Research Article

Identification of Agriculture, Forestry, and Fisheries Sectors in Mitigating Income Inequality in the Former Residencies of Madiun

Maulida Nur Isnaini ,[1],* Agustono ,[2], Umi Barokah ,[2]

Program of Agribisnis Studies, Faculty of Agriculture, Sebelas Maret University, Jl. Ir. Sutami No. 36A Kentingan Surakarta

[1]nurisnaini.maulida@gmail.com

* corresponding author nurisnaini.maulida@gmail.com

ARTICLE INFO

ABSTRACT

Development is a long-term process of change to improve regional welfare. The regional economic development indicator is GRDP. The former Madiun residencies have the lowest average of GRDP. Accordingly, the economic development activities and effort to mitigate income inequality should be carried out properly. Using MRT, Williamson Index, and Shift Share analysis, the research results on agricultural, forestry and fisheries sectors of the former Madiun residencies include the basic and non-basic sectors. The basic-sector former residencies of Madiun include the regencies of Pacitan, Ponorogo, Madiun, Magetan, and Ngawi. Meanwhile, the non-basic sector ex-residence is the City of Madiun. The results of the Williamson Index show that the agricultural sector has a role in reducing income inequality. The IW value of ex-residencies with the agricultural sector has an average of 0.39, and the one without the agricultural sector is 0.53. As for the shift-share, the results show that the national share component of all sub-sectors is positive, meaning that sub-sector is experiencing growth. The industrial mix of all sub-sectors is negative (IM<0), meaning that sub-sector growth in former Madiun residencies is slow. The competitive share has positive value (CS>0), meaning that it has good sub-sector competitiveness and can develop.

INTRODUCTION

Development is a long-term process of change involving various production factors as the input to attain prosperity and welfare as the output, influenced by natural, human, and technological resources. According to Hardisman (2017), development aims at improving regional welfare encompassing economic growth, employment, education, and health. An important element of the national development process is economic development, which is the process of increasing the income per capita of the population and the

level of income distribution. The regional economic growth indicator is the value of the Gross Regional Domestic Product (GRDP).

Sectors of agriculture, forestry, and fishery serve a significant role in economic development. According to Fortunika et al. (2017), the agricultural sector affects economic development as the people of Indonesia mostly depend on this sector for their living. According to the Central Bureau of Statistics of Indonesia (2019), 42% of agricultural land in Indonesia is located on the island of Java, and in 2018, East Java Province had the highest GRDP value at IDR 1,563.75 trillion and a total population of 39.7 million. Sectors contributing to the high GRDP value of East Java include agriculture, forestry, and fisheries. These sectors play a role in providing food and raw materials as well as creating new business opportunities. According to Afnan (2016), agricultural sector of an area potentially provides and optimizes the area's resources to support regional development by identifying its superior commodities. Accordingly, the strategies required to improve the implementation of development policies can be determined.

The former residencies of Madiun encompass regencies of Pacitan, Ponorogo, Madiun, Magetan, Ngawi, and the City of Madiun. According to Regional Regulation Number 2 of 2006, East Java Province establishes a development area unit where the newly developed region is directed to have regional functions in accordance with its local potentials. For the former residencies of Madiun, the regional development center is in the City of Madiun. The city has been referred to as the city of trade and industry as the city is a home of 22,792 companies (Industrial Service). The ex-residencies of Madiun were chosen as they had the lowest GRDP average in 2015-2019, IDR 12.68 trillion in 2019, among other former residencies in East Java Province. With a low GRDP, income inequality and economic development activities can be identified and whether the latter can be carried out well or not.

Table 1. Regency/City GRDP Value and Contribution in the Ex-regencies of Madiun in 2019 (million rupiah)

Number	Economic Sector	GRDP	
		Value (Rupiah)	Contribution (%)
1	Agriculture, Forestry, and Fisheries	17,253,052.70	22.67
2	Mining and Excavation	1,444,396.30	1.90
3	Processing Industry	7,828,458.70	10.29
4	Electricity and Gas Supply	61,351.50	0.08
5	Water Supply, Waste Management, Waste and Recycling	117,656.60	0.15
6	Construction	7,841,265.10	10.30
7	Wholesale and Retail Trade; Car and Motorcycle Repair	14,237,027.80	18.71
8	Transportation and Warehousing	1,219,056.70	1.60
9	Provision of Accommodation and Beverages	2,613,739.90	3.43
10	Information and Communication	7,166,827.30	9.42
11	Financial and Insurance Services	3,041,197.00	4.00
12	Real Estate	1,480,318.30	1.95
13	Company Services	321,591.10	0.42
14	Government Administration, Defense and Mandatory Social Security	3,957,262.40	5.20
15	Education Services	3,808,706.10	6.01
16	Health Services and Social Activities	747,585.30	0.98
17	Others	2,193,825.50	2.88
Total		76,082,825.30	100.00

Source: Central Bureau of Statistics of the Regencies of Pacitan, Ponorogo, Magetan, Ngawi, Madiun and the City of Madiun (2020)

The agriculture, forestry and fishery sectors contributed the highest to GRDP at 22.67%. This number explains that these sectors have a significance on the economy of the former Madiun residency area. Regencies/cities in the former Madiun Residency have different contributions of Gross Regional Domestic Product (GDP) from the agriculture, forestry, and fisheries sectors because they share different potentials for natural and human resources. The value of GRDP in the agricultural, forestry and fisheries sector in each district/city of the former Madiun Residency is presented in Table 2.

