranked Competitiveness Regency / City of West Java Province

Regency / City	X1	X2	X3	X4	X5	Final score	Ranked	Category Competitiveness
Kab. Indramayu	3.27	5.58	9.82	10.77	2.23	31.66	1	Very high
Kab. Cirebon	2.53	2.30	4.81	0.20	1.94	11.79	2	
Kab. earring	2.02	1.93	1.62	3.59	2.57	11.74	3	High
Kab. Sukabumi	3.85	5.33	0.81	0,00	0.73	10.72	4	
Kab. Pangandaran	2.41	0.66	0.37	0.07	6,96	10.47	5	
Cirebon city	0.12	0.23	0.51	5.69	2.41	8.95	6	Sufficient
Kab. Karawang	1.32	2.26	0.97	0.08	0.93	5.56	7	
Kab. Bekasi	1.19	0.78	0.30	0,00	0.51	2,78	8	
Kab. Cianjur	1.81	0.27	0.07	0,00	0.26	2.41	9	Low
Kab. Garut	1.56	0.18	0.09	0,00	0.27	2.10	10	
Kab. Tasikmalaya	1.13	0.45	0.06	0.01	0.17	1.81	11	

(Source: Data Processing)

Information :

X1 = Human Resources

X2 = Infrastructures Fishing

X3 = Production and Production Value of Capture Fisheries

X4 = Application of Science and Technology in Capture Fisheries Management Results

X5 = Productivity

The results of this study in the form of graphical ofl development between regencys/cities in West Java. These overall developments graph shows the development of capture fisheries in West Java Province during the period 2002 - 2017 experienced fluctuating changes. The development of production and productivity in the Q_1 region categories goes in harmony, as production increases, productivity has increased, although the development of fisherman decreases. Areas with categories Q_1 and Q_2 have increased production even though the existing facilities has decreased. Of the three types of fleets, the population og motorboats and outboard motors has consistently increased over time, while the fleet

of boats without motors population showed a tendency to decrease (Marine Affairs and Fisheries Office of West Java Province 2017). This indicates that the fleet of boats and outboard motors that use relatively less labor intensive when compared to the use of labor in the fleet boats without motors. This shows that the fleet of motorboats and outboard motors that use labor is relatively less intensive when compared to the use of labor in non-motorized boat fleets. This means that modernization has begun to occur in the capture fisheries business and tends to use assistive devices to operate it,

so that the need for labor use decreases. Because, indeed, the characteristics of an efficient and profitable capture fisheries business are capital intensive ones.

1. Production Trend Development Index

Based on research that has been done, the result of development index based on aspects of capture fisheries production during a period of 15 years from the period 2002 - 2017. During this period, the development of fisheries production in West Java province fluctuated (Figure 1).
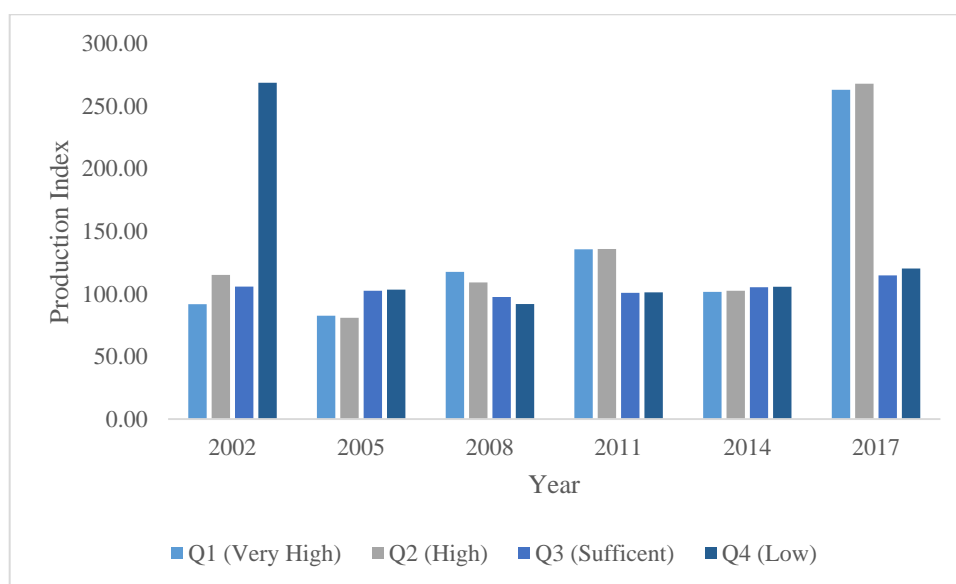
Picture 1. Development Index of Capture Fisheries Production in West Java Province

Areas with very high competitiveness category (Q_1) tends to experienced significant increases and decreasesin production. During the period 2002 - 2011 this region experienced two increases in 2008 and 2011 with an index value of 117.61 and 135.66. Furthermore, it decreased in 2014, then rose again in 2017 with an index value of 263.15.

