

SOCIETY EMPOWERMENT THROUGH AGRICULTURAL INDIGENOUS RESOURCE POTENTIAL: SUSTAINABILITY OF FOOD SELF-SUFFICIENCY GOALS

NASIKH^{1*}, SUGENG HADI UTOMO¹, HADI SUMARSONO¹, JOKO SAYONO², MOEHERIONO³, NIMMI ZULBAINARNI⁴, AVI BUDI SETIAWAN⁵ AND SILVANA MAULIDAH⁶

¹Semarang Street No. 5, Faculty of Economics and Business, Universitas Negeri Malang, East Java, Indonesia. ²Semarang Street No. 5, Faculty of Social Science, Universitas Negeri Malang, East Java, Indonesia. ³Jalan Arif Rahman Hakim No. 150, Universitas Hang Tuah Surabaya, East Java, Indonesia. ⁴School of Business, IPB University, West Java, Indonesia. ⁵Campus Sekaran Gumungpati, Faculty of Economics, Universitas Negeri Semarang, Indonesia. ⁶Faculty of Agriculture, Universitas Brawijaya, East Java, Indonesia.

*Corresponding author: nasikh.fe@um.ac.id

Submitted final draft: 1 June 2021

Accepted: 18 June 2021

<http://doi.org/10.46754/jssm.2022.07.012>

Abstract: This study aims to analyze indigenous agriculture from economic resources in East Java Province as an existing economic resource of strategy and development that evolve into the primary source. This research employed survey and action research methods and secondary data sourced from the central bureau of statistics on 17 economic sectors in Pasuruan and Probolinggo regencies. This research applied survey and action research methods as it attempts to identify the resource potential in each sector setting as the basic strategy for sustainable resources to be the leading sector and as the basis to empower economic resources to reach sustainable food security. This research methodology uses three analysis devices: Location Quotient, Growth Ratio Model and finally describes how to combine LQ and Growth Ratio Model. The result showed that Probolinggo Regency was categorized as rapid advance but left behind. In other words, the economic growth of Probolinggo Regency has weakened. Meanwhile, the food security in Pasuruan Regency was weak. This regency had focused on increasing its economic growth rather than sustainability. The research found that sectors with a positive Growth Ratio Model might move the local economy through regional development innovations.

Keywords: Sustainable, agricultural, indigenous, resource, potential.

Introduction

Food self-sufficiency is a state in which the food needs of a country have been met at the individual level (Canning *et al.*, 2010). It is reflected by sufficient food, in terms of quality, security, nutrition, availability, price and not contradictory to religion and culture to achieve a healthy, active and productive lifestyle (Syarif, 2017). The development of food security is a national priority written in the National Midterm Development Plan of 2014-2018. It focuses to improve food supply, enrich food distribution, accelerate food diversity and monitoring food security based on local characteristics (Dudin *et al.*, 2016). The disturbance in food security can cause a lot of social turmoil (Nasikh, 2013; Lax *et al.*, 2016). Food self-sufficiency is

strictly connected with the city's foodshed. It is important to promote sustainable practices in the local food system and food security solutions. Therefore, these practices can be adapted to the cities in Indonesia including Pasuruan and Probolinggo.

The economic development in Pagurian and Probolinggo regencies, Indonesia is a logical consequence of the social and economic demands to accelerate the regional economy (Rosmawarni & Soekartono, 2015; Nasikh, 2017b). Regional economic development is a process that should be carried out by both government and society to manage the resources (Fotourehchi, 2017; Nasikh, 2018). It can be implemented by establishing a partnership between the regional government and private parties to create new

jobs to boost economic growth (Purnomo, 2005). Consequently, the regional government of Pasuruan and Probolinggo regencies is expected to internalize the renewed vision into the planning and development processes in the food sector through resource management to anticipate the rapid and dynamic changes (Pelletier *et al.*, 2008; Nasikh *et al.*, 2021).

One way to meet the accelerating changes in society is to optimize local resource management in Pasuruan and Probolinggo regencies. The regional development is adjusted to the existing potential and the governmental program is directed to develop the local economy potential that will result in rapid and optimal development (Pimentel *et al.*, 2008; Eriksen *et al.*, 2018). As a result, society's well-being will increase while poverty and unemployment will be reduced (Husna, 2015; Nasikh, 2021). The added value that is based on local potential is the right strategy to drive the local economy, particularly the agriculture sector (Pierre, 2000; Ashby *et al.*, 2016; Nana, 2018). The agriculture sector (agribusiness) as a rural economic sector has the potential to strengthen the social economy (Almasdi & Suparman, 2013; Nasikh, 2016; Sayono *et al.*, 2021).

This framework should underlie the enrichment of technology's role to strengthen food security (Rajaniemi *et al.*, 2015). Thus, all local potentials are formulated to strengthen the agroindustry in Pasuruan and Probolinggo regencies. Agroindustry is defined as a manufacturing sector component that can add value to the agricultural-based raw material, through efficient management and operational handling in the context of economic development as a strategy to eradicate poverty (Mihail *et al.*, 2018). Regional economic development is also expected to be able to grow spiritually to achieve a high economic growth rate through the empowerment of local economic potential and utilization of existing opportunities to increase society's well-being (Pratomo, 2014; Vaitla *et al.*, 2017; Hartono & Nasikh, 2017; Haysom & Tawodzera, 2018). Another term that is often referred to as the local potential or resources is indigenous resources. It is a

set of knowledge and technology existing and developed in, around and by specific indigenous communities (people) in a specific area or environment (Lailia & Santoso, 2014). In other words, all local resources are optimized to: (1) Drive the economy to improve economic access through new job opportunities and income and (2) Increase the consumption diversity through various products developed from local materials.

The approach of Local Leading Product development focuses on the utilization and optimization of resources and local competency to activate the regional economy to resolve poverty and unemployment as well as establish sustainable development (Pelletier *et al.*, 2008; Nasikh, 2014; Dayamba *et al.*, 2016; Nasikh, 2017a). Thus, local competitiveness will be improved when local leading products are developed (Pelletier *et al.*, 2008; Nasikh, 2014; Dayamba *et al.*, 2016; Nasikh, 2017a). Herein, one of the important factors to develop local leading products is the management of local government. However, there are some obstacles to the local leading product development. There is no optimal management of the local government, due to the low economic scale, so the local product faces difficulties to enter a larger target market (regional, national and international). The strategy to develop the Local Leading Product concerns the high economic and competitive local resources. It means that they have a core competency and high employment, not to mention being produced by technical appropriateness (raw material and market). They also have a local organization (human resources, technology, infrastructure support and social and cultural condition).

