Original Research Article

The Contribution of Aquaculture Sector in Regional Development of West Bandung District, West Java Province

ABSTRACT

This study aims to analyze the base and non-base sectors of aquaculture, analyze the contribution of the aquaculture sector and analyze the market power of aquaculture commodities in the development of the West Bandung District area. The methods used in this study were qualitative and quantitative. The quantitative method uses cross-sectional data and the 2018-2020 time series and descriptive statistics. Qualitative methods were obtained through direct interviews and questionnaires. The analysis used is Location Quotient (LQ) analysis, Dynamic Location Quotient (DLQ) analysis, Shift Share (SS) analysis, Trade Area Capture (TAC) analysis and Pull Factor (PF) analysis. The results of the analysis of Location Quotient (LQ) and Dynamic Location Quotient (DLQ) show that the aquaculture sector in West Bandung District is included in the base sector and has the hope of remaining the base sector in the future because the average LQ value is 1.81 and the DLQ is average. An average of 1.01. The Shift Share (SS) analysis shows that the contribution of the fisheries sector to GRDP has changed; in 2018-2019, it was 46.05%, and in 2019-2020 it was -51.32%.The results of the analysis of Trade Area Capture (TAC) and Pull Factor (PF) show an average TAC value of 80,717.041> the total population, which means they can capture trade opportunities from other regions. The average PF value is 1.64 (PF>1), which means that aquaculture products produced by West Bandung District can attract customers from the other areas. The development of the West Bandung District area can be optimized by setting the aquaculture sector as a regional development priority.

Comment [A1]: The brief statement of the problem should be added on the abstract Brief Conclusion and Recommendation

Keywords: Location Quotient; Dynamic Location Quotient; Shift Share; Trade Area Capture and Pull Factor.

1. INTRODUCTION

Regional development is also known as regional economic development with a macroeconomic context—for example, the economic development of provinces, districts, and cities [1]. Empirically, the development of the fisheries sector in Indonesia is positioned as a fringe and has received less attention from the government and the business community. This condition is inversely proportional to the enormous economic potential of fisheries if managed wisely [2]. Economic activity and a measure of the progress of a region can be seen with a general indicator, namely the Gross Regional Domestic Product [3]. The aquaculture sector in West Bandung District can be a (*prime mover)* in increasing job opportunities, income distribution, and the level of life of the nation.

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Summary of the Introduction
Summary of the Background of the study
Summary of the Statement of the problem
What the Author(s) intended to achieve

WestBandungDistrict is part of West Java Province, geographically, the latitude is at a position of 06°41'- 07°19' South Latitude (LS), and the longitude is at a place of 107°22'-108°05' East Longitude (BT) with an area of 130,577.40 Ha or 1,305.77 Km^2. When viewed from the geographical and demographic conditions of the West Bandung District, this is a potential area to be developed [4].

The highest role in the GRDP of West Bandung District in 2020 was generated

by the processing industry business field, reaching 40.35% and then followed by the Agriculture, Fisheries, and Forestry sector with 13.28%, Wholesale and Retail Trade with 12.89%. In comparison, the role of other business fields is below 8.00% [5]. Seeing fishery opportunities in a business field, it is necessary to make the best possible use of the aquaculture sector, which can become the basis of the economy. This is supported by two large reservoirs that enter the West Bandung District area; namely, Saguling Reservoir and Cirata Reservoir starting from hatcheries, nursery, rearing up to fish processing [4].

The production contribution of the aquaculture sector in Bandung Barat District, when viewed from the data from the Fisheries Service of West Java Province, reached 45,765 tons in 2019, with the most significant production from freshwater floating nets getting 42,261 tons, while calm water pools reached 3,505 tons [6]. The people of Bandung Barat District are pretty enthusiastic about aquaculture commodities because they can become *value-added products*. This is what makes aquaculture commodities such as catfish, catfish, tilapia, and carp increasingly in demand by consumers even though the selling price of aquaculture products changes every year.

