

SUPPORT MARITIME CONNECTIVITY TO POTENTIAL RESOURCES IN SUMATERA ISLAND

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Abstract

The development of Sumatera provides national economic progress of Sumatera role by thirty-one percent. The role of Sumatera against constellation of national economies is not separated from commodity potential and maritime transport support as catalyzation in stimulating the growth of regional economic sectors such as industry, trade and tourism. However, not yet significant impact is felt, the strengthening of commodity distribution connectivity is necessary. This research aims to know the support of maritime connectivity Sumatera Port to potential commodity in Sumatera. Methodology is a method of policy analysis, commodity productivity, spatial and maritime connectivity index. The results showed that there were thirty-two nodes of commodity development supported by maritime transport with the magnitude of maritime connectivity and the movement of goods in-out the territory of Sumatera in the constellation Sumatera/national/international showed the high role of one maritime transport through Tanjung Uban port (47.34 million tons), Dumai Port (12.16 million tons) and Boom Baru Port (7.6 million tons). The support of movement of commodity goods increases wheels of the economy and suppresses the disparities of Sumatera Region.

Keywords: Ports, Commodity Development Node, Maritime Connectivity.

Introduction

Sumatera Island as one of the largest islands in Indonesia and the world's sixth largest island with an area of about 443,065 km² is bordered by the Straits of Malacca, Sunda Strait and Indian Ocean. Topographically, the territory of Sumatera Island is divided into east and west by the mountains of Bukit Barisan, which extends from Aceh to Lampung. The eastern part of Sumatera Island has the dominant characteristic of swamp area which is lined by large rivers that boils down to sea (Straits of Malacca), while the west is more dominant hilly and active volcanoes that is quite difficult to develop due to the potential risk of earthquake disaster is very high. So that the eastern area of development of the region is more rapidly expanding industrial area and rich in natural resources. According to Kusumastanto (2011), regional development contributes greatly to the national economy. The magnitude of the economic role is seen from the level of export and import contribution of Sumatera Island goods by 31 percent (52.9 percent of oil and gas from the total exports of Indonesia oil and gas) and the contribution of 12.1

percent of Sumatera goods imports. In addition to exports and imports, the role of Sumatera Island in the national economy can also be seen from the second largest contribution rate of GDP. Where the contribution of Sumatera Island amounted to 21.7 percent in 2017 (Statistics Indonesia, 2018). The magnitude of the role of Sumatera Island in national constellations is not separated from the potential of natural resources.

The enormous potential of natural resources in Sumatera Island is scattered. But has not had a significant impact and yet has no added value to the potential of the natural resources. Because there are still many lagging areas causing a high disparity between regions where the gap in the city/district is higher than the provincial level, judging by the Williamson index of GDP per capita and HDI in 2010-2017 (Brodjonegoro, 2018). In fact, Sumatera Island has abundant resource potential, which is designated as production center, product processing, and national energy barn with the main economic activities of palm oil, rubber and coal in RPJMN 2015-2019 chapter

III part development of Sumatera Region. In addition to the large area, the area of the sea as an exclusive economic zone and natural resources, Sumatera Island also has the advantage of maritime infrastructure, where the Sumatera Island has 131 seaports and 266 rivers/Lake ports that become gateway. Port became an important vertex in establishing a strong maritime territory. The port serves as catalyzation in stimulating the growth of regional economic sectors such as industry, trade and tourism (Oblak dkk., 2013). However, the port has not been managed effectively and efficiently resulting in the optimal role of the port as a driving force for the economic competitiveness of the region (Sudarmo, 2012). Vessel moorage occupancy (57.6%), average time-of-preparation (81.9 hours) and working time as percentage of turn around (2.45 are still under international standard. It means that the ships are spending too much time in the ship's moorings (Setiono, 2010) and cause port costs to be relatively more expensive than other ASEAN countries (Patuntru dkk, 2007; Setiono, 2010).

In optimizing the potential utilization of natural resources to suppress the disparity between regions need to strengthen the distribution of natural resources from the region to the destination region. So a region must need other areas to thrive (Sullivan, 2008). With the interaction between regions will generate specialization, economic growth, efficiency and lead to regional development (Ibad, 2016). The economic activity that occurs is the movement of goods or exports and imports of goods from one region to another, then the area will occur economic transactions. The larger the economic transaction or interaction occurs evenly across the region, hence the development of the region will be better and the gap between regions decreases. Based on Indonesia's trading data as a comparison in 1999, the trading volume through ALKI reached 21,480 billion tonnes, and increased to 35 thousand billion tonnes in 2010 and 41 thousand billion tonnes in 2014. A quarter of world trade is carried out by approximately 50 – 60 thousand merchant ships crossing the traffic lane of Indonesia's waters annually (Taqwa, 2010). The role of sea port as marine economy Mobilizer is undoubtedly, with the acquisition of economic benefits that can be learned from the existence of sea port. Therefore, the research aims to determine the support of maritime port connectivity on the Sumatera Island to potential resources seen from the magnitude of the maritime connectivity index and the magnitude of movement of resources through the port.

Methodology

The approach in this study uses a spatial approach and a quantitative approach. The spatial approach was conducted to illustrate the potential distribution of resources on the Sumatera Island using 2017 commodity productivity data and the development policy of Sumatera Island (RPJMN 2015-2019 chapter III) to represent the potential node of Sumatera Island resources. To allow potential node resources to be optimized for performance needs to support maritime connectivity as a commodity distribution gateway. A quantitative approach was used to view the support of each port on the maritime connectivity of Sumatera Island based on the level of maritime connection index using the original data of the goods movements in each port both domestically and internationally. Based on both approaches, analytical methods are used to determine the magnitude and spread of potential resources as well as port maritime connectivity conditions in Sumatera Island, namely content analysis, commodity productivity analysis, spatial analysis and maritime connectivity index analysis. The data collection method in this study is the collection of secondary data. The collection of secondary data from the study through literary studies, the official documents of the port related agencies, the origin of the purpose of the movement of goods, PDRB and others. This research also uses the entire port on the Sumatera Island which became a study area and the port which conducts the activity of loading and unloading of the main port, collector's port, feeder port, crossing port and Fisheries harbor. Thus, the criteria obtained as much as 86 ports. The data are analysis as needed.

