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Analysis of Potential Labor and Capital on Capture Fisheries Production in Banyuwangi District (Study in Coastal Sub-District)

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Abstract
Banyuwangi District has a large potential for fisheries resources. In general, this study aims to identify and analysis the influence of labor and capital on capture fisheries production and to find out how much the contribution of the fisheries sector in the regional economy, base level, and economic typology of the fisheries sub-sector in Banyuwangi District. The results of this research show that the number of fishermen, the number of fleets and the number of catching tools has a significant positive effect on capture fisheries production. Furthermore, the fisheries sub-sector is the base sector of the leading category and contributes to the formation of GRDP by an average of 8.4% and places the fisheries sub-sector in the fourth rank as one of the contributing sectors.
Keywords: capture fisheries production, fisherman, fleets, catching tools, share analysis, location quotient, klassen typology
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1. Introduction

Fisheries is a part of economic activity that gives hope to be able to meet the needs of human life through various efforts which ultimately aim to increase the income of fishermen in order to achieve a better level of living welfare. The fisheries sector gives impact on economic activities in various regions (Mira, 2013; Syarief et al., 2014; Rinanti, 2013; Ariani et al., 2014; Winata et al., 2015). In order to support the successful implementation of maritime and fisheries development, regionally based integrated activities with the minapolitan conception were developed, namely 179 Regencies / Cities in 33 Provinces. The minapolitan area is an area developed with a concept that focuses on the progress of the fisheries sector with the aim of making the marine and fisheries economic sector as a driver of the regional economy. Of the 38 District / city regions in East Java, 14 regencies / cities are designated as minapolitan areas. There are 4 (four) regencies designated as development of the minapolitan area for aquaculture as well as capture fisheries i.e Trenggalek District, Malang, Banyuwangi and Lamongan.

Banyuwangi District is a coastal type, which is at the eastern end of East Java. The coastal area in Banyuwangi consists of 11 coastal sub-districts and 36 coastal villages. Banyuwangi District is in a strategic location in the development of the maritime and fisheries fields, with a coastline of 282 Kilo Meters (KM) directly facing the Indonesian ocean, Bali strait and Java sea. This condition is a sector that should be able to boost the regional economy and people's income. Banyuwangi District ranks second with the largest production volume with a production volume of 43,782 tons from 2010 to 2017. The number of capture fisheries households in Banyuwangi District is the second largest, reaching 7,123 over the past three years (2015-2017). This shows that there are quite a lot of people in Banyuwangi District who depend their lives to work as fishermen to earn income. Capture fisheries production in Banyuwangi District increases every year from 2011 to 2015, both marine fisheries and public waters. However, the volume of marine fisheries production has decreased in 2016 and 2017 due to unfriendly global climate conditions so that the Bali Strait sea is empty of fish (DPP Banyuwangi District, www.kabarbanyuwangi.info).

Meanwhile, an increase in income is one indicator of improving community welfare. Since 2013-2017 the average income of fishermen in households or individuals has continued to increase. In 2013 the average income of fishermen was Rp1.68 million per month and in 2017 it had increased to Rp2.70 million million per month. (Annual Report of the Ministry of Maritime Affairs and Fisheries in 2016 and 2017). The existence of marine and marine resources in Banyuwangi District becomes a potential that should be able to continue to be developed. Various opportunities originating from marine resources certainly also become opportunities in motivating the improvement of the economic quality of the community.

2. Literature Review

Most coastal communities, both directly and indirectly, depend on their survival from managing fisheries resource potential. They become the main component of the construction of the Indonesian maritime community (Kusnadi 2009). Fishermen are a group of people whose lives depend directly on marine products, either by carrying out fishing or cultivation. They generally live on the beach, a residential neighborhood close to the location of their activities (Mulyadi 2007). According to Mankiw (2005) factors of production are inputs used to produce goods

and services. The two most important production factors are capital and labor. According to Sukirno (2010) the production function shows the nature of the relationship between the factors of production and the level of production produced. According to Fauzi (2010: 102) in exploiting (catching fish) in a waters various facilities are needed. These facilities are input factors which are referred to as an effort or effort. Inputs are like physical capital (ships and fishing gear), labor needed for a fishing activity in producing fish stocks or fisheries production.