The process of implementing the development of the aquaculture sector in Bandung Barat District has several challenges due to dynamic products and environmental changes, for example, changes in population, land resources, limited access to capital, increasingly limited water and energy, speedy advances in information and technology, lack of cultivating institutions. Fish still lack coordination and integration between sectors. Although there are many challenges in the development process of the Bandung Barat District area, the amount of production and the total value of aquaculture production continues to increase every year where the velocity of money in the aquaculture sector is 1.2 trillion per year [7]. This increase will have a positive effect on the contribution of regional development.

The development policy ofthe aquaculture sector in regional development must be oriented towards increasing added value and productivity, increasing job opportunities and business efficiency, and increasing fishery business. Based on these conditions, it is necessary to research "The Contribution of the Aquaculture.

2. MATERIAL AND METHODS

This research takes place in West Bandung District, West Java Province. The data collection and analysis time is from October 2018 to October 2020. The types of data used are primary and secondary data. Primary data were obtained from interviews with the head of the aquaculture sector and cultivators of calm water ponds and floating net cages. Meanwhile, secondary data from the Central Statistics Agency for West Bandungand West Java districts, the Livestock Fisheries Service Office for West Bandung District, and the Marine and Fisheries Service for West Java Province. The sampling technique for conducting interviews uses *purposive sampling*, where the sampling process requires consideration from the researcher by the research objectives.
The method used is qualitative and quantitative because the data used is numerical data, which will be analyzed statistically. The resulting data is then analyzed to provide answers to the problem formulation. The object of this research is West Bandung District, West Java Province. Meanwhile, the population in this study covers all districts or cities in West Java Province.

2.1 Data Analysis

Comment [A3]: **The author(s) needs to add Literature Review just after the end of this:**

Literature Review
The Author(s) should be able to discuss the following:
Conceptual Framework
Theoretical Framework
Empirical Review

Comment [A4]: The author(s) should measure the following on the Material and Methods:

Research Method
Research design
Population of the study
Sample size and Sampling Techniques
Method of Data Collection
Method of data Analysis
If necessary the Reliability and Validity of data
State the Model Specification
Data Estimation and Evaluation Techniques
Model Estimation and Evaluation Technique

Analysis Quantitative analysis in this study uses several approaches, including:

2.1.1 Analysis of Location Quotient (LQ)

Analysis Location Quotient (LQ) analysis is a calculation technique to obtain base and non-base sectors by comparing the percentage contribution of the fisheries sector [8], as for the calculation according to [9], namely:

$$LQ = \frac{\frac{S_I}{S}}{\frac{N_I}{N}}$$

Where:

LQ = LQ value of the sector in West Bandung District.
S_I = GRDP of the aquaculture sector in West Bandung District.
S = GRDP of all sectors in West Bandung District.
N_I = GRDP of the aquaculture sector in West Java Province.
N = GRDP of all sectors in West Java Province.

The coefficient criteria according to LQ, according to Rizal [8], are:

a) LQ < 1, the aquaculture sector in West Bandung District does not have a regional advantage from a comparative perspective which means that this region does not belong to the base sector.
b) LQ = 1, meaning that the aquaculture sector in the West Bandung District has a regional advantage in terms of the same comparative when compared to the average of all regions in West Java.
c) LQ > 1, meaning that the aquaculture sector in West Bandung District has a regional advantage from a comparative perspective, higher than the regional average in West Java, which means it is included in the base sector.

2.1.2 Analysis of Dynamic Location Quotient (DLQ)

Analysis Dynamic Location Quotient (DLQ) analysis is a modified calculation technique of LQ analysis because the analysis cannot be used to predict the long term. The DLQ analysis is related to the growth rate issued by the economic sector from time to time. DLQ value is calculated using the following formula [10]:

$$DLQ = \left[\frac{(1+g_{in})/\ (1+g_i)}{(1+G_i)/\ (1+G)}\right]^{t}$$

Where:

g_{in} = GRDP growth rate of the aquaculture sector in West Bandung District.
g_j = The average growth rate of total GRDP in West Bandung District.
G_i = GRDP growth rate of the aquaculture sector in West Java Province.
G = The average growth rate of the total GRDP of West Java Province.
t = The difference between the end of the year and the beginning of the year.