In determining the magnitude and distribution of the potential resources in the Sumatera Island, there are several stages of analysis, namely content analysis, commodity productivity analysis, spatial analysis and analysis of the base sector. Content analysis is a method of using a set of procedures to create valid inference from text (Weber, 1994 in Olifia, 2012). Analysis content is conducted related to the policy of the potential node resources of Sumatera Island in RPJMN 2015-2019 chapter III in the form of coal, rubber and palm oil commodities. Determination of the potential of existing resources on the Sumatera Island, seen from the magnitude of commodity productivity on the Sumatera Island.

Where commodity productivity is a magnitude of commodity production divided by the area of the commodity in a region. Here is a formula incalculating the productivity of a commodity.

$$\text{Commodity Productivity} = \frac{\text{Commodity Production (Ton)}}{\text{Commodity land Area (Ha)}} \quad (1)$$

Source (Statistics Indonesia, 2018)

Then, after that, the results of RPJMN policy analysis compared with the results of productivity analysis showing the condition of the potential field and supported by the analysis of the region's economic base in the inputs into the spatial data of each commodity using the join and relate tools in the software ArcGIS 10.3 to perform spatial analysis or mapping the magnitude and distribution of potential existing resources into nodes development potential of commodities. After obtaining the potential commodity nodes of the content analysis overlay with spatial analysis of commodity productivity, thus getting gap in the economic development of Sumatera region that must be supported by the Sumatera maritime transportation system. Further views of the support side of maritime transport use the analysis of maritime connectivity index. The analysis of maritime connectivity index is an analysis to know how well the maritime transportation network is in connecting the destination points (Ewing, 1996 in Litman, 2015). Connectivity index in this study is calculated by dividing the number of connected links in the movement of the link items divided by the number of nodes and the number of inter-node distances. Here is a connectivity index formula:

$$CI_k = \frac{\sum_{i=0}^n (a \times q_{kn}) \times l_i}{(\sum_{i=0}^n (a \times d_{kn})) L} \quad (2)$$

Source (Oxera, 2010)

Description:

CI_k = Connectivity Index *node k*
 a = 0 or 1 Existence of Movement /link
 q_{kn} = Movement of goods from *node k* to *node n*
 d_{kn} = Distance from *node k* to *node n*
 l_i = Total of connected nodes
 L = Total node

From the calculation of maritime connectivity indices, each port is mapped into the geospatial information system to be done overlay with the node of potential commodity development with the magnitude of the commodity entering and/or exiting the port (port activity). Hence the support of the port in the area of economic activity and policy intervensi that must be done to improve the support of the port.

Results And Discussion

The magnitude and distribution potential commodities based on policies and existing conditions of sumatera island

The potential resources owned are very large and varies by Sumatera region. In RPJMN 2015-2019 chapter III mandated the Sumatera Island as the center of production and processing of produce and national energy barns that are then made national economic corridor in Sumatera Island. Potential resources developed in the economic corridor, namely: the strength resources of palm oil plantation, rubber, coal, and processing industries. These potentials form a cluster of development centers that will be expected to provide an impact to improve the region's economic and community welfare of Sumatera Island. Where Sumatera Island directed the economic development of natural resources in the form of rubber plantation nodes, palm oil, and coal is scattered in several provinces as seen in **Figure 1**. Based on the map above, shows that the potential distribution of resources owned by Sumatera Island is very large and has not been optimized, but the potential resources of each province is not the same, so that the development direction of each province varies. But each province is supported by the port as the main gateway to the export and import of goods as the economic center of its territory. Territories that have potential resources will be directed to the development of the economic agglomeration of these resource vertices supported by industrial clusters as a resource processing center produced from rubber, palm and coal plantations that are connected by rail networks, the main line exits the corridor, the connecting lines of the economic center, and the international hub and international port scale. The development direction of Sumatera Region is more concentrated in the eastern part of Sumatera Island.

Therefore, measurements of the size and potency of Sumatera Island using data in 2017. The magnitude and spread of the resource potential of all three commodities can be seen through the productivity level of each commodity.