The local governments of the Pasuruan and Probolinggo regencies are expected to be able to identify and seek the productive and competitive economic potential to enter the global market. It is implicit that the local government has to encourage and facilitate business actors to develop their products independently with their competency to create their local pride.

Market power tends to worsen the development gap among regions. The well-

developed region has a higher competitive accumulation than other places. Haeruman *et al.* (2001) call it the “backwash effect”. The leading sector grows to be the main sector in the interregional sector. Recent regional development has not been able to explain all regional economic activities comprehensively. Some alternative approaches to the development theory have been formularized to help the regional economic development plan.

This organization of the paper is as follows: Section one describes how to analyze the Location Quotient (LQ) and Growth Ratio Model in Probolinggo and Pasuruan Regencies in Indonesia. Section two describes research methodology that focuses on three analysis tools: Location Quotient, Growth Ratio Model and how to combine LQ and Growth Ratio Model in Probolinggo and Pasuruan Regencies in Indonesia.

Materials and Methods

This study employs survey and action research approaches to analyze the resource problem in each research setting as the basic strategy is to develop the existing resources to empower rural society to reach sustainable food self-sufficiency. The data used is secondary and sourced from the central bureau of statistics on 17 economic sectors in Pasuruan and Probolinggo regencies in 2020. Pasuruan and Probolinggo were chosen because these regencies are rural with a lot of local potentials that give a huge contribution to the Gross Regional Domestic Product (GRDP) in East Java. This research employs survey and action research methods from February to December 2020 to produce an alternative model of the techno-industrial cluster that is based on the local advantages in Probolinggo and Pasuruan regencies. Location Quotient, Growth Ratio Model and Overlay were used as the three analysis devices in this research.

The Location Quotient is used to identify the role of the regional economic sector by comparing the same sector in a larger area. This model is aimed at identifying potential economic sectors that can be developed and used to

identify the comparative advantage of a region (Ivarez & Barbero, 2016; Xu, 2018). Equation 1 shows the formula for calculating LQ:

$$LQ = \frac{c_i}{\sum_{j=1}^n c_i} / \frac{C_i}{\sum_{j=1}^n C_i} \quad (1)$$

(Fischer, 2016; Sanso *et al.*, 2017; Ning *et al.*, 2018; Aspiansyah & Arie, 2019)

In Equation 1, the LQ of a sector in a regional economy, C in a different area than the overall region's economic level; c_i is a sector indicator that is relevant in a region, which in this paper is an indicator of the regional economy per sector; C_i denotes the factor i indicator that is appropriate in the regional economic level and n is the number of regional economic sectors.

For example, if c_i is a region's economic sector, then, n is the number of kinds of sites, $\sum_{j=1}^n c_i$ is the total of that region's economic sector and $\frac{c_i}{\sum_{j=1}^n c_i}$ is the percentage of the regional economic sector in the region. Similarly, C_i is the regional economic sector of the overall region, $\sum_{j=1}^n C_i$ is the total size of the regional economic sectors of the entire region and $\frac{C_i}{\sum_{j=1}^n C_i}$ is the total regional economic sector of the entire region (i.e., the total regional economic sector of the overall region). In contrast to the overall region, $LQ = \frac{c_i}{\sum_{j=1}^n c_i} / \frac{C_i}{\sum_{j=1}^n C_i}$ serves as the spatial dissemination of the area within the regional economic sector.

There are three categories of LQ calculation results: If $LQ > 1$, it means the calculated specialized sector in Pasuruan and Probolinggo regencies is smaller than East Java. However, if $LQ < 1$, it means the calculated sector in Pasuruan and Probolinggo regencies is less specialized than East Java. Finally, if $LQ = 1$, it means that the calculated sector is sufficient to fulfill Pasuruan and Probolinggo regencies, but unable to export to other regions. The Growth Ratio Model is an activity growth comparison between the small and big scales. It is an analysis device for describing future economic activity or sector based on regional economic structural growth parameters (Yusuf, 1999; Tadesse & Zewdie, 2019). Region growth ratio

is a comparison between the Gross Regional Domestic Product growth of the sector (i) in the study region and the Gross Regional Domestic Product growth of the sector in the reference region. The comparison result is categorized into two. If > 1 or positive, it means that the sector growth in the reference region is higher than the total growth of Gross Regional Domestic Product of Pasuruan and Probolinggo regencies. If the value is negative, the sector growth in Pasuruan and Probolinggo regencies is lower than the total growth of Gross Regional Domestic Product of East Java.

The reference region growth ratio is a comparison between the average Gross Regional Domestic Product growth of the sector (i) in a particular region and the average Gross Regional Domestic Product growth in the reference region. If the result is > 1 or positive, it means that the sector growth of Pasuruan and Probolinggo regencies is higher than in the reference region. However, if it is negative, the sector growth of Pasuruan and Probolinggo regencies is lower than in East Java.

Besides, the result of the Growth Ratio Model can be classified into four. First, Classification 1 with Studied Region Growth Ratio (+) and Reference Region Growth Ratio (+) means there is a prominent growth in East Java as well as in Pasuruan and Probolinggo regencies. Second, Classification 2 with Studied Region Growth Ratio (-) and Reference Region Growth Ratio (+) shows a significant growth in East Java, but not in Pasuruan and Probolinggo regencies. Next, Classification 3 with Studied Region Growth Ratio (+) and Reference Region Growth Ratio (-) reflects an improving growth in Pasuruan and Probolinggo regencies, but not in East Java. Finally, Classification 4 with Studied Region Growth Ratio (-) and Reference Region Growth Ratio (-) shows inadequate growth in East Java as well as in Pasuruan and Probolinggo regency.