The criteria according to DLQ are:

a) DLQ > 1 means that the ability to develop the aquaculture sector in West Bandung District is higher than in West Java Province, which means there is hope to remain a basic sector in the future.
b) DLQ < 1 means that the ability to develop the aquaculture sector inthe West Bandung District is lower than that of West Java Province, so there is no hope of becoming a base sector.
c) DLQ = 1 means that the ability to develop the aquaculture sector in West Bandung District is the same as in West Java Province.

2.1.3 Analysis Shift-Share (SS)

Analysis Shift-share analysis is a calculation technique to look at the rate of

regional economic growth, which will later compare West Bandung District and West Java Province has seen from the difference in aquaculture growth rates to explain the causes of these changes. According to Ghufron[11], indicators of changes in economic activity are formulated as follows:

a) Changes in the production of the aquaculture sector in the district or province:

$$\Delta \text{Yij} = Y'ij - Yij$$

Where:
ΔYij = Change in the production of the aquaculture sector in West Bandung District or West Java Province.
Y'ij = Production from the aquaculture sector in West Bandung District or West Java Province in the final year.
Yij = Production from the aquaculture sector in West Bandung District or West Java Province in the initial year.

b). Percentage Change in GRDP is formulated:

$$\%\Delta \text{Yij} = \frac{(Y'ij - Yij)}{Yij} \text{ x } 100\ \%$$

Where:
%ΔYij = Percentage change in aquaculture production in West Bandung District or West Java province.
Y'ij = Production from the aquaculture sector in West Bandung District or West Java Province in the final year.
Yij = Production from the aquaculture sector in West Bandung District or West Java Province in the initial year.

The calculation of the indicator ratio of economic activity where the production ratio is used to compare products from the fishery sector in specific areas, including the ratio consisting of ri, Ri, and Ra.

a. ri

$$\text{ri} = \frac{Y'ij - Yij}{Yij}$$

Where:
Y'ij = Production of the aquaculture sector in West Bandung District in the final year.
Yij = Production of the aquaculture sector in West Bandung District in the early years.

b. Ri

$$\text{Ri} = \frac{Y'i - Yi}{Yi}$$

Where:
Y'i = Production of the aquaculture sector in West Java Province in the final year.
Yi = Production of the West Java Province aquaculture sector in the early years.

c. Ra

$$\text{Ra} = \frac{Y'... - Y...}{Y...}$$

Where:
Y'.. = Production of West Java Province at the end of the year.
Y.. = Production of West Java Province in the early years.

c). Growth Components

a. Provincial Growth Component (PGC)

$$\text{KPPij} = (\text{Ra})\ Yij$$

Where:
KPPij = West Java Province growth component of aquaculture sector for West Bandung District.

Yij = Production of the aquaculture sector in West Bandung District in the early years.
Ra = Production ratio of West Java Province.

b. Proportional Growth Component (PGC)

$$PPij = (Ri-Ra)Yij$$

Where:
PPij = The component of proportional growth in the aquaculture sector in West Bandung District.
Yij = Production of the aquaculture sector in West Bandung District in the early years.
Ri = Production ratio of West Java Province from the aquaculture sector.
Ra = Ratio produced by West Java Province.

Criteria Proportional Growth Component:
a) PPij< 0 means that the aquaculture sector in West Bandung District is growing slowly.
b) PPij> 0 means that the aquaculture sector in West Bandung District is growing fast.

c. Components of Regional Share Growth (CRSH)

$$PPWij = (ri-Ri)\ Yij$$

Where:
PPWij = Components of growth in the share of the aquaculture sector in West Bandung District in the early years.
Yij = Production from the aquaculture sector in West Bandung District in the early year.
ri = Production ratio of the aquaculture sector in West Bandung District.
Ri = Production ratio of the aquaculture sector in West Java Province.

