

Determination of superior agriculture commodities in North Sumatra Province

Desi Novita^{1*}, Teja Rinanda², and Mhd. Ilham Riyadh¹

¹Universitas Islam Sumatera Utara, Agribusiness Department, 20223, Medan, North Sumatra, Indonesia.

²STIE Graha Kirana, Management Department, 20223, Medan, North Sumatra, Indonesia.

Abstract. This study aims to determine the contribution of the agriculture sector in the economy in North Sumatra Province and to find out the superior agriculture commodities. The data used in this study is secondary data, namely data on the production of various agricultural commodities in North Sumatra Province and Indonesia for the period 2019-2020. Quantitative description analysis in the form of contribution analysis and growth analysis is used to determine the contribution of the agricultural sector in the economy in North Sumatra Province in 2016-2020. Static Location Quotient (SLQ) and Dynamic Location Quotient (DLQ) analyses are used to analyze superior agricultural commodities. The results show that the contribution of the agricultural sector has decreased to the economy in North Sumatra Province in the 2016-2020 period. The results of the SLQ and DLQ analyses show that the superior agricultural commodities that are cross-sub-sectoral are Red Chili, Cabbage, Tomato, Eggplant, Durian, Salak, Rubber, and Fisheries. The superior agricultural commodities come from the Horticulture Sub-sector, Plantation Sub-sector, and Fisheries Sub-sector. Meanwhile, commodities originating from the Food crop Sub-sector and Livestock Sub-sector did not contribute to the creation of superior agriculture commodities in North Sumatra Province in 2019-2020.

1 Introduction

National development goals can be achieved through achieving development goals in each region [1]. Regional development cannot be separated from the ability of a region to manage its resources to be able to create jobs, alleviate poverty and be able to increase economic activities in the future. One of them is the achievement of agricultural development. This is because the agricultural sector is still a sector that contributes greatly to national development [2].

North Sumatra Province is known as one of the provinces that a strategic position in the development of the agricultural sector in Indonesia. The agricultural sector is the dominant sector in the economy in North Sumatra. This is because the agricultural sector is the main contributor to the formation of Gross Regional Domestic Product (GDP). In 2017, the GRDP of the agricultural sector reached 121,300.05 billion rupiahs, or 24.88 percent of the total GRDP [3]. In addition, another important position is the high export value of agricultural commodities (18.58%), the value of industrial exports, which are mostly agriculture-based industries, and the agricultural sector is still where most of the people work (38%).

"Organizing the City and Building the Village" is the words of wisdom currently being carried by the North Sumatra Provincial government. Building a village in question describes the development of the agricultural sector to realize the foundations of a people's economy

that relies on the agricultural sector as its leading sector. One of the development priorities contained in the Regional Medium-Term Development Plan (RPJMD) for 2018-2023 is increasing competitiveness through the agrarian sector.

This increase in competitiveness, one of which is directed at the development of international standard agricultural areas with natural potential and agricultural cultivation with location specifications. Some of the problems faced in the development of the agricultural sector include:

1. Still spreading agricultural production centers
2. The farmers' cropping pattern is still high, which is adjusted to the assistance program provided by the government.
3. Farmers' Exchange Rate (NTP) is still low (99.14 in 2017)
4. . Population pressure on food security is getting bigger
5. Inequality of rural development.

The above problems are caused by agricultural development planning which has not been fully developed based on superior commodities produced in each region. Development planning must be based on the local potential that can encourage production economic activities [4].

One of the keys to achieving successful agricultural development is through planning, coordination, and integration between sectors and decision-makers. With this, the efficiency and effectiveness of regional

* Corresponding author: desi.novita@uisu.ac.id

independence will be achieved [5]. Sectoral development must be adjusted to the potentials possessed by each region.

Optimization of agricultural development can be achieved through the development of superior commodities in an area. Superior commodities are commodities that have a strategic position, both in terms of land suitability, social, economic, and institutional [6]. In addition, superior commodities are commodities that in proportion are sufficient to meet the needs of their regions and also the needs of other regions.

The development of agricultural potential in North Sumatra Province can be done by determining the superior commodities owned. Determination of superior commodities in an area is important to support the development of an efficient agricultural sector. Regional development is based on superior commodities in increasing people's income and welfare [7]. Therefore, the purpose of this study is to determine the role of the agricultural sector in the economy in North Sumatra Province, as well as to find out which commodities in the agricultural sector are the leading commodities in North Sumatra Province.