Table 2. GRDP Value of Agriculture, Forestry, and Fisheries Sector in the Regency/City of the Former Residency of Madiun in 2015-2019 (million rupiah)

Regency/City	Year				
	2015	2016	2017	2018	2019
Pacitan	2,484,700.00	2,565,500.00	2,595,700.00	2,645,100.00	2,642,500.00
Ponorogo	3,306,340.00	3,399,080.00	3,381,490.00	3,416,530.00	3,410,710.00
Madiun	3,367,835.30	3,453,728.50	3,492,699.30	3,413,896.40	3,489,565.90
Magetan	3,372,496.40	3,484,867.90	3,511,148.60	3,501,309.30	3,517,329.50
Ngawi	3,914,935.70	4,047,684.80	3,945,033.00	4,039,868.90	4,117,317.30
Kota Madiun	75,390.00	76,370.00	75,020.00	76,350.00	75,630.00
Total GRDP of Agriculture	16,521,697.40	17,027,231.20	17,001,090.90	17,093,054.60	17,253,052.70

Source: Central Bureau of Statistics of the Regencies of Pacitan, Ponorogo, Magetan, Ngawi, Madiun and the City of Madiun (2020)

Ngawi Regency has the highest contribution to the agriculture, forestry, and fishery sectors, while the City of Madiun contributes the least. The rise and fall of the value of the Gross Regional Domestic Product (GRDP) of these sectors is influenced by the output produced in the agriculture, forestry, and fisheries sectors. Accordingly, this difference in magnitude will lead to income inequality. The three sectors, which have a large contribution, are expected to help reduce the level of income inequality occurring in the former residencies of Madiun. According to Febriananta (2016), agglomeration occurs in cities where the manufacturing sector develops and is supported by differences in existing resources. This raises the number of industry and factory emergence affecting economic growth. Hence, it has an impact on the economic inequality in the former Madiun residencies.

Based on previous research on income inequality, there are similarities in research methods and fields of study which provide references in carrying out this research. Based on the use of the Williamson Index in the research of Billy *et al.* (2020) and Kuliati *et al.* (2018), an IW value>0.35 indicates a high inequality category. On the other hand, Alit (2016) and Hidayat (2019) show that the IW value of 0.07 has a low inequality value. The novelty of this research includes the research location in the regencies/cities of the former Madiun Residency using the MRT analysis method, the Williamson index, and Shift Share analysis in 2015-2019. The components of inequality are sectoral growth and inequality requiring the identification of agricultural, forestry and fisheries sectors in each former regency. Based on the problems above, the purpose of this research is to identify the agriculture, forestry, and fisheries sectors as a basic or non-basic sector in each regency/city of the former Madiun Residency, identify the role of the agriculture, forestry, and fishery sectors in reducing income inequality in the former Madiun residencies in 2015-2019, and identify the role of growth components in the agriculture, forestry, and fisheries sectors in economic growth in the former Madiun residencies in 2015-2019.

METHOD

According to Suliyanto (2017), this method is used to provide answers to problems and obtain in-depth information to support research with adequate data. The location of the research was carried out in the former Madiun residencies. The location selection was taken purposively with the consideration that the former residencies have the lowest total Gross Regional Domestic Product (GRDP) in 2015-2019. In addition, the agriculture, forestry, and fishery sectors of the regencies in 2019 had the highest contribution. Accordingly, these sectors, as an economic support activity, are expected to accelerate the economic development goals in the former residencies. This study uses secondary data from the Food Security of East Java Province and the Central Bureau of Statistics and the Department of Agriculture of the regencies of Pacitan, Ponorogo, Madiun, Magetan, Ngawi, and Madiun City. The method of collecting data through documentation uses various sources from government agencies or institutions such as the Central Bureau of Statistics, Regional Development Planning, Research and Development Agency, and the Department of Agriculture and Food Security in 2015-2019.

The data obtained were analyzed using the Minimum Requirements Technique (MRT), Williamson Index, and Shift Share. Minimum Requirements Technique is an analytical tool to identify basic and non-basic sectors between regions. The basic concept of the economic base is divided into two, namely the basic sector and the non-basic sector. The basic sector is a sector able to export goods and services outside its regional area (Wicaksono, 2019). Meanwhile, the latter only fulfills the needs of local goods and services in its area. According to Tangkere (2018), the importance of increasing the economy of a region requires the identification of sectors serving as the basis or the pillar of the region in order to boost the development of other sectors. The basic sector consists of regional economic activities completely dependent on external factors such as agriculture. The economic base is the main determinant of economic growth because it is directly related to the level of demand for goods and services from outside the region (Usman, 2016). In the Minimum Requirements Technique results, if the non sector has a minimum share value, any basis will have a sector share value above the minimum value. According to Dinc, the Minimum Requirements Technique has the following formula:

$$\text{Share} = \frac{Eir}{Er}$$

E_{ir} is the GRDP of the agriculture, forestry, and fisheries sector in year i in region r. E_r is the total GRDP in region r, and i is the year under study. Meanwhile, r is each regency/city of the former Madiun Residency (Dinc, 2002).

The Williamson index in this study uses GRDP per capita and the number of residents in the former Madiun Residency in 2015-2019. The following is the formula for the Williamson Index:

$$Vw = \frac{\sqrt{\sum_{i=1}^{n}(yi-y)^2\,(fi/n)}}{y} \qquad \text{yaitu} \quad 0 < Vw < 1$$

Vw is the value of the Williamson Index, yi is the GRDP per capita of Pacitan, Ponorogo, Madiun, Magetan, Ngawi, and Madiun regencies. Meanwhile, y is the average GDP per capita of the former Madiun Residency, f is the total population of the Pacitan, Ponorogo, Madiun, Magetan, Ngawi, and Madiun regencies, and n is the total population of the former Madiun Residency. According to Adi (2017), some regions are facing fast economic development, and some regions are facing slow development. The regions share different pace of growth due to different resource availability. The relatively large inequality results in the disruption of economic stability and hampers economic development. Equitable distribution of GRDP growth

has a good impact and increases the development of all employment sectors and reduces inequality (Hidayat, 2019).