Criteria Components of Regional Share Growth:
a) PPWij> 0 means that the aquaculture sector in West Bandung District has good competitiveness compared to West Java Province.
b) PPWij< 0 means that the aquaculture sector in West Bandung District does not have good competitiveness compared to West Java Province.

d. Growth Profile (GP)

$$PBij = PPij + PPWij$$

Where:
PBij = Growth Profile.
PPij = The component of proportional growth in the aquaculture sector in West Bandung District.
PPWij = The growth component of the aquaculture sector in West Bandung District in the early years.

Growth Profile Criteria:
a) PBij> 0, then the growth of the aquaculture sector in West Bandung District is a progressive group.
b) PBij<0, then the growth of the aquaculture sector in the West Bandung District is sluggish.

2.1.4 Analysis of Trade Area Capture (TAC) and Pull Factor (PF)

a. Trade Area Capture (TAC)

A calculation technique to determine the market strength of aquaculture commodities and their relationship is through social and economic indicators, such as income and the potential for people to buy. TAC calculation describes the number of people who will purchase aquaculture products. The TAC formula for aquaculture in West Bandung District can be formulated as follows [12]:

$$TAC_a = \frac{AS_a}{PCS_{base}\left(\frac{PCI\ a}{PCS\ base}\right)}$$

Where:

AS_a = Actual sales value of aquaculturecommodities in West Bandung District (rupiah).

PCS_{base} = Per capita sales of fish products in West Java Province (rupiah).

PCI_a = Income per capita in West Bandung District (rupiah).

PCI_{base} = Income per capita in West Java Province (rupiah).

Criteria Trade Area Capture:

a) TAC > the total population of West Bandung District means that the population has a more significant expenditure pattern for aquaculture products than West Java Province.
b) TAC < the population of West Bandung District means that West Bandung District has lost potential in terms of aquaculture trade and has a lower spending pattern than West Java Province.

b. Pull Factor (PF)

The calculation technique aims to determine the attractiveness of the local population in aquaculture commodities. The pull factor is used to separate the influence of outsiders (*non-residents*) from TAC. Pull Factor (PF) can be calculated using the following formula [13]:

$$PF_a = \frac{TAC_a}{P_a}$$

Where:

TAC_a = *Trade Area Capture* West Bandung District (rupiah).

P_a = Total population of West Bandung District (individual).

Criteria Pull Factor:

a) PF > 1 means that the aquaculture product market of West Bandung District can attract customers from other areas.
b) PF < 1 means that West Bandung District has lost customers to other competing markets.

3. RESULTS AND DISCUSSION

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The Author(s) should discuss the findings

3.1 Analysis of Location Quotient (LQ) and Dynamic Location Quotient (DLQ)

Analysis Location Quotient (LQ)analysis is a calculation technique to obtain base and non-base sectors by comparing the percentage of fishery sector contributions [8].While analysis Dynamic Location Quotient (DLQ) analysis is a calculation technique to determine the position of the aquaculture sector in the West Bandung District, this calculation is necessary because the current base sector will not necessarily remain the base sector in the future, and vice versa. This method emphasizes the proportion of the West Bandung District's growth rate (GRDP/economic sector).Based on the calculation results, it is found that the aquaculture sector in 2018-2020 has increased and also decreased.

The LQ value in 2018 was 1.77, then increased in 2019 to 2.23 and decreased in 2020 to 1.42. So that the average LQ value is 1.81 (> 1) (Table 1), which means that the aquaculture sector in West Bandung District has a regional advantage from a comparative perspective which is higher than the regional average in West Java which is included in the economic base sector.This study is in line with previous research [4], where the LQ value obtained in 2008-2013 was 1.82 (LQ value> 1), which means the fisheries sector is included in the base sector.This happens because of the potential for aquaculture, which is supported by the existence of the Saguling and Cirata reservoirs formed in the West Bandung District area. Therefore, fishery products produced by West Bandung District not only meet the needs of the region but can also meet the needs of other regions.