2 Materials and Methods

This research is a descriptive research with a quantitative approach. Research location is in North Sumatra Province. The type of data used in this research is secondary data which are the GRDP data for the Province of North Sumatra in 2016-2020 and production data for 51 agricultural commodities at the provincial and Indonesian levels in 2019-2020. Data were obtained from the Central Statistics Agency of Indonesia, the Central Statistics Agency of North Sumatra Province, the Ministry of Agriculture of the Republic of Indonesia, and other related reference sources.

Data analysis method used is quantitative descriptive analysis to find out the role of the agricultural sector on the economy in North Sumatra Province. SLQ (Static Location Quotient) and DLQ (Dynamic Location Quotient) methods are to determine leading commodities in North Sumatra Province.

2.1 Static Location Quotient (SLQ) Analysis

SLQ is a data analysis method used to identify basic and non-basic commodities in a region. SLQ is usually abbreviated as LQ or Location Quotient. The SLQ formula is as follows:

$$SLQ = \frac{Rip/Rtp}{Nin/Ntn} \quad (1)$$

Information :

Rip = Production of commodity i at the provincial level of North Sumatra

Rtp = Total production of all commodities at the provincial level of North Sumatra

Nin = Production of commodity i at the Indonesian level

Ntn = Total production of all commodities at the Indonesian level

If $SLQ > 1$, then the commodity is a base commodity, and if $SLQ < 1$, then the commodity is a non-basic commodity. The structure of the SLQ formulation provides several values as follows:

- $SLQ > 1$, this means the growth rate of commodity i at the provincial level of North Sumatra is greater than the growth rate of the same commodity at the Indonesian level. Thus, commodity i is a basic commodity to be further developed at the provincial level of North Sumatra
- $SLQ < 1$, this means that the growth rate of commodity i at the level of North Sumatra Province is smaller than the growth rate of the same commodity at the Indonesian level. Thus, commodity i is not a base sector
- $SLQ = 1$, this means the growth rate of commodity i at the level of North Sumatra Province is the same as the growth rate of the same commodity at the Indonesian level

2.2 Dynamic Location Quotient (DLQ) Analysis

DLQ is an LQ analysis conducted in the form of a time series/trend. In this case, the development of LQ can be seen for a particular sector at different times, whether it has decreased or increased [8]. DLQ is a modification of SLQ by accommodating the large production value of horticultural commodities from time to time. DLQ is calculated using the formula:

$$DLQ = \left[\frac{(1+gik)/(1+gk)}{(1+gtp)/(1+gp)} \right] t \quad (2)$$

Information :

gik = average production growth of commodity i at the provincial level of North Sumatra

gk = average growth in total commodity production at the level of North Sumatra Province

gip = average production growth of commodity i in Indonesia

gp = average growth of total commodity production in Indonesia.

T = difference between end year and beginning year

The concept of DLQ analysis is:

- $DLQ > 1$ = potential development of commodity i faster than the same sector
- $DLQ < 1$ = potential development of commodity i is lower than the same sector

The next step is to combine the SLQ and DLQ values into four commodity criteria, namely leading, mainstay, prospective and underdeveloped commodities. The matrix of the four criteria can be seen in Table 1.

Table 1. Classification of commodity criteria based on the combined value of SLQ and DLQ

criteria	SLQ > 1	SLQ < 1
DLQ > 1	Superior Commodity	Mainstay Commodity
DLQ < 1	Prospective Commodity	Underdeveloped Commodity

Source : Kuncoro, Mudrajad (2012)

3 Results and Discussion

3.1 The Contribution of the Agricultural Sector in the Economy of North Sumatra Province

Table 2. Distribution of Gross Regional Domestic Product (GRDP) on the basis of current prices by business field in North Sumatra Province in 2016-2020

