THE ROLE OF OIL PALM AND RUBBER INDUSTRY TOWARD REGIONAL ECONOMIC IN WEST KALIMANTAN-INDONESIA

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ABSTRACT

The study aimed to assess the role of palm oil and rubber toward the economy in West Kalimantan. Another aim was to develop oil palm and rubber industry to strengthen the economy of West Kalimantan. The method used in this research was the analysis of Input-Output. The main data was the Input-Output (IO) data in 2011 from the Central Bureau of Statistics (BPS), which consists of 54 sectors. The results show that the industrial output of palm oil and rubber, as well as oil palm and rubber, is still low. Weak innovation and technology lead to the low output and role of these two sectors to the economy of West Kalimantan. Another obstacle that leads to the economy of rubber and palm oil industries under the standard is the lack of motivation research, infrastructure, and connectivity.

Keywords: economic, industry, oil palm, rubber

INTRODUCTION

The potency of the plantation, palm oil, and rubber industry cannot be optimized by the government of West Kalimantan Indonesia for the following reasons; (1) the availability and quality of infrastructure (roads, ports, energy/electricity, and water) is not adequate. (2) The industrial added value is very low. (3) The rule of law in developing investment. (4) The function of the port is still a local level. Lastly, (5) Lack of innovation and technology in the field of oil and rubber industry (Badan Perencanaan dan Pembangunan Daerah, 2014).

This study aims to assess and understand the role of the plantations and oil palm and rubber industry in West Kalimantan. Palm and rubber plantations have lasted over 50 years in West Kalimantan. However, industrial processing, connectivity, and human resources have not supported it yet. The problem of human resource constraints in palm and rubber industry leads to low innovations. On the other hand, the problem in connectivity causes transportation costs to be inefficient and ineffective. Chiu & Lin (2012) said that the transport industry has a close relationship with other industries to meet the input and output of the industry.

The area of oil palm plantations owned by the people and companies in West Kalimantan is estimated to be 314.983 ha and 906.486 ha, while rubber plantations are estimated to be 587.262 ha and 4.942 ha. Based on the data, the utilization of oil palm and rubber plantations for total farming area ranges from 73,45% (Badan Pusat Statistik, 2014). In the same year, the amount of foreign direct investment (FDI) and domestic investment (DCI) in the plantation sector are estimated to be $ 40,78 million (62,27% of the total investment) and $ 3,16 million (52,94% of the total investment). With

such broad field, palm oil and plantation industries indeed can thrive. However, the role of oil palm and rubber industry has not been able to improve the economic and alleviate poverty. The poverty in West Kalimantan is estimated to have increased by 11,33%, which in number increases from 1.097.369 to 1.221.779 people (Badan Pusat Statistik, 2014).

The productivity of oil palm and rubber plantations in Indonesia is still less than other ASEAN countries. The average of productivity of palm plantations in Indonesia ranges from 3,8 tons/ha, which is lower than Malaysia's 4,6 tons/ha. The same thing happens with rubber plantations. The productivity is only 993 tons/ha, which is lower than Thailand, Vietnam, and Malaysia. Furthermore, the export of palm oil plantations is higher in CPO.

This reflects that the agricultural sector has forward linkage as well as backward linkage that are still weak (Dasril, 1993). The weak linkages show that the downstream agricultural sector is still very low. This causes the added value obtained by the sector to be low. On the other hand, the total number of labor depends on agriculture sector (including plantation) is 48,63% (Badan Pusat Statistik, 2016). Therefore, to strengthen the linkages, it is necessary to develop strong downstream industries, especially the oil palm and the rubber plantations sector. This is because the area's utilization of the sector is very wide. Furthermore, the government needs to strengthen human resources to support the downstream industry.

Hausmann *et al.* (2013) said that the quality of human resources is a basic fundamental in developing innovations and modern technologies. Skilled human resources and abundant innovation should support a complex economic activity. Resources and modern technological innovation have not supported the processing of oil industry and rubber industry. The added value of the industry becomes low, and the development of the industry slow, which impact the economy significantly.

