

AN ANALYSIS OF LOCAL SUPERIORITY POTENTIAL IN THE AGRICULTURAL SECTOR TO ACHIEVE THE FOOD SECURITY IN PASURUAN AND PROBOLINGGO DISTRICTS IN EAST JAVA INDONESIA

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The goal of the qualified human resources is possibly achieved by the fulfilment of food availability through the development of agricultural sector in each area of Indonesia. This study aims at analyzing the superior and potential sub-sectors in the agricultural sector in Pasuruan and Probolinggo districts. This study is a quantitative study. The data collection in this study employs the documentation technique. The document used is the publication data provided by the Central Bureau of Statistic. The analysis is done by the Local Quotient (LQ) model, Growth Ratio Model or Model Rasio Pertumbuhan, and overlay analysis. The LQ analysis result of Pasuruan district shows that the agricultural sector is not the superior sector (non-basis). Moreover, the MRP analysis reflects that the forestry and fishery sub-sectors grow rapidly and they are potential to be developed in order to improve the food security in Pasuruan district. Meanwhile, in Probolinggo district, the LQ analysis result shows that the agricultural sector is a superior sector (basis). The MRP analysis displays that the agricultural and hunt services, forestry, and fishery sectors grow rapidly and they are potential to be developed in order to improve the food security in Probolinggo district.

Keywords: Local Superiority, Agricultural Sector, Food Security, Local Quotient, Growth Ratio Model, Economy Basis Theory, Gross Domestic Product.

INTRODUCTION

The benchmark of the national development success can be measured from the availability of the qualified human resources it possesses. The good quality of human resources is reflected from the good nutrient status in which each individual is physically and mentally healthy. This success can be achieved by the fulfilment of food availability in each area through the development of agricultural sector. The significance of the food fulfillment is stated in the Law Number 18 in 2012 saying that the food security is a condition in which the availability of food for the country can reach the individual level which is reflected from sufficient (in terms of the amount and quality), varied, nutritious, equally distributed, and affordable food. The agricultural development policy is one of the important national development policies and it affects significantly to the establishment of national security. (Bafadal, 2014; Simamora, *et al.* 2013; Nasikh, 2013; Nasikh 2014) add

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that not only as the food supplier, industrial material, food and bioenergy, labor supplier, and national income source, the agricultural sector also promotes the regional development as well as stimulates the people-centered economic development. There are three reasons underlying the importance of food development (Sandiyatma, 2015; Nasikh, 2016). First, the easy access to food and various, balance, safe, and sufficient food nutrition are a form of human right fulfillment. The second reason is the sufficient consumption of food and nutrition are the basis to develop the qualified human resources. Lastly, the food security is a basis of the economic security which aims at improving the economic growth and decreasing the poverty level. The food security also reflects the national security of an independent nation.

In line with this statement, the provincial and district/city governments play a role to implement and manage the food security by referring to their own development plan policy. East Java Province is a food central in Indonesia. The development of food security in Pasuruan and Probolinggo districts is a consequence of social, economy, and politic developments in this globalization era. Thus, each region is demanded to accelerate their economic condition by using a new approach which is more decentralized, empowerment-centered, and food diversity-based.

However, there are some challenges which can affect the development of food security. For example, the unstable oil price can affect to the high price of various food. The climate change and global warming can also lead to the scarcity of food availability. If the problem is not resolved soon, they can increase the poverty level and decrease the quality of human resources. One of ways to identify the success of agricultural development is by analyzing the income of the region, namely the internal analysis of Gross Domestic Product. The Gross Domestic Product represents the capability of a region to earn their income and repay factors contributing to the production process in the region (Ibrahim, 2008). Developing a regional superior product is an important way to improve the competitiveness level of the region. Basically, the resources diversity possessed by each region has the same potential to be the superior product of the region. However, the management of the product has not been optimum yet. The quality control has also not met the standard yet which becomes the obstacle in the product development. This obstacle makes the product unable to compete in the local and regional levels. If it is associated to the economy basis theory which states that the regional economy is divided into two sectors, namely basis and non-basis sectors, the analysis of Gross Domestic Product can identify the superior products of the agricultural sector. Consequently, the development of the product can be monitored well as it can be one of the stimulators of the regional development which is related to the fulfillment of the food need.

