

Fishery's Potential in Indonesia

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ABSTRACT: *In order to improve the utilization of fishery, used as accessibility of food and exported to increase competitiveness, it is necessary to know potential of fishery in Indonesia. The purpose of this study was to analyze the potential of fishery in Indonesia based on the export intensity, output, sector concentration, labor, and the farmers exchange rate of the fishery. The method used in this study is descriptive quantitative research methods with a mathematical approach. Based on potential of fishery in Indonesia, there are four province which have potential in the development of output and export intensity of fishery in Indonesia, there are: South Sulawesi, East Java, Lampung and North Sumatra Province. The provinces can be used as a pilot area development of output and export intensity of fishery in other provinces in Indonesia.*

Keywords: *export intensity, output, sector concentration, labor, the exchange rate of farmers*

I. INTRODUCTION

Trade is the central of economic development, the outward orientation is better than inward orientation (Lynn, 2002: 329). An open economy interacts with other economies in two ways, consist of buying and selling goods and services in the product markets of the world; or buying and selling capital assets, such as stocks and bonds in world financial markets (Mankiw et al, 2012 a: 184).

Indonesia's economy is growing rapidly in the era of free trade. Economic players started to show its existence, the attention of the government to develop the seed sector also began to rise. Many choices of goods and low prices would benefit consumers. Thomas Mun (1621 in Salvatore, 2004: 30) states that one of the ways a country becomes rich and powerful is by exporting more than importing.

One of the reasons the government was interested to participate the era of free trade is opening up opportunities to attract foreign investors to invest in Indonesia. The number of Indonesian population with a culture of consumption of Indonesian society, of course, is an attraction for foreign investment. However, Say (1936 in Skousen 2005: 67) argues that it would be unwise if the government only stimulate the increase in consumption than production. Just encourage consumption, is not beneficial to trade. "Supply its create its own demand". By producing, people would have an income follows these conditions people will spend their income. With the increased of production, the purchasing power of the people and the welfare of society will increase.

The government should not only look at the economy in terms of demand, which means encouraging consumption, but also on the supply side (production). The increase in production will be a greater increase incomes. The increase in revenue can be interpreted will increase welfare with increased purchasing power. Encourage consumption without any increase in production will only increase community dependence on other parties to produce. This situation also applies in international trade.

Through international trade, each country can achieve economies of scale. Can share the excess production that can not be absorbed by domestic consumers. Excess production can be exported (Basri and Munandar, 2010: 32). Indonesian Chamber of Commerce (2011: 1) argues that exports are very important for economy to two things, namely: 1) as the main source of foreign exchange and 2) as a motor of economic growth.

In 2015, Indonesia participated Asean Economic Community (AEC). AEC is an ASEAN economic integration formed by all member countries of ASEAN to establish a system of free trade between member countries of ASEAN. With the implementation of the integration, it is necessary to update and improve the competitiveness of Indonesian products with foreign products, thus increasing the value of Indonesia's exports.

Fishery as one sub sector supporting Indonesia's economy also needs to be developed to improve the international trade in Indonesia. Fauzy (2010: 98) revealed that fish is one of the commodities which plays an important role in human life. Empowerment of fishery should be in line with the concept of Blue Economy which was first introduced by Gunter Pauli (2013). Blue Economics, gave a tremendous impact on the ecological and economic system, allowing humans, or even a biological system as a whole, to develop in a sustainable and safe in the development of evolution and recycling. Saksono (2013: 8) argues that a requirement

for the government to Indonesia as an archipelagic nation to change the direction of its development by exploiting maritime potential as a prime mover economic growth in the country. However, in reality the government has not focused on organizing, fixing and facilitating the community and business world who want to implement the conception of economic development based marine blue.

