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## Analysis of Fisheries Sector Contribution in Nabire District of West Papua Province

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### ABSTRACT

The aims of this research were to analyze the rate of growth of the fisheries sector from year to year in Nabire District and analyze the role of the fisheries sector to regional development in Nabire District. The research method covered Shift Share analysis and competitive analysis region, using Location Quotient (LQ), Localization Index (LI) analysis, and Specialization Index (SI) analysis. Shift Share analysis results indicate that the fisheries sector of Nabire District has a slower growth profile and has a low competitiveness. The results of the analysis of regional advantages by using LQ with the average rate of 1.43; LI with the average rate of 0.01; and SI with the average rate of 0.00 to 0.01 indicate that the fisheries sector is a basis sector, but not the prime mover sector of the economic sector.

**Keywords:** Fisheries sector, basis sector, economy growth, development, Nabire District, West Papua

### 1. INTRODUCTION

Nabire District is one of the fish producers in the West Papua region. The value of fisheries production in the formation of GDP in Nabire District has a tendency to increase every year. The fisheries sector in Nabire District has a significant contribution in GRDP. The

fisheries sub-sector of Nabire District also makes a significant contribution to the economy of Nabire District.

The fisheries sector in 2016 accounted for 3.12 percent of the total GRDP of Nabire District with a GDP value of 611.36 billion IDR, with this figure growing relatively up to 2014. In 2014, the fisheries sub-sector accounted for 3.29 percent of the total GRDP of 777.48 billion IDR. These conditions indicate that coastal areas as the main producers of fisheries have a very large role in the economy and certainly still have great potential and opportunities to develop.

The number of fish production in Nabire District in 2016 was 28.29 thousand tons consisting of 26.26 thousand tons (92.81 percent) originating from the sea and the remaining 2.03 thousand tons (7.19 percent) were cultivated in land fisheries. The amount of fish production is believed to be far from the potential possessed by Nabire District, both marine and inland fisheries.