According to the background of the study and the explanation above, the research problem is as follows: what is the superior sub-sector of agriculture in Pasuruan and Probolinggo districts? What is the potential sub-sector which can be developed in Pasuruan and Probolinggo districts?

LITERATURE REVIEW

Economy Basis Theory

The regional economy is categorized into two sectors, namely the basis and non-basis sectors. Tarigan (2004) explains that the basis economy is the exogenous activity which means that it does not depend on the internal economic condition of the region and its function is to expand the job vacancies. Atmanti (2010) adds that in the basis economy, there is a process of exporting goods and services to other places beyond the borderline of the economy of the society. Meanwhile, according to Tarigan (2014) the non-basis economy is an activity to fulfill the needs of the society in certain region. The non-basis sector can only meet their local need, so the development fully depends on the society's income. Thus, this sector relies on the local economic condition and it cannot develop beyond the regional economic growth (Nasikh, 2017a). Atmanti (2010) suggests that in the non-basis economy, there is a process to fulfil the need of goods of the society who live in the certain region, so the production in the non-basis economy is limited locally. Based on the definition, the basis sector is the only sector which is able to improve the regional economy.

Superior Sector and Superior Sector Criteria

The superior sector is the important part of the regional economic development which does not only refer to the geographical location, but it also a sector which spreads in various economic lines to activate the economy (Soebagiyo and Hascaryo, 2015). The Gross Domestic Product data can determine the superior sector in a region. The superior sector is a group of sectors or sub-sectors which is able to stimulate the economic activity and improve the wealth of the society, particularly by the production, export, and job opportunities (Fachrurrazy, 2009). The economic sector can be called as the superior sector if it can meet some criteria as follows (Fachrurrazy, 2009).

- a) The sector has to be able to produce high demanded products, so the economy grows rapidly due to the high demand.
- b) There is an altered technology which is adopted creatively, so the new production function shifts by the wider capacity of development.
- c) There is an increasing investment of the production which becomes the priority of the government and private sectors.
- d) The sector has to develop well so that it can affect other sectors.

Andika, *et al.* (2015) explains that the aim of the regional economic growth achievement is to improve the output per capita which is represented by the economic sectors contributing to the Gross Domestic Product. However, the limited development budget can be an obstacle to develop the economic sectors, thus, the development of each sector cannot be achieved at the same time. Therefore, an appropriate and directed policy is required. The development policy to determine the superior sector will be the leading sector for other sectors.

Potential Sector

Erawati and Yasa (2011) suggests that the regional economic potential is the worth-developing economic capability of a region which can become the source of income of the society. It can even help the regional economy to develop sustainably on their own. The potential sector has to possess strength, namely the superiority in comparative and competitive ways. Arsyad (2010) states that the relationship among sectors which support the regional economy can be measured by two methods, namely Location Quotient (LQ) and *Growth Ratio Model* or *Model Rasio Pertumbuhan* (henceforth MRP). Bafadal (2014) suggests that in the agricultural development, it is important to prioritize the regional potential as well as the society's capability. The comparative superiority in the form of natural resources has to be assisted by the improvement of the competitive superiority which is achieved through the professional human resources. Farmers, especially the unskilled farmers can be the main target of the society empowerment so that in its process, the farmer need to be supervised and assisted in order to be a skilled, independent, wealthy, and equitable farmer. The qualified agricultural development can be achieved through the balance development of natural and human resources (Nasikh, 2017b).