Based on published data of Central Data, Statistics and Information of Maritime and Fisheries Ministry (2014a), Indonesia waters area larger than the land area. If the water area is used optimally will provide abundant fishery products, so that together with food crops products can be used for food accessibility. Can be consumed domestically or exported. Thus, in the future Indonesia could become the world's maritime axis. Fishery resources are so great would be very lost if not used optimally for the welfare of society and even can be used as a major driver of economic growth and overcome the problems of others macroeconomic.

The fishery output is still less than the food crops. Indonesian Gross Domestic Product in 2010-2013, show that the average share of output fishery was second after the food crops. The output value of the fishery is still far less than the food crops. The agricultural sector is dominated by products from food crops. In other words, product diversification of fishery in Indonesia is still low. In fact, if utilized, the output of fishery could be an alternative foodstuffs, so that in the future, Indonesia could achieve food accessibility by diversifying the food is not only with food crops but also of fishery products.

The largest of fishery output in Indonesia is on the island of Sumatra and Java. In other words, the output production of fishery in Indonesia concentrated on these two islands. An industrial sector that is concentrated in a region, will provide benefits for companies operating in the region. The presumption applies also to the fishery. The concentration of fishery in a certain region will affect the amount of production on output fishery. The more concentrated, the output of fishery will also increase. The minimization of costs can motivate labor or firm to produce more output.

Haig (1928 in Setiono, 2011: 465) developed the economic base analysis which is an economic analysis of the area used to determine the extent of concentration of economic sectors in rural areas or sectors what is a basic sectors or leading sector. Sub sectors concentrated certainly have a significant influence on the economic growth of the region, in other words, can increase economic output. Susanto and Woyanti (2008: 153); Subagiyo and Hascaryo (2015: 138); and Sapriadi and Hasbiullah (2015: 71) in his study suggests that sectoral has positive effect on economic output.

Adisasmita (2014: 15) considers that the regional area is very important and is a factor that must be taken into account in analyzing and determining where a program or project is put into development planning. Territory connoted with the location of a development activity or economic activities such as industry or factories, enterprises, and service facilities, thus the selection or determination of the location will affect the continuity of these activities. By determining the exact location of the activity is expected to take place in a productive and efficient.

Besides the sector concentration, how the production process of fishery is also important to observe. Case et al (2012: 152) states that the production is a process through which inputs are combined and converted into output. A certain amount of input required to produce a type of services or goods. The production technology is a quantitative relationship between input and output. Economists express the relationship between input and output (production technology), through figures (numeric) or mathematically, known as the production function. The production function shows the total product unit as a function of the input unit. Mankiw (2012b: 22) categorizes the factors of production as production inputs needed by the company as follows: labor, land, and capital. Nicholson and Snyder (2012: 315) argues that the company's output of certain goods for a period is a function of the engine (capital / capital) use during the period, the labor input (labor) per hour, the raw material used, and possibly other variables affecting the production process.

The production function was originally put forward by some economists namely: von Thünen (1826), Turgot (1776), Smith (1776), Steuart (1767), Malthus (1815) and Ricardo (1817) on "The Law of Diminishing Marginal Return" which is an important consideration in agriculture. Cobb-Douglas (1934); Arrow et al.(1961); Leontief (1966) and Solow (1957) developed some form of production function. Other economists only use land, capital and labor as inputs in the production function. Solow contrast to other economists, incorporate technical progress (technical progress) / technology (technology) as one of the factors that can increase output. Incorporating technical progress (technical progress) into the production function (Nicholson and Snyder, 2012: 320). More specifically Gordon (1954 in Fauzy, 2010: 102) developed a production function becomes specialized production functions for fisheries. Gordon revealed that the production or activity of the fishery could be explained as a function of effort and fish stocks. Effort is an index of various inputs such as labor, boats, nets, fishing gear, land cultivation, etc. required for a fisheries activities.

Based on the theory of production, factors of production as input has an important role in generating output and encourage international trade. The production factors in question include: labor, land, capital, and natural resources. The abundance of factors of production necessary to produce great output so it

can export (sell abroad). In this study, the factors of production are incorporated into the model only labor, while the land area of fisheries and other production factors assumed to be fixed / constant.

