ISBN : 978-602-72006-2-3

PROCEEDING

OF ISAE INTERNATIONAL SEMINAR

BANDAR LAMPUNG, AUGUST 10-12, 2017

"STRENGTHENING FOOD AND FEED SECURITY AND ENERGY SUSTAINABILITY TO ENHANCE COMPETITIVENESS"

Agricultural & Biological Engineering

PROCEEDING
OF ISAE INTERNATIONAL SEMINAR
BANDAR LAMPUNG
AUGUST 10-12, 2017

"Strengthening Food and Feed Security and Energy Sustainability to Enhance Competitiveness"

DEPARTEMENT OF AGRICULTURAL ENGINEERING
FACULTY OF AGRICULTURE
UNIVERSITY OF LAMPUNG

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ISBN	**:**	**978-602-72006-2-3**
Published by	**:**	**Departement of Agricultural Engineering, Faculty of Agriculture, University of Lampung**
Address	:	Prof. Dr. Ir. Sumantri Brojonegoro street, No. 1, Gedong Meneng, Rajabasa, Bandar Lampung, Lampung, Indonesia 35141
E-mail	:	isae@fp.unila.ac.id
Published date	**:**	**February 2018**

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AGRICULTURAL SECTOR AND AGROINDUSTRY LINKAGE IN CREATING REGIONAL ECONOMIC MULTIPLIER IN NEW REGIONAL AUTONOMY

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ABSTRACT

The objective of this research are to (1) examine the economic base sector which contribute to regional economic growth (2) analyze the linkages between agricultural and agroindustrial sector (3) to examine the multipliers impact of regional output. The data collected include (a) GDP of 2010-2014, and (b) I-O (Input-Output) Table as an update version of I-O 2010, using RAS Method of Lampung Province. I-O Table of 2014 of Mesuji District is derived from I-O 2010 using LQ (Location Quotient). The results show that (1) agriculture and industrial processing are the economic basis. (2) the plantation, livestock, as well as food and beverages sub-sectors have forward linkages, spread effect, and spread coefficient.Those sectors are able to encourage and attract the downstream and upstream of sector growth, respectively. (3) the industrial processing sector has a greater multiplier impact than the agricultural sector.

Keywords : regional economic, I-O Tabel, linkage, multiplier effect.

I. INTRODUCTION

Mesuji district is a new regional autonomy splitted from the main district of Tulang Bawang District through Law No. 49 of 2008. With the existing authority Mesuji District is entitled to take care of its own "household". According to Kuncoro (2012), improving the welfare of local people is the fundamental reason for regional separation, in addition to improving services, and shortening the span of control. Autonomy should be understood functionally, in which the autonomy orientation is interpreted as an effort to maximize government functions, namely arrangement, service, and empowerment that can be done as quickly, as closely, and as precisely as possible to society needs (Badrudin 2012).

Based on data (BPS Provinsi Lampung 2016), during the period of 2012 to 2015, the position of economic growth rate and Gross Domestic Regional Product (GDRP) per capita of Mesuji District are consistently at higher criteria. In 2012 and 2014, Mesuji District is in a position equivalent to Tulang Bawang District as the main District,however in 2013 and 2015 the Tulang Bawang District quadrant shifts to a lower growth rate and Mesuji District in an equal position with Bandar Lampung City which is the capital of Lampung Province.

These data indicate that mesuji district as a new regional autonomy can be well developed as its main district, i.e.,Tulang Bawang District. Whereas according to Bappenas and UNDP (2008), the level of economic growth in the main district is higher than the new regional autonomy. the main district has a better per capita gdrp than the new regional autonomy.

Mesuji District is categorized as a district with high economic growth rate and high per capita income that is also a positive indication for the newly established separation regions. Mesuji District as a separated district from Tulang Bawang District has similar economic characteristics from its main district with an average share of agriculture to its GDRP of 47.88% as shown in Table 1. The contribution of GDRP based on economic sectors in Mesuji District can be seen in Table 1.