Food Security

Kilonzi (2013) explains that the food security is an attempt to achieve a condition in which every individual can have a physical, social, and economic access to the safe and nutritious food anytime in order to fulfil their need and preference of food to live actively and healthily. This condition can be achieved by the existence of food availability, easy access to food, and further utilization. On the other side, the food security can reflect the capability of the society to meet the average of daily consumption per capita per person per day or the minimum energy requirement per day which is 2350 kcal energy per person per day. The food availability includes the production, storage, import, and access to food which is reflected by the purchasing power in the market or distribution. The main elements of the food security are as follows: availability, demand, and the further utilization of the food. They are affected by the agricultural and non-agricultural productions. Jokolelono

(2011) adds that from the three elements, there are some possible condition, such as (1) the food is available and physically accessible, but the purchasing power is low; (2) the food is available but not physically accessible and financially affordable; or (3) the food is available but not physically accessible and the purchasing power is high.

On the other hand, Kilonzi (2013) describes that food scarcity is the temporary limitation to the food access in a country, region, or household due to the lack of food resources. It can occur widely as the result of insufficient investment, environmental change, and ineffective policy implementation. The difficult access of food is also related to the high level of poverty which leads to the increasing number of people who rely on the food aid. The Food Security Board of East Java (2015) adds that the food availability aims to guarantee the food supply to meet the need of the society in terms of the quantity, diversity quality, and safety. The food availability can be fulfilled from three sources, namely (1) local production, (2) food supply, and (3) food reserve management. The food availability can be observed in various levels, including the household, regional (district/city and province), and national levels.

RESEARCH METHOD

This study is a quantitative study which employs the secondary data issued by the Central Bureau of Statistic in 2011 to 2014. The data is the Gross Domestic Product of constant price in 2010 in the agricultural sub-sector. This study aims at identifying the superior and potential agricultural sub-sectors in Pasuruan and Probolinggo districts.

The method uses to answer the research problem is as follows.

3.1. Location Quotient (LQ)

Local Quotient (LQ) is a comparison between the role of a sector or industry in the region level and national level (Tarigan, 2014). This LQ method is aimed at identifying the basis and non-basis sector, thus, it can be determined which sector that can be sold and developed to stimulate the regional economic condition (Prawoto, 2012). The formula for the LQ method refers to the study of Ibrahim (2008) formula (1)

$$LQ = \frac{Y_{ij} / Y_j}{Y_i / Y} \quad \text{Formula (1)}$$

In formula (1):

LQ = the level of location quotient of sector i

Y_{ij} = the Gross Domestic Product of sector/subsector i of Pasuruan/Probolinggo district

- Y_j = the total Gross Domestic Product of Pasuruan/Pasuruan district
 Y_i = the Gross Domestic Product of sector/subsector i of East Java
 Y = the total Gross Domestic Product of East Java

The interpretation of the LQ calculation can be explained as follows (Bafadal, 2014).

- a) $LQ > 1$ means that certain commodity is the basis sector whose specialization level in the region is higher than the same sector in East Java economy
- b) $LQ < 1$ means that certain commodity is the basis sector whose specialization level in the region is lower than the same sector in East Java economy
- c) $LQ = 1$ means that the specialization level of sector i in the region is similar to the same sector in the East Java economy.

3.2. Growth Ratio Model

Other than the LQ analysis to identify the potential sector and subsector based on the Gross Domestic Product's contribution criteria, another analysis tool is important to identify the potential sector and sub-sector in Pasuruan and Probolinggo districts. This refers to Bloom, et. Al. (2002) which suggests the researcher to use more than one analysis tools to identify the potential economic sector of a region. Hence, *Growth Ratio Model* or *the Model Rasio Pertumbuhan* (MRP) analysis is also used to analyze the potential sector and sub-sector based on the Gross Domestic Product's growth criteria in Pasuruan and Probolinggo districts. The model refers to the study by Erawati and Yasa (2011).