No	Business Fields	Years				
		2016	2017	2018	2019	2020
1	Agriculture	21.5	21.3	20.9	20.5	21.3
2	Mining	1.35	1.30	1.29	1.27	1.28
3	Industry	20.1	20.3	20.0	19.1	19.3
4	Electricity	0.11	0.12	0.11	0.11	0.11
5	Water Supply	0.10	0.11	0.10	0.10	0.10
6	Constrction	13.5	13.7	13.9	14.2	13.6
7	Retail	17.8	17.5	18.1	18.8	18.9
8	Transportation	5.1	5.02	4.99	5.07	4.48
9	Provision of Accomodation	2.39	2.37	2.38	2.42	2.18
10	Information and Communication	1.95	2.01	2.04	2.14	2.28
11	Financial and Insurance	3.31	3.17	3.05	2.92	2.90
12	Real Estate	4.75	4.97	5.03	5.12	5.27
13	Company Service	1.00	1.03	1.03	1.08	1.07
14	Government Administration	3.67	3.71	3.68	3.69	3.73
15	Education	1.88	1.82	1.82	1.85	1.90
16	Health Service	0.95	0.96	0.98	1.02	1.03
17	Other Services	0.56	0.58	0.57	0.58	0.57

The agricultural sector is the mainstay sector as a contributor to GRDP and also as the sector that absorbs the most labor compared to other sectors. Based on Central Statistics Agency's data, the agricultural sector is still the highest sector contributor to GRDP in North Sumatra, although it has decreased. The agriculture sector contributes to GRDP around 20 – 22% over the last 5 years.

Meanwhile, the growth rate of the agricultural sector in the 2016-2020 period is still lower than the general GDP growth rate. The growth rate of the agricultural sector shows an increase every year. Especially when the Covid 19 Pandemic occurred. It was seen that the agricultural sector in North Sumatra Province grew by 1.95%. while the level of the economy in general decreased by -1.07%. This condition shows that the agricultural sector in North Sumatra Province is a priority in regional economic development.

Table 3. GRDP Growth Rate of Agriculture Subsector in North Sumatra Province in 2016-2020 (%)

Subsector	Years					Average
	2016	2017	2018	2019	2020	
1. Food Crops	7.57	5.58	2.15	4.20	-0.26	3.63
2. Horticultural Crops	2.03	5.69	0.16	-0.37	1.54	1.81
3. Plantations	4.47	5.52	6.59	7.47	3.68	5.55
4. Ranc	6.78	6.64	6.78	6.28	-1.96	4.90
5. Agriculture Services	1.98	5.02	-0.45	4.37	0.90	2.36
6. Forestry	-3.54	0.27	6.86	2.54	2.07	1.64
7. Fishing						
Agriculture Sector	4.65	5.31	4.87	5.13	1.95	4.38
GRDP of SUMUT	5.18	5.12	5.18	5.22	-1.07	3.93

3.2 Determination of Leading Commodities in the Agricultural Sector in North Sumatra Province

3.2.1 Stage 1. Static LQ (SLQ) Analysis

Based on the results of the SLQ calculation, it is known that of the 51 existing agricultural commodities, there are 20 agricultural commodities that have a SLQ value >1. This means that these 20 agricultural commodities have a comparative advantage compared to other agricultural commodities in North Sumatra Province.

Agricultural sector commodities classified as basic commodities have a comparative advantage because they have an average value of SLQ>1. This value indicates that the production value of the commodity is high so that it has the ability to meet the needs of other regions. As for the 20 basic commodities, the five highest include salak, pork, fisheries, capture fisheries, and cabbage.

Table 4. Results of SLQ Analysis of Agricultural Sector Commodities in North Sumatra Province (2019-2020)

No	Commodity	SLQ Average
1	Paddy	0.49
2	Corn	1.09
3	Soybean	0.23
4	Peanuts	0.16
5	Mung Beans	0.07
6	Cassava	0.94
7	Sweet Potato	0.74
8	Red Onion	0.18
9	Red Chili	1.78
10	Cayenne Paper	0.48
11	Potato	1.24
12	Cabbage	1.95
13	Tomato	1.74
14	Garlic	0.18
15	Petsay/Mustard	1.52
16	Carrot	1.92
17	Eggplant	1.53
18	Spring Onion	0.30
19	Durian	1.04
20	Siamese Orange	1.71
21	Mango	0.15

22	Pineapple	1.27
23	Papaya	0.40
24	Snakefruit	3.27
25	Jackfruit	0.22
26	Ginger	0.37
27	Turmeric	0.14
28	Cardamon	0.01
29	Galangal	0.16
30	Aromatic Ginger	0.05
31	Banana	0.18
32	Palm Oil	1.55
33	Rubber	1.49
34	Tea	0.84
35	Cocoa	0.63
36	Coconut	0.46
37	Sugarcane	0.09
38	Tobaaco	0.08
39	Coffeeca	1.29
40	Clove	0.10
41	Pepper	0.01
42	Beef	0.36
43	Buffalo Meat	0.91
44	Lamb	0.21
45	Pork	2.43
46	Broiler	0.56
47	Eggs	1.39
48	Fishing in The Sea	2.24
49	Public Water Fisheries	1.70
50	Catch Fishing	2.13
51	Aquaculture	0.33