This analysis is used to determine the role of the agricultural, forestry and fishery sectors in income distribution by comparing the Williamson Index values for all sectors and excluding agriculture, forestry, and fisheries. It later compares the magnitude of the level of inequality by including the GDP of all sectors. After the GRDP of the agricultural, forestry and fishery sectors are excluded from the calculation and the results of the inequality are getting bigger, then the sector plays a role in reducing inequality. According to Arsyad, there are three criteria for the calculation of the Williamson Index, namely 0.0 to 0.2 for low inequality, 0.21 to 0.35 for moderate inequality, and >0.35 for high inequality. Economic development has a very close relationship and is interdependent on each other. Based on this, the impact of the development gap is the existence of inequality, including individual, household, or regional inequality (Rizani, 2017).

Shift Share analysis is used to check regional economic performance by comparing larger regions (regional or national). Shift Share analysis can be used to map agricultural commodities having the main contribution to drive output growth in a region (Abidin, 2019). Shift Share was first introduced by Dunn in 1960 in explaining economic changes that were influenced by local, regional, and national sectors (Goschin, 2014). The influence of provincial growth is called the share effect, the influence of the industrial mix is called the industrial mix, and the influence of competitive advantage is called the competitive share which determines how far the competitiveness of the local industry with the economy is used as a reference. Hence, it is called the Shift Share technique. There are three components in the Shift Share analysis technique, namely National Growth (NG), Industrial Mix (IM), and Competitive Share (CS) as follows.

National Growth (NG) explains how much an area of industrial growth is explained by the condition of the national economy as a whole by measuring the changes in the regional economy that will occur if the area grows at the same speed as the reference area (Dinc et al., 2002). This study is to determine the effect of economic growth in East Java Province on the growth of the agricultural, forestry, and fisheries sectors in the former Madiun residencies. The following is the formula for calculating national growth:

$$NG = E_i^t \ (\frac{N^{t+1}}{N^t} - 1)$$

NG is the result of National Growth, E_i^t is the GRDP of the sub-sector of the agriculture, forestry, and fisheries sector in the ex-residencies of Madiun in the early year of the analysis (2015), N^{t+1} is the GRDP of East Java Province in the final year of the analysis (2019), and N^t is the GRDP value of East Java Province in the initial year of analysis (2015). If the results of national growth have a positive value, it explains that there is growth in the sub-sector. Every single policy regulation taking place in the former Madiun residencies will provide benefits for the sub-sector in each district/city (Kasikoen, 2018).

Industrial Mix is a component to determine changes in the quantity of growth from the agriculture, forestry, and fisheries sectors in the former Madiun residencies to the same sector in East Java Province. There are two categories in the IM calculation, namely IM>0 which means the growth of the sector under study is fast and IM<0 which means that the sector under study has a slow growth. These results can be obtained from the following calculations:

$$IM = E_i^t (\frac{N_i^{t+1}}{N_i^t} - \frac{N^{t+1}}{N^t})$$

IM is the result of the Industrial Mix calculation, N_i^{t+1} is the sub-sector GRDP of the agriculture, forestry, and fisheries sector of East Java Province in the final year of the analysis (2019), and N_i^t is the sub-sector GRDP of the agriculture, forestry, and fisheries sector of the East Java Province in the initial year of analysis (2015). The different IM growth results in each sub-sector can be influenced by government policies related to subsidies, taxes, and other policies related to these sub-sectors (Salakory & Matulessy, 2020).

Competitive Share is used to measure changes in sector competitiveness in the former Madiun residencies so that it can represent the region's comparative advantage for the industry. In this analysis, there is an important component of the shift-share analysis because it is strongly influenced by local economic conditions. This calculation results in two categories, namely CS≥0 which means the agriculture, forestry, and fisheries sectors in the former Madiun residencies have good competitiveness, and CS<0 which means the sectors are not competitive. Competitive Share is calculated as follows:

$$\text{CS} = \text{E}_i^t \left(\frac{E_i^{t+1}}{E_i^t} - \frac{N_i^{t+1}}{N_i^t} \right)$$

Based on each component of the shift-share analysis, there is a total economic change, showing the actual growth or decline of an area, determined by adding up the three components. Shift-share analysis is calculated using the formula:

TEC = NS + IM + CS

TEC is the total economic change, NS is the result of national share, IM is the result of industrial mix, and CS is the result of competitive share. TEC is the total share in the shift-share analysis (Erna et al., 2018).
.

RESULTS AND DISCUSSION

Identification of Basic and Non-Basic Agriculture, Forestry, and Fisheries Sectors Based on Minimum Requirements Technique (MRT) at the Former Residencies of Madiun

Economic development in the former Madiun residencies aims at achieving economic growth and reducing inequality, especially in the agricultural sector. As the highest contributor to the Gross Regional Domestic Product (GRDP), the agriculture, forestry and fisheries sectors are expected to achieve the goal. The identification of the basic and non-basic sectors is expected to aid the government in considering policy formulation and in optimizing the potential of the former Madiun residencies. As the most significant GRDP contributor, the agricultural sector can be identified with the basic and non-basic sectors to optimize the potential of economic growth in the former Madiun residencies. According to Jumiyanti (2018), the economic base theory seeks to find and identify the basic activities of a region then predicts those activities and analyze the additional impacts of these activities. The key concept of the basic economic theory is that exports are the engine of growth. The growth of a region is determined by how the region performs towards the demand for goods and services from other regions. Furthermore, this theory can be used to determine potential sub-sectors in the regencies/cities of the ex-Madiun Residency based on Gross Regional Domestic Product (GRDP). If the potential sector can be developed properly, it certainly has a significant effect on the economic growth of a region, which in turn can increase regional income optimally (Tutupoho, 2019).