Labor is one of the factors of production used in the production process to generate output fishery, is regarded as one of the important factors. Fisheries resources need a lot of human resources to process and manage. Human resources to produce output related to the fisheries labor. Fisheries labor, among others: the fishermen and fish farmers. Fishermen are engaged in fishing, while fish farmers engaged in the aquaculture. Arifin (2006: 149); Yonvitner (2007: 265); Heryansyah et al. (2013: 13) and Li et. al. (2012), argued that labor has positive effect on output production.

One of the motivations for someone to work in the fisheries if they can reach the better welfare for working in the fisheries subsector compared with other subsectors. The better welfare will affect a person's decision to spend his time working in the fisheries more or not. Welfare relating to real wages, which is a measure of the amount of wages that can be used to buy things goods and services. On fishery, welfare measured by exchange rate of farmer fishery (NTN), which is a proxy of real wages. According to the Directorate of Maritime Affairs and Fisheries Bappenas (2014: 94), the exchange rate of farmers fishery index is the ratio between the price that farmers receive (IT) with the index of prices paid by farmers (IB).

Real wages are nominal wage adjustment to changes in the price level. The Central Bureau of Statistics (2015), suggests that from IT can be seen fluctuations in the prices of goods produced by farmers, while the IB can be seen fluctuations in the prices of goods consumed by the farmers, as well as fluctuations in the price of goods required to produce fishery products. IB can also describe the inflation fluctuation. Based on the definition of the NTN, it can be concluded that NTN is a proxy of real wages in the fisheries. Fisheries farmers welfare will encourage farmers to produce more output, so it will also affect the exports that will be generated.

Hicks (1932 in Nicholson and Snyder, 2012: 583) developed a theory of real wages that describes how the behavior of labor associated with real wages received. Hicks stated that the amount of real wages will affect a person's decision in working hours and leisure time depending on the substitution effect and the income effect. Arifin (2006: 149), argued that real wage has positive effect on production output.

In order to improve the utilization of fishery, whether used as a food improvement as well as exported to the improvement of competitiveness, it is important to know the potential of fisherie in Indonesia based on the export intensity, output, sector concentration, labor, and the exchange rate of fisheries farmers. The purpose of this study was to analyze the potential of fishery in Indonesia

II. METHODS

The method used in this study is descriptive quantitative research methods with a mathematical approach. The variables examined in this study, there are: labor (tk); sector concentration (kon_ek); exchange rate of fisheries farmer (ntn); output (output); and export intensity (in_eks). Each variable is defined operationally as follows:

a. Labor

Fisheries labor (tk) in Indonesia consists of: fishermen and fish farmer. According to Republic Indonesia Law number 45 of 2009, a fisherman is a person who is actively doing work in fishing operations/other aquatic animals/aquatic plants. While the fish farmer is a person whose engaged in the aquaculture. Data obtained from Central Bureau of Statistics and expressed in person. In this study, labor of fisheries each province in Indonesia are categorized as follows: 1) abundant labor, if the amount of fisheries labor in a province equal to or greater than the average number of fisheries labor in Indonesia, and 2) bit labor, if the number of fisheries labor in a province smaller than the average number of fisheries labor in the Indonesia.

b. Sector Concentration

The concentration of the sector in this study was measured by the location quotient (LQ). The location coefficient is a measure of the degree of specialization fisheries sub-sector in each province in Indonesia on the output of the agriculture, livestock, forestry and fisheries nationwide. The concentration of the sector are calculated from the ratio between the amount of output fisheries every province in Indonesia on the output of the agriculture, livestock, forestry and fisheries in Indonesia. NTN Data obtained from Central Bureau of Statistics and expressed in index.

