LINKAGES AND MULTIPLIERS OF THE AGRICULTURAL SECTOR IN THE REGIONAL ECONOMY IN TANGGAMUS REGENCY: INPUT-OUTPUT ANALYSIS

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ABSTRACT

One of the regional developments carried out is development in the agricultural sector. Development in agriculture is expected to be a catalyst in achieving the goal of increasing the regional economy. This study aims to analyze the linkages and multipliers of the agricultural sector to the regional economy in Tanggamus Regency. The method used is input-output analysis which consists of linkage analysis, dispersion impact, and output and income multiplier effect. The results of the analysis conclude that the agricultural sector has a linkage to the manufacturing sector in the future; and the transportation and warehousing sector, then has backward linkages with the real estate sector and the construction sector. The agricultural sector is able to drive production growth in the downstream industrial sector. The output multiplier and income multiplier of the agricultural sector has a lower value compared to other economic sectors

| KEYWORDS | *Agriculture, Regional Economy, Input-output, Linkage, Multiplier effect* |

INTRODUCTION

Regional development is an effort to spur socio-economic development, reduce disparities between regions, and maintain environmental sustainability in a region, so that regional development aims to optimize the potential possessed by a region. One of the regional developments carried out is development in the agricultural sector. Development in agriculture is expected to be a catalyst in achieving the goal of increasing the regional economy. Regional development is

closely related to the development strategy towards achieving optimal and sustainable prosperity (Nugroho 2004) , so that in this case a development priority strategy is needed by prioritizing the comparative and competitive advantages of an economic sector, (Arifien, Fafurida, and Noekent 2012) .

One of the areas with the agricultural sector as the leading sector in Lampung Province is Tanggamus Regency. The average contribution of the agricultural sector to GRDP from 2015 to 2019 was 44.13% with a contribution to GRDP in 2019 of 4.6 trillion rupiah (BPS 2020b) . Seen in Table 1, even though in the last five years the agricultural sector was the main contributor in contributing to GRDP in Tanggamus Regency, this sector has always experienced a decrease in contribution every year. The decline that occurs every year can be seen in which sub-sectors are still influential and are no longer influential.

In addition, the decline occurred because there were other sectors that experienced an increase in the number of contributions to GRDP each year, such as the wholesale and retail trade sector; car and motorcycle repair. This means that while other sectors experienced an increase in total output, the agricultural sector actually experienced a decline. This is in accordance with Saragih's theory (2010) that the agricultural sector is a very important sector in the national economy, but in the stages of economic development, business activities and services based on agriculture are also increasing, such as agribusiness activities (including agro-industry) will become one of the activities superior (a leading sector) of national economic development in various broad aspects.

In addition, the cause of the decrease in contribution is the conversion of agricultural land to non-agricultural land, (BPS 2020b) . The increasing population causes the demand for land to increase (demand side) while the availability of land does not increase (supply side) is one of the causes of the conversion of agricultural land, (Kusumastuti, M. Kolopaking, and Barus 2018) . This is in accordance with research (Saputra 2017) which states that Tanggamus Regency has experienced a slowdown in its contribution to GRDP and an increase in the conversion of agricultural land. The growth rate of the economic sector can also be an indicator of whether a sector can be said to be potential or not in an effort to develop a region. It is known that the growth rate of the wholesale and retail trade sector in 2015 was 1.43% and increased quite significantly in 2019, namely 9.46%, (BPS 2020a) .

Even though it has experienced a decrease in GRDP and a low growth rate, Tanggamus Regency is able to absorb a large number of workers and has good natural resource potential. Research (Lisdayanti 2017) , (Hayati, Elfiana, and Martina 2017) , and (Huda, Purnamadewi, and Firdaus 2015) state that the number of workers can be used as an indicator to calculate the development of a region. Data states that the workforce in Tanggamus Regency is 65.3% of the workforce in the formal sector and 2.81% of the workforce in the informal sector with a total workforce in the agricultural sector of 174,216 people (BPS 2020a) .