The results of the DLQ analysis in the 2018-2019 (Table 1) period did not experience a change in position because

it had a DLQ value > 1, so the ability to develop the aquaculture sector in West Bandung District was higher when compared to West Java Province, which means getting hope to remain the base sector in the future.But in 2020, the aquaculture sector experienced a change in position due to the DLQ value of 0.34 (< 1). Based on the calculation of the growth rate of the fisheries sector in West Java Province in 2020, it got a value of -0.24 while West Bandung District was -0.52. This happened because, in 2020, there was a decline in the number of aquaculture production at the district and provincial levels, one of which was suspected to be the COVID-19 pandemic. However, according to the calculation results, the average DLQ in 2018-2020 is 1.01, which means that the aquaculture sector in the future will remain a basic sector and have competitiveness against the regional economy.

In realizing the development of the West Bandung District area, development priorities must be set through a sectoral approach by emphasizing the selection of sectors that contribute to improving the regional economy. Therefore, the aquaculture sector in West Bandung District is entitled to priority for regional development because the aquaculture sector is a sector of the economic base and is proven by the average LQ and DLQ value in 2018-2020 (> 1), which will encourage other sectors to move forward and become the main driver of economic growth in West Bandung District, such as increasing job opportunities, income distribution, and the level of life.

3.2 The Contribution of the Aquaculture Sector in Regional Development Analysis Shift Share (SS)

Analysis Shift-share analysis is a calculation technique to see the regional economic growth rate, which will compare West Bandung District and West Java Province seen from the difference in aquaculture growth rates to explain the causes of these changes.

Based on the results of the calculation of the GRDP value for the 2018-2020 (Table 2 and fig 1) period, it was found that the percentage change (%) of the aquaculture sector in the West Bandung District had a fluctuating value. The table above shows that the average percentage change in the value of the GRDP of West Java Province is higher than that of the West Bandung District. This happens because the aquaculture sub-sector in West Java Province has a broader scope, such as floating net cages, rushing water ponds, calm water ponds, Mina-rice (combined farming between fish and rice), and others. In contrast, West BandungDistrict only has floating net cages and still water ponds.

The GRDP value of the aquaculture sector in West Bandung District in 2018-2019 was 46.05%, and in 2019-2020 it decreased to -832.24%. This decrease impacts the amount of production and aquaculture business fields. In the 2019-2020 period, there was a reasonably significant decline caused by the covid-19 pandemic, which resulted in a decrease in production. Meanwhile, the GRDP value of the aquaculture sector in West Java Province in 2018-2019 was 16.07% and decreased in 2019-2020 to -24.00%. The decline is due to inadequate facilities and infrastructure and quite limited capital.

The growth of GRDP value in the aquaculture sector in West Bandung District and West Java Province can be compared with the ri, Ri, and Ra ratio.

The analysis results show that the proportion of the growth rate of the aquaculture sector in West Bandung District and West Java Province in 2018-2020 (Table 3) is fluctuating due to positive and negative ratios. The table shows the reference value (Ra/GRDP ratio of West Java Province). The results of the calculation of the values of ri and Ri in the 2018-2019 period and the 2019-2020 period are higher when compared to Ra. Therefore, the value of the GRDP ratio of the aquaculture sector in the West

Bandung District can be more developed than the value of the GRDP ratio in the West Java Province.

Table 1.Calculation of GRDP Location Quotient (LQ) and Dynamic Location Quotient (DLQ) based on constant prices for the Aquaculture Sector in West Bandung District in 2018-2020

Year	LQ Value	Information LQ	DLQ Value	Information DLQ
2018	1,77	Basis	1,37	Potential
2019	2,23	Basis	1,31	Potential
2020	1,42	Basis	0,34	No Potential
Average	**1,81**	**Basis**	**1,01**	**Potential**

Source: Central Bureau of Statistics West Bandung District

Table 2. Calculation of GRDP Changes in Aquaculture Sector in West Bandung District and West Java Province based on constant prices in 2018-2020

Year	(∆Yi)	Percentage Change (%)	(∆Yj)	Percentage Change (%)
2018/2019	511,34	46,05	4.948,64	16,07
2019/2020	-832,24	-51,32	-8.576,84	-24,00
Average		**-2,63**		**-3,96**