The development of the fisheries sector is not only related to capture fisheries and aquaculture businesses. Hendri (2010) states that marine and fisheries business opportunities can be seen from at least two factors, namely internal factors and external factors. Internal factors in the form of marine and fisheries resource potential, potential human resources, technology, facilities and infrastructure. External factors are aspects related to the demand aspects of fishery products and the conditions that accompany demand in competition. Increased catch of fishermen depends on the use of production inputs. The influence of production inputs is needed so that the fishing business runs optimally, with the use of production inputs that are effective and efficient can increase the catch and income of fishermen, in addition to increasing regional economic growth. Furthermore, wealth or natural resources in an area can be a driver of economic development (Muta'ali, 2011). Natural resources are a part of internal factors for regional development. The sector that is the mainstay of exports in a region illustrates its important role in the regional economy.

The main problem in regional development often lies in the resources and potential they have in order to create an increase in the number and types of employment opportunities for the local community. Economic base theory based his view that the rate of economic growth in a region is determined by the large increase in exports from the region (Tarigan, 2009: 28). In regional development, development cannot be carried out simultaneously in all economic sectors but prioritized on the development of economic sectors with considerable development potential. Because this sector is expected to grow and develop rapidly which will stimulate other related sectors to develop to balance the development of this potential sector. As research by Malau and Hotman (2018) found government policies by increasing the number of fishing fleets by 20% will result in an increase in fisheries production 2.1036%, and increase fisheries sector investment by 3.8970%. Then, the results of research conducted by Fattah, Mochammad et.al (2017) giving consideration in increasing production are the number of fleets and fishermen to increase production. Furthermore, research by Lumbantobing, Haslan et al (2016) found that the capture fisheries sub-sector is a base sector in the economy of the Sibolga City Region. Whereas, research by Adinugroho, Gilang (2016) shows that the fisheries sub-sector in Tepus Subdistrict is superior and prospective. Saptosari, Tanjungsari, Panggang and Girisubo are superior but not prospective.

3. Methodology

The type of research used in this study is descriptive-quantitative. This research was conducted in one of the districts in East Java, namely Banyuwangi District, a study in 11 sub-districts located in coastal areas. The time period used in this study was from 2010 to 2017. The first objective of this study was to examine the effect of production inputs on fisheries production. Second, to find out the contribution of the fisheries sector to GDP. Third, to find out whether the fisheries sector is a base sector or non-base sector. Fourth, to find out the economic typology of the fisheries sector. The multiple linear regression equation is as follows:

$$Production_{it} = \alpha_{it} + \beta_1 Fisherman_{it} + \beta_2 Fleet_{it} + \beta_3 Catching\_Tool_{it} + \mu_{it}$$

Where :

Production	: Amount of fishery production
α	: Constanta
β_1 - β_3	: Coefficient of independent variable
Fisherman	: Amount of fisherman
Fleet	: Amount of fleet
Catching_Tool	: Amount of catching tool
μ	: Error term
i	: time
t	: province

Furthermore, share analysis is used to see the contribution of a sector to the economy of a broader region, and sectors that have progressed during the measurement period. The role of the capture fisheries sub sector in Banyuwangi District can be seen from its contribution to economic development including its contribution in Gross Regional Domestic Product (GRDP), with the following formula:

$$Pi = \frac{Si}{Ti}\ x\ 100\%$$

Where :

Pi	: Amount of fishery production in year i
Si	: Capture fisheries sub-sector GRDP in year i

Ti : Total GRDP in year i

To find out the potential of economic activity which is an indication of the base and non-base sectors can be used the Location Quotient (LQ) method which is a relative comparison between the capabilities of the same sector in a wider area (Rustiadi et al., 2011), with the following formula:

$$LQ = \frac{vi/vt}{Vi/Vt}$$

Where :

v_i : Amount of GRDP in district fisheries sector
v_t : Amount of GRDP in all district sector
V_i : Amount of GRDP in province fisheries sector
V_t : Amount of GRDP in all province sector