The Minimum Requirements Technique is an approach to identify basic and non-basic sectors by comparing the contribution of the agriculture, forestry, and fisheries sectors with the contribution of the same

sector in an area of the same size. This analysis uses the value of GRDP in the agricultural, forestry, and fisheries sectors in each district/city in the former Madiun residencies with the total GRDP in that area. The results of the MRT analysis in the agriculture, forestry, and fisheries sectors in the former Madiun residencies are presented in Table 3:

Table 3. Results of Minimum Requirements Technique Analysis for Agriculture, Forestry, and Fisheries Sector in Former Regencies of Madiun in 2015-2019

Number	Regency/ City	Identification of Basic and Non-Basic Sectors				
		2015	2016	2017	2018	2019
1	Pacitan Regency	0.275481 Basic	0.270351 Basic	0.26055 Basic	0.251643 Basic	0.231861 Basic
2	Ponorogo Regency	0.282887 Basic	0.276221 Basic	0.261453 Basic	0.250854 B Basic	0.238481 Basic
3	Madiun Regency	0.314608 Basic	0.306483 Basic	0.294015 Basic	0.27344 Basic	0.265128 Basic
4	Magetan Regency	0.311578 Basic	0.30574 Basic	0.293132 Basic	0.277813 Basic	0.265692 Basic
5	Ngawi Regency	0.348828 Basic	0.342804 Basic	0.317983 Basic	0.309521 Basic	0.300273 Basic
6	Madiun City	**0.008916** Non-basic	**0.008528** Non-basic	**0.007908** Non-basic	**0.008176** Non-basic	**0.007349** Non-basic

Source: Data Analysis Results

Based on the results of MRT data analysis, the agriculture, forestry, and fisheries sectors in each district/city of the former Madiun Residency are the basic sectors, except for the City of Madiun. In 2015-2019, the former residency areas with basic agriculture, forestry and fisheries sectors include Pacitan Regency, Ponorogo Regency, Madiun Regency, Magetan Regency, and Ngawi Regency. The basic sector meets the needs of goods or services in its own area, and if local needs have been met and there is a surplus, then it fulfills the demands of other regions and is eligible to conduct exports to other regions with non-basic sectors. The regions with a basic sector show that their agriculture, forestry, and fishery sectors can produce output to meet the needs of their area and have a surplus so that they can export to other areas. The average value of the highest MRT share analysis in 2015-2019 was in Ngawi Regency of 0.323878. While the average value of the lowest share of MRT analysis (non-basic) is in Madiun City of 0.008178. Ngawi Regency plays the basic role of the agricultural sector and is supported by its territory which is an agrarian area. Through the government's program in realizing the district as a granary for Java-Bali agriculture, the government can encourage infrastructure and production input providers provided by the Department of Agriculture for farmer association.

Ngawi Regency has the largest contribution to the agricultural sector among the regencies in the former Madiun Residency. The agricultural sector in Ngawi Regency has an important role, especially in the food crops sub-sector. Increased production in the sub-sector food crop leads to the increased economic growth in the same sub-sector (Erna et al., 2018). Therefore, the role of Ngawi Regency as the country's food barn is increasing, encouraging the productivity of other sectors as an effort to increase food security and provide food surplus. The main commodity of food crops in Ngawi Regency is rice. Rice fields and irrigation waters in 2019 in Ngawi Regency reached 38.74% of the total district area. Rice production in 2019 reached 831,878 tons, followed by corn production at 258,191 tons, soybeans at 3,444 tons, cassava at 37,202 tons, and sweet potatoes at 11,274 tons. In addition, with the priority of developing organic-based integrated

agriculture characterized as environmentally friendly and sustainable, farmers have a high enthusiasm for implementing this with the support of the Organic Rice Agribusiness (APO) program. As a result, agricultural yields on food crops increase, boosting industrial opportunities for agricultural development. The plantation sub-sector in Ngawi Regency includes cocoa, rubber, coconut, sugar cane and clove. Sugarcane plantations have the largest land area of 4,820 hectares and have sugarcane production of 205,582.75 tons in 2019. This is driven by the presence of several sugar factories in Ngawi Regency. The livestock sub-sector in Ngawi Regency includes livestock and poultry. The production of cattle, buffalo, goats, and broilers also increased in 2019, creating business opportunities for the procurement of cattle fodder. Ngawi Regency is the second largest producer of Teak Wood in East Java after Banyuwangi Regency with a real area of forest plantations of 300 ha. Wood production of Ngawi Regency includes various types of wood such as Teak, Acacia, Mahogany, Pine, and others. For the fisheries sub-sector, the regency's total land fishery production reached 3,977.36 tons. The largest contributor to fishery products is Paron District. Fishery products include catfish, tilapia, and others. The increase in the fisheries sub-sector was due to the demand of the community.

The role of the government in increasing production output is that it has the authority to formulate regional policies in the agriculture, forestry, and fishery sectors for intensification, especially in the agricultural sector. According to Kartikawati et al. (2019), the development of infrastructure facilities to facilitate farmers can encourage the growth of the agricultural, forestry, and fisheries sectors in an area. Consistent agricultural development is expected in an area. In this case, the government's role is very much needed in agricultural development, especially to realize the facilities and infrastructure needed by farmers. Therefore, government policies are very important to overcome problems in development in the agricultural sector (Ni Luh, 2017).