Areas with high competitiveness category (Q_2) experienced a similar development with area of high competitiveness category (Q_1) during the period 2002 - 2017. However, the development Q_2 in 2002 and 2017 was higher than Q_1. Q_2 region index value in 2017 amounted to 267.92.

Areas with sufficient competitiveness

category (Q_3) has decreased and increase that was not significant. During the period 2002 - 2017 has decreased in 2005 and 2008 with an index value of 102.6 and 97.53. Then increased in 2011 and 2017, despite an index value was not so different. The index value for 2011, 2014, and in 2017 respectively are 100.89; 105.33; and 114.88.

Areas with low competitiveness category (Q_4) has decreased significantly in the period from 2002 to 2005 with an index value of 2002 amounted to 268.73; while in 2005 amounted to 103.49. Then shows not so sigfinicant development in the period 2008 to 2017. The index value Q_4 2017 is greater than the index area of Q_3 in the same year which is equal to

120.36.

2. Facilities and Infrastructures Trends Development Index

The number of facilities and infrastructure, ispecifically the number of ships or fleets that used in capture fishery in the period of 15 years during the period 2002 – 2017 varied greatly. During the period 2002 – 2001 development of fisheries facilities and infrastructure was fluctuated in West Java Province. The development of fisheries facilities and infrastructure reflects the level of progress from year to year (Figure 2).
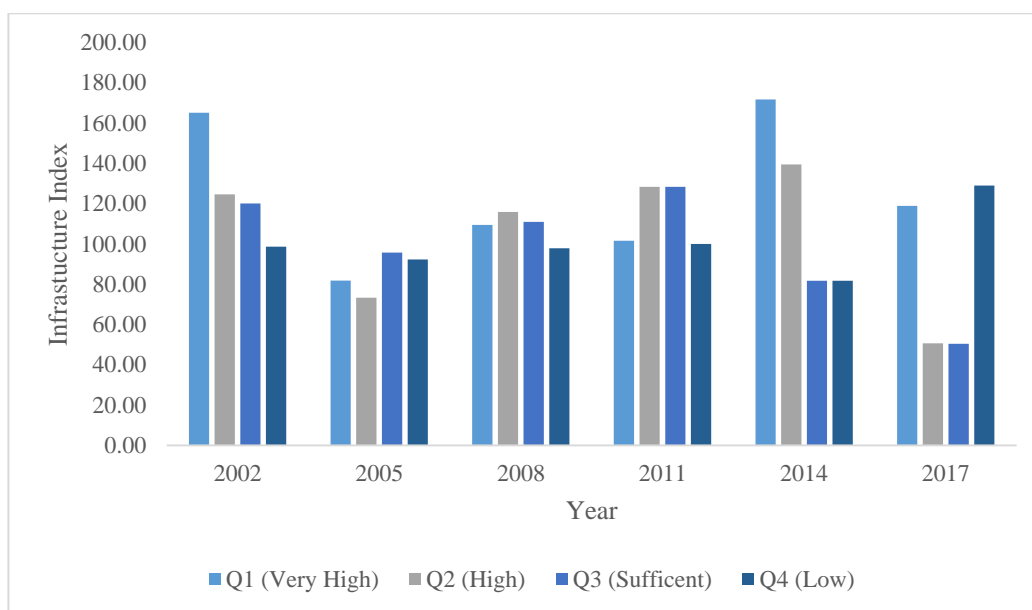

Figure 2. Infrastructures Development Index fisheries in West Java Province

Based on the graph obtained, the region with very high competitiveness category (Q_1) tend to decline significantly, especially in 2005 and 2017 with an index values of 81.85 and 118.92. However, it increased in 2008 and 2014. The index values of facilities and infrastructure development in 2008 and 2014 was 109.48 and 171.72.