Currently, the processing of the oil industry in West Kalimantan is only in the form of CPO. The processing of CPO to be the main ingredient for cosmetics and medicine has not been well developed in West Kalimantan. There are four things that need to be considered by the government in increasing the added value of the oil industry: (1) encouraging and giving priority to investment in the field of refined palm oil industry rather than investment in on-farm and CPO. (2) The government should increase the participation of farmers as owners and producers of oil palm plantations, not as labor. (3) The government must have a clear road map to the palm oil industry. (4) The government needs to promote the procedure to develop oil industry specialization and investment incentives (Amzul, 2011; Aswandi & Kuncoro, 2002). These should be done in order to improve economic linkages in the region (Arman *et al.*, 2015). Therefore, it is important to understand the sectors that can generate high added value in a region (Muchdie, 2017).

The Indonesian government has launched a Master Plan for the Acceleration and Expansion of Indonesian Economic Development (MP3EI). Ministry of Economics has developed six policies: (1) domestic industry security through a competitive industry in the face of global competition, (2) infrastructure development, (3) improvement of the quality of public service, (3) improvement of the regulation, (4) fiscal policy, and (5) human resource development in the field of industry (Kementerian Koordinator Bidang Perekonomian, 2011).

Tijaja & Faisal (2014) stated that Indonesia experiences a lack of energy to support industrialization, low labor productivity, bureaucracy, and lack of synergy between the ministries and government agencies. Therefore, MP3EI program is expected to help boost the productivity of industrial oil palm and rubber plantations in Indonesia. Along with the MP3EI program, the government of President Jokowi and Jusuf Kalla will cut regulatory policies that impede investment and create policies in 13 packages to facilitate the investment. Guo & Planting (2000) explained that the role of the non-manufacturing industry has a great influence on the economic structure when it has inter-industry linkages.

Industrialization needs to be considered by the state to strengthen the competitiveness of countries, particularly with ASEAN countries. In two decades, the economy of Vietnam is has grown and become modern. The standard of living in Vietnam develops very rapidly and makes the economic transition integrate with the world economy. That is because the government focuses on the process of industrialization and modernization that aims to make Vietnam as an industrial economy by 2020 (Trinh *et al.*, 2012).

METHODS

This study uses non-survey technique. The data used as the unit of analysis is the Input Output (IO) data consisting of 54 sectors (presented in a manuscript of 53 sectors) in the year of 2011, sourced from BPS (Badan Pusat Statistik, 2011). The data is still relevant to be used as a short-term analysis of the economic condition of the region in West Kalimantan, with the assumption that: (1) technical coefficients technology does not change, (2) prices are relatively stable, (3) the relative economic structure is constant, and (4) the economic structure of the short-term period has not changed much. The data will be projected from as many as 54 sectors of the field of business. The economic structure which shows that the regional economy in West Kalimantan is relatively constant in the short term is presented in Table 1.

Table 1 Economic Structure of West Kalimantan Based on Constant 2010
Prices According to Field of Business in 2012-2015

No	Sector	2012	2013	2014	2015
1	Agriculture and Forestry	24,13	23,93	23,31	22,77
2	Mining and Excavation	4,77	4,5	4,29	4,12
3	Processing Industry	16,92	16,97	16,85	16,62
4	Procurement of Electricity and Gas	0,08	0,07	0,09	0,09
5	Procurement of Water	0,15	0,15	0,14	0,14
6	Construction	10,06	10,38	10,94	11,41
7	Trading	15,01	15,16	15,08	15,28
8	Transportation	4,13	4,15	4,18	4,18
9	Procurement of Accommodation and Food Drink	2,29	2,27	2,29	2,31
10	Information and Communication	3,71	3,86	4,12	4,37
11	Financial Service	3,31	3,52	3,6	3,61
12	Real Estate	3,02	2,99	3,02	2,98
13	Company Service	0,47	0,48	0,48	0,49
14	Government Administration	4,96	4,69	4,72	4,83
15	Education Service	4,34	4,34	4,35	4,28
16	Health Service	1,53	1,46	1,46	1,45
17	Others	1,12	1,07	1,08	1,07

(Source: BPS, 2017)

The data in Table 1 shows that the contribution of each sector in the period of 2012-2015 is relatively unchanged. This is why the IO data of 2011 can still be used as a unit of analysis with other assumptions strictly considered stable. The IO method used in this research is developed by Leontief in 1930. His findings brought him to get the Nobel Prize (Miller & Blair, 2009). Leontief thought of the Input-Output analysis as:

"An empirical study of interrelations among different parts of a national economic as
revealed through covariation prices, output, investment, and income." (Leontief, 1936)

Leontief (1936) developed the formulation by observing in detail the flow between commodity and industry. After that, Leontief made an Input-Output table that consists of (1) final demand, (2) primary input, and (3) total output. Final demand consists of household consumption, government spending, investment, and export. Primary input consists of the value-added component of wages, value-added profit, and imports (Hewings & Jensen, 1987). In detail, the standard used for balancing the Leontief flow of goods and transaction is:

$$\sum_j x_{ij} + Y_i = X_i \tag{1}$$
$$\sum_i x_{ij} + Z_i = X_j \tag{2}$$

Assuming a production function is linear and homogeneous along with a relatively unchanged technological coefficient, the formula input coefficient is:

$$a_{ij} = {}^{x_{ij}}\!/X_j \tag{3}$$

Furthermore, the above equation is substituted into equation (2). Hence, it becomes:

$$\sum_j a_{ij}X_j + Y_i = X_1 \tag{3}$$

If matrix A is ($n \times n$), vector Y ($n \times 1$), and X ($n \times 1$), the equation becomes:

$$AX + Y = X \tag{4}$$

Furthermore, the formula can be written into a matrix of Leontief, namely:

$$[I - A]^{-1}Y = X \tag{5}$$

Matrix Leontief's key matrix is used to (1) determine and estimate forecasting models and Input-Output, and (2) estimate backward and forward Linkage (Daryanto & Hafizrianda, 2010). Chenery & Watanabe (1958) said that the backward Linkage sees the demand side (demand driven or power of dispersion) and the forward Linkage sees the supply side (supply driven or sensitivity dispersion) (Mattioli & Lamonica, 2013). The Backward formula and forward Linkage are presented in the following equation:

$$BL_j^R = \sum_{j=1}^n a_{ij} \tag{6}$$
$$FL_j^R = \sum_{j=1}^n a_{ij} \tag{7}$$

Furthermore, this research also adopts the model from Sinha, Das, and Datta (2012) and Morilla, Diaz-Salazar, and Cardenet (2007) to estimate the added value of wages, indirect taxes, and effort. The formula used is:

$$M = (1 - A)^{-1} \tag{8}$$

RESULTS AND DISCUSSIONS

The estimation results of this study can only be used as a reference and information materials in taking policy for a short period with the provision of strict assumptions as predetermined. One of the facts used to prove that the regional economy in West Kalimantan is relatively stable is the unchanged economic structure during 2012-2015. Therefore, the results of this study can be used as additional information material for the government to observe the economic development, especially in sectors emphasized in this research which are the palm oil industry and rubber industry.

Contributions of plantations and industrial rubber and palm oil based on the value of backward linkage and forward linkage are still lower compared to some sectors in West Kalimantan. The value of backward linkage from rubber and oil palm plantations is 1,271 and 1,389 each, which ranks 38th and 30th. The value of backward linkage from the industries of rubber and oil palm plantations amounts to 1,611 and 1,180 each. Both of these are ranked 17th and 42nd. The value of forward linkage from rubber and palm oil amounts to 0,968 and 0,967 respectively, which ranks 9th and 11th. The rated value of forward linkage from industries of rubber and palm oil is 0,266 and 0,740 respectively, which ranks 28th and 22nd.

The estimation results of forward linkage and backward linkage show that plantation and plantation industry still have the smaller role in the economy compared with other sectors. Based on the value of backward linkage, rubber industry ranks much higher than the oil industry with 17th and 42nd respectively. Meanwhile, the value of forward linkage from oil industry ranks higher at 22nd than the rubber industry which ranks 28th. The rubber industry has the greater influence on the demand side than the oil industry. It shows that the rubber industry, involving other sectors (in the economy), is more active than the oil industry in driving the region's economy. The rubber industry is more cultivated by the local people, while oil palm plantations are owned by large-scale enterprises. The effects of rubber industry's influence are greater than the demand side. The implication is that the rubber industry multiplication creates greater income to the various sectors and economic activities in West Kalimantan.