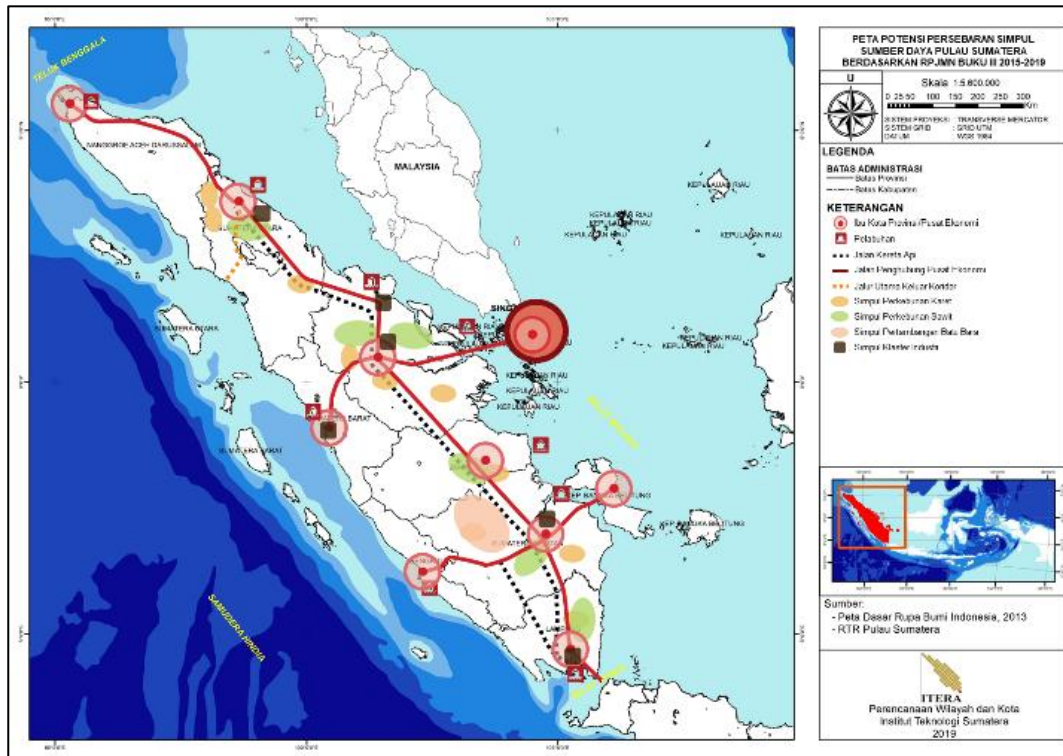


Figure 1. Potential Distribution of Sumatera Island resource node based on RPJMN Policy Chapter III.
 Source (RPJMN 2015-2019 Chapter III, 2015: 51)

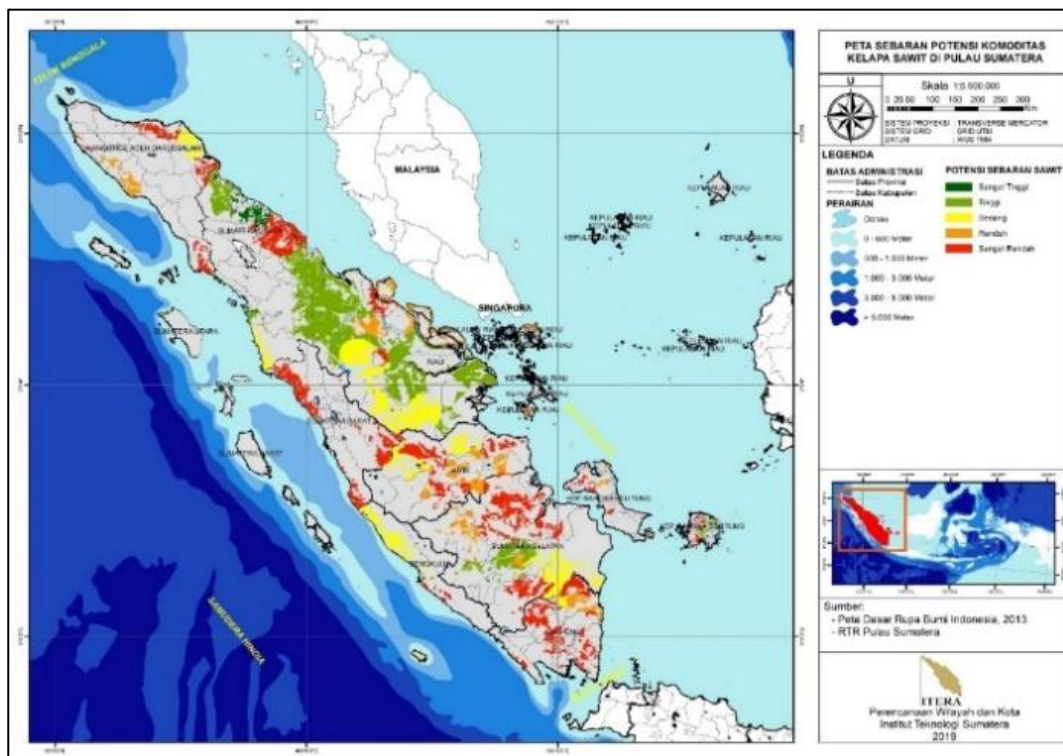


Figure 2. Potential distribution of palm oil commodities in Sumatera Island in 2017.

From the Ministry of Agriculture data in 2018, obtained information that the potential of the highest palm oil resources located in Riau Province covering an area of 2,776.44 thousand the province of North Sumatera, South Sumatera and Jambi have a wide area, production and productivity is quite high. While the lowest potential of palm oil resources is Riau Islands province with a total area of 21,604 hectares (0.3 percent) with palm oil production as much as 49.9 thousand tonnes and productivity of 2,762 tons per hectare, for potential spreads can be seen in **Figure 2**.

Based on the image above shows that the potential spread of palm oil commodities in the Sumatera Island spread, but more dominant concentrated on the eastern region of Sumatera Island. The potential of palm oil with a very high scale is in Riau Province. Potential of palm oil with a moderate to high potential scale is in the Province of Riau, Aceh, South Sumatera, Jambi, Bengkulu, Bangka Belitung, Lampung, and North Sumatera. Then the provinces of West Sumatera and Riau Islands have a low potential, but this potential can be increased economically by optimizing land-land and processing downstream of palm oil commodities (industrialization) considering the little land but productivity is quite high. In addition, the potential of owned by Sumatera Island is rubber commodities. Rubber commodities are potentially economically the region in improving the welfare of the people because the people in the Sumatera Island majority of the field work in rubber plantations, especially in the South Sumatera and Jambi province.