Madiun City is non-basic in the agricultural, forestry and fisheries sectors since it has a minimum share value. This is indicated by the sector's low and less dominant performance. The agricultural, forestry, and fisheries sectors in Madiun City tend to be less able to meet the needs of Madiun City. As a result, this city carries out import activities to deal with the shortage of output produced in this sector. Some factors cause Madiun City to be non-basic of the agricultural sector, one of them is that the area of agricultural land in Madiun City is shrinking due to land conversion for industrial and residential buildings. Based on data from the Department of Agriculture and Food Security in Madiun City, the productive land area of 926 Ha in 2016 decreased to 923 Ha in 2017, and only became 901 Ha at the end of 2018. An effort of the Madiun City government in reducing land conversion is by issuing Regional Regulation Number 6 of 2011 which stipulates that sustainable agricultural land is prohibited from being converted until 2030. In addition, the area of Madiun City when compared to other districts in the former Madiun Residency is the smallest area. Therefore, the agriculture, forestry, and fishery sectors only play an insignificant role in contributing to regional income. The development of the food crop sub-sector in non-basic areas is very important for the economy in Madiun City. The need for rice consumption in Madiun City reaches 13,800 tons, while the rice produced by farmers of the city is only around 11,000 tons. The shortage of the food crop sub-sector of Madiun City makes the city dependent on the supply of other areas in the former Madiun Residency, one of which is in Madiun Regency. Therefore, support for agricultural human resource development activities who are trained in the application of technology such as agricultural field schools, technical guidance, training, and education is needed (Azifah et al., 2016).

The Role of Agriculture, Forestry and Fisheries Sector in Reducing Income Inequality in the Former Residencies of Madiun

Economic growth is a process in which there is an increase in income due to the increased production within a certain period towards a better economy. Economic growth is influenced by several factors ranging from human resources, natural resources, inflation rates, and some other factors. A good economic growth is

an indicator that the economic sector in a region is experiencing a progressive development. However, if it is not balanced with a good income distribution, income inequality in the society will occur and the level of prosperity will decrease (Wijayanto, 2016). Inequality in development is indisputably one of the important things to be considered by the government and components of society. The method used to see inequality between regions is the Williamson Index Analysis. Inequality will cause the economic growth created to be less beneficial, especially in terms of poverty. Factors causing regional inequality include regional economic activities, low mobility between regions, differences in the allocation used for investment, and differences in geographical conditions and natural resources of a region. According to Hanum and Sarlia (2019), economic growth is formed from various economic sectors where the growth rate of a region can be reflected in changes in GRDP (Gross Regional Domestic Product) from year to year. The annual increase in GRDP (Gross Regional Domestic Product) can have a direct impact on the per capita income obtained by people in a region.

According to Sjafrizal, the differences in the ability of each region to encourage the development process will lead to developed and underdeveloped regions. Income inequality in the former Madiun residencies was analyzed using the Williamson Index. The classification of the criteria for calculating the Williamson Index value is between zero (0) to one (1). An insignificant or close-to-0 value of the Williamson Index means that the region is getting less unequal. On the other hand, if it is close to 1, the area will be more unequal (Lestari, 2016). The results of the analysis of the Williamson index in the former residencies of Madiun using the total sector of the economy without using the agriculture, forestry, and fishery sectors are presented in Table 4.

Table 4. Williamson Index Value with and without the Agriculture, Forestry, and Fisheries Sector in GRDP in the Former Madiun Residencies in 2015-2019

Year	Former Residencies of Madiun	
	Indeks Williamson (Vw)	
	With Agriculture	Without Agriculture
2015	0.40	0.54
2016	0.40	0.54
2017	0.40	0.54
2018	0.37	0.50
2019	0.39	0.52

Source: Secondary Data Analysis (2020)

Analysis of the Williamson Index on the former Madiun residencies in 2015-2019 shows the results of fluctuating values, former residencies with agricultural sector have an average of 0.39, and the ones without the agricultural sector have an average of 0.53 which is classified as a high criterion. Analysis of the Williamson Index can also indicate the role of the agricultural sector in mitigating income inequality. This is proven in the calculation of the Williamson Index analysis showing that former residencies with the agricultural sector have a smaller inequality when compared to one without the agricultural sector. The agricultural sector plays a role in reducing income inequality by supplying regional income. The results of the analysis of income inequality in the ex-Madiun residencies in 2015-2019 fluctuated at the level of 0.37-0.4, meaning that

inequality in the residencies was at a high criterion. The results of the calculation of Vw without the agricultural sector have a higher inequality value at the level of 0.50-0.54, indicating that the agriculture, forestry, and fishery sectors potentially reduce income inequality. The high level of inequality calls for the government's response by making efforts to increase the even distribution of economic growth centers. Income inequality takes place mostly in residencies with income sources mainly originating from the processing industry. Madiun City is one of the areas in the former Madiun Residency with a strategic location and has a high level of processing industry such as the food industry to the transportation industry.

The results of the calculation show that without the agricultural sector, the value of inequality will be higher. The change in the value of inequality shows that the role of the agricultural sector can mitigate income inequality in the former Madiun residencies, and the development of a sector integrating the economy between farming and services, or industry, is needed. This is intended to increase people's income through national and regional economic structures based on agriculture and agricultural industrial activities (agro-industry) which can reduce income inequality (Osly et al., 2020). Ultimately, economic strength in a certain period can be increased (Uduporuwa, 2020).

The years 2015-2019 show that the trend of inequality values has decreased. This is due to the presence of areas in the former Madiun residencies which have higher GRDP per capita than other regencies, such as the City of Madiun. Income inequality between districts/cities explains that there is inequality in income distribution. Regency areas still generally center their focus on agriculture, whereas the Madiun City area is the center of development, industry, and settlements, resulting in a lack of agricultural land. This is shown by the trade and processing industry sectors being the highest contribution in Madiun City to the 2019 GRDP.