The agricultural sector is the sector that gives the largest contribution to GDRP of Mesuji District during the period of 2009 to 2013 in the amount of 47.88 percent. The second largest contribution comes from the processing industry sector with an average share of 23.69 percent. The condition of mesuji district as a new regional autonomy, with the economic growth that becomes interesting to be studied further as what aspects of the economic base sector are able to encourage the regional economic growth? What is the relation of the economic base sector to the region's economy?

The objectives of this study are (1) to examine the economic base sector that drives regional economic growth, (2) to analyze the linkages of agricultural and agro-industry sectors in the regional economy, and (3) to analyze the impact of output multipliers.

Table 1. GDRP contribution by economic sectors in District Mesuji Period 2009-2013

No.	Sector	2009	2010	2011	2012	2013	Average
		Percent (%)					
1	Agriculture	49,28	49,50	47,67	46,59	46,34	47,88
2	Mining	0,20	0,22	0,21	0,20	0,20	0,21
3	Processing industry	24,52	23,48	23,87	23,52	23,05	23,69
4	Electricity, Gas & Water	0,02	0,01	0,01	0,01	0,01	0,01
5	Building / Construction	1,43	1,61	1,80	1,83	1,79	1,69
6	Trading, hotel and restaurant	14,55	14,93	16,05	16,98	18,15	16,13
7	Transportation and Communication	2,87	3,09	2,96	2,94	2,90	2,95
8	Finance	3,04	2,92	2,85	2,69	2,56	2,81
9	Services	4,08	4,24	4,58	5,24	5,00	4,63
	Amount	100,00	100,00	100,00	100,00	100,00	100,00

Source: BPS 2014 (data were analyzed)

II. MATERIALS AND METHODS

The location of the research was conducted in Mesuji District as the new autonomous region, result of the separation from the main district of Tulang Bawang District in 2008. The used data is the secondary data consists of GDRP on the basis of 2010-2014, Input-Output Table (IO) of Lampung Province Year 2014 which is the result of updating with RAS Table IO method in 2010 and lowered to Table IO 2014 for Mesuji District through Location Quotient (LQ) approach. Input analysis used in this study is based on the analysis of the economic inter-sectoral linkages, spread effect, and output multiplier impact.

A. Location Quotient (LQ) Analysis

The basic sectors are considered to be able to encourage economic growth. One indicator that is able to describe the existence of the base sector is through the LQ index which is a simple indicator that can indicate the strength or the role of a sector in an area compared with the area above it. How to measure LQ from a sector in a region's economy with a value-added approach or GDRP. Mathematically LQ measurement as follows:

$$LQ = \frac{Vi/Vt}{Yi/Yt} \quad (1)$$

where Vi, Vt, Yi, and Yt denote the value of sector I GDRP at the lower level of the region, total GDRP at the lower region level, the value of sector I GDRP at the upper region level, and total GDRP at higher regional level, respectively.

A sector with an LQ>1 means that the sector is a base sector that becomes a regional power to export its products outside the region concerned. Conversely, if LQ <1, the sector becomes an importer. Whereas, if LQ = 1, there is a tendency that the sector is closed because it does not conduct transactions to and from outside the region, however such conditions are difficult to find in the region's economy.

B. Input Output Analysis

The IO method can be used to see which sectors can be a sector of leaders in regional development. According to Arief (1993) in Daryanto and Hafizriandra (2010), these sectors can be detected in four ways:

- A sector is considered a key sector if it has a backward link and a forward link
- A sector is considered a key sector if it produces relatively high gross output, thus maintaining a relatively high final demand
- A sector is considered a key sector if it is capable of generating relatively high net foreign exchange earnings
- A sector is considered a key sector if it is able to create relatively high employment opportunities.