Furthermore, Overlay analysis is used to determine the potential sector, according to the Location Quotient and Growth Ratio Model. There are four assessments (Wahyuningtyas,

2013; Moseson *et al.*, 2017; Yusuf & Ibikunle, 2017) of this analysis. First, growth (+) and contribution (+) show a dominant activity in terms of growth and contribution. Second, growth (+) and contribution (-) reflect activity with dominant growth, but little contribution. Its contribution has to be improved to be a dominant activity. Next, growth (-) and contribution (+) explain an activity with little growth, but a large contribution. There is likely reduced activity. Finally, growth (-) and contribution (-) tell a low potential activity in terms of growth and contribution. The collaboration of these tools is used to increase the validity of the research finding. So, the output of the research can be used to analyse the local economic development in the Pasuruan and Probolinggo regencies.

Results and Discussion

To identify the economic growth pattern and structure of seventeen economic sectors in Probolinggo regency, data on the rate of economic growth and the contributing proportion of Gross Regional Domestic Product of 2020 were utilized. The Location Quotient (LQ) was calculated by using the Gross Regional Domestic Product of Probolinggo regency according to the constant price of 2019. Table 1 showed the LQ of Probolinggo Regency in 2019.

From Table 1, it was identified that the basis category included water supply, trash and waste management and recycling, as well as real estate, government administration, defence and social security and other services. It means that those sectors were able to meet the local need of Probolinggo Regency and transferred to meet the other region's needs. Those were leading sectors that can improve the regional economic growth of Probolinggo Regency (Kondaourouva, 2015). Meanwhile, the non-basis sector consisted of mining and digging, processing industry, construction, wholesale and retail, car and motorbike repair, transportation and storage, accommodation and food and beverage supply, information and communication, financial and insurance service, corporate service, education service and health and social activity service. In

Table 1: The location quotient of Probolinggo regency

No.	Business Area	LQ	Note
1	Agriculture, forestry and fishery	3.06	BASIS
2	Mining and excavation	0.46	NON-BASIS
3	Processing industry	0.76	NON-BASIS
4	Electricity and gas supply	3.07	BASIS
5	Water supply, trash and waste management and recycling	1.19	BASIS
6	Construction	0.77	NON-BASIS
7	Wholesale and retail, car and motorbike repair	0.68	NON-BASIS
8	Transportation and storage	0.29	NON-BASIS
9	Accommodation and food and beverage supply	0.28	NON-BASIS
10	Information and communication	0.58	NON-BASIS
11	Financial and insurance service	0.71	NON-BASIS
12	Real estate	1.40	BASIS
13	Corporate service	0.41	NON-BASIS
14	Government administration, defence and social security	1.42	BASIS
15	Education service	0.98	NON-BASIS
16	Health and social service	0.93	NON-BASIS
17	Other service	1.36	BASIS

Source: Data analysis (central bureau of statistics of Probolinggo regency, 2020)

other words, those sectors could only fulfil local needs (David & Vasil, 2013; Djoudi *et al.*, 2016; Koudougou *et al.*, 2017; Vinceti *et al.*, 2018) and they were unable to be exported. Thus, improvement and development of those sectors were required to make them leading sectors and help to improve the regional economic growth (Osipova, 2015; Ravera *et al.*, 2016). Besides, the analysis result of the Growth Ratio Model of Probolinggo Regency was shown in Table 2.

Table 2 reflected the real and nominal values of Pasuruan Regency. Consequently, a comparison between the Growth Ratio Model of East Java and Probolinggo Regency could be carried out to obtain a depiction of economic activity that might be possible in Probolinggo regency. Sectors that belonged to Classification 1 or (+) and (+) were wholesale and retail, car and motorbike repair, transportation and storage, accommodation and food and beverage supply, information and communication, financial and

insurance, education and health and social activity sectors. It meant that those sectors obtained significant growth in East Java and Probolinggo regency. Besides, mining and excavation sectors fell in Classification 2 with (+) and (-) values of comparison between the Growth Ratio Model of East Java and Probolinggo Regency. It meant that both sectors obtained prominent growth at the East Java level but were inadequately significant in Probolinggo Regency. Meanwhile, the processing industry, water supply, trash and waste management, and recycling, construction, real estate, corporate service, government administration, defence and social security and other services sectors were in Classification 3. Those sectors grew significantly in Probolinggo Regency but insignificantly in East Java. Finally, agriculture, forestry and fishery, electricity and gas supply belonged to classification 4. They did not grow significantly in 2019 both in East Java and Probolinggo Regency.

Table 2: Growth ratio model of Probolinggo regency

No.	Business Area	RP _s	
		Real	Nominal
1	Agriculture, forestry and fishery	0.65	-
2	Mining and excavation	0.61	-
3	Processing industry	1.16	+
4	Electricity and gas supply	0.82	-
5	Water supply, trash and waste management and recycling	1.10	+
6	Construction	1.08	+
7	Wholesale and retail, car and motorbike repair	1.31	+
8	Transportation and storage	1.45	+
9	Accommodation and food and beverage supply	1.68	+
10	Information and communication	1.56	+
11	Financial and insurance service	1.44	+
12	Real estate	1.09	+
13	Corporate service	1.05	+
14	Government administration, defence and social security	1.03	+
15	Education service	1.24	+
16	Health and social service	1.25	+
17	Other service	1.01	+

Source: Data analysis (central bureau of statistics of Probolinggo regency, 2020)

From Location Quotient (LQ) and Growth Ratio Model analysis results, it could be concluded that not all sectors grew significantly in Probolinggo Regency and East Java. They could meet the regional need of Probolinggo Regency, but are unable to export to other regions (Porter, 2000). The Overlay analysis was displayed in Table 3.

From the Overlay analysis of Probolinggo Regency presented in Table 3, it could be categorized that water supply, trash and waste management, recycling, real estate, government administration, defence and social security, as well as other services sectors were the outstanding sectors, with positive growth and significant contributions to the Gross Regional Domestic Product of Probolinggo Regency, which was classified as “rapid advance rapid growth”.