The LQ value obtained will be in the range of smaller or equal to greater than number 1 (1≥LQ> 1). The magnitude of the LQ value indicates the degree of specialization or concentration of the commodity in the relevant region relative to the reference region. This means that the greater the LQ value in an area, the greater the degree of concentration in the region. Then, to map potential areas in a sectoral manner based on GRDP data can use the Klassen Typology Analysis. Klassen Typology Analysis is a grouping technique of a sector by looking at the growth and contribution of certain sectors to the total GRDP of a region. A sector can be grouped into four categories, namely: leading sector ($r_{sector} \geq r_{GRDP}$ and $\hat{Y}_{sektor} \geq \hat{Y}_{GRDP}$), potential sector ($r_{sector} < r_{GRDP}$ and $\hat{Y}_{sector} \geq \hat{Y}_{GRDP}$), developing sector ($r_{sector} \geq r_{GRDP}$ dan $\hat{Y}_{sector} < \hat{Y}_{GRDP}$), and underdeveloped sector ($r_{sector} < r_{GRDP}$ dan $\hat{Y}_{sector} < \hat{Y}_{GRDP}$).

4. Findings

Based on the estimation results obtained the R-square value of 0.555 (55.5%). So that it can be interpreted that the dependent variable can be explained by the independent variable / predictor of 55.5%, while the remainder is explained by other variables outside the model. Fishermen have a significant positive effect on production. The fishery coefficient value is 0.553 indicating that every increase in the number of fishermen is 1 person, it will increase production by 0.553 tons. The greater the number of fishermen, the greater the production of fisheries, this is in line with the production theory where labor is one of the inputs in the production process. In line with the research of Pratama et al. (2016), it was stated that the more ABK in the right amount, the easier it was for fishing operations and resulted in an increase in fishing results.

Table 1. **Estimation Result Using Robust Least Square**

Variable	Coefficient	z statistic	Prob.	Explanation
Constanta	-1.605			
Fisherman	0,553	11,156	0,000	Significant
Fleet	2,880	6,372	0,000	Significant
Catching_Tool	0,982	9,388	0,000	Significant
R Square	= 0,555			

Source: Data Processed, 2019

Production = -1.605 + 0,553 Fisherman + 2,880 Fleet + 0,982 Catching_Tool

Furthermore, the Fleet has a significant positive effect on production. The fleet coefficient value of 2.880 shows that every increase in the number of fleets by 1 fleet will increase production by 2,880 tons. The large quantity of fishermen makes the wider range of fishing areas assuming that they must be balanced with the number of fleets as a medium to reach these waters. This is also in accordance with the results of research by Zebua and Ramli (2014) stating that the number of fleets and fishermen has a positive influence or has a direct relationship to fisheries production in the Nias region. Then, the Catching Tool has a significant effect on the production coefficient of the fishing gear of 0.982 indicating that every increase in the number of fishing gears is 1 fishing gear, it will increase production by 0.982 tons. The increasing number of fishermen must also be balanced with the availability of fishing equipment so that the fishing process becomes more efficient. In line with the research by Runtuboi et.al (2015), that the increase in fishery products is influenced by fishing gear, fleets and business capital.

The sector that is the mainstay of exports in a region illustrates its important role in the regional economy. The growth of the fisheries sector is basically influenced by the competitive advantage of a region, regional specialization and the fisheries potential of the region (Wicaksono, 2011). The potential of a region if developed to the maximum will bring an advantage to the region.