Rustiadi *et al*. (2011) also explained that the Input-Output (IO) table structure is used as a linkage tool for economic sector linkages. For the purposes of analysis, the most important parameter is the coefficient of technology which is mathematically formulated as follows:

$$a_{ij} = \frac{X_{ij}}{X_j} \; atau \; X_{ij} = a_{ij}.X_j \quad (2)$$

where a_{ij} denotes the ratio between the number of outputs of sector *i*used as input sector *j* (X_{ij}) to total input sector *j*(X_j) or also known as input coefficient. Thus, Table I-O or Equation 2 can be mathematically formulated as the following matrix equation:

$$\begin{pmatrix} a_{11} & a_{12} & \vdots & a_{1n} \\ a_{21} & a_{22} & \vdots & a_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ a_{n1} & a_{n2} & a_{nj} & a_{nn} \end{pmatrix} \begin{pmatrix} X_1 \\ X_2 \\ \\ X_n \end{pmatrix} + \begin{pmatrix} Y_1 \\ Y_2 \\ \vdots \\ Y_n \end{pmatrix} = \begin{pmatrix} X_1 \\ X_2 \\ \vdots \\ X_n \end{pmatrix}. \quad (3)$$

GDRP of sector *i (Vi)* is further notated as *Yi*, where $Y_i = F_i^d - M_i$ = GDRP of the *i* sector. With the above matrix notations then can be formulated as AX + Y= X, where matrix A is a direct relationship coefficient matrix between sectors (technological coefficients), thus

X – AX = Y,
(I - A) X = Y,
X = (I - A) -1.Y.

The matrix (I - A) is known as the Leontief matrix, an important parameter in the I - O analysis. The inversion of the matrix, matrix $(I-A)^{-1}$or B is Leontief's inverse matrix (interconnected sector matrix) or also called as multiplier matrix. Since $(I-A)^{-1}Y = BY$, the production increase (X) is the result of the pull of the final demand Y. The gradient of increase is determined by the elements of the B matrix.

C. Technical parameters in I-O Analysis.

1. Direct Backward Linkage

It demonstrates the effect of a sector's demand on a change in the level of production of sectors that directly provides the intermediate input for the sector, i.e., by adding up each column a_{ij} in each column j, where

$$B_j = \sum_i^n a_{ij} \quad (4)$$

For the need to measure relative (comparison with other sectors), there is a normalized measure which is the ratio of the direct backward linkage of sector *j* to the backward linkage average of other sectors, hence

$$B_j^* = \frac{B_j}{\frac{1}{n}\sum_j B_j} = \frac{n.B_j}{\sum_j B_j} \quad (5)$$

The value of above B_j^* is 1 that indicates the *j* sector has a strong backward linkage in penegrila having a stronger influence on the growth of other sectors in meeting the derived demand posed by this sector.

2. Direct Forward Linkage

It shows the output of a sector used by other sectors as

$$F_i = \sum_j a_{ij} \quad (6)$$

Normalized F_i or F_j^* is formulated as follows

$$F_j^* = \frac{F_i}{\frac{1}{n}\sum_i F_i} = \frac{n.F_i}{\sum_i F_i} \quad (7)$$

3. Direct And Indirect Backward Linkage

It indicates the indirect effect of an increase in the final demand of a particular sector unit (*j*) that can increase the total output of all sectors of the economy. This parameter shows the strength of a sector in driving the improvement of all sectors of the economy, mathematically formulated as follows

$$BL_j = \sum_i bij \quad (8)$$

where *b* is the matrix elements *B* or $(I-A)^{-1}$which is the inverse of the Leontief matrix.Backward linkages effect ratio or backward power of dispersion (β_j) expressed as :

$$\beta_j = \frac{\sum_j b_j}{\frac{1}{n}\sum_i \sum_j b_j} = \frac{n.\sum_j b_j}{\sum_i \sum_j b_j} \quad (9)$$

It demonstrates the relative strength of a sector's final demand in driving the total production growth of all sectors of the economy. If β_j > 1, then the relative demand for *j* sector in stimulating production growth is greater than the average.

4. Direct and Indirect Forward Linkage

The role of a*i* sector can meet the final demand of the entire economy, where

$$FL_i = \sum_J b_{ij} \quad (10)$$

When the final demand for each sector of the economy increases one unit (which means the increase in the final demand for all sectors of the economy is in *n* units) thus *i* sector contributes to the fulfillment of FL_i.

The sensitivity to end-market signal or sensitivity index (forward power of dispersion, α_j) is expressed as

$$\alpha_j = \frac{\sum_j b_j}{\frac{1}{n}\sum_i \sum_j b_j} \quad (11)$$

It demonstrates the contribution of relatif a sector in meeting the overall demand of the economic sector. If a sector has characteristics with $\alpha_j > 1$, then the sector is a strategic sector. This is because it can relatively meet the final demand above the average capacity of the sector.