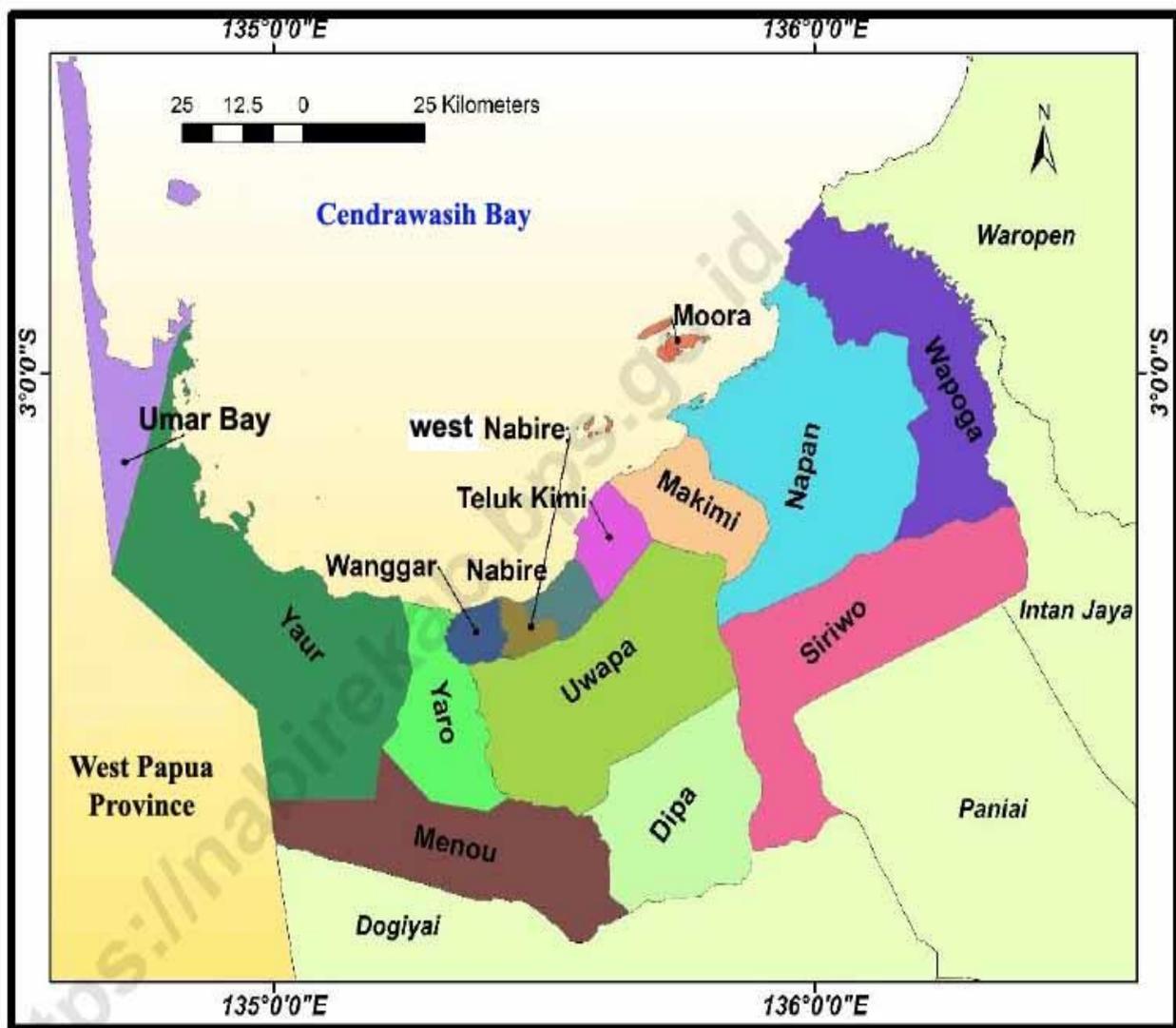


Fig. 1. Nabire District Map.

The maritime and fisheries sector in Nabire District have been developing intensively through appropriate measures. This sector will fabricate a large production value and can be utilized for the economic progress of the community in Nabire District. Large production values can be used to make maximum contributions to regional development.

The progress of the fisheries sub-sector in Nabire District is expected to be able to support an increase in fisheries production so that it will indirectly increase welfare as reflected in fisheries household income per year. For this reason, it is necessary to analyze the role of the fisheries sector in regional development to see how much the fisheries sector contribute to the development of the Nabire District region [1, 2].

## 2. RESEARCH METHOD

The research method used is the Literature Survey method. Primary data were obtained from the results of direct interviews with the agency or service related to this study. Secondary data were obtained from the Nabire District Central Bureau of Statistics, West Papua Province Central Bureau of Statistics, Nabire District Bappeda, and other agencies or institutions in Nabire District. The data utilized in this study include: (1) GRDP data according to current prices and constant prices; (2) Population data; (3) Regional potential data; (4) Results of interviews with relevant agencies in Nabire District. Analysis of the data used in this study is descriptive quantitative while the analysis used are:

### I. Shift Share Analysis

Shift Share Analysis aims to determine economic growth in a region. This analysis compares the differences in the growth rates of various sectors in the region with national territory. The six steps in using shift share analysis are as follows [3-7, 9-13]:

**1.1.** Determine indicators of economic activity and also determine the economic sector to be analyzed, namely the fisheries sector.

**1.2.** Calculating changes in indicators of economic activity from the fisheries sector in the district or province, the production of the fisheries sector in the base year of analysis, and the final year of analysis can be formulated as follows:

**A)** Changes in the production of the fisheries sector in the district or province are formulated:

$$\Delta Y_{ij} = Y'_{ij} - Y_{ij} \dots\dots\dots(1)$$

**B)** Percentage of Change in GRDP is formulated:

$$\% \Delta y_{ij} = \frac{(Y'_{ij} - Y_{ij})}{Y_{ij}} \times 100\% \dots\dots\dots(2)$$

**1.3.** Calculate the ratio of economic activity indicators where the production ratio is used to see the comparison of production from the fisheries sector in a particular region. The ratio consists of  $r_i$ ,  $R_i$ , and  $R_a$ .

**A)**  $r_i$

$$ri = \frac{Y'_{ij}-Y_{ij}}{Y_{ij}} \dots\dots\dots(3)$$

**B) Ri**

$$Ri = \frac{Y'_{i}-Y_i}{Y_i} \dots\dots\dots(4)$$

**C) Ra**

$$Ra = \frac{Y'_{-}-Y_{-}}{Y_{-}} \dots\dots\dots(5)$$

**1.4.** Calculate the growth component consisting of Provincial Growth Component (PGC), Component of Proportional Growth (CPG) and Component of Regional Share Growth (RSG).