3.2.2 Stage 2. LQ Dynamic Analysis (DLQ)

The dynamic LQ calculation is a development of the SLQ calculation. DLQ analysis is developed in the form of a time series/trend. DLQ analysis in determining the priority commodities in the amount of production for each commodity. Based on the DLQ calculation, there are eight agricultural sector commodities that fall into the basic commodity category. These commodities include red chili (DLQ 4.98), tomatoes (DLQ 4.71), cabbage (DLQ 4.16), durian (DLQ 3.95), Eggplant (DLQ 3.88), fisheries (DLQ 3.55), rubber (DLQ 1.14), and salak (DLQ 1.13). The eight commodities have a DLQ value > 1 which indicates that the potential for growth of these commodities is faster than other commodities in North Sumatra Province.

3.2.3 Stage 3. Combined Static LQ and Dynamic LQ Analisis Analysis Results

Based on the calculation results of Static LQ and Dynamic LQ analysis. the combined results of these two methods are able to classify commodities into 4 categories. The 4 categories are superior commodities, mainstay commodities, prospective commodities, and underdeveloped commodities. The results of the calculation of the SLQ and DLQ analysis showed that there were 8 agricultural commodities which became the leading commodities in North Sumatra Province. These commodities are red chili, cabbage, tomatoes, eggplant, durian, salak, rubber, and fisheries. Meanwhile, there are 10 agricultural commodities that are categorized as prospective commodities including corn, potatoes,

Chinese cabbage, carrots, Siamese oranges, pineapple, palm oil, coffee, pork, eggs, and chicken eggs. There are 11 agricultural commodities which are mainstay commodities and 8 commodities which are underdeveloped commodities. In more detail, the division of the agricultural commodities into 4 categories can be seen in Table 5.

The superior commodities are commodities that have DLQ and SLQ values > 1 (Category 1). This commodity is said to have a good comparative advantage at the moment and has the potential to remain a leading commodity in the future. The second category, mainstay commodities are agricultural commodities as indicated by the value of DLQ > 1 and SLQ < 1. This mainstay commodity means that this commodity has not become a commodity that has advantages at this time. but has the opportunity to have advantages in the future.

Meanwhile in the third category, prospective commodities are commodities that have a SLQ value > 1 and DLQ < 1 which means that this commodity has a comparative advantage at the moment but is not expected to have an advantage in the future. The fourth category is the category that is categorized as underdeveloped commodity with DLQ and SLQ values < 1. This lagging commodity means that the commodity does not have a comparative advantage at this time and also has no potential to develop in the future.

Table 5. Matrix of combined analysis of SLQ and DLQ

	SLQ > 1	SLQ < 1
DLQ > 1	SUPERIOR COMMODITIES : Red Chili Cabbage Tomato Eggplant Durian Snakefruit Rubber Fishing in the sea	MAINSTAY COMMODITIES: Mung Beans Sweet Potato Cassava Red Onion Ginger Turmeric Coconut Beef Buffalo Meat
DLQ < 1	PROSPECTIVE COMMODITIES : Corn Potato Petsai/Mustard Carrot Siamese Orange Pineapple Palm Oil Coffe Pork Eggs	UNDERDEVELOPED COMMODITIES : Garlic Papaya Cocoa Tea Broiler Clove Pepper Aquaculture

4 Conclusion

The agricultural sector provides the largest contribution to the formation of the GRDP structure in the economy of North Sumatra Province with a declining contribution every year. The agricultural sector was able to survive and grow amid the Covid-19 pandemic that occurred.

Commodities in the agricultural sector which are the leading commodities in the province of North

Sumatra include 8 commodities namely Red Chili, Cabbage, Tomato, Eggplant, Durian, Salak, Rubber and Fisheries. These commodities can meet needs within the province and also able to meet needs originating from outside the province so that it has a comparative advantage compared to other commodities in the agricultural sector.

Proper planning is needed to increase regional income through the 8 leading commodities in the agricultural sector. Increasing regional income based on superior commodities is the focus of development so that the direction and policies of agricultural development in North Sumatra Province can be right on target.

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