III. RESULTS AND DISCUSSION

A. Base Sector of Regional Economic Growth Drivers

After the separation, the agricultural sector is still the base sector (LQ = 1.39) in Mesuji District as the main district of Tulang Bawang with positive growth. Food crops and plantations are the dominant sub-sectors to the contribution in the agricultural sector. Main food crops other than rice are cassava produced in 97% of the total land area for food crops of 32,618 ha. In the plantation sub-sector, oil palm and rubber crops dominate the plantation sub-sector. 45% of the plantation area is for palm oil crops and 54% for rubber from the total plantation area of 45,351 ha. The area of Mesuji District is 218,400 ha. The agricultural sector as a base is supported also with a potential labor base. With sector contribution to GRDP 46%, this sector is able to absorb labor 78%.

Another base sector in Mesuji District after the separation is the manufacturing sector. The local growth of this sector tends to slow down. But it is still possible to develop, considering that this sector is also the basis of sector for labor. There are 4 units of medium / large industry and 749 units of small industry in Mesuji District which contributes to GDRP in manufacturing industry sector. The mining and quarrying sectors, and the service sector, are the non-base sectors which allow to become potential sectors because they have positive growth (Endaryanto 2015).

According to Endaryanto (2015), the two basic sectors in Mesuji District are agriculture and processing industries similar to the existing base sector in Tulang Bawang both before and after the separation. This is likely to occur because the split region has characteristics of potential economic sector that are relatively similar to the main district. It includes area after separation that is sufficient for sector development such as agriculture sector. If this sector is well managed and developed, hence it is expected to be able to increase people's incomes and reduce poverty.

According to Gyimah-Brempong (1988), high growth of agricultural sector can increase relative income and decrease income inequality. The strategy is by providing price incentives, improving the village road infrastructure, and the availability of inputs. However, because there are still many poor people in the agricultural sector, the strategy for development is not enough to only reduce the inequality of income, but it must also reduce the level of poverty.

Based on the analysis of Klassen Tipologi, in Mesuji District, the agriculture, mining, quarrying sectors and services, processing and gas, electricity, and drinking water industries are categorized as potential sectors or can still grow rapidly as shown in Fig. 1. As a new regional autonomy, to develop potential sectors, Mesuji District needs to manage the region well and efficiently. Distance center of the capital district and the provincial capital are far enough, as well as road infrastructure.

If it is viewed from Human Development Index (HDI) Mesuji District (68.79) that is still under the HDI of the main district and Lampung province, hence the improvement of quality and service of education, as well as health and economic improvement is very important to be noticed. If the management can be well and efficiently

performed, hence the potential development of potential sectors such as agriculture and industry sectors with commodities such as cassava, rubber, and oil palm can greatly contribute to the region. Especially with the support of large medium, medium, and small industries in the industrial sector.

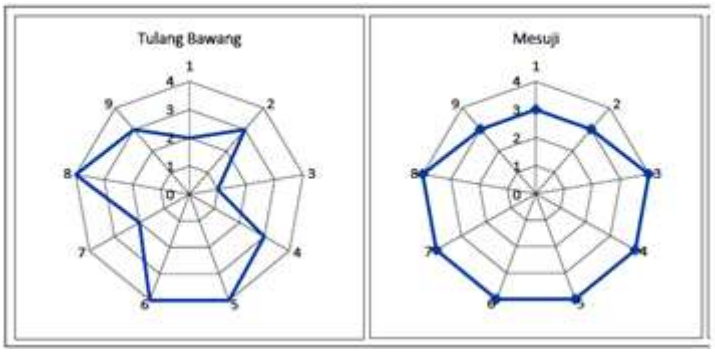

Fig. 1. Radar Diagram of Klassen Typology Sector In Tulang Bawang and Mesuji Districts 2009-2013

In general, based on the classification of classification for the district, it is still quite a lot of sectors in the category of relatively lagging behind. Nayak and Mishra (2009) states that some aspects of structural change in Meghalaya include reduced employment in the agricultural sector and are converted with an appropriate increase in the tertiary sector, especially in the suburbs. The manufacturing and mining sectors are gradually becoming more prominent. Furthermore, income per capita increases. However, improved infrastructure is not balanced by the increasing number of vehicles on the road that are increasing rapidly. Mesuji District as a newly created district, during the period of 2010-2013 post-2008, was able to show an encouraging economic performance as shown in Fig. 2.