It meant that those subsectors not only gave huge contributions but also obtained

rapid growth. Agriculture, forestry and fishery, electricity and gas supply belonged to the highly contributing and dominant sectors, but they obtained insignificant growth. Therefore, they were categorized into “rapid but stressed advance”, reflecting that these sectors gave huge contributions but had a reduced growth rate. Sectors with “rapid advance” were the processing industry, construction, wholesale and retail, car and motorbike repair, transportation and storage, accommodation and food and beverage supply, information and communication, financial and insurance service, corporate service, education, health and social activity sectors. It meant that those subsectors gave little contribution but obtained rapid growth. Finally, the mining and excavation sectors showed little growth and contribution. Thus, they belonged to the “relatively left behind” category. Related to food security conditions in Probolinggo Regency, agriculture as the basic sector is not significantly growing but it

Table 3: Overlay analysis (a combination of LQ and growth ratio model)

No.	Business Area	LQ RP _s			
		Real	Nominal	Real	Nominal
1	Agriculture, forestry and fishery	3.06	+	0.65	-
2	Mining and excavation	0.46	-	0.61	-
3	Processing industry	0.76	-	1.16	+
4	Electricity and gas supply	3.07	+	0.82	-
5	Water supply, trash and waste management and recycling	1.19	+	1.10	+
6	Construction	0.77	-	1.08	+
7	Wholesale and retail, car and motorbike repair	0.68	-	1.31	+
8	Transportation and storage	0.29	-	1.45	+
9	Accommodation and food and beverage supply	0.28	-	1.68	+
10	Information and communication	0.58	-	1.56	+
11	Financial and insurance service	0.71	-	1.44	+
12	Real estate	1.40	+	1.09	+
13	Corporate service	0.41	-	1.05	+
14	Government administration, defence and social security	1.42	+	1.03	+
15	Education service	0.98	-	1.24	+
16	Health and social service	0.93	-	1.25	+
17	Other service	1.36	+	1.01	+

Source: Data analysis (central bureau of statistics of Probolinggo regency, 2020)

probably affects the processing industry that has positive growth. In agriculture development, many businessmen realize the farming product will be value-added if they process it before they sell it to the market and is calculated as the growth of the industry. It can be said that food security in Probolinggo Regency has been in step with agriculture sustainability development. Sustainable agriculture has become essential to agricultural progress around the world, including in Indonesia. This strategic factor is shown by its role in capital formation, provision of foodstuffs, industrial raw materials, feed and bioenergy, absorbing labour, sources of foreign exchange and sources of income, as well as environmental preservation through environmentally friendly farming practices. Agricultural development in Indonesia is directed towards the development of sustainable agriculture, as part of the implementation of sustainable development.

Sustainable agricultural development (including rural development) is an issue of strategic importance that is of concern in all countries today. Besides being a goal, sustainable agricultural development has also become a paradigm for agricultural development patterns. In conclusion, the agriculture and processing industry sector has a strong relationship towards food security sustainability in Probolinggo Regency.

From the above analysis, it also can be concluded that Probolinggo Regency was categorized as Rapid Advance but Left Behind (Anpilov, 2012; Etongo *et al.*, 2018b) since most job opportunities sectors fell into this category. Studies by Rosmawarni and Soekartono (2015) and Moreda (2018) argued that Probolinggo Regency fell into Rapid Advance Rapid Growth from 2011 to 2018 as most jobs were in this category. In other words, the economic growth of

Probolinggo Regency weakened, so the regional planning program had to prioritize increasing the Gross Regional Domestic Product (Marcelo & Doug, 2015).

To identify the economic growth pattern and structure of seventeen economic sectors of Pasuruan Regency, the data of economic growth rate and Gross Regional Domestic Product contribution proportion were used (Maxim & Irina, 2017). Table 4 showed the LQ result by using the Gross Regional Domestic Product of Pasuruan Regency with the constant price in 2019.

From the calculation of LQ in Table 4, the sectors in Gross Regional Domestic Product were categorized into two categories: Basis and non-basis sectors (Mohamed & Lee, 2006). The basic sector included the processing industry, electricity and gas supply and construction sectors. It meant that those three sectors became leading sectors in the regional economic growth of Pasuruan Regency. They could meet the

regional need of Pasuruan Regency and export to other regions (Mbukwa, 2013; Koffi et al., 2017; Etongo et al., 2018a).

The non-basis sectors were agriculture, forestry and fishery, mining and excavation, water supply, trash and waste management and recycling, wholesale and retail, car and motorbike repair, transportation and storage, accommodation and food and beverage, information and communication, financial and insurance, real estate, corporate service, government administration, defence and social security, education, health and social activity sectors. Those sectors were able to meet the needs of the Pasuruan Regency without exporting to other places. There were a lot of sectors in Pasuruan Regency that had to be developed further so that they could be leading sectors to increase the economic growth of Pasuruan Regency (Yusuf & Ibikunle, 2017; Binam et al., 2017; Meinzen et al., 2017). Table 5 showed the Gross Regional Domestic Product of Pasuruan Regency.

Table 4: Calculation of location quotient (LQ) of Pasuruan regency

No.	Business Area	LQ	Note
1	Agriculture, forestry and fishery	0.56	NON-BASIS
2	Mining and excavation	0.10	NON-BASIS
3	Processing industry	1.98	BASIS
4	Electricity and gas supply	2.76	BASIS
5	Water supply, trash and waste management and recycling	0.35	NON-BASIS
6	Construction	1.32	BASIS
7	Wholesale and retail, car and motorbike repair	0.54	NON-BASIS
8	Transportation and storage	0.20	NON-BASIS
9	Accommodation and food and beverage supply	0.64	NON-BASIS
10	Information and communication	0.57	NON-BASIS
11	Financial and insurance service	0.30	NON-BASIS
12	Real estate	0.43	NON-BASIS
13	Corporate service	0.13	NON-BASIS
14	Government administration, defence and social security	0.50	NON-BASIS
15	Education service	0.26	NON-BASIS
16	Health and social service	0.23	NON-BASIS
17	Other service	0.73	NON-BASIS

Source: Data analysis (central bureau of statistics of Pasuruan Regency, 2020)

Table 5: Gross regional domestic product of Pasuruan regency

No.	Business Area	RP _s	
		Real	Nominal
1	Agriculture, forestry and fishery	0.65	-
2	Mining and excavation	0.47	-
3	Processing industry	1.06	+
4	Electricity and gas supply	0.06	-
5	Water supply, trash and waste management and recycling	1.24	+
6	Construction	0.37	-
7	Wholesale and retail, car and motorbike repair	1.27	+
8	Transportation and storage	1.19	+
9	Accommodation and food and beverage supply	1.57	+
10	Information and communication	1.51	+
11	Financial and insurance service	1.20	+
12	Real estate	1.26	+
13	Corporate service	1.23	+
14	Government administration, defence and social security	0.90	-
15	Education service	1.09	+
16	Health and social service	1.34	+
17	Other service	1.09	+