Rubber industry is able to push the economy's output amounted to 1,611 if the sector final demand is increased by one. It shows the rubber industry's influence on various sectors. Rubber industry has a linkage with a rubber plantation sector, trade, land transport, river transport and crossings, sea transport, banking, warehousing sector, infrastructure (construction), chemical industry, other industries, and electricity. Rubber industry is strongly influenced by the connectivity between regions. This is reflected in its influence on sea transport, river, and land transportation. Therefore, the development of road infrastructure must be realized in order to support the flow of commodities.

On the contrary to the side of the forward linkage, the oil industry is slightly better than the rubber industry. Most of the oil palm plantations are operated by large-scale enterprises, including industrial processing. It shows that the oil industry a little better on the supply side. Unfortunately, the value of forward linkage from palm and rubber industry is less than one. This shows that the majority of processed palm oil industry has not been able to be absorbed by domestic outlets. Innovation and technology in West Kalimantan is not enough to be able to process the processed, e.g., CPO, into value-added products.

This situation can create a capital outflow to other regions or countries. The greater the resources of raw materials exported, the greater the added value of regional economic flows to other regions and countries. Its influence on the region is the added value of labor, employment, and economic output into a small area. Needless to say, the role of the oil industry is to be small in boosting the economic in the West Kalimantan region. Instead, the role of other industries such as industrial goods, timber industry, and the chemical industry is better than the oil industry.

From the supply side, oil palm and rubber plantations are quite good compared to some other sectors. Rubber plantations and palm oil are ranked 9th and 11th respectively. It is not uncommon for large-scale oil palm plantations to always be accompanied by the development of processing fresh fruit into CPO industry. Likewise, with rubber, the rubber-processing industry is already available in a decent amount to meet the supply of plantation sector output.

Palm and rubber plantations should have been able to give a major influence on the technology industry, chemical industry, transportation, and agriculture. These four sectors are considered creating linkages in fostering the development of the demand side. However, it does not

happen because of the low human development in the field of innovation and technology. The role of governments and employers to improve the resource is not optimal, which is reflected in the low cost of research and human resources to develop innovation and technology. That is why oil palm and rubber plantation sector experience a mislinkage with related sectors would be expected for the region and between regions. Furthermore, the plantation sector requires alliances linkage with other sectors in other countries to meet the basic input plantations. Here is the beginning of the stream flowing out the added value and economic inefficiency. In detail, the value of backward linkage and forward linkage is presented in Table 2.

Table 2 Backward Linkage and Forward Linkage Plantation of an
Industrial Commodity Rubber and Palm Oil in West Kalimantan

No	Sector	Backward	Forward
1	Paddy	1,314	2,083
2	Corn	1,115	0,993
3	Soybean	1,784	0,992
4	Cassava	1,630	0,985
5	Other Crops	1,824	0,983
6	Agricultural Services and Hunting	1,787	0,979
7	Orange	1,538	0,973
8	Horticultura	1,566	0,970
9	Rubber	1,217 (38)	0,968 (9)
10	Coconut	1,119	0,967
11	Palm oil	1,389 (30)	0,967 (11)
12	Coffee	1,153	0,966
13	Pepper	1,132	0,965
14	Other Plantation Crops	1,145	0,965
15	Poultry	1,721	0,964
16	Other Livestocks	1,523	0,844
17	Wood	1,214	0,791
18	Other Forest Products	1,812	0,769
19	Captured Fisheries	1,791	0,762
20	AquaCulture	1,209	0,759
21	Mining	1,293	0,756
22	Palm Oil Industry	1,180 (42)	0,740 (22)
23	Food and Beverage Industry	2,711	0,739
24	Textiles and Apparel Industry	1,699	0,240
25	Manufacture of Wood, Articles of Wood and Matting	1,734	0,239
26	Industry Paper and Paper Products and Printing	1,410	0,233
27	Chemical, Pharmaceutical, and Traditional Medicine	1,763	0,232
28	Rubber Industry, Manufacture of Rubber and Plastics	1,611 (17)	0,226 (28)
29	Industrial Good Excavation	1,403	0,225
30	Manufacture of Metal Goods, Computers, and Electronics	2,130	0,222
31	Furniture Industry	1,464	0,209
32	Other Industry	1,744	0,206
33	Electrification	1,218	0,192
34	Water Supply	1,097	0,191
35	Infrastructure	1,466	0,191
36	Large Retail Trade	1,317	0,189
37	Land Transportation	1,841	0,186
38	Water Transportation	1,566	0,179
39	River Rransportation	1,580	0,157