**A) Provincial Growth Component (PGC)**

$$PGC_{ij} = Ra (Y_{ij}) \dots\dots\dots(6)$$

**B) Component of Proportional Growth (CPG)**

$$CPG_{ij} = (Ri - Ra) Y_{ij} \dots\dots\dots(7)$$

If the  $PGC_{ij} < 0$ , it indicates the fisheries sector in the  $j$  region is slow growth whereas if  $CPG_{ij} > 0$ , it indicates that the fisheries sector is in a fast growing region.

**C) Component of Regional Share Growth (RSG)**

$$RSG_{ij} = (ri - Ra) Y_{ij} \dots\dots\dots(8)$$

**1.5.** Evaluating the sector growth profile is used to evaluate the growth of the sector in the specified time period by expressing the percent change in proportional growth component ( $PG_{ij}$ ) and growth in the share area ( $GS_{ij}$ ). The percentage of regional growth can be formulated as follows:

$$\% PG_{ij} = \frac{PP_{ij}}{Y_i} \times 100\% \dots\dots\dots(9)$$

$$\% GS_{ij} = \frac{PPW_{ij}}{Y_i} \times 100\% \dots\dots\dots(10)$$

There are four quadrants in shift share namely:

**A.** Quadrant I shows that the sector has fast growth and good competitiveness compared to other regions (progressive growth)

**B.** Quadrant III shows that the sector has slow growth and good competitiveness

C. Quadrant II and quadrant IV have a slash that drives the quadrant and sets a 45° angle, indicating that the top of the line is a sector that has a progressive growth while the bottom line is a sector that has slow growth.

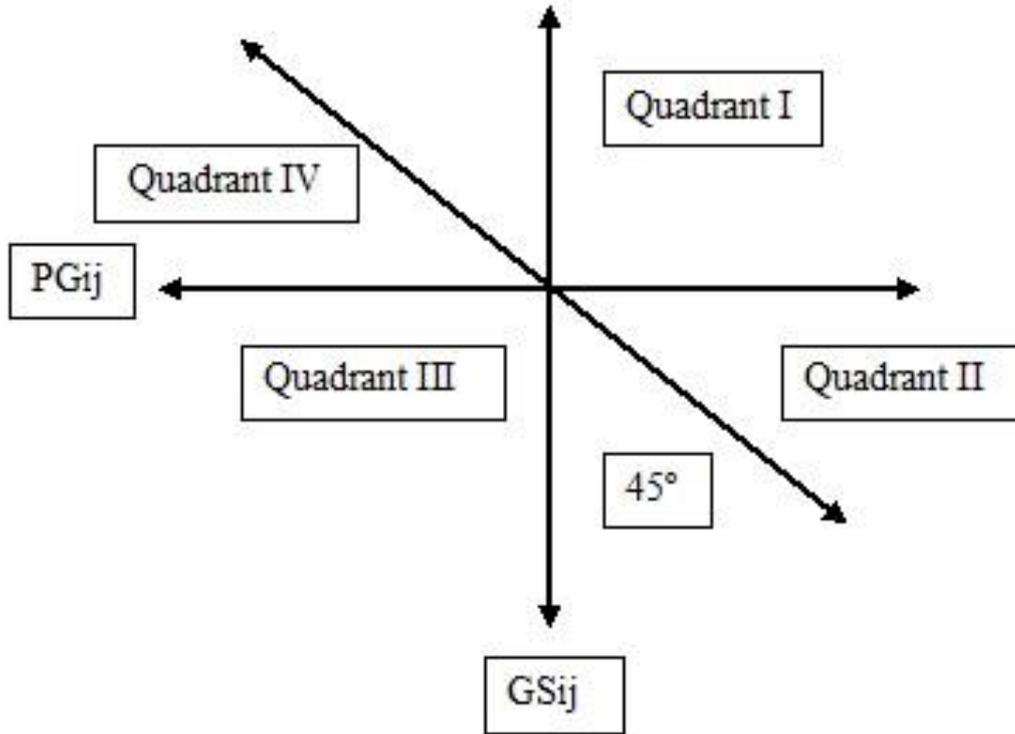


Fig. 2. Sector Grouping According to Shift Share Analysis

1.6. Calculate a Net shift (NS)

$$NS_{ij} = PG_{ij} + GS_{ij} \dots\dots\dots(11)$$

**II. Analysis of Regional Excellence**

**2.1. Location Quotient (LQ) Analysis**

Location Quotient (LQ) analysis model is a calculation technique to find out the base and non-base sectors by comparing the percentage contribution of the fisheries sector [6-8].

$$LQ = \frac{x_{ij}}{x_j} / \frac{x_{il}}{x_l} \dots\dots\dots(12)$$

The LQ coefficient <1 means that the sector concerned does not have a comparative advantage. The coefficient of LQ = 1, means the sector has a comparative advantage that is equal to the average of all regions. The LQ coefficient > 1 means that the sector concerned has a comparative advantage that is more than average, or in other words a base sector [5-9].