Based on this, the development of the agricultural sector in Tanggamus Regency needs to be prioritized considering that many people in Tanggamus Regency make their main livelihood in the agricultural sector. The development of the agricultural sector in Tanggamus Regency is expected to become a strategic sector to increase regional economic growth through increasing the role and

linkages with other sectors within the internal region. The linkages of the agricultural sector must be increased so as to be able to attract upstream sectors (sector that have backward linkages) and encourage downstream sectors (sectors that have forward linkages). The stronger the linkages between the agricultural sector and other sectors, the greater the influence on regional development in Tanggamus Regency.

By knowing the role of the agricultural, forestry and fisheries sectors through the base sector, it is hoped that it can improve the community's economy and people's welfare, so that it can also increase the development of the Tanggamus Regency area. Research related to the role of the agricultural sector in regional development has been carried out by several researchers. The agricultural sector plays a very important role in regional development in Bireuen District, Aceh Province, (Hayati et al. 2017) and in East Java Province (Huda et al., 2015)

It is hoped that the great potential of Tanggamus Regency as a means of providing production raw materials for its downstream sectors is expected to be further enhanced so that the contribution of the agricultural sector to the economy of Tanggamus Regency can be more optimal. Based on this description, this study aims to determine the role of the agricultural sector in regional development in Tanggamus Regency by knowing the linkages, impact of dispersion, and the multiplier effect of the agricultural sector with other sectors.

RESEARCH METHOD

Data analysis was carried out through a quantitative description approach using input-output (IO) analysis. The input output analysis method used in this study is as follows.

Linkage Analysis

This analysis is used to see the relationship between the agricultural sector and other economic sectors in Tanggamus Regency.

Direct forward linkage; look at the amount of agricultural sector output that is used as input by other economic sectors. Mathematically formulated as follows.

$$F(d)i = \Sigma \, aij \quad \text{.. ....(1)}$$

where $F(d)i$ is the direct forward linkage value obtained from the input coefficient matrix (aij).

Direct and indirect forward linkages; see the role of the agricultural sector in driving the development of its downstream sector directly and indirectly.

$$F(d+i)i = \Sigma \, aij \quad \text{.. ....(2)}$$

where $F(d+i)i$ is the value of the direct and indirect forward linkages obtained from the input coefficient inverse matrix (aij).

Direct backward linkage; look at the amount of input used by the agricultural sector from other economic sectors.

$$B(d)j = \Sigma \, aij \quad \text{.. ....(3)}$$

where $B(d)i$ is the direct backward linkage value obtained from the input coefficient matrix (aij).

Direct and indirect backward linkages; look at the effect of direct and indirect changes in the final demand of the agricultural sector on the total output of other economic sectors.

Deployment Impact Analysis

Analysis of the impact of the spread is the development of linkage analysis. This analysis is divided into sensitivity index and dispersion index. Multiplier effect analysis is used to see the impact of changes in the final demand of the agricultural sector on the economy in Tanggamus Regency, both the output and income multiple effects

RESULT AND DISCUSSION

Linkage Analysis

The linkage of the agricultural sector with other sectors in Tanggamus Regency can be seen through *forward linkage* and *backward linkage* which is further divided into two, namely direct and indirect. Direct forward linkages are obtained from the input coefficient matrix, whereas to see indirect forward linkages obtained from the inverse matrix of input coefficients or leontifs. The greater the value of the input coefficient matrix and the input coefficient inverse matrix, the greater the forward linkages between the agricultural sector and other sectors, so that the greater the dependence of certain sectors on the agricultural sector in the supply of inputs or raw materials for the production process.

The total value of direct forward linkages; the largest direct and indirect in Tanggamus Regency are among others the agricultural sector, namely 130.1444; processing industry sector, namely 115.7750; and the transportation and warehousing sector, namely 113.1034. The value of the direct forward linkage of the agricultural sector is 0.2552, meaning that for 1 billion output produced by the agricultural sector, the output used as input by other economic sectors is worth 0.2552 billion, while the value of the indirect forward linkage is 129 .8892 means that if there is an increase in the final sector demand worth 1 billion, then the agricultural sector will directly and indirectly encourage the development of the downstream sector worth 129.8992 billion.