- a) The regional growth ratio of East Java

This analysis aims at comparing between the growths of each sector in the context of East Java and Gross Domestic Product of district/city (Atmanti, 2010) in formula (2).

$$RP_r = \frac{\Delta Y_{in} / Y_{in(t)}}{\Delta Y_n / Y_{n(t)}} \quad \text{Formula (2)}$$

- b) The district growth ratio

This analysis aims at comparing between the growths of each sector in the context of district/city and provincial growth sector of East Java (Atmanti, 2010) in formula (3)

$$RP_s \frac{\Delta Y_{ij} / Y_{ij(t)}}{\Delta Y_j / Y_{j(t)}} \quad \text{Formula (3)}$$

In formula 3:

- ΔY_{in} = the change of East Java's Gross Domestic Product in sector i
 $\Delta Y_{in(t)}$ = the East Java's Gross Domestic Product in sector i in the beginning period of study
 ΔY_n = the change of East Java's Gross Domestic Product
 $\Delta Y_{n(t)}$ = the East Java's Gross Domestic Product in the beginning period of study
 ΔY_{ij} = the change of Pasuruan/Probolinggo district's Gross Domestic Product in sector i
 $\Delta Y_{ij(t)}$ = Pasuruan/Probolinggo district's Gross Domestic Product in sector i in the beginning period of the study
 ΔY_j = the change of Pasuruan/Probolinggo's Gross Domestic Product
 $\Delta Y_{j(t)}$ = Pasuruan/Probolinggo district's Gross Domestic Product in the beginning period of the study.

Based on the analysis result of LQ and MRP, an overlay analysis is then carried out. This analysis is used to determine the potential sector based on the two previous methods. According to Andika, *et al* (2015), this analysis has four possible results as follows.

- a) Contribution (+) and growth (-) indicate that the sector is dominant, in terms of its growth and contribution
- b) Contribution (-) and growth (+) indicate that the sector has big growth and little contribution
- c) Contribution (+) and growth (-) indicate that the sector has small growth and big contribution
- d) Contribution (-) and growth (-) indicate that the sector is not potential in terms of its growth and contribution.

RESEARCH FINDING

The Agricultural Sector of Pasuruan District

According to the Central Bureau of Statistic (2016), the area of rice field in Pasuruan district was 40033 hectares, in which most of them was the technically-irrigated rice field, which was 25416 hectares. The area of rained-irrigated rice field was 3103 hectares. Out of 24 sub-districts in Pasuruan district, the widest area of rice field was in Kejayan sub-district which was 8709 hectares, followed by Purwosari

and Pandaan sub-districts which was 6875 and 6461 hectares, respectively. The dominant potential of Pasuruan district was fruits and horticulture. The vegetable product, such as paprika, leeks, carrots, and tomatoes, has been exported to Japan whose production capacity was 8 containers each week, see in table 1.

TABLE 1: THE ANALYSIS OF AGRICULTURAL, FORESTRY, AND FISHERY SUB-SECTORS OF PASURUAN DISTRICT IN 2011 TO 2016

<i>Sector</i>	<i>LQ (Contribution)</i>		<i>MRP (Growth)</i>		<i>OVERLAY</i>
	<i>Value</i>	<i>Mark</i>	<i>Value</i>	<i>Mark</i>	<i>Combined</i>
Agriculture, Forestry, and Fishery	0,560719584	-	0,522793009	-	--
1. Agriculture	0,659071198	-	0,452864825	-	--
a. Food plants	0,596142938	-	0,519156813	-	--
b. Horticulture	0,851287189	-	0,246417585	-	--
c. Crops	0,627229372	-	0,693232761	-	- -
d. Livestock	0,699197277	-	0,306076487	-	--
e. Agricult & hunt Services	0,558159477	-	0,862933465	-	--
2. Forestry & Wood Cutting	0,130483569	-	1,430379598	+	- +
3. Fishery	0,210806184	-	1,547520274	+	- +

Source: Analysis of Data 2017

Based on the LQ analysis result (in table 1), it was drawn that the agricultural, forestry, and fishery sectors were not the superior sector (non-basis) in Pasuruan district in 2011 to 2016. This could be seen from the value of agricultural sub-sector which showed $LQ < 1$ or negative (-). However, the biggest contribution to Gross Domestic Product in the agricultural sector was made by the horticultural plants which included the vegetable, fruit, and decorative plants. The most popular product of Pasuruan district was mango, durian, and snake fruit. Moreover, other horticultural products were found in Tukur district, such as chrysene follower; tuberose flower in Rembang district, and orchid in Prigen district.