Source: Central Bureau of Statistics West Bandung District and West Java

Table 3. GRDP Ratio of Aquaculture Sector in West Bandung District and West Java Province in 2018-2020

Year	ri	Ri	Ra
2018-2019	0,46	0,16	0,05
2019-2020	-0,51	-0,24	-0,03

Source: Central Bureau of Statistics West Bandung District and West Java

Fig. 2 shows the Provincial Growth Component (KPP) in the 2018-2019 period and the 2019-2020 period has a positive value, meaning that the West Java Province GRDP growth/value will affect West Bandung District GRDP growth or it can be said that regional policies will affect the contribution aquaculture sector. The value of the Provincial Growth Component (KPP) for the aquaculture sector in West Java in 2018-2019 was 20.49. Then in 2019-2020, it increased to 29.93. This result follows previous research from 2008 to 2013 [4]. The value of the provincial growth component has grown every year.

Fig. 3 shows the Proportional Growth (PP) of the aquaculture sector in 2018-2019 of -151.35 and 2019-2020 of -221.04. This means that the contribution of the aquaculture sector in the West Bandung District has slow growth compared to West Java Province due to PP < 0. This slowdown can occur due to the COVID-19 pandemic, which has resulted in a decrease in the number of aquaculture production and a reduction in the number of marine cages in Cirata and Saguling reservoirs, where KJA's contribution in 2018 was Rp. 879,942,372, in 2019 it was Rp. 1,123,122,662. In 2020 it was Rp. 789,568,210. This follows previous research [14] that the control program carried out at the KJA Saguling, Cirata, and Jatiluhur reservoirs affects social risks and affect the economy of the aquaculture business community.

Fig. 4 shows the Regional Share Growth Component (PPW) of the aquaculture sector, which has an average value of -233.79 (PPWij< 0). This means that the aquaculture sector in West Bandung District for the 2018-2020 period does not have good competitiveness or does not yet have an advantage compared to the aquaculture sector in other areas in West Java Province. This happens because West Bandung District only has freshwater aquaculture, such as floating net cages and calm water ponds, compared to other areas in West Java supported by the existence of seawateraquaculture fisheries with high competitiveness. According to research [15], economic growth at the district level is influenced by competitiveness.

Fig. 5 shows the Growth Profile (PB) that the average value is -419.99, which means that the growth of the aquaculture sector in West Bandung District is sluggish and has no competitiveness. The aquaculture sector in West Bandung District has not been able to contribute significantly compared to the aquaculture sector in other regions. Therefore, it is necessary to have a policy from the local government to optimize the potential of fisheries in the West Bandung District by providing various facilities and infrastructure that support aquaculture activities.

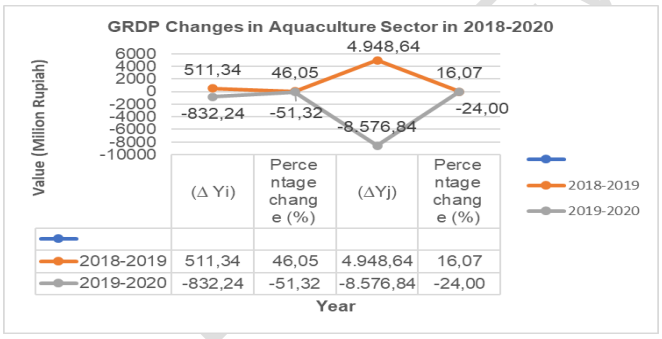

Fig. 1. Graph calculation of GRDPchanges in the aquaculture sector in the west Bandung District and west java province based on constant prices, 2018-2020