For the manufacturing industry sector, the direct forward linkage value of the sector is 0.2305, which means that for 1 billion output produced by the manufacturing sector, the output used as input by other economic sectors is 0.2305 billion, while the linkage value is In the future, the indirect demand is 115.5444, which means that if there is an increase in the final demand sector worth 1 billion, then the manufacturing sector will directly and indirectly encourage the development of the downstream sector worth 115.5444 billion. Likewise with the transportation and warehousing sector, the direct forward linkage value of the sector is 0.2220, which means that for 1 billion output produced by the manufacturing sector, the output used as input by other economic sectors is worth 0.2220 billion. while the indirect forward linkage value is 112.8814, which means that if there is an increase in the final demand sector worth 1 billion, then the manufacturing sector will directly and indirectly encourage the development of its downstream sector worth 112.8814 billion. The results of the analysis of the forward linkages of the economic sector in Tanggamus Regency can be seen in Table 1 below.

Table 1 The results of the analysis of the future linkages of the economic sector in Tanggamus Regency, 2019

Sector	Forward Linkage			
	Direct	Direct and Indirect	Total	Rating
Agriculture, forestry and fisheries	0.2552	129.8892	130.1444	1
Mining and excavation	0.0146	7.7968	7.8114	9
Processing industry	0.2305	115.5444	115.7750	2
Supply of electricity and gas	0.0072	4.7855	4.7927	15
Water supply, waste management, waste recycling	0.0007	1.3816	1.3824	17
Construction	0.0373	11.2277	11.2650	7
Wholesale and retail trade; car and motorcycle repair	0.0244	13.3876	13.4120	5
Transportation and warehousing	0.2220	112.8814	113.1034	3
Provision of accommodation and meals	0.0760	39.6085	39.6845	4
Information and communication	0.0131	7.7884	7.8015	10
Financial and insurance services	0.0128	7.7225	7.7353	12
Real estate	0.0075	4.9172	4.9247	14
Company services	0.0009	1.4566	1.4575	16
Administration of government, defense, and mandatory social security	0.0076	4.9384	4.9460	13
Educational services	0.0141	7.7760	7.7902	11
Health services and social activities	0.0232	12.4194	12.4426	6
other services	0.0195	10.9597	10.9792	8

Source: BPS Tanggamus Regency, 2020

Because the agricultural sector has the greatest value of direct and indirect linkages, in total, the economic sector in Tanggamus Regency has the strongest direct and indirect linkages with the agricultural sector, while in detail, the agricultural sector has forward linkages with the industrial sector. processing; and the transportation and trade industry sector. Thus the development is directed at the development of the processing industry sector and; the transportation and warehousing sector will have a direct impact; directly and indirectly to the development of the agricultural sector. This is in line with Harianto (2007) which states that increased growth in the agricultural sector can encourage agro-industry development, infrastructure growth, rural and urban areas, increased human resources, and increased demand in the non-agricultural sector. In addition, this research is also in line with research (Widyawati 2017) namely the agricultural sector has links to other sectors as providers of inputs (goods and services) with other sectors which ultimately affect national economic growth.

Just like the forward linkage value, the backward linkage value is directly obtained from the input coefficient matrix; and the values of direct and indirect

backward linkages are obtained from the input coefficient inverse matrix. The greater the value of the input coefficient matrix and the inverse coefficient matrix of a sector's input, the greater the direct backward linkage; directly and indirectly the sector to the agricultural sector. Thus, it can be seen the role of output of other sectors in supporting the increase in output of the agricultural sector. The results of the analysis of the backward linkage value of the economic sector in Tanggamus Regency can be seen in Table 2 below.