Inequality in income between former residencies of Madiun could be due to geographical conditions and differences in natural resources resulting in the different ability of the regions to support development processes. The results of the study show that the agriculture, forestry, and fisheries sectors in 2015-2019 played a role in reducing income inequality between residencies/cities. In addition, this sector continues to be developed as a support for economic development in the areas of former Madiun residencies. According to Dewi and Harianto (2016), good infrastructure facilitates community activities, and the local government as the provider of community needs is expected to be able to accelerate the rate of economic growth. The government's role in increasing economic growth can be in the form of streamlining local government spending in supporting community economic activities such as the construction of public facilities. In addition, with proper allocation of government spending, it is expected that regional income will also increase (Sa'diyah & Irham, 2018).

Analysis of the Growth Components of the Agriculture, Forestry and Fisheries Subsector in the Former Residencies of Madiun Shift-Share

According to Alias et al. (2014), shift share analysis can be used in regional economic analysis to examine the differences between regional and national growth rates, that is to determine the components of growth in the agricultural, forestry, and fisheries sectors and sub-sectors in the former Madiun residencies and East Java Province. According to Sambidi, shift share analysis can show the level of economic growth in the region compared to the national economy with the aim to find out the level of the growth. The main advantage of shift share analysis is that in its application it uses secondary data, and calculations in shift share analysis are relatively simple when compared to other analytical tools that are also used to determine the performance of a sector (Hutabarat, 2020). Shift share analysis is useful in analyzing changes in the regional economic structure in this study, namely the former Madiun residencies compared to regional or national regions, in this study is the Province of East Java. The purpose of this analysis is to determine the performance or work

productivity of the agricultural sub-sector economy in the former Madiun residencies by comparing them with East Java Province. This study uses the income variable, namely Gross Regional Domestic Product (GRDP) at constant prices to describe the economic growth of the agricultural sub-sector on regional development in the former Madiun residencies. The results of this analysis will describe the performance of the economic sector in the formation of GRDP in the former Madiun residencies compared to East Java Province which is presented in Table 5.

Table 5. Calculation of the Shift Share of the Agriculture, Forestry and Fisheries Sector in the Ex-Madiun Regencies in 2015-2019 (millions of rupiah)

Number	Agriculture, Forestry and Fisheries Subsector	NS (*National Share*)	IM (*Industri Mix*)	CS (*Competitive Share*)	TS (*Total Share*)
1	a. Crops	1,895,151.01	-2,348,203.72	184,601.71	-268,451.00
	b. Horticultural Crops	391,686.08	-303,354.43	133,894.38	222,226.02
	c. Plantation Crops	312,609.45	-229,506.24	-83,072.34	30.87
	d. Animal Husbandry	641,716.39	-406,254.20	211,679.21	447,141.40
	e. Agricultural and Hunting Services	43,110.27	-49,158.71	10,157.46	4,109.02
2	Forestry and Logging	214,743.88	-206,918.79	78,146.88	85,971.97
3	Fishery	232,560.41	-140,209.08	148,005.96	240,357.28

Source: Secondary Data Analysis (2020)

Based on the results of the shift share analysis, there are three components in the shift share analysis, namely national share (NS), industry mix (IM), and competitive share (CS). The components of the calculation of the national share show the effect of the growth of the Gross Regional Domestic Product (GDP) of East Java Province on the economy in the former Madiun residencies, showing positive values in all sub-sectors. A positive value in each sub-sector indicates that any growth in the value of the sub-sector and any changes in policy in East Java Province will provide benefits to the sub-sector in the former Madiun residencies. The highest growth was in the food crops sub-sector, accounting for IDR 1,895,151.01 (million rupiah). The provincial influencing policy includes the policy of the Province of East Java in protecting food agricultural land to guarantee food availability. Based on this, the Province of East Java determined the Sustainable Food Agricultural Land of approximately 1,017,549.72 Ha, with details of wetland covering an area of 802,357.9 Ha and dry land covering an area of 215,191.83 Ha. The growth of different sub-sectors can be influenced by government policies related to subsidies, taxes, and other policies related to these sub-sectors (Syamsiyah, 2017). In addition, the authority of the East Java Provincial government in developing a minapolitan area in the district/city through strengthening the farmer group's effectiveness at the provincial level, facilitating the Fish Production Unit related to increasing production, and procuring seeds at low prices. The government can encourage economic development in terms of infrastructure and production companies provided by the Department of Agriculture for farmer groups and formulate regional policies in the agricultural, forestry and fisheries sectors for intensification, especially in the agricultural sector. According to Kartikawati et al. (2019), the development of infrastructure facilities to facilitate farmers can encourage the growth of the agricultural, forestry and fisheries sectors in an area. According to Salakory & Matulessy (2020), to achieve a stable and

93

Isnaini et.al (Indentification of Agriculture, Forestry and Fisherie... Agriculture Sector, Madiun Residency,Minimum Requirements Technique, Shift Share, Williamson Index)

ideal level of economic growth, regional development planning must be directed at developing leading and competitive economic activities.

The components of the industrial mix calculation have negative values for all its sub-sectors, indicating that sub-sector growth in the former Madiun residencies is still slow. For the competitive share component, only the plantation sub-sector has a negative value (CS>0), accounting for IDR -83,072.34 (million rupiah). This means that the plantation sub-sector has low or no competitiveness. Other sub-sectors with positive CS values indicate that these sub-sectors are competitive. The total share, the sum of the national share, industrial mix, and competitive share, shows that in 2015-2019, there was an increase in the Gross Regional Domestic Product (GDP) of the agriculture, forestry, and fisheries sectors by IDR 731.38 billion in the former Madiun residencies. According to a previous research, Erna et al. (2018), the total share of the agriculture, forestry and fishery sectors in Karanganyar Regency is IDR 257.22 billion, indicating that the growth of the former Madiun residencies sector is faster than the growth of the Karanganyar Regency (Tangkere, 2018).