Table 2 Backward Linkage and Forward Linkage Plantation of an
Industrial Commodity Rubber and Palm Oil in West Kalimantan (Continued)

No	Sector	Backward	Forward
40	Air Transportation	1,633	0,150
41	Warehousing and Transport Supporting Services	1,245	0,146
42	Provision of Acomodation	1,586	0,145
43	Provision of Food and Bevarage	2,152	0,126
44	Information and Communication	1,158	0,050
45	Bank	1,219	0,050
46	Insurance	1,081	0,049
47	Other Financial Service	1,079	0,049
48	Real Estate	1,372	0,049
49	Company Services	1,190	0,048
50	Government Administration and Defense	1,000	0,047
51	Education Services	1,529	0,047
52	Health Services and Social Activities	1,531	0,031
53	Other Services	1,039	0,001

(Source: Data IO Year 2011 after being processed, 2011)

The added value of the wage sector is quite various, but the oil palm plantation industry has better added value than the rubber industry or sector of rubber and oil palm plantations. The big sector that produces value-added labor is the administration, warehousing, and service companies as well as the rice sector. The rating wage of value-added palm oil and rubber industries are on the 5th and the 37th rank respectively. Meanwhile, the palm and rubber plantations are 45th and 21st each. The considerable difference between the ranks of the oil industry and rubber industry indicates differences in factor productivity.

Factor productivity differences are indicated in (1) human resources, (2) technology, (3) output, and (4) market acceptance. The output of oil palm plantations is much larger than rubber plantations. The significant output differences encourage the use of more modern technology and the improved skills of human resources to increase productivity output. At the same time, the market acceptance of palm oil products is very large. It is the main indication why the value-added labor in the palm oil industry is much larger than the rubber industry.

However, the added value of wages in the oil palm plantation sector is lower than a rubber plantation. That is because (1) the greater labor demand of oil palm plantations than that of rubber, (2) government policies that encourage large-scale enterprises of oil companies to provide maximum employment around the plantation, and (3) the company's avoidance of social unrest if there are non-workers around the garden. That results in the average wage of labor is low, as the company is estimated to absorb the labor force exceeding the requirements - average. Naturally, the company measures to reduce operating costs and improve efficiency.

Rubber plantation labor is relatively better than the wages of oil palm plantations. Generally, the rubber plantation in West Kalimantan is owned by small companies and society (not a big company). The added value of high wage is caused by the rubber plantation owner using manpower according to the needs.

In the indirect value-added tax, value-added industry ranks of rubber and palm oil industries are 13th and 20th. The value of indirect taxes of transport and fisheries sector is still larger than both of these sectors. The contribution of these two sectors could actually be in a better position to increase indirect taxes. However, it is difficult to explain why these two sectors do not provide value-added tax

directly on the economy, especially palm oil industry. The local government needs to verify the low contribution of the indirect value-added tax of these industries.

The rated indirect value-added tax of each palm and rubber plantations each ranks 15th and 47th. The contribution of indirect taxes on the rubber plantation sector is considered reasonable for most of the rubber plantation holdings are farmers. Plantation area owned by each farmer ranges only between 0,5 ha to 2 ha. Oil palm plantations have a better value-added contribution of indirect taxes than rubber plantation. The added value of large indirect tax on oil palm plantations is caused by some companies operating in the oil palm plantations. The oil palm plantation area is already owned by the company in West Kalimantan, amounting to 906.486 ha. The vast magnitude will affect the amount of value-added tax that is not directly produced by palm oil plantations.

The value-added of industrial enterprises in the oil palm and rubber industry is ranked 47th and 25th, while the sector of oil palm and rubber plantations 15th and 22nd. Oil palm and rubber industry has not demonstrated a better effort than some sectors in West Kalimantan. On top of that, this low effort is affected by problems of infrastructure and connectivity between areas in West Kalimantan. Infrastructure development is recommended in West Kalimantan to improve the efficiency and effectiveness of business scale. The greater the transport costs, the smaller the added value of palm and rubber plantations and their respective industrial enterprises. In detail, the added value of wages (U), operating surplus (SU), indirect taxes (PTL), and industrial estates on palm and rubber commodities are presented in Table 3.