Areas with high competitiveness category (Q_2) is not experiencing significant development during the period 2002 - 2017. The Q_2 region ecperiencd a decreases twice over 15 years in 2005 and 2017 with an index values of 73.33 and 50.70. However, the increase was not significant during the period 2008 to 2014.

Areas with sufficient competitiveness category (Q_3) increased two times during the period from 2002 to 2017 in 2008 and 2011. The 2008 has the index value of 110.95 and 2011 has the same index value with the region Q_2 in the same year amounted to 128.35. But decreased significantly in 2014 and 2017. The index value of facilities and infrastructure development in 2014 and 2017 amounted to 81.77 and 50.43.

Areas with low competitiveness category (Q_4) during the period from 2002 to 2017 experienced three times increase in 2008, 2011, 2017. In 2017 a very significant increase is even greater than the index of the region Q_1 in the same year amounted to 139.04. But decreased significantly in 2014 with the same index value as Q_3 region of 81.77.

3. Fishermen Trend Development Index

The number of fishermen in capture fisheries within a period of 15 years during the period 2002-2017 varied greatly. During the period 2002 - 2017 there was a development of fisheries fishermen are likely to decline in West

Java Province. In 2017 the fishermen development index of entire area has decreased. The fishermen development reflects the level of progress from year to year (Figure 3).

Based on the graph obtained, fisherman development index in 2002 and 2005 has the same value. This is because, there are no statistical data on the number of fishermen in each regency in that year. So the researchers

estimated the number of fishermen by the total number of fishermen in West Java province in 2001, 2002, 2004, and 2005 through the presentation of the nearest year.

Areas with very high competitiveness category (Q_1) tends to increase in 2008 until 2014. However, it decreased in 2017. The fisherman development index value in 2017 amounted to 95.40.
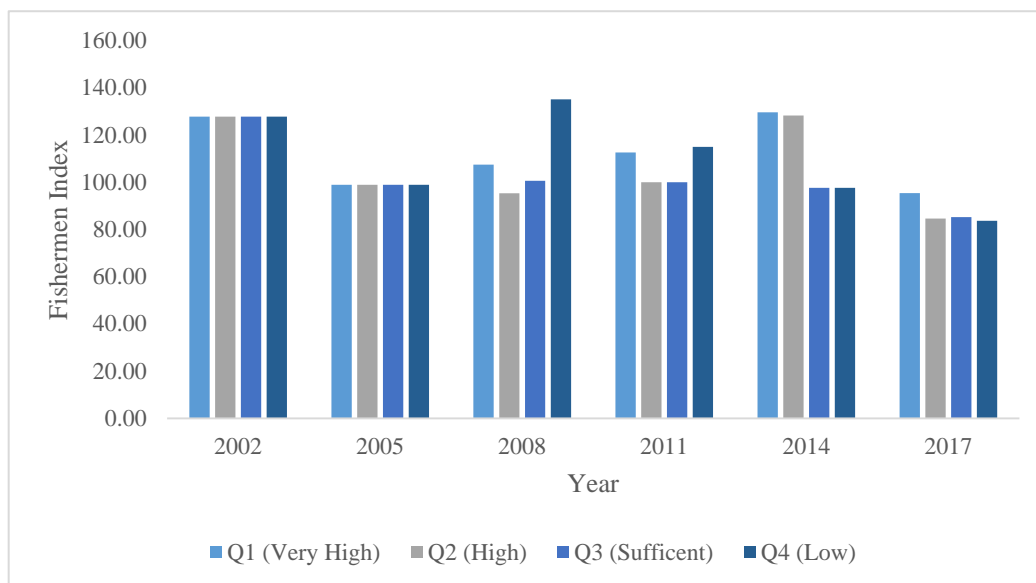

Figure 3. Fishermen Development Index in Java Barat

Areas with high competitiveness category (Q_2) did not experiencing significant development during the period 2002 - 2017. The Q_2 region experienced a decreases index twice in 2008 and 2017 with an index value of 95.33 and 84.59. However, increased significantly during the period 2008 to 2014. In 2014 in particular increased significantly with an index value of 128.27.

Areas with sufficient competitiveness category (Q_3) increased one time during the period from 2002 to 2017 in 2008. The index value in 2008 amounted to 100.60. Furthermore, it experienced no significant decline during the period 2011 - 2017. The area with low competitiveness category (Q_4) experienced a similar development to the

region of high competitiveness category (Q_3) during the period 2002-2017.