Source: Data analysis (central bureau of statistics of Pasuruan Regency, 2020)

From the Growth Ratio Model in Table 5, the real and nominal values of Pasuruan Regency were obtained. A comparison of the growth Ratio Model of East Java and Pasuruan Regency was carried out to obtain the description of potential economic activity in Pasuruan Regency. It was classified as follows. Classification 1 with (+) and (-) values consisted of wholesale and retail, car and motorbike repair, transportation and storage, accommodation and food and beverage, information and communication, financial service and insurance sectors. It meant that those sectors obtained significant growth in both East Java and Pasuruan Regency levels. Classification 2 with (+) and (-) only consisted of mining and excavation sectors. In other words, it significantly grew at East Java level but did not make significant growth in Pasuruan Regency. Next, the processing industry, water supply,

trash and waste management and recycling, real estate, corporate service and other sectors fell into Classification 3, or (-) and (+) values. It meant that they made prominent growth in Pasuruan Regency level, but not at the province level. Finally, Classification 4 with (-) and (-) values consisted of agriculture, forestry and fishery, electricity and gas supply, construction, government administration, defence and social security sectors. There was no significant growth both in East Java and Pasuruan Regency levels.

From the result of the Location Quotient (LQ) and Growth Ratio Model analysis, it was concluded that not all sectors that grew significantly in Pasuruan Regency and East Java were able to export to other regions to meet their regional needs. In other words, they could only meet their own needs. Table 6 showed the Overlay analysis.

Table 6: Overlay analysis (the combination of location quotient and growth ratio model)

No.	Business Area	LQ		RP _s	
		Real	Nominal	Real	Nominal
1	Agriculture, forestry and fishery	0.56	-	0.65	-
2	Mining and excavation	0.10	-	0.47	-
3	Processing industry	1.98	+	1.06	+
4	Electricity and gas supply	2.76	+	0.06	-
5	Water supply, trash and waste management and recycling	0.35	-	1.24	+
6	Construction	1.32	+	0.37	-
7	Wholesale and retail, car and motorbike repair	0.54	-	1.27	+
8	Transportation and storage	0.20	-	1.19	+
9	Accommodation and food and beverage supply	0.64	-	1.57	+
10	Information and communication	0.57	-	1.51	+
11	Financial and insurance service	0.30	-	1.20	+
12	Real estate	0.43	-	1.26	+
13	Corporate service	0.13	-	1.23	+
14	Government administration, defence and social security	0.50	-	0.90	-
15	Education service	0.26	-	1.09	+
16	Health and social service	0.23	-	1.34	+
17	Other service	0.73	-	1.09	+

Source: Data analysis (central bureau of statistics of Pasuruan Regency, 2020)

The result of the Overlay analysis in Table 6 for Pasuruan Regency was classified as follows. The processing industry sector was the leading, dominant sector as it presented positive growth and made a significant contribution to the Gross Regional Domestic Product of Pasuruan Regency. Therefore, it belonged to the “rapid advance rapid growth” category. Also, electricity and gas supply, as well as construction sectors, gave large contributions, but they obtained insignificant growth, so they belonged to “rapid but stress advance”. Next, water supply, trash and waste management and recycling, wholesale and retail, car and motorbike repair, transportation and storage, accommodation and food and beverage, information and communication, financial service and insurance, real estate, corporate service, education, health and social

activity and other service sectors were sectors dominant sectors in terms of economic growth, but they did not give a large contribution to the Gross Regional Domestic Product. Therefore, they belonged to the “rapid development” typology. Finally, the “relatively left-behind” typology consisted of agriculture, forestry and fishery, mining and excavation, government administration and defence and social security. These sectors did not show great potential.

According to the LQ result, agriculture is not a basis sector in Pasuruan Regency and it showed that Pasuruan Regency sectors have shifted to secondary sectors where the processing industry, gas and electricity, also construction become the basic sectors. The correlation between this phenomenon and food security is that Pasuruan Regency is weak in

food security sustainability. This Regency is focusing on increasing its economic growth rather than sustainability. Also, it showed that Pasuruan Regency belonged to the “rapid development” category since the dominant sectors had rapid growth, but little contribution. This was contrasted with the study of (Sudarti, 2009) which stated that Pasuruan Regency was “relatively left-behind” from 2013-2016. In other words, the job opportunities in Pasuruan Regency improved in terms of economic growth but their contribution was still low (Heubach *et al.*, 2016; Igbal & Elnur, 2017; Anna *et al.*, 2017; Vera *et al.*, 2017). Looking beyond, Pasuruan Regency should improve its ability to increase the sector’s contribution as the objective of sustainable development, in simple terms, is a development that meets today’s life without diminishing future generations’ capability to meet their needs. The implementation of socially just economic development is carried out without sacrificing the environment; therefore, the current development must also consider the needs of the next generation.

Sustainable agriculture should be pursued in the Pasuruan regency. The concept of sustainable agriculture is oriented towards three dimensions of sustainability, namely: Long-term viability of commercial enterprises (profit), long-term viability of human social life (people) and long-term viability of natural ecosystems (planet). The economic dimension is concerned with maximizing the profit streams by at least managing the productive assets that exist as the foundation for the profit. The level of efficiency and competitiveness, the magnitude and the increase of added value are the major indicators of economic dimension. The economic dimension emphasises addressing current and future generations’ economic requirements.

The social dimension is a constitutional orientation that is tied with the desire for social welfare, which is represented by a peaceful social life (including the prevention of social disputes), cultural variety preservation and socio-cultural capital, including ethnic minority protection.

Stability is the key indicators to consider while putting development plans into action. Natural ecosystems, which contain biological life and natural material must be stable, according to the dimension of the natural environment. The preservation of biodiversity and biological carrying capacity, land, water and agro-climate resources, as well as environmental health and comfort, are all included.