LQ calculation is as follows:

$$LQ = \frac{\left(\frac{o_i}{o_{tot}} \right)}{\left(\frac{O_i}{O_{tot}} \right)}$$

Note:

LQ = Location Quotien

o_i = amount of output fisheries each province in Indonesia

o_{tot} = amount of output agriculture, livestock, forestry and fisheries each province in Indonesia

O_i = amount of output fisheries in Indonesia

O_{tot} = amount of output agriculture, livestock, forestry and fisheries in Indonesia

Based on the LQ calculation, can be categorized as follows: 1) High concentration, if the value of location quotient equal to or greater than one ($LQ \geq 1$). This means that the fisheries sub-sector output in relative terms in a province is equal to or greater than the output of the fisheries sub-sector in Indonesia. Thus, Sub fisheries sector is a sub-sector that is concentrated in the province and is a sub-sector that can be further developed than another sub-sector on the Agriculture, Livestock, Forestry and Fisheries, and 2) Low concentration, if the value of location quotient smaller than one ($LQ < 1$). This means that the output of the fisheries sub-sector in the province is smaller than the output of the fisheries sub-sector in Indonesia. Thus, Sub fisheries sector is a sub-sector that is not concentrated in the province and a sub-sector that is not prospective for further development compared to other sub-sector on the Agriculture, Livestock, Forestry and Fisheries.

c. Exchange Rate of Fisheries Farmer (NTN)

The purchasing power of wages (real wages) in this study was measured by the exchange rate of Fisheries farmers (NTN) every province in Indonesia. According to the Directorate of Maritime Affairs and Fisheries Bappenas (2014: 14), NTN is an indicator to assess the ability of the exchange of products (commodities) produced / sold by the farmers against farmers better products needed for the production process (enterprise) as well as for household consumption. Magnitude NTN obtained by comparing the received index (It) with paid index (Ib) by fisheries farmers. NTN Data obtained from Central Bureau of Statistics and expressed in index.

NTN calculation, as follows:

$$NTN = \frac{I_t}{I_b}$$

Note:

NTN = exchange rate of fisheries farmers

I_t = received index

I_b = paid index

NTN in this study are categorized as follows: 1) The exchange rate of fisheries farmers is high, if the exchange rate of fisheries farmers sub-sector is greater than or equal to 100 ($NTN \geq 100$), it means the purchasing power of these farmers are relatively better compared to the base year period, indicating the relative welfare of farmers either or in other words the received index greater than or equal to the paid index, and 2) The exchange rate of fisheries farmers is low, if the exchange rate of the fisheries farmers less than 100 ($NTN < 100$) means a decline in the purchasing power of farmers. Reflecting the welfare of farmers is still low or paid index is still higher than received index.

d. Output

The fisheries output is the sum of the value of fishery products in every province in Indonesia. Measured in rupiah. Data obtained from Central Bureau of Statistics and expressed in units Rupiah (Rp.). In this study the fishery output in each of the provinces in Indonesia are categorized as follows: 1) The high output, meaning that fisheries output in a province equal to or greater than the average output of fisheries in Indonesia, and 2) Output is low, it means fisheries output in a province smaller than the average output of fisheries in Indonesia.

e. Export Intensity

The fisheries export intensity in this study was measured by the ratio of export sales of the provincial fisheries sub-sector in Indonesia to export sales total in Indonesia. A higher level on the intensity of exports showed an increased level of dependence on exports. Data obtained from Central Bureau of Statistics and expressed in index.

Export intensity value is calculated by the following formula:

$$IE_{i,t} = \frac{e_{i,t} / e_{tot,i,t}}{E_{nas,t} / E_{tot,nas,t}}$$

Note:

- IE_i = Fisheries export intensity province i in Indonesia
 e_i = Fisheries export province i in Indonesia
 e_{tot} = Total export province i in Indonesia
 E_{nas} = Fisheries export in Indonesia
 $E_{tot,nas}$ = Total export in Indonesia
 t = time

Export intensity in this study can be categorized as follows: 1) high export intensity, meaning that the value of export intensity is greater than or equal to one ($IE \geq 1$). This means that the value of exports relative terms fisheries in a province is equal to or greater than the value of exports of fisheries in Indonesia. Thus, in the province has high export capacity on fisheries and is a sub-sector that can be developed further to be exported compared to other sub-sector, and 2) low export intensity, meaning that the value of export intensity is smaller than one ($IE < 1$). This means that the export value of fisheries in the province is smaller than the export value of fisheries in Indonesia. Thus, in the province has a low export capacity on fisheries and is a sub-sector that is not prospectively developed more than other sub-sector.