## 2.2. Localization Index (LI) Analysis

Localization Index (LI) is an analysis technique that shows an activity developing in all regions (dispersion) or relatively developing only in certain regions (localization/concentration).

$$Lij = \frac{1}{2} \sum_{j=1}^n \left\{ \left| \frac{X_{ij}}{X_j} - \frac{X_i}{X_{..}} \right| \right\} \dots\dots\dots(13)$$

## 2.3. Specialization Index (SI) Analysis

SI analysis is used to categorize that a region has diversified activities or has specialized activities. If a region has diversified activities, the region does not have a base activity, but if the region has specialized activities and has certain base activities. The SI analysis can be formulated as follows:

$$Lij = 1/2 \sum_{j=1}^n \left\{ \left| \frac{X_{ij}}{X_i} - \frac{X_j}{X_{..}} \right| \right\} \dots\dots\dots(14)$$

# 3. RESULTS AND DISCUSSION

## 3. 1. Share component

Shift Share Analysis is used to determine regional economic growth with broader regional growth as a reference economy. There are three components of growth in the Shift Share analysis. The first share component which explains that regional growth is compared to the following national growth [10-17].

**Table 1.** Changes in GRDP of the Fisheries Sector in Nabire District and West Papua Province on the basis of Constant Prices in 2013-2017

Year	(ΔYi)	Change Presentation (%)	(ΔYj)	Change Presentation (%)
2013/2014	32.28	6.29	336.59	4.59
2014/2015	-2.17	-0.40	402.30	5.24
2015/2016	26.27	4.83	432.31	5.35
2016/2017	18.28	3.21	462.29	5.43

The fisheries sector in Nabire District has a tendency to decrease from year to year. The change in GRDP of West Papua Province is greater than that of the fisheries sector in Nabire District owing to its wider coverage with the contribution of the marine capture sector which has a greater GRDP value than the district fisheries sector.

The fisheries sector was the highest in 2013/2014 with a percentage of 6.29% while in the provincial fisheries sector it increased higher in 2016/2017 with a percentage of 5.43%. Comparison of GRDP growth is further described by the ratio expressed in terms of *Ri* and *ri*. Overall provincial growth is reflected in the form of *Ra*.

**Table 2.** GRDP Ratio of Fisheries Sector in Nabire District and West Papua Province in 2013-2017

Year	<i>Ri</i>	<i>ri</i>	<i>Ra</i>
2013/2014	0.06	0.046	0.07
2014/2015	-0.004	0.052	0.06
2015/2016	0.05	0.054	0.06
2016/2017	0.03	0.054	0.05

The development of the fisheries sector in Nabire District and West Papua has not been developed because of the negative ratio values. The fisheries sector tends to fluctuate every year. In 2013/2014, the development of the fisheries sector in the district was higher than the provincial fisheries sector, while based on the reference value of the fisheries sector, the district and the provincial fisheries sector developed more slowly.

The following year 2013/2014 shows developments that have not been in accordance with the reference. The district fisheries sector is under a negative value due to a decrease in the district fisheries sector production. In 2014/2015, the fisheries sector had still not developed optimally based on its reference value. In 2015/2016, the provincial fisheries sector developed in line with the reference value which has a balanced value with the reference value.

**Table 3.** Share Components of the Fisheries Sector in Nabire District with West Papua Province in 2013-2017

Year	CPG
2013/2014	35.93
2014/2015	32.73
2015/2016	32.61
2016/2017	28.48

Table 3 shows the fisheries sector with the largest proportional growth component value in 2013/2014 with a value of 35.93 and the smallest is 2016/2017 with a value of 28.48.

### 3. 2. The mix component

The mix component is a component that explains the relative speed of regional growth compared to the growth of the province [20-25]. Mix components for the fisheries sector in 2013-2017 are shown in the following Table 4.