Table 3 Value-Added Wage (U), Surplus (SU), Indirect Taxes (PTL), and Plantation, Industrial, and Commodity of Rubber and Palm Oil in West Kalimantan

No	Sector	U	SU	PTL
1	Paddy	0,551	0,423	0,008
2	Corn	0,430	0,551	0,003
3	Soybeans	0,379	0,567	0,021
4	Cassava	0,371	0,565	0,019
5	Other Crops	0,225	0,706	0,020
6	Agricultural Services and Hunting	0,372	0,562	0,020
7	Orange	0,467	0,474	0,032
8	Horticultura	0,291	0,639	0,029
9	Rubber	0,346	0,635	0,006
10	Coconut	0,175	0,725	0,020
11	Palm Oil	0,174	0,683	0,046
12	Coffee	0,132	0,796	0,050
13	Pepper	0,047	0,931	0,002
14	Other Plantation Crops	0,093	0,894	0,005
15	Poultry	0,331	0,718	0,013
16	Other Livestock	0,368	0,608	0,010
17	Wood	0,277	0,485	0,008
18	Other Forest Products	0,351	0,505	0,028
19	Captured Fisheries	0,244	0,621	0,069
20	Aquaculture	0,252	0,667	0,061
21	Mining	0,127	0,863	0,012
22	Palm Oil Industry	0,549	0,374	0,041
23	Food and Beverage Industry	0,444	0,903	0,044
24	Textiles and Apparel Industry	0,292	0,618	0,022
25	Manufacture of Wood, Articles of Wood and Matting	0,352	0,531	0,016
26	Industry Paper and Paper Products and Printing	0,261	0,667	0,018
27	Chemical, Pharmaceutical and Traditional Medicine	0,223	0,677	0,042
28	Rubber Industry, Manufacture of Rubber and Plastics	0,234	0,615	0,050

Table 3 Value-Added Wage (U), Surplus (SU), Indirect Taxes (PTL), and Plantation, Industrial, and Commodity of Rubber and Palm Oil in West Kalimantan (Continued)

No	Sector	U	SU	PTL
29	Industrial Good Excavation	0,131	0,800	0,010
30	Manufacture of Metal Goods, Computers, and Electronics	0,123	0,768	0,071
31	Furniture Industry	0,218	0,582	0,037
32	Other Industry	0,217	0,528	0,097
33	Electrification	0,205	0,742	0,008
34	Water Supply	0,425	0,424	0,020
35	Infrastructure	0,508	0,361	0,045
36	Large Retail Trade	0,294	0,517	0,055
37	Land Transportation	0,173	0,682	0,058
38	Water Transportation	0,460	0,486	0,033
39	River Transportation	0,274	0,588	0,025
40	Air transportation	0,253	0,537	0,106
41	Warehousing and Transport Supporting Services	0,711	0,242	0,010
42	Provision of Acomodation	0,417	0,433	0,047
43	Provision of Food and Bevarage	0,278	0,734	0,023
44	Information and Communication	0,411	0,336	0,151
45	Bank	0,252	0,713	0,005
46	Insurance	0,272	0,582	0,091
47	Other Financial Service	0,234	0,575	0,052
48	Real Estate	0,246	0,666	0,030
49	Company Services	0,650	0,174	0,096
50	Government Administration and Defense	0,723	0,000	0,000
51	Education Services	0,259	0,573	0,045
52	Health Services and Social Activities	0,479	0,250	0,012
53	Other Services	0,064	0,920	0,004

(Source: Data IO Year 2011 after being processed, 2011)

The results generally indicate that the industrial sector of oil and rubber in West Kalimantan is not optimal. The industrial sector of oil palm and rubber haven't been able to produce the optimal output which is why its performance is still very slow. Processing chemical industry, food and beverage industry, palm oil industry, rubber industry, and other industries haven't been real activities in West Kalimantan region. Hence, its effects on the welfare of the community are still very small. The Government of West Kalimantan has a vision of improving the welfare. However, it still faces major constraints as the utilization of natural and human resources is not optimal. There is also a mission to expand employment and business-based community economy through the empowerment of the potential and strength of the local economy, innovation, and human resources. Mission Regional focuses on the development of infrastructure to facilitate the mobility of people and goods flow, and accelerate development in rural areas, border, coastal, and island as a source of economic potential. This mission must be optimized through the linkage of economic and local resources output.