The maintenance of the ecosystem’s resilience and dynamism is prioritized over the preservation of an ideal that is not possible to achieve. These three dimensions influence each other so the three must be considered in a balanced manner.

Lastly, there should have been a policy to bridge and facilitate the activation of leading sectors so that they kept developing from time to time in Pasuruan Regency (Faical *et al.*, 2012; Cooper & West, 2017).

Conclusion

From Location Quotient (LQ) and Growth Ratio Model analysis in Probolinggo and Pasuruan Regencies, it is concluded that basis sectors in Probolinggo and Pasuruan Regencies give opportunities for both regencies to be exporters to other regencies and cities in East Java in contributing to food security sustainability. Sectors with a positive Growth Ratio Model can move the local economy through regional development innovations. Furthermore, sectors with a positive Growth Ratio Model can move the regional economy in East Java by considering the existing sectorial linkage. The result of this research can be used by the management of the local government for consideration of policymaking. The policy arranged by the local government of Pasuruan and Probolinggo regencies should focus on the economic sectors which give huge contribution. This research is limited by using only three tools which are Location Quotient (LQ), Growth Ratio Model and Overlay. This means that it might have been better if it had used more tool combinations. Therefore, it is necessary to collaborate more

analysis tools including data type. For future research, it is suggested to use more tools and incorporate primary and secondary data to get a better result.

Acknowledgements

The authors would like to express their gratitude to the Research Programs of the Ministry of Education, Culture, Research and Technology, Republic of Indonesia, Research Programs of Ministry of Agriculture, Republic of Indonesia, LPPM Universitas Negeri Malang and Faculty of Economics and Business (FEB), Universitas Negeri Malang, East Java, Republic of Indonesia.

References

- Almasdi, S., & Suparman. (2013). Remote area development strategies as an attempt to accelerate rural economic development. *Economic Development Journal*, 14(1), 126-139.
- Anna, M., Nasikh, Imam M., Mit W., Sugeng H. U., Handoko, Hari, W., Yohanes, H. S., Moehariono & Setyobudi, S. (2017). The analysis of the economic growth, minimum wage and unemployment rate to the poverty level in East Java. *International Journal of Economic Research*, 14(13), 127-138. https://serialsjournals.com/abstract/91637_11.pdf.
- Anpilov, S. M. (2012). The key factor of sustainable development of a modern entity. *Economics and the Law*, 6(2), 40-45.
- Arsyad, L. (1999). Methodological bases for the development and implementation of the sustainable development strategy of an economic entity. Economic analysis: Theory and practice. *Economic Development Fourth Edition Yogyakarta Sekolah Tinggi Ilmu Ekonomi YKPN*, 44(395), 14-25.
- Ashby, S., Kleve, S., McKechnie, R., & Palermo, C. (2016). Measurement of the dimensions of food insecurity in developed countries: A systematic literature review. *Public Health Nutri*, 19(16), 2887-2896.
- Aspiansyah & Arie, D. (2019). Indonesia's Economic Growth Model: The role of spatial dependence. *JEPI*, 19(1), 62-83. <https://jepi.fe.ui.ac.id/index.php/JEPI/article/view/810/312>.
- Binam, J. N., Place, F., Djalal, A. A., & Kalinganire, A. (2017). Effects of local institutions on the adoption of agroforestry innovations: Evidence of farmer-managed natural regeneration and its implications for rural livelihoods in the Sahel Agric. *Agricultural and Food Economics*, 5(1), 121-136.
- Blattman, C., Jamison, J. C., Koroknay-Palicz, T., Rodrigues, K., & Sheridan, M. (2016). Measuring the measurement error: A method to qualitatively validate survey data. *Journal of Development Economics*, 120(2), 99-112. <https://doi.org/10.1016/j.jdeveco.2016.01.005>.
- Canning, P., Charles, A., Huang, S., Polenske, K., & Waters, A. (2010). Energy use in the U.S food system. *Economic Research Service*, (Economic research report No. 94 United States Department of Agriculture).
- Central Bureau of Statistics of Pasuruan Regency. (2020). website: <https://pasuruankab.bs.go.id/>
- Central Bureau of Statistics of Probolinggo Regency. (2020). website: <https://probolingokab.bps.go.id/>.
- Cooper, M. W., & West, C. T. (2017). Unraveling the Sikasso paradox: Agricultural change and malnutrition in Sikasso, Mali. *Ecology of Food and Nutrition*, 56(2), 101-123.
- Dayamba, S. D., Djoudi, H., Zida, M., Sawadogo, L., & Verhot, L. (2016). Biodiversity and carbon stocks in different land-use types in the Sudanian Zone of Burkina Faso, West Africa. *Agriculture, Ecosystems and Environment*, 216 (2), 61-72.
- David, S., & Vasil, K. (2013). Location advantage and Georgia's potential to