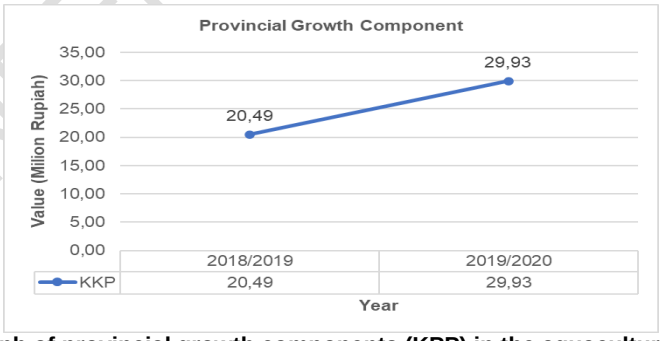

Fig. 2. Graph of provincial growth components (KPP) in the aquaculture sector in The West Bandung District, 2018-2020

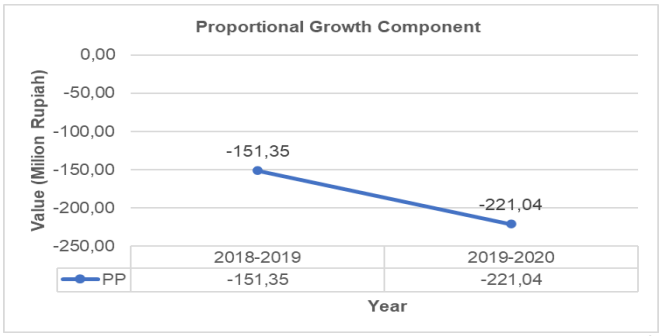

Fig. 3. Graph of the proportional growth components (PP) in the aquaculture sector in west Bandung District, 2018-2020

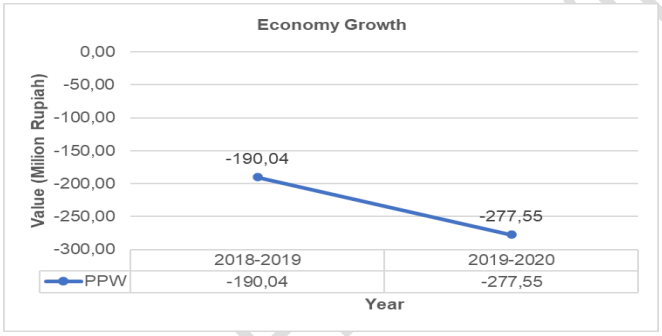

Fig. 4. Graph of economy growth (PP) in the aquaculture sector in west Bandung District, 2018-2020

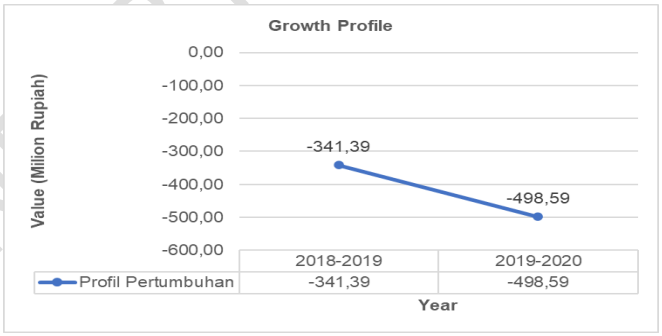

Fig. 5. Graph of growth profile (PB) in the aquaculture sector in west Bandung District, 2018-2020

3.3 Market Strength of Aquaculture Sector in Regional Development Analysis Trade Area Capture (TAC)

Trade Area Capture (TAC) analysis is a calculation technique to determine the market strength of aquaculture

commodities and their relationship through social and economic indicators, such as income and people's potential to buy. TAC calculation describes the number of people who will purchase aquaculture products. The variables of this research are the actual sales value of fish in West Bandung District (AS_a), per capita sales of fish products in West Java Province (PCI_{base}), income per capita in West Bandung District (PCI_a), and income per capita in Java Province West (PCS_{base}).

The Trade Area Capture (TAC) calculation results will describe the population of West Bandung District who will buy aquaculture products. Where in 2018 (Table 4) the TAC value was greater than the total population (79,978,669 > 48,683.86 people), in 2019 the TAC value was greater than the total population (80,743.767 > 49,316.71 people) and in 2020 the TAC value was also greater compared to the total population (81,428,689 > 49,935.85 people). While the average value of the TAC of West Bandung District is 80,717.041. So, it can be concluded that the population of West Bandung District has a pattern of spending on aquaculture products greater than that of West Java Province.