Table 2 Results of the analysis of the backward linkages of the economic sector in Tanggamus Regency, 2019

Sector	Back linkage			
	Direct	Direct and Indirect	Total	Rating
Agriculture, forestry and fisheries	0.9199	25.1722	26.0921	17
Mining and excavation	0.9334	28.3052	29.2386	14
Processing industry	0.9879	29.2989	30.2868	10
Supply of electricity and gas	0.9992	29.6275	30.6267	7
Water supply, waste management, waste recycling	0.9974	30.6275	31.6248	3
Construction	0.9910	30.7233	31.7143	2
Wholesale and retail trade; car and motorcycle repair	0.8312	25.6776	26.5088	16
Transportation and warehousing	0.9926	30.2357	31.2283	5
Provision of accommodation and meals	0.9950	28.4552	29.4502	13
Information and communication	0.9516	28.9632	29.9149	11
Financial and insurance services	0.9816	29.6929	30.6746	6
Real estate	0.9913	31.3147	32.3061	1
Company services	0.9983	30.4294	31.4278	4
Administration of government, defense, and mandatory social security	0.9255	27.9992	28.9247	15
Educational services	0.9748	28.9228	29.8976	12
Health services and social activities	0.9943	29.4139	30.4083	9
other services	0.9928	29.6217	30.6144	8

Source: BPS Tanggamus Regency, 2020

The total value of direct backward linkages; indirectly, the largest of Tanggamus Regency are among others; *real estate* sector , namely 32.3060; the construction sector, namely 31.7143; and the water supply sector, waste management, waste recycling, namely 31.6248; while the agricultural sector is ranked 17th or the lowest rank, namely 26.0921. Therefore, the agricultural sector has backward linkages to the *real estate sector* ; construction sector; and the sector of water supply, waste management, waste recycling. Thus, the development of the three sectors will have a direct impact; directly and indirectly to the agricultural sector.

The value of the direct backward linkage of the water supply, waste management, and recycled waste sectors is 0.9974 which means that for 1 billion

output produced by this sector, the amount of input needed by the water supply, waste management, and recycled waste sectors is other economies is worth 0.9974 billion, while the value of the direct and indirect backward linkages of the water supply sector, waste management, waste recycling is 30.6275, meaning that if there is an increase in final demand of 1 billion, then the water supply sector, waste management , recycled waste will directly and indirectly increase or attract the development of the upstream sector or other economic sectors worth 30.6275 billion.

Deployment Impact Analysis

The results of the analysis of the impact of the spread can be seen from the continued results of the analysis of the input output table for Tanggamus Regency in 2019. The analysis of the degree of sensitivity and the power of spread is the analysis used in the input-output analysis. The degree of sensitivity index describes the relative impact caused by the external influence of the agricultural sector on other downstream sectors. The degree of sensitivity index can be used to analyze the sensitivity of certain sectors to external influences, while the power of distribution describes the strength of the agricultural sector in stimulating output growth in other economic sectors so as to spur economic growth (Zuhdi 2017) .

The agricultural sector has a Degree of Sensitivity Index value of more than one (IDK> 1), namely 1.0565, which means that the agricultural sector is able to drive production growth in its downstream industrial sector, is a raw material for industry and other economic sectors, and can used for direct and indirect consumption. This is in line with Harianto's theory (2007) which states that the important role of the agricultural sector in the economy includes (1) provision of food; (2) supply of raw materials; (3) as a potential market for products produced by the industry; (4) sources of labor and formation of capital needed by other sectors; (5) foreign exchange sources; (6) reducing poverty and increasing food security; and (7) contributing to village development and environmental preservation and research results (Wildan, Darsono, and Sutrisno 2018) which states that a sector that has a high sensitivity index value means that sector has more sensitivity to external influences. This value also shows the large role of the agricultural sector in driving the economy in Tanggamus Regency.