- attract foreign direct investment. *European Scientific Journal*, 24(1), 1857-1871.
- Djoudi, H., Locatelli, B., Vaast, C., Asher, K., Brockhaus, M., & Sijapati, B. B. (2016). Beyond dichotomies: Gender and intersecting inequalities in climate change studies. *Ambio*, 45(3), 248-262.
- Dudin, M. N., Frolova, E. E., Kucherenko, P. A., Vernikov, V. A., & Voykova, N. A. (2016). China in innovative development of alternative energy advanced industrial technologies. *International Journal of Energy Economics and Policy*, 6(3), 537-541.
- Eriksen, S., Lutz, C., & Tadesse, G. (2018). Social desirability, opportunism and actual support for farmers' market organizations in Ethiopia. *Journal of Development Studies*, 5(4), 343-358.
- Etongo, D., Epule, T. E., Djenontin, I. N. S., & Kanninen, M. (2018a). Land management in rural Burkina Faso: The role of socio-cultural and institutional factors. *Natural Resources Forum*, 42(3), 201-213.
- Etongo, D., Kanninen, M., Epule, T. E., & Fobissie, K. (2018b). Assessing the effectiveness of joint forest management in Southern Burkina Faso: A SWOT-AHP analysis. *Forest Policy and Economics*, 9(2), 31-38.
- Faical, A., Jose, M., & Rodolfo, M. (2012). Assessing the market potential for a local food product: Evidence from a non-hypothetical experiment. *British Food Journal*, 14(1), 19-39 <http://doi.org/10.1108/00070701211197347>.
- Fischer, M. (2016). Spatial externalities and growth in a Mankiw-Romer-Weil world: Theory and evidence. *International Regional Science Review*, 41(1), 45-61.
- Fotourehchi, Z. (2017). Renewable energy consumption and economic growth: A case study for developing countries. *International Journal of Energy Economics and Policy*, 7(2), 61-69.
- Haeruman, Herman, J., & Eriyatno. (2001). *Partnership in Local Economic Development*. Jakarta: Penerbit Yayasan Mitra Pembangunan Desa-Kota dan Busines Inovation Centre Indonesia.
- Hartono, R., & Nasikh. (2017). Applying remote sensing technology and geographic information system in Batu, East Java. *Indonesian Journal of Geography*, 49(2), 118-124.
- Haysom, G., & Tawodzera, G. (2018). Measurement drives diagnosis and response gaps in transferring food security assessment to the urban scale. *Food Policy*, 74(3), 117-125.
- Heubach, K., Schumann, K., & Hahn, K. (2016). Substitutes for seeds of *Vitellaria paradoxa*, *Parkia big Lobos* and *Adansonia digitata* used for nutrition by five major ethnic groups in Benin, West Africa. *Flora et Vegetatio Sudano-Sambesica*, 19(1), 7-17.
- Husna, N. (2015). Analysis of local economic potential development to strengthen regional competitiveness in Gresik Regency. *Public Administration Journal (JAP)*, 1(1), 188-196.
- Igbal, A., & Elnur, T. (2017). The role of fuel and energy sector in the Eurasian economic community integration process. *International Journal of Energy and Policy: 2017*, 7(2), 72-75. <http://www.econjournals.com>.
- Ivarez, I. C., & Barbero, J. (2016). The public sector and convergence with spatial interdependence: Empirical evidence from Spain. *Applied Economics*, 48(24), 2238-2252. doi:<https://doi.org/10.1080/00036846.2015.1117048>.
- Koffi, C. K., Djoudi, H., & Gautier, D. (2017). Landscape diversity and associated coping strategies during food shortage periods: evidence from the Sudano-Sahelian region of Burkina Faso. *Regional Environmental Change*, 17(5), 1369-1380.

- Kondaourouva, D. S. (2015). *Development of Recommendation for the Development of the Mechanism of Management of Sustainable Development of Industrial Enterprises*. Samara, Samara State Economic University.
- Koudougou, S., Stiem-Bhatia, L., Bary, H., & TallGenre, F. (2017). foncier et gestion durable des terres au Burkina Faso: Étude de cas des villages de Bouéré et Tiarako. - IASS Working Paper, November 2017.
- Lailia, F., & Santoso, B. (2014). Determination of agricultural leading commodity-based agroindustry area in Probolinggo Regency. *Permits Engineering Technique*, 2(3), 142-147.
- Lax, J. R., Phillips, J. H., & Stollwerk, A. F. (2016). Our survey respondents lying about their support for same-sex marriage? Lessons from a recent list experiment. *Public Opinion Quarterly*, 80(2), 510-533.
- Marcelo, V., & Doug, L. (2015). The cooperative advantage for community development. *Journal of Entrepreneurial and Organization Diversity*, 4(1), 1-10.
- Maxim, V. C., & Irina, A. R. (2017). Analysis of sustainable development factors in fuel and energy industry and conditions for achievement energy efficiency and energy security. *International Journal of Energy Economics and Policy*, 7(5), 6-27. <http://www.econjournals.com>.
- Mbukwa, J. (2013). A model for predicting food security status among households in developing countries. *International Journal of Development and Sustainability*, 2(2), 544-555.
- Meinzen, D. R. Quisumbing, A, Doss, C., & Theis, S. (2017). Women's land rights as a pathway to poverty reduction: Framework and review of available evidence. *Agricultural Systems*, 172(2), 72-82.
- Mihail, N., Vadim, N., Olesya, I. D., Irina, V., & Alisa, M. B. (2018). Renewable energy sources as an instrument to support the competitiveness of agro-industrial enterprises and reduce their costs. *International Journal of Energy Economics and Policy*, 8(2), 162-167.
- Mohamed, A., & Lee, K. (2006). Energy for sustainable development in Malaysia: Energy policy and alternative energy. *Energy Policy*, 34(7), 2388-2397. <https://doi.org/10.1016/j.enpol.2005.04.003>.
- Moreda, T. (2018). Contesting conventional wisdom on the links between land tenure security and land degradation: Evidence from Ethiopia. *Land Use Policy*, 77(3), 75-83.
- Moseson, H., Treleaven, E., Gerdtts, C., & Diamond-Smith, N. (2017). The list experiment: What we know and what we still need for family planning research. *Studies in Family Planning*, 48(4), 397-405.
- Nana, P. P. (2018). Du groupe à l'individu: Dynamique de la gestion foncière en pays gouin (sud-ouest du Burkina Faso) Belgeo. *Revue belge de géographie*, 9(2), 67-79.
- Nasikh. (2013). A model of collaborative forest resources management between the local Government and Pesanggem farmers to improve the prosperity of poor family farmers in East Java. *Indonesia Journal of Geography*, 45(1), 80-89.
- Nasikh. (2014). Horizontal management of forest resources to enhance the partnership and accountability in Pasuruan, East Java, Indonesia. *Asian. Journal of Humanities and Social Studies*, 2(5), 685-688.
- Nasikh. (2016). Developing ecotourism as an attempt to improve the competitiveness in the economic globalization era in Banyuwangi Regency, East Java Province. *International Journal of Economic Research*, 7(1), 2735-2750.
- Nasikh. (2017a). Institutional model and activities of destitute society around forest as an attempt to develop the sustainable and equitable forest in East Java. Indonesia. *Periodica Polytechnica Social and*