Due to the fact that most of the area in the district was the industrial area, the agricultural sector in Pasuruan district was not superior. The industrial sector made the biggest contribution to the Gross Domestic Product to develop the economy. According to The Central Bureau of Statistic (2016) the processing industry included the economic activity which involved chemistry or physical change of the material, element, or component and became a new product. The raw material of processing industry was from the agricultural, forestry, fishery, and mining product, just like products of other processing industry. Main change, renewal, or reconstruction of the goods was generally utilized as the processing industry.

Furthermore, the MRP analysis result of Pasuruan district showed that the agricultural sub-district grew insignificantly in the district level. While the forestry and fishery sectors showed rapid growth in the district level. In 2016, the growth

of business in this sector was 3.18 percent. Geologically, Pasuruan district was divided into three geological areas, namely hill, low land, and coastal areas. Therefore, the hill area was potential enough to increase the forestry product and the coastal area was potential to increase the production of fish and fish cultivation.

According to the two analysis which were carried out in Pasuruan district in 2011 to 2016, it could be drawn that the agricultural sub-sector was not potential to be developed as its contribution was insignificant and the growth was low. In other words, the agricultural sub-sector was not worth prioritizing. Meanwhile, the forestry and fishery sub-districts also showed similar result; they contributed insignificantly, yet they grew rapidly so that these sub-districts were potential to be developed, especially to improve their contribution to the Gross Domestic Product of Pasuruan district.

The Agricultural Sector of Probolinggo District

According to The Central Bureau of Statistic (2016), the non-rice field area in Probolinggo district was employed as field and temporary land. The area of field was 49707 hectares, while the smallest use of non-rice field area was for temporary land which was only 4 hectares. The area of irrigated and non-irrigated rice field was 37222 hectares, which consisted of 34719 hectares of irrigated rice field and 2503 hectares of non-irrigated rice field, see in table 2.

TABLE 2: THE ANALYSIS OF AGRICULTURAL, FORESTRY, AND FISHERY SUB-SECTORS IN PROBOLINGGO DISTRICT IN 2011 TO 2016

Sector	LQ (contribution)		MRP (growth)		Overlay
	Value	Mark	Value	Mark	Combined
Agricult, Forestry, & Fishery	2,976278329	+	0,752623344	-	+-
1. Agriculture	3,173587004	+	0,551823645	-	+-
a. Food plants	2,708016449	+	0,696755237	-	+-
b. Horticultural plants	4,630463977	+	0,161508684	-	+-
c. Crops	3,773893681	+	0,715319316	-	+-
d. Livestock	2,652703652	+	0,4381937	-	+-
e. Agri & hunt Services	4,431290886	+	1,083369235	+	++
2. Forestry & Wood Cutting	3,351800282	+	1,98485729	+	++
3. Fishery	2,005109418	+	1,979677289	+	++

Source: Analysis of Data 2017

In table 2 showed the LQ analysis result. The agricultural, forestry, and fishery sub-sectors were the superior sector (basis) of Probolinggo district in the research period in 2011 to 2016. This was reflected from the value of agricultural sub-sector which showed $LQ > 1$ or positive (+). The biggest contribution of Gross Domestic Product was made by the horticultural plants whose values was 4.63 as well as the agricultural and crops whose value was 4.43. All in all, the agricultural,

forestry, and fishery sub-sectors made the biggest contribution to the Gross Domestic Product of Probolinggo district, which was 38.32 percent. According to The Central Bureau of Statistic (2016), the dominant horticultural commodity of Probolinggo district was onions, chilies, potatoes, cabbages, leeks, and carrots. From the data of plantation area in Probolinggo in 2016, the biggest area was the tobacco plantation, which was 13030 hectares. Its production was 14721.21 tons. It was followed by the coffee bean plantation whose area was 5925.19 hectares and 1775.27 tons of production.