III. DISCUSSION

Potential of fisheries each province in Indonesia based on the distribution of labor, sector concentration, the exchange rate of fisheries farmers, output, and export intensity, helpful in providing information on how the potential of each province in Indonesia in developing the fisheries. Such information can be used in the determination of resource management policies owned by their respective provinces for the foreseeable future.

The factors of production in each province is different, so the ability to produce output and export the fisheries also vary (uneven). Efforts are underway to increase the output and the export intensity of fisheries is also not optimal, whereas Indonesia is an archipelago country / maritime requires more attention from the government, especially regarding labor regulation, exchange rate of fisheries farmers, and local concentrations of the fisheries sector.

Province in Indonesia that could potentially generate high output on fisheries in Indonesia in the year 2013, there are: 1) South Sulawesi Province; 2) East Java Province; 3) Lampung Province; 4) South Sumatra Province; 5) East Kalimantan Province; 6) North Sumatra Province; 7) West Java Province; 8) Central Java Province; and 9) Riau Province. Each province has a different characteristic in terms of labor, sector concentration and exchange rate of fisheries farmers, which is explained further in Table 1.

Table 1 Characteristics Provinces Produces High Output

No.	Province	Characteristics
1.	Sulawesi Selatan	abundant labor, high sector concentration, and high exchange rate of fisheries farmers
2.	Jawa Timur	abundant labor and high sector concentration
3.	Lampung;	high sector concentration and high exchange rate of fisheries farmers
4.	Sumatera Selatan	high sector concentration and high exchange rate of fisheries farmers
5.	Kalimantan Timur	high sector concentration
6.	Sumatera Utara	abundant labor
7.	Jawa Barat;	abundant labor and high exchange rate of fisheries farmers
8.	Jawa Tengah	abundant labor and high exchange rate of fisheries farmers
9.	Riau	Bit labor, low sector concentration, and low exchange rate of fisheries farmers

Based on Table 1, it is known that there are 8 provinces that can produce a high output with a supporting factor labor is abundant, high sector concentration and the exchange rate farmers fisheries sub-sector is high. Supporting factors are contained in one province alone could one characteristic, characteristic could be two, or even all three. South Sulawesi Province is a province that has the third characteristic. Of course, based on the three characteristic owned, the South Sulawesi Province can produce high output.

In contrast to the South Sulawesi Province, Riau Province have none of the three characteristic, but can produce high output. Thus, Riau province has a supporting factor other than the three characteristic to encourage Riau Province to produce high output. One of the factors supporting the Riau province near the provinces with the ocean harbor port of Belawan, North Sumatra Province. When viewed from the geographical nature, based

on information from the Riau Provincial Government (2016) that the province has 17.40% of the sea area of the total area and has 15 rivers. Thus making the fisheries is well developed. In addition, the area of untapped is also a great potential for the development of aquaculture land such as cages, pools, common fisheries and pond. In addition to the potential of the province that produces high output, also analyzed the provinces that produce high export intensity of fisheries in Indonesia in the year 2013, there are: 1) South Sulawesi Province; 2) East Java Province; 3) Lampung Province; 4) North Sulawesi Province; 5) Bali Province; and 6) North Sumatra Province. Each province has a different characteristic in terms of labor, sector concentration, exchange rate of fisheries farmer and output, which is explained further in Table 2.