Rubber commodity of Sumatera Island contributes to Indonesia's exports of approximately 64 percent of total rubber exports (BPS, 2017). Of the 64 percent, South Sumatera Province has the highest contribution compared to other provinces in the Sumatera Island amounting to 837,431 hectares or 32.4 percent with the rubber production rate in 2017 for 997,682 tons and productivity of 1.4 tons per hectare. Then the provinces of North Sumatera, Jambi, and Riau have a wide area, production and productivity is quite high. While the lowest potential of rubber resources is the province of Riau Islands with an area of 25,403 hectares (1 percent) with rubber production as much as 25,487 tonnes and productivity of 1.3 tons per hectare. Here is a map of the potential distribution of palm oil commodities in Sumatera Island.

Based on the picture above explained that the potential distribution of rubber commodities

hectares (33.2 percent) with a production rate of 9,071.27 thousand tons and productivity 3.779 tons per hectare. Then

in the province of Sumatera in the year 2017 with high potency is partly in the South Sumatera, Bengkulu, Bangka Belitung Islands, Aceh, North Sumatera, Riau Islands, and West Sumatera. The potential of a rubber scale commodity is scattered in several provinces, namely: Aceh Province, South Sumatera, Lampung, Bangka Belitung Islands, Bengkulu, Riau, West Sumatera, North Sumatera, Jambi, and Riau Islands. As for the potential of low-scale rubber commodities to very low spread throughout the region in the island of Sumatera but dominance in the province of North Sumatera. The low potential is not a meaningful constraint in the development of the region in the province of North Sumatera, because it will be a huge potential, even the highest potential of rubber commodities in the province of North Sumatera given the vast area of rubber commodity land is very broad and the processing industry of rubber commodities are potentially in industrialization to increase the economic value of rubber commodities. Here are the potential resources of coal commodity in Sumatera Island.

Sumatera Island as the largest reserve of coal commodity in Indonesia. Although Sumatera has a huge coal reserve, coal production in Sumatera is still very low. This is due to one of them because of the top ten companies of coal producers in Indonesia, only one company that has large processed land in Sumatera. The reserve of coal resources in Sumatera Island is only located in several provinces, namely South Sumatera Province, Jambi, Riau, West Sumatera, and Bengkulu. But the largest coal reserves in South Sumatera province amounted to 11,998.3 million tonnes or equivalent to 92.5 percent of the total reserves of coal resources in Sumatera Island. However, for the existence of coal mining activities carried out in nine provinces in Sumatera Island, except the province of North Sumatera there is no coal excavation activities.

Node distribution potential resources of Sumatera Island

The potential of the region is the power of a resource that can be used, exploited, and taken advantage of to be developed further, so as to improve and create adequate territorial ability (Sujali, 1989). Based on the distribution potential resources of Sumatera Island in RPJMN 2015-2019 chapter III on the economic corridor of Sumatera as a reference to the analysis distribution potential resources of Sumatera Island using the

existing resource data year 2017 conducted overlay spatial obtained the potential distribution of resources Sumatera Island in the form of development vertices that will be the center of activity Development and further, which will later be supported by adequate infrastructure to enhance and create the ability of an economically adequate region of the international scale in creating a globally competitive region as can be seen in **Figure 4**. Based on the results of the analysis, there are several areas that have the potential resources of both palm oil, rubber, coal as well as the center of processing industry that must be developed node resource development in suppressing the gap between regions in Sumatera Island, especially in the western region of Sumatera Island.

In this assessment process, the level of potential that exists in the region and pay attention to the surrounding area supply in support of the development node. This assessment is conducted by looking at the productivity level of each commodity, so that if there is one region with more than one commodity potential will be seen in the constellation of land use allocation rate of the region

Based on the results of the analysis shows that the western region of Sumatera Island potentials have considerable potential in the development of the region supported by an adequate network of infrastructure and ports. Aceh province is directed to develop the resources of rubber plantation node, palm plantation node and supported by industrial cluster node (Arun Lhokseumawe special economic zones). West Sumatera Province also directed the development of rubber plantation node in the border area with North Sumatera and node of coal mining/mineral metal on the border of Riau and the industrial cluster node in support of the activities of the vertices in West Sumatera.

Furthermore, Bengkulu Province with the Baai Island port as the entrance gate of domestic and international trade becomes the potential of Bengkulu Province which is supported also with the potential resources as a supplier of such trading activities, so the development of Bengkulu Province based on the potential area of palm oil plantation and rubber plantation node. Bangka Belitung Province based on the results of the analysis has potential of the resources of rubber plantation and palm oil potential to be developed as the economic substitution of tin commodities

that have been exhausted, where the knot made rubber and palm oil plantations are supported with the central cluster of rubber and palm oil processing industry in the future become the economic base of Bangka Belitung Islands apart from mining and tourism.

Then the Riau Islands Province has potential of rubber plantation and mineral bauxite minerals that high economic value in increasing the economic region apart from the activities of manufacturing and trading industry. Because of this potential, the Riau Islands is a node of rubber plantations and the special Economic Area in the mineral sector of bauxite minerals. Potential development of these vertices also found in other

provinces in the Sumatera Island such as North Sumatera province, Jambi, Riau and South Sumatera node rubber and palm oil plantations. Node of coal mining and metal minerals in the provinces of West Sumatera, Jambi, and South Sumatera. While the special economic area with the focus of rubber and palm oil processing industry is located in the province of North Sumatera, Jambi, South Sumatera and Riau. most high and other commodity development nodes seen from the second highest productivity level, in order to spread the distribution of regional development evenly. In addition, it also considered the availability of industrial areas in the region to support the development of the commodity nodes.

It was then mapped by spatial distribution of commodity developments in Sumatera Island, node development of palm oil commodities, rubber, and coal that is supported by the cluster or the central commodity processing industry as can be seen in **Figure 5**. With the development of these nodes, the commodity is expected to provide focus or concentration of development direction and become the catalyst of economic activator in moving the other multiplier effects and economies of scales in the region.