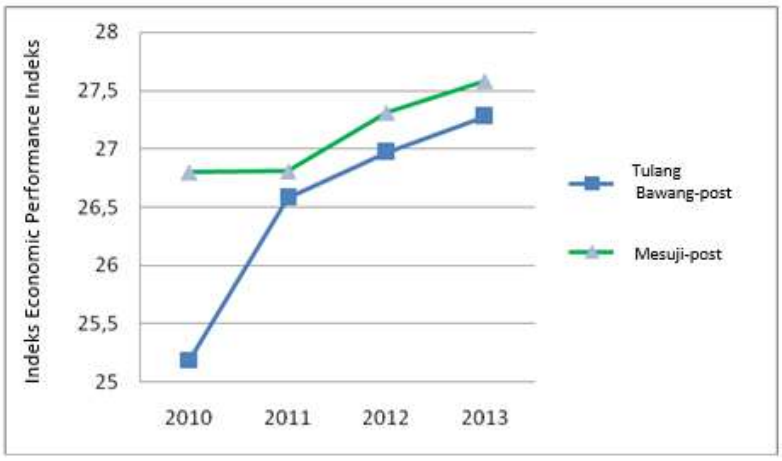

Fig. 2. Economic performance of Tulang Bawang and Mesuji Districts

The average Economic Performance Indeks (EPI) of Mesuji District is of 27.13 higher than the parent district of Tulang Bawang which is 26.51. Indicators that encourage the economic performance of Mesuji District are the growth of increasing GDRP and the level of poverty in the district of the lower expansion of the parent district, so that the average of (EPI) Mesuji District (expansion) during 2010-2013 is higher than Tulang Bawang.

B. The Linkage of Agricultural Sector and Agroindustry in the Regional Economy

To determine the impact of changes in the final demand of a sector on the output of all economic sectors in a region, it can be seen from the value of backward linkage. By knowing the value of backward linkage, hence it can be searched the index of power dissemination of sector concerned. Then, to know the impact of changes in the final demand of a sector on the output of all economic sectors in a region, it can be seen from the value of forward linkage. By knowing the value of future relevance, hence it can be searched index of degree of sensitivity of sector concerned.

The forward linkage is divided into two categories, i.e., (1) direct forward linkage and (2) direct and indirect linkage (total linkage). The direct forward linkage shows that if there is a final increase of one unit, hence the output of the sector allocated directly to other sectors including the sector itself will increase by the value of its

linkage. The direct and indirect linkages indicates that the sector has direct or indirect linkages to other sectors including the sector itself. In addition, the future linkage is the linkage of the upstream production sector to the downstream.

Based on the Table 2, the results of the analysis of direct and indirect output (total linkage) output in the future generally show that the economic sector in Mesuji District has a value of total forward linkage of more than one. The sub-sectors with the greatest forward-looking linkage were the food and beverage industry sub-sector of 1.414816, followed by food crops sub-sector of 1.366707. These values indicate that each increase of 1 (one) unit of final demand for the food and beverage subsector will result in an increase in total output of 1.414816 and any increase of 1 (one) unit of final demand for food crop sub-sector will result in an increase in total output of 1.366707. This shows the role of the food and beverage industry sub-sector and the food crop sub-sector in providing the output generated for the use as input by other sectors in the production process and used to meet the substantial end-demand.

Then the result of analysis of direct linkage of economic sector in Mesuji District is the sector that has the largest direct linkage which is the livestock sub-sector of 0.293848 and the food and beverage industry subsector of 0.377560. This means that any increase of 1 (one) unit of final demand of the livestock sub-sector will directly result in an increase in total output of 0.293848 through the path of increasing of the output of livestock subsector used as the input by other sectors. Each increase of 1 (one) unit of final demand of the food and beverage subsector will directly result in an increase in total output of 0.377560 through an increase in the output of the food and beverage industry subsector used as the input by other sectors.