CONCLUSION

Based on the problem formulation, research objectives, and research results, it can be concluded that the identification of the agriculture, forestry, and fisheries sectors using the Minimum Requirements Technique (MRT) analysis in 2015-2019 is categorized into two types, namely the basic sector and the non-basic sector. The basic agricultural, forestry and fisheries sectors are in Pacitan, Ponorogo, Madiun, Magetan and Ngawi Regency, while the non-basic sectors are in Madiun City. The agriculture, forestry, and fisheries sectors from 2015 to 2019 served a role in reducing income inequality in each regency/city of the former Madiun Residency. The components of economic growth in the agricultural, forestry, and fisheries sectors in the former Madiun residencies grew by IDR 3,731.58 billion during 2015 until 2019. The value of the industry mix component is IDR -3,683.61 billion, a negative value (IM<0) indicates that the agriculture, forestry, and fishery sectors have a slow growth rate. The value of the competitive share component is IDR 683 billion, indicating that the sector has good competitiveness in the sector and can be developed in the regency/city. Based on the research results, income inequality in the former Madiun residencies is included in the high criteria, and the agricultural sector shows that it can reduce this inequality. Therefore, one of the efforts to overcome inequality between regions is to spur economic growth through shift share analysis in each region and develop sectors that have a role in economic growth by increasing employment opportunities. The agricultural sector has the largest role in economic growth in the former Madiun residencies. The development of the basic sector can overcome inequality through the development of agribusiness, and the competitiveness of commodities produced in the former Madiun residencies has improved. Therefore, economic development activities in each district will be in harmony between high economic growth and decreasing income inequality. The role of the government in each regency is to direct agricultural-based regional development because it is effectively proven to increase economic growth and reduce income inequality. The results of this study can be used in planning regional development as the agriculture, forestry and fisheries sectors have a major contribution to economic development in each residence

REFERENCES

Abidin, Z. (2019). Aplikasi Analisis Shift Share pada Transformasi Sektor Pertanian dalam Perekonomian Wilayah di Sulawesi Tenggara. Jurnal Informatika Pertanian, 24(2), 165–178.

Adi, L. (2017). Analisis LQ , Shift Share , dan Proyeksi PDRB Jawa Timur 2017. Jurnal Akuntansi dan Ekonomi FE. UN PGRI Kediri, 2(1), 79–90.

Afnan, F., Darsono., Rahayu, W. (2016). Peranan Komoditi Pertanian Unggulan tiap Kecamatan dalam Perekonomian Wilayah Kabupaten Bantul. SEPA, 13(1), 40–47. https://doi.org/10.15294/jejak.v7i1.Journal

Alias, E. F., Radam, A., Fen, Y. P., Yacob, M. R., & Alam, M. F. (2014). Growth in Malaysia's export food market: A shift-share analysis. Asian Social Science, 10(3), 26–43.

https://doi.org/10.5539/ass.v10n3p26

Alit Pamrihnan, M. C. (2016). ANALISIS KETIMPANGAN PENDAPATAN DAN IDENFIKASI SEKTOR BASIS ANTAR KECAMATAN DI KABUPATEN WONOGIRI TAHUN 2010-2014. JIEP, 16(2), 75–87.

Anton tri Wijayanto. (2016). Analisis Keterkaitan Pertumbuhan Ekonomi, Ketimpangan Pendapatan Dan Pengentasan Kemiskinan Di Provinsi Sulawesi Utara Tahun 2000 Â 2010. Jurnal Berkala Ilmiah Efisiensi, 16(2), 418–428.

Azifah, D., Agustono, A., & Setyowati, N. (2016). Identifikasi Sub Sektor Pertanian Di Eks Karesidenan Kedu (Pendekatan Minimum Requirements Technique). SEPA: Jurnal Sosial Ekonomi Pertanian dan Agribisnis, 12(2), 182–192. https://doi.org/10.20961/sepa.v12i2.14222

Billy, E., Turnip, A., & Saputra, J. (2020). Supply Chain Strategy for Implementing Fiscal Decentralization and its Effect on Regional Performance in North Sumatera Province , Indonesia. International Journal of Supply Chain Management, 9(1), 975–981.

BPS. (2019). Kabupaten Magetan Dalam Angka. 53, 160.

Dewi Nur Aini, Harianto, H. P. (2016). Ketimpangan dan faktor-faktor yang mempengaruhi kualitas pembangunan manusia di kota depok. Jurnal Manajemen Pembangunan Daerah, 8(1), 71–85.

Dinc, M., Dunia, I. B., Dunia, B., & Dc, W. Alat Analisis Ekonomi Regional dan Lokal. 1–44.

Erna, F., Harisudin, M., & Rahayu, W. (2018). Analisis Peran Subsektor Pertanian Terhadap Pembangunan Kabupaten Karanganyar; Sebuah Pendekatan Comparative Performance Index. SEPA: Jurnal Sosial Ekonomi Pertanian dan Agribisnis, 14(1), 28. https://doi.org/10.20961/sepa.v14i1.21040

Febriananta, H. (2016). Ketimpangan Spasial dan Aglomerasi Pada Koridor Pembangunan di Provinsi Jawa Timur tahun 2009-2013.

Goschin, Z. (2014). Regional growth in Romania after its accession to EU: a Shift_Share analysis approach. Procedia economic and finance. Available online in www.scientdirect.com, 169–175.

Hanum, N., & Sarlia, S. (2019). Pengaruh Pendapatan Perkapita Terhadap Konsumsi Di Provinsi Aceh. Samudra Ekonomika, 3(1), 84–92.

Hardisman. (2017). Pembangunan Terintegrasi Sebagai Pendekatan Pemecahan Masalah Kesehatan di Indonesia. In Kesehatan Masyarakat (Vol. 5, Nomor 2, hal. 94–99).