Maritime connectivity index (MCI) of Sumatera Island

Maritime connectivity is an interregional connectedness from the place of origin to the destination with sea transportation, the greater the sea transportation performance will be the higher the level of maritime connectivity (UNCTAD, 2015). The formation of maritime connectivity is related to

the level of interaction

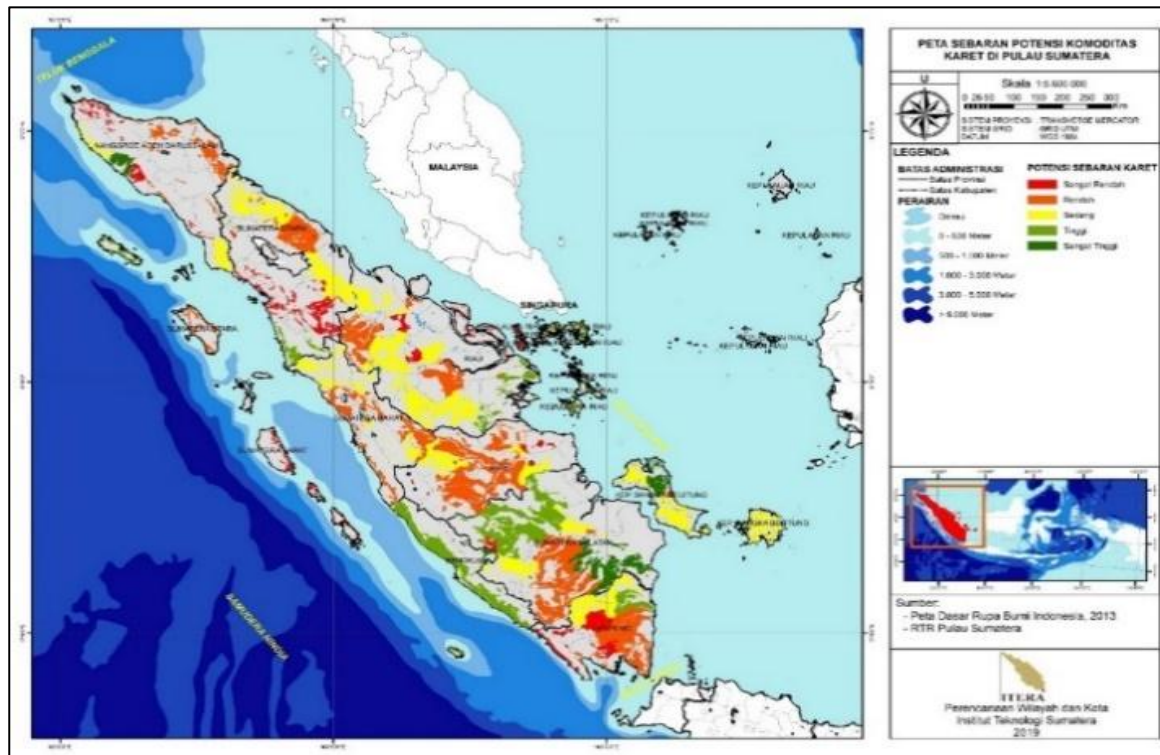


Figure 3. Potential distribution of rubber commodities in Sumatera Island in 2017.

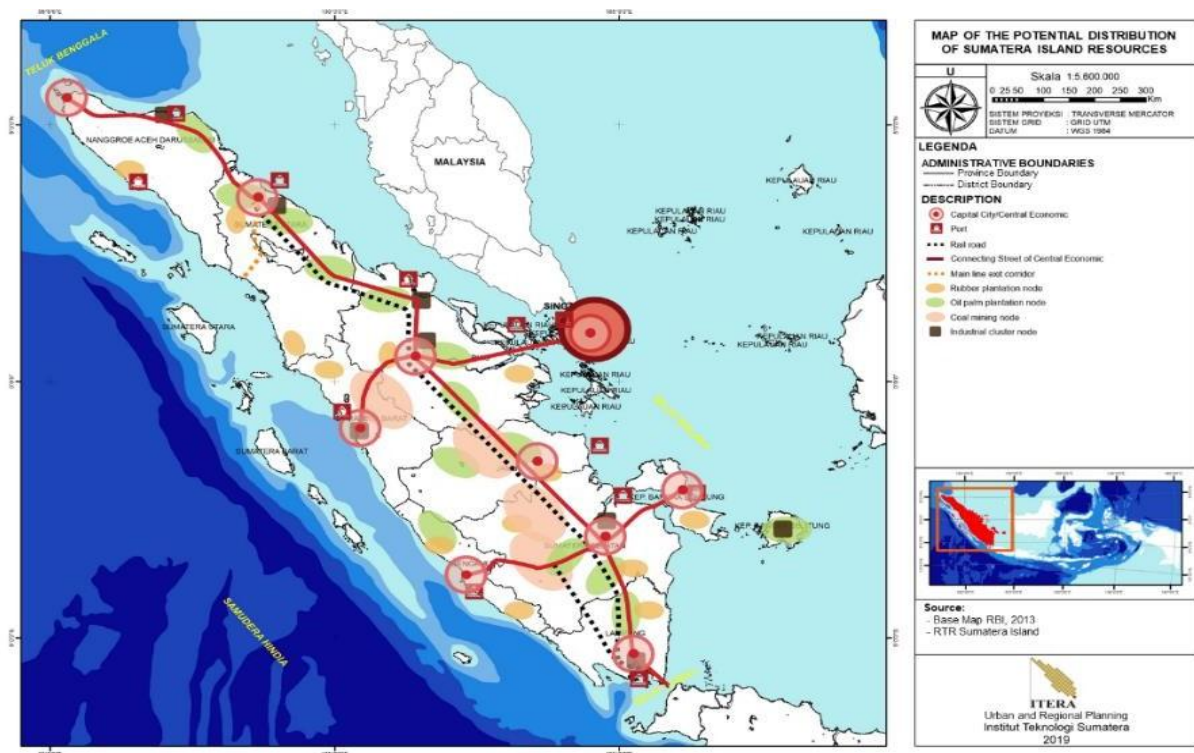


Figure 4. Potential overlay of resource distribution based on RPJMN Policy Chapter III with real conditions in 2017.