To improve the industrial oil palm and rubber industry for the economy of West Kalimantan, cooperation between the government, private sector, and communities are necessary. The cooperation is on developing (1) road infrastructure, (2) connectivity land, river, and sea which has not been integrated, (3) low-quality seeds, (4) the provision of quality fertilizer, and (5) improvement of regulations, incentives, and disincentives in developing the downstream oil industry and rubber industry.

The time needed by farmers to transport fresh fruit harvest to the milling machine can reach 12-48 hours. However, large-scale enterprise processing industry's travel time to harvest the oil industry could be faster. It takes longer because the quality of oil palm's fresh harvest can either

decrease or increase the cost of transporting oil palm farming. Causes of the long journey are the lack of connectivity between the waterway to the port and overland to the river. Furthermore, oil palm and rubber industry activities are concentrated on the upstream industry. The downstream oil industry is only to process CPO while the downstream rubber industry is only to process raw materials for vehicle tires. An estimated 15% of the rubber plantations upstream production is consumed by the downstream industry in Indonesia and the rest 85% of the export commodity. This indicates that the industrial linkages of upstream and downstream oil and rubber commodities have not been going well. On the other hand, the development of high-quality seeds is low in West Kalimantan which results in research and development costs being fully used on seeds. Due to this, it is still difficult to produce quality seeds productively.

In order to develop and optimize the role of the oil and rubber industries against West Kalimantan region economy, planning systems and policies are needed in an integrated region. As the first step, the government needs to improve regulatory and regulations on the investment and marketing of oil palm and rubber production. Secondly, rubber and palm oil commodity investments should be managed in the balance between upstream and downstream. Third, every investor must have a plan of development projects between the upstream and downstream oil palm and rubber industry. Fourth, results from upstream production should go through downstream processing into new products of high added value. Lastly, exports of raw materials of palm and rubber commodities should gradually be reduced by strengthening the processing industry in West Kalimantan.

In order to support the success of downstream products, the government should provide skilled human resources and innovations. Hilirisasi program should be implemented by the government, private parties, and community with the emphasis on research, development, and innovation of products from processed palm oil and rubber commodities. Innovation research has synergy from upstream to downstream, namely (1) the availability of quality seeds which are friendly to the environment and (2) the innovation in technology and industry to produce a variety of output.

The government should give full opportunity to the local farmers to be able to access the land and cultivate plantations. It aims to increase the participation of local communities in developing local economies and regions. Local farmers must be provided with the skills and ability of innovation in the processing of oil palm plantations and rubber plantations in order to be more productive.

The pattern of the upstream and downstream industry should be reflected in the regulation of the spatial structure and pattern. The plantations and industrial estates have connectivity with a wide range of industrial areas, ports, and airports. The region should be connected by land, river, and sea in order to achieve economies of scale. Industrial economies of scale could have been better if the Input-Output industrial linkages can be realized. Gradually, the Input-Output relationship and economies of scale will create economic agglomeration in West Kalimantan region. Therefore, government regulation factor, human resources, and innovation have an important role in improving the economy of oil and rubber industries in West Kalimantan.

Palm and rubber industry development in West Kalimantan is becoming more strategic as the region is located in the sea lanes Islands 1 (ALKI-1) Indonesia and faced directly onto the sea waters of the South China Sea. Development of industrial estates in West Kalimantan will optimize the economy of the region in promoting economic growth and welfare. Industrial estates will put West Kalimantan as a liaison in cooperation among countries, namely Indonesia-Malaysia-Singapore-Growth Triangle (IMS-GT) and the Brunei-Indonesia-Malaysia-Philippines East ASEAN Growth Area (BIMP EAGA). The flow of goods by road between Brunei Darussalam and Malaysia will be more intense if the industrialization of the region grows rapidly.

CONCLUSIONS

Important findings in the study show that industrial oil palm and rubber plantations, as well as commodities of palm oil and rubber, are still relatively low in the West Kalimantan region. Compared with other sectors, the role of industrial plantations, oil palm, and rubber for West Kalimantan is still low. This low performance of industrial and agricultural commodities is caused by regional connectivity and economic linkages. The government should build and strengthen the industrial area of palm and rubber to be able to become national and international economic hub. It is supported by the strategic position of West Kalimantan borders with several countries in facilitating trade and economic interaction.

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