Table 2 Characteristics Provinces Producing High Exports Intensity

No.	Province	Characteristics
1.	Sulawesi Selatan	abundant labor, high sector concentration, high exchange rate of fisheries farmers, and high output
2.	Jawa Timur	abundant labor, high sector concentration, and high output
3.	Lampung;	high sector concentration, high exchange rate of fisheries farmers, and high output
4.	Sulawesi Utara	abundant labor and high sector concentration
5.	Bali	high sector concentration
6.	Sumatera Utara	abundant labor and high output

According to Table 2 on page 103, it is known that there are six provinces that can produce a high output with a supporting factor labor is abundant, high sector concentration, high exchange rate of fisheries farmers and high output. That supporting factors be found in a province could only one characteristic, could be two characteristic, could be three or even all four. South Sulawesi Province is a province that has the fourth characteristic. Thus, South Sulawesi most superior in generating output and export intensity of fisheries in Indonesia.

Apart from excelling in four characteristic the natural geography of South Sulawesi Province also supports the development of fisheries in the province. Based on data from the Central Bureau of Statistics South Sulawesi (2016: 7), South Sulawesi Province, bordering the Gulf of Bone in the east, Makassar Strait in the west and Flores Sea in the south, thus the public access area of South Sulawesi province to the sea is very easy. Besides South Sulawesi province has 67 streams. The flow number that is in Luwu, as many as 25 streams. There is the longest river flowing Saddang River District includes Tator, Enrekang and, Pinrang. The length of the river is 150 km. The average area of fish farming in 2009 and 2013 amounted to 131 976 ha.

Although South Sulawesi Province does not have the ocean harbor, but the location is close to the province that has a provincial oceanic ports, namely Port Kendari, Southeast Sulawesi Province. However, it will be easier for the South Sulawesi province to sell fishery products if the province has its own ocean port, considering the province has great potential of fisheries.

Having obtained the provinces that produce high output and high export intensity, then these provinces paired. As described in Table 3.

Table 3 Grouping Provinces Which Produces High Output and/or High Export Intensity

Characteristics		
High Output and High Export Intensity	High Output But Low Export Intensity	High Export Intensity But Low Output
Sulawesi Selatan Province	Sumatera Selatan Province	Sulawesi Utara Province
Jawa Timur Province	Kalimantan Timur Province	Bali Province
Lampung Province	Jawa Barat Province	
Sumatera Utara Province	Jawa Tengah Province	
	Riau Province	

According to Table 3, obtained four provinces that produce high output and high export intensity of fisheries in Indonesia in the year 2013, there are: South Sulawesi Province, East Java Province, Lampung Province and North Sumatra Province; 5 provinces that produce high output but low export intensity, there are: South Sumatra Province, East Kalimantan Province, West Java Province, Central Java Province and Riau Province; and two provinces that generate high export intensity but low outputs, there are: North Sulawesi Province and Bali Province.

For provinces that produce high output and high export intensity can be used as a pilot area development of output and export intensity of Fisheries in other provinces in Indonesia. Although ideally these conditions occurs naturally, because of the high output fisheries act as input fisheries exports, thereby generating high export intensity.

For provinces that generate high output but low export intensity, made possible so that could be due in fisheries outputs generated only serves to satisfy domestic consumption, then produce low export intensity.

For provinces that generate high export intensity but low output, thus could be made possible due to the export obtained input from other areas. Although the fishery output generated is low, but can be met from other areas to be processed into export products.

IV. CONCLUSION

Based on potential of fishery in Indonesia, there are four provinces that produce high output and high export intensity of fisheries in Indonesia in the year 2013, there are: South Sulawesi Province, East Java Province, Lampung Province and North Sumatra Province; 5 provinces that produce high output but low export intensity, there are: South Sumatra Province, East Kalimantan Province, West Java Province, Central Java Province and Riau Province; and two provinces that generate high export intensity but low outputs, there are: North Sulawesi Province and Bali Province. The four provinces that produce high output and high export intensity of fisheries in Indonesia in the year 2013 can be used as a pilot area development output and export intensity of fisheries in other provinces in Indonesia.

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