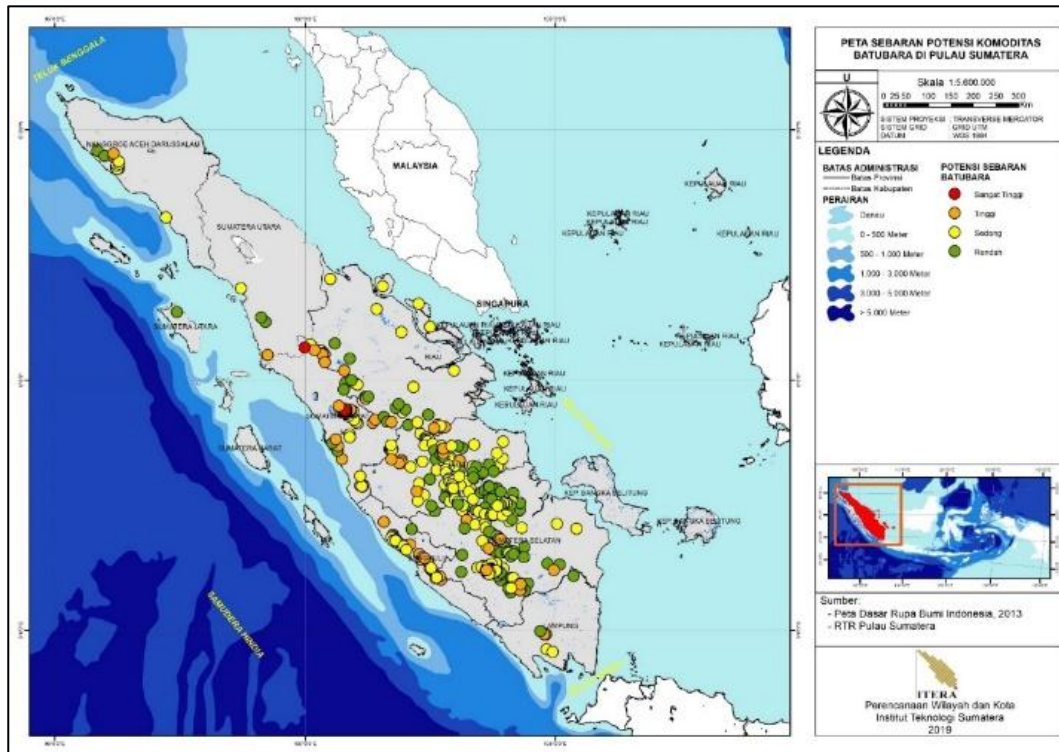


Figure 5. Potential distribution of coal commodities in Sumatera Island in 2017.

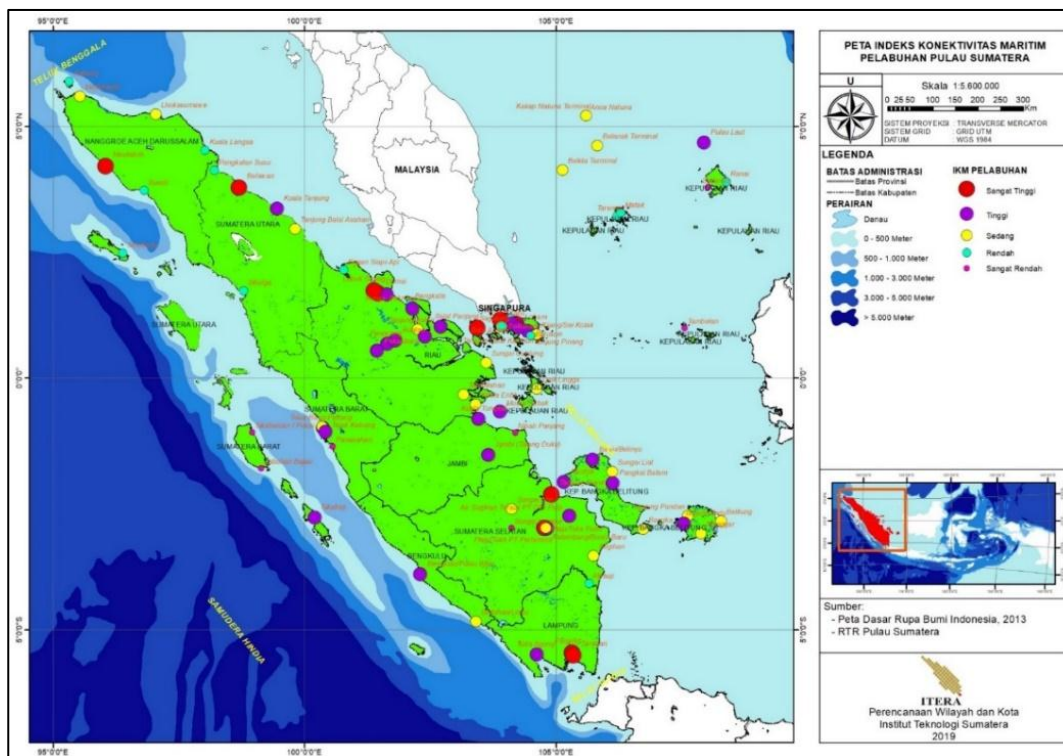


Figure 6. Port maritime connectivity index Sumatera Island in 2018.

or inter-region linkage. The high level of maritime connectivity will indicate that the level of accessibility and low levels of isolated and securability of a region, rather than low maritime connectivity will indicate lower levels of accessibility and high isolation or seeability of a region. In measuring the level of maritime connectivity of the port in Sumatera Island through the origin data of the goods of every port on the Sumatera Island both domestic and international by dividing the number of connected links by loading the movement of link goods divided by the number of nodes and the number of distances between nodes (Oxera, 2010). From the data processing of the purpose of each port on Sumatera Island both domestic and international using the analysis of maritime connectivity index was obtained index of maritime connectivity ports in Sumatera island in 2018 years. Here is port maritime connectivity index on Sumatera Island in 2018 as seen in **Figure 6**.