Based on the results of previous research in Bogor District [16], the value of TAC in Bogor District is greater than the total population. Therefore, Bogor District has a pattern of spending on fishery products that is larger than other regions to capture opportunities for fishery trade in other areas because the amount of production has met the region's needs.

3.4 Attractive Power of Aquaculture Sector in Regional Development Analysis Pull Factor (PF)

Pull Factor analysis is a calculation technique that aims to determine the attractiveness of the population of West Bandung District on aquaculture commodities. The pull factor is used to separate the influence of outsiders (*non-residents*) from TAC.

Based on the calculation results for the 2018-2020 period (Table 5), it was found that the average Pull Factor value was 1.64 (PF > 1), which means the aquaculture product market in West Bandung District can attract customers from other regions. This is due to the increasing contribution of the aquaculture sector to the GRDP of West Bandung District, market demand from the different areas, and aquaculture commodities such as carp *(Cyprinuscarpio)* and catfish *(Clariasgariepinus)*, tilapia *(Oreochromisniloticus)*, catfish (Pangasianodonhypophthalmus) and gourami *(Osphronemusgoramy)* can attractcustomer.

Table 4. Results of Calculation of Trade Area Capture (TAC) in the Aquaculture Sector in West Bandung District in 2018-2020

Year	Pά	PCI_a	PCI_{base}	AS_a	PCS_{base}	TAC_a
2018	48,683.86	17,750,000	29,160,000	920,437,000,000	18,906,410	79,978,668
2019	49,316.71	18,470,000	30,240,000	2,275,732,000,000	46,145,250	80,743,767
2020	49,935.85	17,870,000	29,140,000	789,568,100,000	15,811,648	81,428,689
Average	**49,312.14**					**80,717,041**

Source: Central Bureau of Statistics West Bandung District

Table 5. Results of Calculation of Pull Factor (PF) in the Aquaculture Sector in West Bandung District in 2018-2020

Year	Pά	TAC_a	Pf_a
2018	48,683.86	79,978,668	1.64
2019	49,316.71	80,743,767	1.64

2020	49,935.85	81,428,689	1.63
Average	**49,312.14**	**80,717,041**	**1.64**

Source: Central Bureau of Statistics West Bandung District

4. CONCLUSION

Based on the results of the study, the conclusions are as follows:

The aquaculture sector in West Bandung District has the right to be a priority sector in regional development. This is reinforced by the calculation results of Location Quotient and Dynamic Location Quotient. The average LQ value for the 2018-2020 period is 1.81 (LQ>1), while the average DLQ value is 1.01 (DLQ>1). This means that the aquaculture sector in West Bandung District is included in the base sector in the current period and hopes to remain in the base sector in the future.

The contribution of the aquaculture sector is based on the calculation results of the Shift Share analysis. The percentage change in the GRDP value of West Bandung District in 2018-2019 of 46.05%, and 2019-2020, it decreased to -832.24%. Meanwhile, the value of GRDP in West Java Province in 2018-2019 was 16.07%, and in 2019-2020 it was -24.00%. Based

on the analysis of the growth profile, the average value is -419.99 (PBij<0), which means the aquaculture sector in West Bandung District has slow growth and does not yet have competitiveness compared to other regions in West Java.

The market strength of the aquaculture sector commodity based on Trade Area Capture and Pull Factor analysis shows that the TAC value in the 2018-2020 period is always greater than the total population. The average value of TAC for the 2018-2020 period is 80,717.041 (TAC > total population/ 49,312.14 people). This means that the aquaculture sector in West Bandung District has trade opportunities with other areas. Meanwhile, when viewed from the PF value, the aquaculture sector for the 2018-2020 period got an average value of 1.64 (PF>1). This means that aquaculture products produced by West Bandung District can attract customers from other regions.

Comment [A6]: Summary, Conclusion and Recommendation(s)

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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