- Management Sciences*, 25(1), 8-16 <https://pp.bme.hu/so/article/view/8536>.
- Nasikh. (2017b). An analysis of income distribution of plus traditional fish farmers in Pasuruan District, East Java. *International Journal of Economic Research*, 14(13), 183-194. https://serialsjournals.com/abstract/48698_16.pdf.
- Nasikh. (2018). An analysis of the local resources potential to achieve food security in Jombang and Probolinggo Regencies East Java Indonesia. *Iranian Economic Review*, 22(2), 135-148. https://ier.ut.ac.ir/article_66161.html
- Nasikh. (2021). How are the estimation of investment index and its improvement strategy? *Iranian Economic Review*, 25(2), 349-366. https://journal.ut.ac.ir/article_83456_8bc1609e9c7c1dfa8c7f2351b0bdc04e.pdf
- Nasikh, Mahirah Kamaludin, Bagus Shandy Narmaditya, Agus Wibowo & Indra Febrianto. (2021). Agricultural land resource allocation to develop food crop commodities: Lesson from Indonesia. *Heliyon*, 7(2021). <https://reader.elsevier.com/reader/sd/pii/S2405844021016236?toKen=DAF02FB9F67E098FD341DEBB60C558FDFBCCFDBDD2CD67C3FDE6054B80F0BB4F922ABCF52F3D3FDB0C1A6C74B4930393&originRegion=eu-west-1&originCreation=20220424041426>
- Ning Xu, Yuning Cheng, I., & Xiaodong, X. (2018). Using location quotients to determine public-natural space spatial patterns: Zurich Model. *Sustainability* 2018, 10(10), 3462-3473, MDPI. <https://doi.org/10.3390/su10103462>
- Osipova, E. A. (2015). Methodical bases of strategic management of the sustainable development of forestry company based on balanced scorecard. *Power and Government in the East of Russia*, 4(3), 191-199.
- Pelletier, N., Arsenaault, N., & Tydmers, P. (2008). Scenario-modeling potential eco-efficiency gains from a transition to organic agriculture: Life cycle perspective on Canadian canola, corn, soy and wheat production. *Environmental Management*, 42(4), 989-1001.
- Pierre, A. (2000). Community possibilities and approaches toward forestry in Haiti. In Ruiz, B. I., Wadsworth, F. H., Miller, J. M., Lugo, A. E. (Eds.), *Possibilities and Approaches Toward Community Forestry in the Caribbean: Proceedings of the Tenth Meeting of Caribbean Foresters at Georgetown Guyana, 13-16 June 2000*. (pp. 101-102).
- Pimentel, D., Dougherty, R., Carothers, C., Lamberson, S., Bora, N., & Lee, K. (2008). Energy inputs in crop production in developing and developed countries. In *Food, Energy and Society* (3rd ed.) (pp.137-159). New York.
- Porter, M. (2000). Location competition and economic development: Local clusters in a global economy. *Economic Development Quarterly*, 14(1), 15-20.
- Pratomo, A. (2014). Analysis of economic growth development potential in Cilacap Regency. *Economic Development Journal*, 3(1), 42-54.
- Probolinggo Regency. Retrieved from Central Bureau of Statistics of Probolinggo Regency website: <https://probolinggokab.bps.go.id/>
- Purnomo, H. (2005). A modeling approach to collaborative forest management. PPS IPB Not Published, Bogor.
- Rajaniemi, M., Turunen, M., & Ahokas, J. (2015). Direct energy consumption and saving possibilities in milk production. *Agronomy Research*, 13(1), 261-268.
- Ravera, F., Iniesta-Arandia, I., Martín-López, B., Pascual, U., & Bose, P. (2016). Gender perspectives in resilience, vulnerability and adaptation to global environmental change. *Ambio*, 45(3), 235-247.

- Rosmawarni, A., & Soekartono, S. (2015). Analysis of economic growth and structural transformation in East Java in 2000 to 2010. *Economic and Business Journal*, 25(1), 13-25.
- Sanso-Navarro, M., Vera-Cabello, M., & Xim'enez-De-Emb' un, D. P. (2017). Human capital spillovers and regional development. *Journal of Applied Econometrics*, 32(4), 923-930. doi:<https://doi.org/10.1002/jae.2541>. DOI: <https://doi.org/10.21002/jepi.v19i1.810>.
- Sayono, J., Ayundasari, L., Filasari, R., Nasikh, & Ridhoi, R. (2021). Socio-Edu-Eco-Tourism: An integrated history learning design to foster entrepreneurship awareness. *IOP Conference Series: Earth and Environmental Science*, 747(1), 012024.
- Sudarti. (2009). Determination of leading sectors of regency/city development in East Java. *Humanity Journal*, 1(5), 68-79.
- Syarief, R. (2017). Developing food security through society empowerment in conflict Prone Region of Timika Papua. *Indonesian Agricultural Science Journal (JIPI)*, 22(3), 163-171.
- Tadesse, G., & Zewdie, T. (2019). Grants vs. credits for improving the livelihoods of ultra-poor: Evidence from Ethiopia. *World Development*, 113(3), 320-329.
- Vaitla, B., Coates, J., Glaeser, L., Hillbruner, C., Biswal, P., & Maxwell, D. (2017). The measurement of household food security: Correlation and latent variable analysis of alternative indicators in a large multi-country dataset. *Food Policy*, 68(3), 193-205.
- Vera, V., Nasikh, Hari, W., Yohanes, H. S., Sri, H., & Rizza, M. (2017). The effect of working capital, credit distribution and inflation rate to the profit of PT. Pegadaian (Persero) Branch Tlogomas Malang East Java. *International Journal of Economic Research*, 14(6), 81-92. https://serialsjournals.com/abstract/88293_8.pdf.
- Vinceti, B., Termote, C., Thiombiano, N., Agúndez, D., & Lamien, N. (2018). Food tree species consumed during periods of food shortage in Burkina Faso and their threats. *Forest Systems*, 27(2), 506-517.
- Wahyuningtyas, R. (2013). Analysis of leading sectors by using Gross Regional Domestic Product (Case study of BPS of Kendal in 2006 to 2010). *Gaussian Journal*, 3(2), 219-228.
- Xu, N. A. (2018). Study on the pattern of urban public space based on efficiency and equity. *Archit. J.*, 6(1), 16-22.
- Yusuf, M. (1999). Indonesian economy and finance. *Economic Journal*, 18(2), 105-123.
- Yusuf, O. A., & Ibikunle, O. O. (2017). Exploration of renewable energy resources for sustainable development in Nigeria: A study of the Federal Capital Territory. *International Journal of Energy Economics and Policy*, 7(3), 240-246.