From the analysis of Maritime Connectivity index, it is seen that the Sambu Island port in Riau Islands Province has the highest maritime connectivity index of the other ports of 730.06 tons/mil/year. Following The Port of Tanjung Uban Riau Archipelago Province of 43.38 tons/mil/year, the port of Dumai Riau province amounted to 9.49 tons/mil/year, and the new Boom port of South Sumatera Province of 8.68 ton/mil/year. It can be said that the port is a port with the highest accessibility to other ports. The lowest maritime connectivity index is Labuhan Bajau port at 0.0001 tons/mil/year. Labuhan Bajau Port is a port with the highest isolation from other ports in the Sumatera Island. The Maritime connectivity index of the results of the analysis is divided into five classifications, namely: very high maritime Connectivity index, High maritime connectivity index, Moderate maritime connectivity index, Low maritime connectivity index and very low maritime connectivity index. The high and very high maritime connectivity index is the port of Sambu Island, Tanjung Uban, Dumai, Palembang Boom Baru, Tanjung Buyut, Tanjung Balai Karimun, Belawan, Tarahan, Lubuk Gaung, Meulaboh, Panjang, Teluk Bayur, Muara Sabak, Teluk Kabung, Batu Ampar, Pelintung, Pulau Laut, Kabil, Baai Island, Port Futong Terminal, Perawang, Air Sugihan Tersus PT OKI Pulp, Talang Duku, Kuala Tanjung, Lobam, Kota Agung, Pekanbaru, Sekupang, Tanjung Pinang, Pangkal Balam, Plaju/Tuks Pt. Pertamina, Muntok, Tanjung Batu, Sungai Pakning, Blinju/Belinyu, Selat Panjang, Kuala Tungkal, Sikakap, and Buatan port. The rest

is a port with an index of moderate maritime connectivity to very low.

The maritime connectivity index is related to the advancement of a region, the higher the maritime connectivity index of the port, the higher economic activity is due to its contribution in the macro development of the region in reducing the lag of a region, because the high index of maritime connectivity followed by the completeness of the provision of regional infrastructure in support of maritime activities. The regions surrounding the port with its high and very high maritime connectivity index are regions that are experiencing good economic growth and a more rapidly expanding region. Regional growth occurred due to high maritime connectivity in the region, high maritime connectivity demonstrated servicing facility and promoting facility in support of regional development around ports with high maritime connectivity and high investment in the region. While low maritime connectivity illustrates the territorial disconnection due to low maritime activity both in terms of supply and demand of the region, so the provision of port support infrastructure is very low and does not significantly impact the maritime economy in the development of areas around the port with low maritime connectivity.

The maritime connectivity support of commodity development node

In view of the support of maritime connectivity of the commodity development vertices on the Sumatera Island seen from the magnitude of movement of commodities through the port (import export activities). Where the movement of goods in Sumatera Island is very dominant by sea line. More than 98 percent of the movement of goods from or out of Sumatera Island through the port, such as palm oil of 13 million tonnes in exports to various countries, the export of rubber commodity of Sumatera Island amounted to US \$2,824 million with a proportion contribution of South Sumatera US \$1,295.9 million, Jambi US \$700.84 million, West Sumatera US \$443.4 million, Lampung US \$178.5 million, North Sumatera US \$114.2 million, Bangka Belitung Islands US \$17 million and Riau US \$1.6 million. Then coal commodities resulting from excavations amounting to 30.65 million tonnes of Sumatera Island exports. The export activities through the port, which is the largest through Boom Baru Port and Tanjung Buyut in South Sumatera Province amounted to 13.8 million tonnes or 45.1 percent of total coal exports in the

Sumatera Island. In the next order, Panjang Port and Tarahan in Lampung province amounted to 6.1 million tonnes or 20 percent of total coal exports on the Sumatera Island. Then the port of Meulaboh in Aceh Province 5.1 million tonnes, the

port of Muara Sabak, Kuala with, and Talang Duku in Jambi province 2.2 million tons, the port of Baai Island in Bengkulu province 1.8 million tons, and the lowest is the port of Teluk Bayur and Sikakap in West Sumatera province of 504 thousand tons.