The Spreading Power Index (IDP) value of the agricultural sector has a value of less than one (IDP <1), namely 0.9502, so that the agricultural sector in Tanggamus Regency has not been able to attract growth in the upstream sector either directly or indirectly. This is because the agricultural sector is the earliest sector in the economic sector chain. Because the agricultural sector has an IDP value of <1 but an IDK value of> 1, the agricultural sector is included in the supporting sector for key sectors. Key sectors are sectors that have IDP and IDK values of more than one. There are 9 key sectors in Tanggamus Regency including the manufacturing industry sector; electricity and gas procurement sector; sector of water supply, waste management, waste recycling; transportation and warehousing sector; the accommodation and food supply sector; financial services and insurance sector; *real estate* sector ; corporate service sector; and other service sectors. The results of this study are in line with research (Zuhdi 2017) which states that the spreading power index looks at the strength of a sector in influencing all sectors,

while Tanggamus Regency has weak strength in its spread (backward linkage). This can be seen from the total value of the backward linkages of the agricultural sector, where the sector is in the last sequence, namely rank 17.

Multiplier Effect Analysis

Multiplier effect analysis analyzed in this study is the multiplier effect of output and income. Analysis of the output and income multiplier effect is used to see the impact of changes or increases in output and income on the final demand of a sector on the economy in Tanggamus Regency. The multiplier number *describes* the impact that occurs on certain endogenous variables due to changes in exogenous variables in the economy.

The economic sector in Tanggamus Regency which has the greatest value of the output multiplier effect is the real estate sector, namely 31.3147; the construction sector, namely 30.7233; and the water supply sector, waste management, waste recycling, namely 30.6274. This means that these three sectors are the sectors that have the greatest impact on the increase in output in other economic sectors. Thus, if there is an increase in final demand of 1 billion in the three sectors, it will have an impact on the increase in output on other economic sectors including the three sectors themselves.

The agricultural sector is at the very end, ranking 17th in terms of having an impact on increasing output on other economic sectors (Table 6) with a value of 25.1722. This value means that if there is an increase in final demand of 1 billion in the agricultural sector, there will be an increase in output in other economic sectors worth 25.1722 billion. This research is in accordance with the results of research (Harianto 2007) which states that the agricultural sector plays an important role in the rural economy so that if the growth of the agricultural sector increases, output in other economic sectors will also increase. In addition, this research is also in line with research (Arianti 2014) namely an increase in final demand in a sector will have an impact on increasing output or production of goods and services.

The economic sectors in Tanggamus Regency which have the greatest value of the income multiplier effect are among others the electricity and gas procurement sector, namely 1728.8593; the corporate service sector, namely 470.1432; and the water supply sector, waste management, waste recycling, namely 176.5967. This means that these three sectors are the sectors that have the greatest impact on increasing income in other economic sectors. Thus, if there is an increase in final demand of 1 billion in these three sectors, it will have an impact on increasing income on other economic sectors including the three sectors themselves.

The value of the income multiplier impact of the agricultural sector is 14.5634 which means that if there is an increase in final demand of 1 billion in the agricultural sector, there will be an increase in income in the economic sector worth 14.5634 billion. This is in accordance with the results of research (Harianto 2007) that the agricultural sector plays an important role in income, both household income and income of other economic sectors. Judging from the value of the multiplier effect, the agricultural sector is not included in the strategic sector in Tanggamus Regency because it is at the bottom both in terms of output and income. This result means that the agricultural sector has a low ability to encourage or stimulate additional output and income in Tanggamus Regency. This is due to the

limited facilities and infrastructure in the agricultural sector. This result is in line with theory (Suryani 2013) which states that a strategic sector is a sector that has large forward and backward linkages and is able to create large multiplier numbers *in* the economy, whereas in this case the agricultural sector in Tanggamus Regency belongs to the in lower rank. The fact that the agricultural sector is not a strategic sector is very ironic when viewed from the contribution it makes to the GRDP of Tanggamus Regency

CONCLUSION

The agricultural sector has forward linkages to the manufacturing sector and the transportation and warehousing sector, and has backward linkages to the real estate sector and the construction sector. Based on the dispersion impact value, the agricultural sector plays an important role in encouraging the development of its downstream sector, but has a low dispersion power so that it is included in the supporting sector. The results of the output and income multiplier analysis show that the agricultural sector has a lower multiplier effect than other economic sectors.

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