**Table 4.** Components of Mix of Fisheries Sector in Nabire District with West Papua Province in 2013-2017

Year	PG
2013/2014	-12.39
2014/2015	-4.14
2015/2016	-3.52
2016/2017	2.46

Proportional growth (PG) shows the contribution of the fisheries sector in the province. In 2016/2017 Nabire District had a positive growth with  $PG > 0$  so it was possible to conclude that in the year the fisheries sector had a rapid growth rate compared to West Papua province. In 2013/2014, 2014/2015, and 2015/2106 it had a negative PG value indicating that in that year the growth rate was late compared to West Papua province rate. The following figure displays the development of the mix component from year to year.

### 3. 3. The Competitive component

The Competitive component is a component that shows that a region has a competitive advantage compared to national level [18-25].

**Table 5.** Competitive components of the fisheries sector in 2013-2017

Year	GS
2013/2014	8.7365
2014/2015	-30.7612
2015/2016	-2.81764
2016/2017	-12.6554
Mean	-9.3744

The Competitive component shown in Table 5 has an average of  $-9.3744$  which is a value that shows that in general in the last five years development from 2013 to 2017 shows the district fisheries sector has no advantages over other regions in West Papua Province.

### 3. 4. The net shift

The net shift is obtained from the sum of proportional growth (PG) and growth in the share of the region (GS) of the fisheries sector. The net shift value is greater than 0, indicating that the sector is progressive (forward), while the net shift value of less than 0 indicates that the fisheries sector is a slow sector.

**Table 6.** Net Shift of the Fisheries Sector in Nabire District

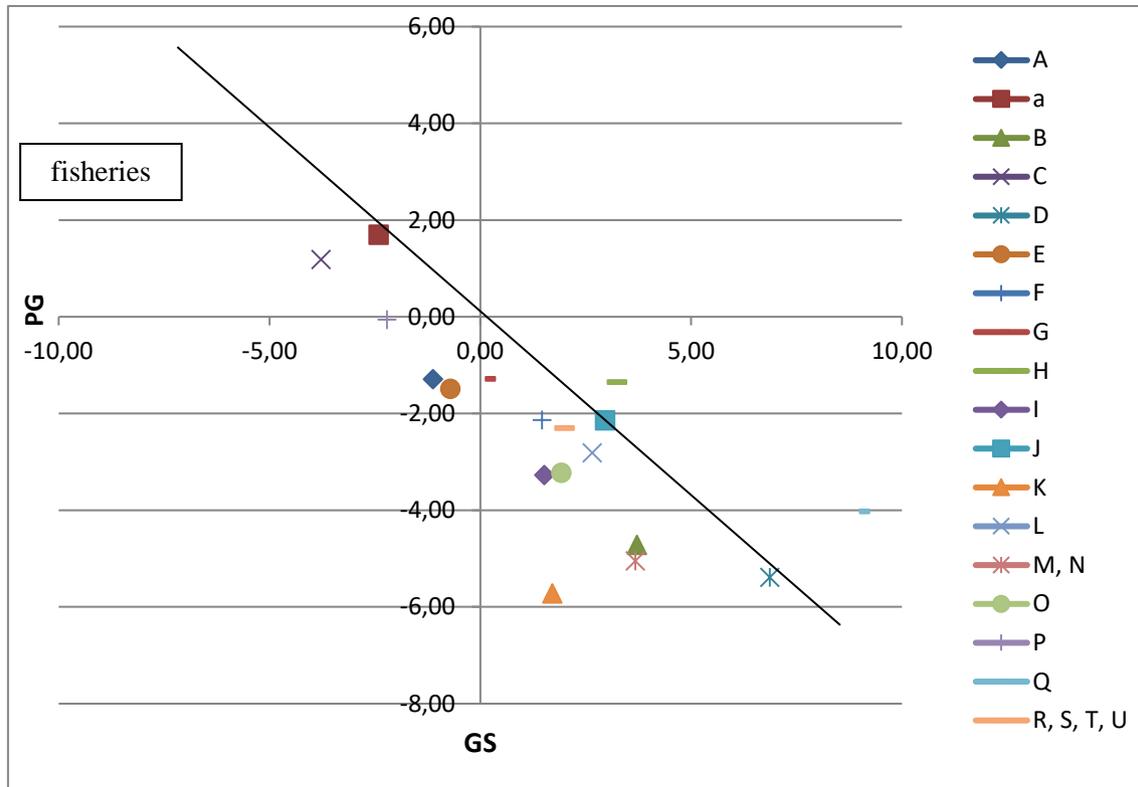
Tahun	NS
2013	-3.655
2014	-34.9021
2015	-6.34168
2016	-10.1945
Mean	-13.773

The fisheries sector in Nabire District shows that on average each year the it sector has a value of less than zero. This value indicates that the fisheries sector is one sector that has slow growth. This does not mean a negative value because the fisheries sector is dominated by fishing companies.