Hidayat, T. R. (2019). Intelligent Software for Classification of Regional Inequality in Banten Province Using the Williamson Index Perangkat Lunak Cerdas Untuk Klasifikasi Tingkat Ketimpangan Wilayah Pada Provinsi Banten Menggunakan Indeks Williamson Corresponding Autor : Zaen. Journal of Machine Learning and Soft Computing, 01(01), 25–33.

Hutabarat, R. Y. (2020). Penentuan Sektor Unggulan di Kabupaten Kepulauan Anambas. Jurnal Samudra Ekonomi dan Bisnis, 11(1), 95–110. https://doi.org/10.33059/jseb.v11i1.1790

Iriantini, D. B. (2019). Identifikasi Komoditi Unggulan Sektor Ekonomi Kabupaten Madiun. Birokrasi Pancasila: Jurnal Pemerintahan, Pembangunan dan Inovasi Daerah, 1(2), 119–132. https://jurnal.madiunkab.go.id/index.php/bp/article/view/36

Kartikawati, D., Darsono, & Sundari, M. T. (2019). The role of agriculture, forestry and fishery sector in the development of Malinau District (location quotient and shift share approach). IOP Conference Series: Earth and Environmental Science, 314(1). https://doi.org/10.1088/1755-1315/314/1/012077

Kasikoen, K. M. (2018). ANALISIS SHIFT SHARE UNTUK PERENCANAAN WILAYAH (STUDI KASUS – KABUPATEN BOGOR). Forum Ilmiah, 15(3), 442–448.

Kuliati, W. O., Bafadal, A., & Abdullah, W. G. (2018). Analisis Ketimpangan Pembangunan Sektor Petanian Pada Wilayah Daratan Di Sulawesi Tenggara Dengan Pendekatan Indeks Williamson. Jurnal Sosio Agribisnis, 3(2), 33–41. https://doi.org/10.33772/jsa.v3i2.7590

Lestari, S. (2016). Faktor-Faktor yang Mempenagruhi Ketimpangan Pendapatan di Jawa Timur Tahun 2008-2012. 1–7. http://repository.unej.ac.id/bitstream/handle/123456789/73804/SUSI LESTARI.pdf?sequence=1

Ni Luh Putu Rossita Dewi, Made Suyana Utama, N. N. Y. (2017). Faktor-faktor yang Mempengaruhi Produktivitas Usaha Tani dan Keberhasilam Program Simantri di Kabupaten Klungkung. E-Jurnal Ekonomi dan Bisnis Universitas Udayana, 6(2), 701–728.

Oktafiana Fortunika, S., Istiyanti, E. I., & Sriyadi, S. (2017). Kontribusi Sektor Pertanian Terhadap Perekonomian Kabupaten Banjarnegara, Provinsi Jawa Tengah (Analisis Struktur Input–Output).

AGRARIS: Journal of Agribusiness and Rural Development Research, 3(2). https://doi.org/10.18196/agr.3252

Osly, P. J., Ihsani, I., Ririhena, R. E., Dwiyandi, F., & Putri, A. (2020). ANALYSIS OF AGRICULTURAL GROWTH USING LQ AND SHIFTSHARE METHODS (Case Study : Manokwari Regency , Indonesia). 6(1), 53–58.

R. Jumiyanti, K. (2018). Analisis Location Quotient dalam Penentuan Sektor Basis dan Non Basis di Kabupaten Gorontalo. Gorontalo Development Review, 1(1), 29–43. https://doi.org/10.32662/golder.v1i1.112

Rizani, A. (2017). Analisis Potensi Ekonomi di Sektor dan Subsektor Pertanian, Kehutanan, dan Perikanan Kabupaten Jember. Jurnal Ekonomi Pembangunan, 15(2), 138–156.

Sa'diyah, S. H., & Irham, I. (2018). Peran Sektor Pertanian dalam Mengurangi Ketimpangan Pendapatan di Wilayah Papua Sebelum dan Sesudah Otonomi Khusus. Agro Ekonomi, 27(1), 1. https://doi.org/10.22146/jae.30216

Salakory, H. S. M., & Matulessy, F. S. (2020). Analisis Shift-Share Terhadap Perekonomian Kota Sorong. Barekeng Jurnal Ilmu Matematika dan Terapan, 14(4), 575–586. https://doi.org/10.30598/barekengvol14iss4pp575-586

Sambidi, P. Regional Industry Cluster Analysis for the Gulf Coast Economic Development District. 146.

Suliyanto. (2017). Pelatihan Metode Pelatihan Kuantitatif. Journal of Chemical Information and Modeling, 5(2), 223–232.

Tangkere, A. G. S. P. A. P. E. G. (2018). Analisis Sektor Basis dan Non Basis di Kabupaten Bolaang Mongondow Timur. Agri -SosioEkonomi Unstrat, 14(3), 279–288.

Tutupoho, A. (2019). Analisis Sektor Basis dan Sektor Non Basis Terhadap Pertumbuhan Ekonomi Di Provinsi Maluku. Jurnal Ekonomi, 8(1), 1–18.

Uduporuwa, R. J. M. (2020). Measuring of Regional Growth Performance using Shift Share Analysis with Special Reference to Sabaragamuwa Province, Sri Lanka. International Journal of Humanities and Applied Social Science, 5(10), 1–8. https://doi.org/10.33642/ijhass.v5n10p1

Usman. (2016). Analisis Sektor Basis dan Subsektor Pertanian Basis terhadap Pertumbuhan Ekonomidi Kabupaten Keerom, Provinsi Papua. Jurnal SEPA, 13(1), 10–21.

Wicaksono, A. E. (2019). Analisis Sektor Basis dan Non Basis pada Pertumbuhan Ekonomi di Kabupaten Madiun Tahun 2013-3017. Oeconomicus Journal of Economics, 3(2), 207–219