4. Productivity Trend Development Index

The productivity of capture fisheries within a period of 15 years during the period 2002-2017 varied greatly. During the period 2002 - 2017 development of fisheries productivity was fluctuated in West Java Province. The development of capture fisheries productivity will be directly proportional to the production of fish, but inversely proporsional to fishermen (Figure 4).

Based on the graph obtained, the index of productivity development in region with very high competitiveness category (Q_1) tends to

increase during the period from 2002 to 2011. But it declined in 2014, then rose significantly in 2017. The value of fishermen development index in 2017 amounted to 285.49.

Areas with high competitiveness category (Q_2) was not experieced significant development during the period 2002 - 2017. The Q_2 region index declined as much as one in 2008 with the index value of 82.18. However, it increased significantly during the period 2008 to 2014. In 2014 in particular it increased significantly with an index value of 141.67.

Areas with sufficient competitiveness category (Q_3) increased significantly one time over a period of years from 2002 to 2017 in

2008. The index value of fisherman development in 2008 amounted to 181.37. Furthermore, it experiences insignificant decline during the period 2011-2017.

Areas with low competitiveness category (Q_4) has developed very volatile during the period 2002 - 2017. In 2002 the index value of the Q_4 region was very high compared with the other three areas with a value of 210.29. Then it experienced a significant decline in 2005, then increase significantly during 2008 - 2011. In 2014 Q_4 region experienced a significant decline with an index value of 88.53, then there was an insignificant incease in 2017 amounted to 93.91.
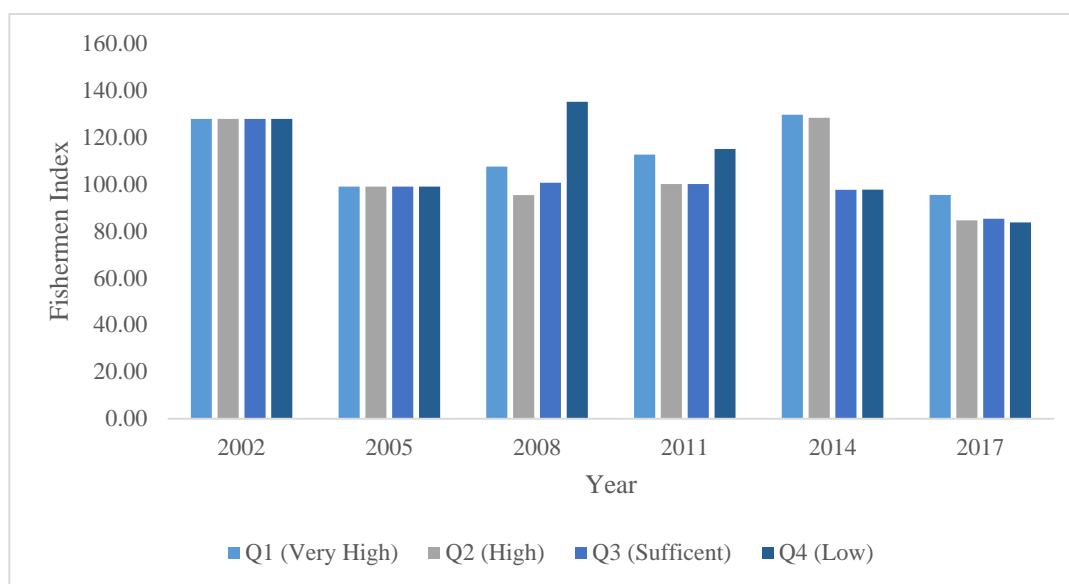

Figure 4. Capture Fisheries Development Index Productivity in West Java Province

CONCLUSION

Based on the research that has been conducted obtained several conclusions as follows:

The development of fisheries regencys/cities in West Java Province in terms of production, infrastructure, fishermen, and productivity changes fluctuated during the years 2002 to 2017. Production development in the region with very high competitiveness category increased significantly in 2017. The development of infrastructure in the region with very high competitiveness category has increased and decreased over the past 15 years.

The infrastructure development was increase significant occurred in 2014. The development of

fisherman in the area with category very high competitiveness decreased in 2017. The development of productivity in the region with very high competitiveness category has increased very significantly in 2017.

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