Declining in capture fisheries can be influenced by numerous factors. Built on the results of interviews, damage to the aquatic environment causes the availability of fish to decline and affect the value of fisheries production. Ship permits not made by fishermen affect the data collection of fisheries production and also cause fishermen do not go to sea owing to the absence of a ship's permit. Prohibition of fishing gear is also the reason for the decline in fisheries production.

### 3. 5. Profile of Growth Sector

The growth profile shows that the fisheries sector is a basic sector that has slow growth. The sector growth profile is established based on the percentage value of PG and GS. This value will indicate the fisheries sector quadrant. Figure 3 shows the fisheries sector quadrant in quadrant IV below the line, which means that the fisheries sector is a slow-growing one with low competitiveness.



**Fig. 3.** Growth Profile of the Fisheries Sector in Nabire District

### 3. 6. Location Quotient (LQ)

LQ analysis is used to find out that the fisheries sector is a base or non-base sector so it can be determined that the potential fisheries sector is developed or not. Table 7 shows the LQ values of all sectors in Nabire District.

**Table 7.** Results of Calculation of LQ Analysis in Nabire District in 2013-2017.

Category	Sector	2013	2014	2015	2016	2017
A	Agriculture, Forestry and Fisheries - Fisheries	0.84 <b>1.44</b>	0.85 <b>1.48</b>	0.85 <b>1.41</b>	0.86 <b>1.43</b>	0.84 <b>1.41</b>

The fisheries sub-sector is also a basic sector of Nabire District. This is indicated by the LQ value that is greater than 1. The fisheries sub-sector contributes around 3% of GRDP which has an average LQ value of 1.43 even though the fisheries sector is not usually a sector base. The fisheries sector is a basic sector meaning that fish production in Nabire District has been able to meet demand in the region and outside the district.

### 3. 7. Localization Index (LI)

The data used in the LI analysis are the data used in the LQ analysis, namely Nabire District GRDP data and West Papua province GRDP data. Results of the LI analysis are shown in the Table 8.

**Table 8.** Results of calculation of LI analysis for the Fisheries Sector

Year	LI
2013	0.01
2014	0.01
2015	0.01
2016	0.01
2017	0.01

LI value (the result of a calculation close to 0 (0.01 or below 0.5) indicates that the fisheries sector is dispersed in Nabire District, meaning that the fisheries sector has not been the focus and excellence in Nabire District. It has the potential of the fisheries sector in accordance with its geographical area.

### 3. 8. Specialization Index (SI)

Specialization Index analysis is used to know that an activity is realized or not in any area. An activity can be determined as the realization that becomes a focus in an area. The results of SI analysis calculations in Nabire District are shown in the following Table 9.

**Table 9.** Results of Calculation of SI Analysis of Nabire District in 2013-2017

Category	Sector	2013	2014	2015	2016	2017
A	Agriculture, Forestry and Fisheries - Fisheries	-0.02 <b>0.0</b>	-0.02 <b>0.01</b>	-0.02 <b>0,0</b>	-0.02 <b>0,0</b>	-0.02 <b>0,0</b>

Table 9 shows that the value of SI is between 0.00-0.01, which means that economic activities in Nabire District are dispersed, and there are no activities or sectors that are more focused than other sectors in the sense that there is no concentration or specialization in one economic activity. The realization of an activity that describes a region gets a good development or not. Dispersed economic activity of Nabire District is a picture of equitable development in various economic sectors. Among these activity sectors, there need to be commodities that can be seeded.

#### 4. CONCLUSION

The growth of the fisheries sector from year to year since 2013-2017 shows a meaningless increase and the growth of the fisheries sector is relatively slow and already does not have a competitive advantage compared to other regions. The growth profile shows that the fisheries sector in Nabire District is a sector with sluggish growth and low competitiveness. The role of the fisheries sector is a basic sector with a LQ value of 1.43 but is not a focus and is not specifically developed in Nabire District.

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