Furthermore, the MRP analysis result in Probolinggo district showed that some sub-sectors displayed rapid growth (positive), such as agricultural and hunt services, forestry and wood cutting, and fishery. Other sectors showed negative sign which meant that those sectors grew a little. According to the Central Bureau of Statistic (2016), the data of *Perum Perhutani* KPH Probolinggo showed that the forest area in Probolinggo was 84264.8 hectares. It consisted of production forest which was 46903.7 hectares and protected forest which was 34.212 hectares. The wood production in Probolinggo district was dominated by carpentry wood which was 15322, teak wood which was 2124, and forest wood which was 13.198.

According to the LQ and MRP analysis which was carried out in Probolinggo district in 2011 to 2016, it was identified that the agricultural sub-sector which included food plants, horticultural plants, crops, and livestock resulted similarly. They had a big contribution to the Gross Domestic Product of Probolinggo district, yet they grew slowly. Consequently, these sectors were potential to be developed to increase their growth. While the agricultural and hunt service, forestry and wood cutting, and fishery sub-sectors resulted similarly. They contributed a lot and grew rapidly. Therefore, it can be concluded that the three sub-sectors were worth prioritizing to be developed. The big potential of the agricultural sector was closely related to its geographical condition. According to The Central Bureau of Statistic (2016) of Probolinggo district, Probolinggo district was located in 0 to 2500 meters above the sea level. This condition made its soil volcanic. It contained minerals resulting from the volcano explosion which consisted of sand and rocks, mud and yellowish clay. This characteristic reflected the high fertility of soil and it was suitable for some vegetables, such as in Tengger mountain rings which was in 750 to 2500 meters above the sea level. The land which lied from east to west in the south part in Argopuro Mountain was suitable for coffee bean plantation and fruits, such as durian, avocado, and etcetera. The suitable sub-district for fruits was Krucil and Tiris sub-districts.

According to the analysis done in both districts, it could be concluded that the agricultural sub-sector in Probolinggo district was more superior than in Pasuruan district. However, they had a big potential to be gradually developed, referring to the fact that it was important to develop the agricultural sector to meet the food

need of the society and achieve the national food security. There were some alternative ways to develop the food security which could be implemented in both districts. One of them was food diversification. According to Elizabeth (2011), food diversification was an alternative way to consume various kinds of food aiming at optimizing the utilization of agricultural and forestry resources by producing various food to decrease the dependency to the imported food. The food diversification was not a goal and policy instrument to achieve the rice stability and it was not aimed to substitute rice wholly, yet it was meant to change the food pattern of the society so that they could consume more varied food with sufficient, balance, and safe nutrient. The main strategy to achieve the diversification and food security required a set of policy, technology and information, and the utilization of supervising and marketing institutions, as well as the approach system of the related institution. The support of the government in the form of farmer-focused policy was also required to achieve the diversification and food security (Fachrurrazy. 2009).

The food diversification was useful to be implemented in both districts as the more varied the food, the more optimal utilization of food commodities. If the agricultural product of both districts increased, the non-superior sub-sector would be the superior and potential sub-sectors. Besides, the increased contribution of sub-sector to the fulfilment of food need would result in the economic growth in those two districts (Erawati, and Yasa, 2011).

CONCLUSION

In Pasuruan district, agricultural sector is not the superior sector (non-basis) as the main and biggest contribution of Gross Domestic Product is made by the processing industry sector. However, the food security development in this district can be contributed by the forestry and fishery sub-sectors as they grow rapidly and they are potential to be developed. Meanwhile, in Probolinggo district, the agricultural sector is the superior sector (basis) and it makes the biggest contribution to Gross Domestic Product of Probolinggo district. Moreover, the food security development in this district can be focused on the agricultural and hunt services, forestry, and fishery sub-sector due to the fact that they grow rapidly and they have a big potential to be developed. One of the ways to improve the food security is the food diversification.

Based on the conclusion above, it is suggested that the regional government of Pasuruan and Probolinggo districts establish a development policy which prioritizing the superior sub-sector in each region. The advanced technology and information is also significant to implement the food diversification in both districts. It is also important to revitalize the potential sub-sector, so it can contribute more to the Gross Domestic Product of each district.

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