Table 2. **Contribution of the Fisheries Sector at Constant Prices in Banyuwangi District, 2010-2017**

Year	GRDP of Fisheries Sector (in million rupiah)	GRDP of all sector (in million rupiah)	Contribution of Fisheries Sector (%)	Value Change Sector Contribution Fishery (%)
2010	2.527.220,6	32.463.822,6	7.8	-
2011	2.726.011,7	34.720.429,5	7.9	0.1
2012	3.020.639,1	37.235.736,2	8.1	0.3
2013	3.389.157,1	39.733.619,7	8.5	0.4
2014	3.628.702,7	42.005.651,6	8.6	0.1
2015	3.915.668,8	44.529.927,8	8.8	0.2
2016	4.174.379,3	46.924.576,4	8.9	0.1
2017	4.306.007,3	49.480.440,0	9.0	0.1

Source : BPS in Banyuwangi District, Data Processed 2019

The fisheries sector has contributed to the formation of GDP at an average of 8.4%. The contribution of the fisheries sector to the GRDP from 2010 to 2017 places the fisheries sub-sector in the fourth rank as one of the contributing sectors. Furthermore, the role of each sector in the formation of a regional GDP reflects the tendency of the regional economic structure.

Table 3**. LQ Value of Fisheries Sub Sector in Banyuwangi District, 2010-2017**

Year	GRDP of Fisheries Sector in Banyuwangi District (Vi)	GRDP of all sector in Banyuwangi District (Pi)	GRDP of Fisheries Sector in East Java Province (Vt)	GRDP of all sector in East Java Province (Pt)	LQ Value
2010	2,527.22	32,463.82	20,592.50	990,648.84	3.75
2011	2,726.01	34,720.43	21,847.30	1,054,401.77	3.79
2012	3,020.64	37,235.74	24,112.60	1,124,464.64	3.78
2013	3,389.16	39,733.62	26,903.90	1,192,789.80	3.78
2014	3,628.70	42,005.65	28,752.90	1,262,684.50	3.79
2015	3,915.67	44,529.93	30,393.50	1,331,394.99	3.85
2016	4,174.38	46,924.58	31,931.60	1,405,236.11	3.91
2017	4,437.64	49,480.44	33,471.30	1,405,561.00	3.77

Source: Data Processed, 2019

The LQ value of the fisheries sub-sector in Banyuwangi District for 8 years (2010 to 2017) is an average of 3.80. This value is more than 1 (LQ> 1), thus the fisheries sub-sector in Banyuwangi District is a base sector, meaning that the fisheries sub-sector has been able to meet the needs of the district and indicates the possibility of export in that sector. The fisheries sub sector in Banyuwangi District is a base sector. That is, the subsector is able to serve market needs both inside and outside of Banyuwangi District. This shows that the fisheries sub-sector has good potential to be developed.

Table 4. **Klassen Typology Matrix of the Fisheries Sub Sector in Banyuwangi District, 2005-2017**

QUADRANT II (Leading Sector) Fisheries Sub Sector 2017 2011 2016 2010 2015 2009 2014 2008 2013 2007 2012	QUADRANT I (Developing Sector) Fisheries Sub Sector
QUADRANT IV (Potential Sector) Fisheries Sub Sector 2006 2005	QUADRANT II (Underdeveloped Sector) Fisheries Sub Sector

Source: Data Processed, 2019

In regional development, development cannot be carried out simultaneously in all economic sectors but prioritized on the development of economic sectors with considerable development potential. The fisheries sub-

sector in Banyuwangi District from 2005 to 2006 entered into the potential sector category (Quadrant IV) which means the fisheries sub-sector contributes highly to the regional economy but the sector's growth is slow and tends to decline. Then in 2007 to 2017, the fisheries sub-sector experienced a shift to a superior sector which meant that the contribution to the large GRDP and growth was high.

5. Conclusion

The number of fishermen, the number of fleets and the number of fishing gear had a significant positive effect on capture fisheries production in 11 Coastal Districts of Banyuwangi District. So that there needs to be an increase in fleet equity and fishing gear in all coastal sub-districts through good cooperation between the local government and fishermen in accessing capital. Furthermore, the contribution of the fisheries sub-sector contributed to the formation of GRDP on an average of 8.4% and is a base sector with superior typology, so it must be more safeguarded and developed without putting aside development towards other sectors by providing a sufficient portion of the regional budget accelerate the development process of the fisheries sub-sector and provide training to fishermen in order to foster and develop the ability of fishermen to catch fish and in applying appropriate and more modern technology.

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