Table 2. Direct Linkages, Direct and Indirect Linkages of Mesuji Distric, 2014.

No.	Sector	Forward Linkages		Backward Linkages	
		Direct	Direct and Indirect	Direct	Direct and Indirect
1	Food Crops	0.275897	1.366707	0.121271	1.138932
2	HorticultureCrops	0.056640	1.063423	0.072850	1.195100
3	Plantation	0.221757	1.277858	0.156336	1.195089
4	Animal Husbandry	0.293848	1.355733	0.233298	1.194914
5	Agricultural Services, and Hunting	0.131686	1.157391	0.147339	1.184353
6	Forestry and Logging	0.024074	1.025165	0.224020	1.174390
7	Fishery	0.235225	1.290273	0.138820	1.174334
9	Food and Beverage Industry	0.377560	1.414816	0.138588	1.174024
10	Wood And Products Of Wood, Cork And Wickerwork From Bamboo, Rattan And Similar Products as well As The Furniture Industry	0.036154	1.038574	0.213185	1.173699
11	Transportation Industry	0.000123	1.000123	0.138586	1.173683

The backward linkage is divided into two categories, i.e., (1) direct backward linkage and (2) direct and indirect backward linkage (total linkage). The direct backward linkage shows that if there is an increase in one-unit of the end demand, hence the sector's inputs directly allocated to the other sectors including the sector itself which will increase by their corresponding value. Whereas the direct and indirect linkage indicates that the sector has direct or indirect linkages to other sectors including the sector itself. The backward linkage is the downstream sector linkage to the upstream production sectors.

The result of direct and indirect output linkage analysis (linkage total) in general shows that the economic sector in Mesuji District has a total backward value of more than one. The agricultural sector which has the greatest forward linkage is horticulture crop sub-sector of 1.195100, which means that every increase of 1 (one) unit of final demand of horticulture crop sub-sector will result in increase of total input equal to 1.195100. As for the industrial sector, the sector which has a total value of backward linkage is the food and beverage industry sub-sector of 1.174024. This means that every increase of 1 (one) unit of final demand of the food and beverage industry subsector will result in an increase in total input of 1.174024.

The agricultural sector which has the largest direct backward value is the livestock sub-sector of 0.233298. This means that every increase of 1 (one) unit of final demand of livestock sub-sector will result in increase of total input equal to 0.233298. While in the industrial sector, the food and beverage industry sub-sector has the largest direct backward linkage with the value of 0.213185. This means that any increase of 1 (one) unit of final demand for the food and beverage industry sub-sector will result in an increase in total input of 0.213185.

The dispersion analysis results in spread sensitivity (forward spread) and spread coefficient (backward spread). Spread sensitivity is a value that indicates a sector's ability to directly or indirectly drive the downstream industry's capabilities. While the spread coefficient is the effect caused by a sector due to the increase of output of that sector to the output of other sectors used as input either directly or indirectly (upstream sector) by the sector.

Based on Table 3 it also can be seen that there are several economic sectors in Mesuji District which have high spread sensitivity index , i.e., ß> 1.The agricultural sector: food crops, plantation, animal husbandry, and fishery sub-sectors have more than one sensitivity index. The sub-sector that has the greatest value is the food crop with the value of 1.130285. While industrial sector that is sub-sector of food and beverage industry has index of the highest degree of spread sensitivity, that is of 1,170072. A sector with a high degree of spread sensitivity index means that output from these sectors is widely used as input by other sectors of the economy or output generated by the sector which is able to encourage the growth of its downstream sectors. This value also shows the role of these sectors in pushing the Mesuji District economy.

The data in Table 3 also shows that some economic sectors in Mesuji District have a high spread coefficient index i.e., α> 1. The agricultural sector, the estate sub-sector, and the livestock sub-sector have a spread coefficient index of 1.013492 and 1.018914. While for the industrial sector which has the highest spread coefficient index is the food and beverage industry sub-sector of 1.140315. Economic sectors with a high spread coefficient index α> 1 mean that the sector has a high influence or in its production activities. Hence, the sector requires a lot of output from other sectors as the inputs. This value also means that the sectors are able to attract the growth of upstream sectors in Mesuji District.