Tabel 1. Support of Port Maritime Connectivity Against Development Node

Node	Commodity	Supported by Port	MCI	Supply-Demad	Node	Commodity	Supported by Port	MCI	Supply-Demad
Aceh Timur	Palm Oil	Lhokseumawe	Moderate	16.910	Muaro Jambi	Rubber	Talang Duku	High	405.861
		Kuala Langsa	Low	-4.518			Nipah Panjang	Very Low	-50
Aceh Barat	Rubber	Melaboh	Very High	5.108.106	Bungo	Palm Oil	Kuala Tungkal	High	304.550
		Susoh	Low	-400			Talang Duku	High	405.861
Langkat	Palm Oil	Belawan	Very High	617.416			Muara Sabak	High	2.577.765
		Pangkalan Susu	Low	-8.882	Lahat	Coal	Boom Baru	Very High	7.615.985
Karo	Rubber	Belawan	Very High	617.416			Sungai Lumpur	Very Low	100
Deli Serdang	Sawit	Kuala Tanjung	High	1.109.199			Panjang/Tarahan	Very High	9.142.303
		Belawan	Very High	617.416	Muba	Coal	Boom Baru	Very High	7.615.985
Labuhan Batu	Palm Oil	Tj.Balai Asahan	Moderate	-9.200			Sungai Lilin	Moderate	43.500
		Kuala Tanjung	High	1.109.199	OKI	Palm Oil	Boom Baru	Very High	7.615.985
		BaganSiapi-Api	Low	-200			Tanjung Buyut	Very High	9.657.930
Mandailing Natal	Rubber	Sibolga	Low	-1.650	Muara Enim	Palm Oil	Boom Baru	Very High	7.615.985
		Teluk Bayur	High	3.930.830			Tanjung Buyut	Very High	9.657.930
Pasaman	Rubber	Teluk Bayur	High	3.930.830	Musi Rawas	Rubber	Boom Baru	Very High	7.615.985
		Teluk Kabung	High	-467.920			Sungai Lilin	Moderate	43.500
Sawah Lunto	Coal	Teluk Bayur	High	3.930.830	OKI	Rubber	Boom Baru	Very High	7.615.985
		Teluk Kabung	High	-467.920			Sugihan	Moderate	81.000
Rokan Hilir	Palm Oil	Dumai	Very High	12.161.229			Mesuji	Low	-25.186
		Lubuk Gaung	Very High	4.549.327	Bengkut	Palm Oil	Pulau Baai	High	1.936.218
		Pelintung	High	1.908.157	Bengkut	Rubber	Pulau Baai	High	1.936.218
		BaganSiapi-Api	Low	-200	South Bengkulu	Rubber	Pulau Baai	High	1.936.218
Siak	Palm Oil	Pekanbaru	High	-84.651			Bintuhan	Moderate	20.000
		Perawang	High	-306.338	Tubaba	Palm Oil	Mesuji	Low	-25.186
		Buatan	High	-129.350			Panjang/Tarahan	Very High	9.142.303
		Futong Terminal	High	29.403	Tulang Bawang	Rubber	Panjang/Tarahan	Very High	9.142.303
		Tanjung Buton	Moderate	153.100			Mesuji	Low	-25.186
Indragiri Hilir	Rubber	Sungai Guntung	Moderate	82.848	East Belitung	Palm Oil	Belitung	Moderate	34.215
		Tembilahan	Moderate	1.420			Tanjung Pandan	Moderate	31.394
		Kuala Enok	Moderate	105.590			Manggar	Moderate	246.320

Node	Commodity	Supported by Port	MCI	Supply-Demad	Node	Commodity	Supported by Port	MCI	Supply-Demad
Kampar	Rubber	Pekanbaru	High	-84.651	South Bangka	Rubber	Tanjung Batu	High	1.125.035
		Perawang	High	-306.338			Pangkal Balam Bangka	High	-61.539
		Teluk Bayur	High	3.930.830				Moderate	361.600
Indragiri Hulu	Palm Oil	Tembilahan	Moderate	1.420	Kab. Kep. Riau	Rubber	Kijang	Moderate	-39.214
		Kuala Enok	Moderate	105.590			Tanjung Pinang	High	468.260
Tebo	Coal	Kuala Tungkal	High	304.550			Batulicin	Low	1.067
		Talang Duku	High	405.861			Lobam	High	102.362
		Muara Sabak	High	2.577.765			Tanjung Uban	Very High	-
									47.346.214
West Tanjung Jabung	Palm Oil	Kuala Tungkal	High	304.550					
		Talang Duku	High	405.861					
		Muara Sabak	High	2.577.765					

*MCI: Maritime Connectivity Indeks

Aside from commodity export levels, maritime connectivity support for the development of commodity vertices can also be seen from the maritime connectivity index. In general, the development node has been backed by a high maritime connectivity index with high commodity supply or demand in favor of optimizing the industrialization functions on each commodity development node. Only a few ports have functions as feeder ports that have a low maritime connectivity index. But all commodity development nodes are already supported by the main port which has excellent maritime connectivity index.

Conclusion

From the discussion above, it can be concluded that there is a difference in the distribution and magnitude of potential of the commodity development from RPJMN 2015-2019 book III part of the economic development of Sumatera Island from the comparison of the policy direction of commodity development in Sumatera Island with the existing conditions of the commodity in 2017, but some of the nodes of commodity development remains the same and there are a 32 node of The difference in the node development of the commodity in North Sumatera Province previously in Langkat and

Labuhan Ratu as a knot of development of rubber commodities into palm oil. In addition, there are areas that have a large potential as a node for the development of commodities, but not yet found in the policy, namely East Aceh, Bungo, Bengkulu,

East Belitung as the node of the development of palm oil commodities and West Aceh, Mandailing Natal, Pasaman, Indragiri Hilir, North Bengkulu, South Bengkulu, South Bangka, and Kep. Riau as a knot for the development of rubber commodities as well as Sawah Lunto, Tebo, and Musi Banyuasin as the node of coal development. As for the highest potential commodity in Riau Province (palm oil commodities) and South Sumatera Province (rubber and coal commodities). Thirty-two vertices of the commodity development have been supported by good maritime connectivity by the magnitude of the port maritime connectivity and the magnitude of the movement of goods entering or exiting the territory of the Sumatera Island in the constellation of internal Sumatera, national constellations, as well as the world constellation which shows that the high role of maritime transportation is one of them through Tanjung Uban port (47.34 million Ton), Dumai port (12.16 million Ton) and New Boom Port (7.6 million Ton). The support of the movement of commodities goods from the downstream process of the industry improves the economy wheels and suppresses the disparities of Sumatera Region.

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