Table 3. Spreading Power of Mesuji District, 2014.

No.	Sector	spread sensitivity	spread coefficient
1	Food Crops	1.130285	0.941912
2	Horticulture Crops	0.879465	0.895455
3	Plantation	1.056806	1.013492
4	Animal Husbandry	1.121209	1.018914
5	Agricultural Services, And Hunting	0.957178	0.909736
6	Forestry And Logging	0.847825	0.868501
7	Fishery	1.067073	0.961302
9	Food And Beverage Industry	1.170072	1.140315
10	Wood And Products Of Wood, Cork And Wickerwork From Bamboo, Rattan And Similar Products As Well As The Furniture Industry	0.858915	1.008942
11	Transportation Industry	0.827115	0.977440

C. Impact of Output Multiplier

The multiplier impact analysis aims to look at the effect of changes of endogenous variables in the event of a change in exogenous variables such as the final demand. The multiplier effectconsists of two types, i.e., Type I and Type II. It should be noted that Type II multipliers always have a value greater than the Type I. This is because the household effect is taken into account.

The initial impact is an economic stimulus that is assumed as an increase or decrease in sales in one unit of monetary unit. On the output side, this initial impact is assumed to be an increase in sales to the final demand of one unit of monetary unit. In this case it is simulated that there is an increase of one million rupiah of final demand from a sector.

The results of the output multiplier impact analysis, i.e.,Type I and Type II, plantation and livestock sub-sector have higher multiplier value compared with the other agricultural sub-sectors. The value of output multiplier impact Type I sub-sector livestock of 1.232041. That is, if there is an increase in the final demand for livestock subsector by 1 unit, if will increase the output in all sectors of the economy of 1.232041. When it is viewed from the value of the impact of Type II output multiplier impact, the livestock sub-sector is amounted to 1.978625. This value means that by including the effect of household consumption, if an increase in the final demand for the livestock sub-sector by 1 unit, hence it increases the output in all sectors of the economy of 1.978625.

As for the manufacturing sector, the food and beverage industry sub-sector has the highest multiplier value, i.e., Type I and Type II, compared to other industrial sub-sectors. The value of output multiplier impact of Type I sub-sector of livestock is of 1.378836. That is, if there is an increase in final demand for livestock sub-sector of one

unit, hence it will increase the output in all sectors of the economy of 1.378836. When it is viewed from the value of the impact of Type II output multipliers, the breeding sub-sector is amounted to 1.966101. This value means, by entering the effect of household consumption, if an increase in the final demand for the livestock sub-sector by one unit, it increases output in all sectors of the economy of 1.966101.

Table 4. Impact of Output Multiplier

No.	Sector	Impact Of Output Multiplier			
		First	Total	Tipe I	Tipe II
1	Food Crops	1.000000	1.522195	1.138932	1.522195
2	Horticulture Crops	1.000000	1.650628	1.082758	1.650628
3	Plantation	1.000000	1.898751	1.225485	1.898751
4	Animal Husbandry	1.000000	1.978625	1.232041	1.978625
5	Agricultural Services, And Hunting	1.000000	1.895263	1.100027	1.895263
6	Forestry And Logging	1.000000	1.660695	1.050166	1.660695
7	Fishery	1.000000	1.685588	1.162379	1.685588
9	Food And Beverage Industry	1.000000	1.966101	1.378836	1.966101
10	Wood And Products Of Wood, Cork And Wickerwork From Bamboo, Rattan And Similar Products as well as the furniture industry	1.000000	1.706183	1.219983	1.706183
11	Transportation Industry	1.000000	1.877456	1.181892	1.877456
	Average		1.784149	1.177250	1.784149

IV. CONCLUSION

The results of this research show that (1) agriculture and industrial processing are the economic basis. (2) the plantation, livestock, as well as food and beverages sub-sectors have forward linkages, spread sensitivity, and spread coefficient.Those sectors are able to encourage and attract the downstream and upstream of sector growth, respectively. (3) the industrial processing sector has a greater multiplier impact than the agricultural sector.

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