HORTICULTURAL COMMODITY-BASED ANALYSIS OF TERRITORIAL SUPERIORITY IN BOALEMO

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ABSTRACT

This study affords an analysis of (1) the trend of the horticultural crop yields per unit area in Boalemo, (2) the territorial superiority bred by horticultural crop commodities in Boalemo, and (3) the development of horticultural farmer welfare rate in Boalemo. This is a quantitative study using secondary data, collected from the official website of Statistics Indonesia (BPS) and primary data, collected through interviews. Data analyses deployed here are the trend analysis, LQ analysis, LQ_{Share}-LQ_{Shift} analysis, and NTP analysis. Results demonstrate that (1) the horticultural plant 'vegetable' was inclined to exhibit a positive growth or trend but a consistent decreasing trend in the last two years. In other words, the productivity of the agricultural sector, especially horticulture, in Boalemo starts declining, (2) spinach, large chili, cayenne pepper, Chinese cabbage, and tomato commodities have a Location Quotient (LQ) above 1 and hence belong to the base category. Meanwhile, based on the LQ_{Share} and LQ_{Shift} analysis, four commodities, i.e., spinach, large chilies, Chinese cabbages, and tomatoes, belong to the progressive category. Moreover, four commodities, namely onions, long beans, cucumbers, and eggplants, which are developing sectors, and one commodity, which is cayenne pepper, belong to the unprogressive category, and (3) in 2016, 2017, 2018, and 2019, the horticultural farmer exchange rate (NTP) was 144.259%, 143.955%, 154.503%, and 154.151%, respectively. The NTP indicates that there is a surplus in farming carried out. However, if we include the living cost spent by farmers during farming (waiting for the harvesting time) in the cost element of NTP, the NTP will decrease or even experienced a deficit in 2016 and 2017.

Keywords: *Horticulture, Territorial Superiority, NTP*

INTRODUCTION

The horticulture subsector plays a great role in the economic development in Indonesia. However, the horticultural commodity competitiveness in Indonesia is considered poor. Several issues engendering this condition are horticultural agenda not determined based on legal references, minimum technical guidance, inadequate human resource capacity, minimum technical requirements prepared, and no integrated horticultural area established. As a result, horticultural farmers cannot earn maximum profits or income.

Boalemo is the third district in Gorontalo whose agricultural sector significantly contributes to the GRDP in the province. The district has arranged a program based on the blueprint of development for horticulture in 2011-2025 by the Ministry of Agriculture as agricultural stimuli, notably horticultural ones, possesses a lot of effects on farmers.

Table 1. Horticultural Crop Production

No.	Commodity	Year (Data in Tons)			
		2016	2017	2018	2019
1	Onion	66.30	192.20	385.40	52.70
2	Spinach	14.90	3.60	0.90	9.10
3	Big chili	76.70	110.40	61.40	15.90
4	Cayenne pepper	2,447.40	9,320.80	7,521.90	1,634.40
5	Long bean	36.60	14.80	12.10	2.70
6	Cucumber	38.10	31.90	32.90	3.80
7	Chinese cabbage	34.60	9.00	0.10	8.70
8	Eggplant	43.80	68.60	26.00	4.00
9	Tomato	441.00	1,178.10	683.20	174.20

Source: BPS in Boalemo, 2020

Referring to Table 1, nine horticultural commodities manifest a good existence or have production data each year. However, a decline in production and productivity rates is suffered by almost all of them, as the consequence of a high production cost and high fluctuation found in primary agricultural product costs. It is analogous with Sahab, in Kasuba *et al*. (2015), that the use and development of all economic potentials should be prioritized and maintained to perform a sustainable local economic development targeted to farmers liable to poverty.

It is also aligned with Syarwani Canon et al. (2016), that to develop local potentials and support the ongoing local autonomy implementation, inventory should be undertaken as a benchmark to determine a management policy and monitoring tool. The foreseeable results are elevated locally generated revenues and local economy.

Hence, we carry out a study titled *Horticultural Commodity-based Analysis of Territorial Superiority in Boalemo*.

STUDY METHODS

This study was conducted in Boalemo in March-July 2020. Data analyses employed here are the trend analysis, LQ analysis, LQ_{Share}-LQ_{Shift} analysis, and NTP analysis.

STUDY RESULTS

A. The Trend of the Horticultural Crop Yields Per Unit Area in Boalemo

1. Onion commodity

Table 2. Onion Commodity

Year	Productivity (Tonne/Ha)		Trend (%)	
	Boalemo	Province	Boalemo	Province
2016	2.072	38.989		
2017	7.392	72.418	256.793	85.741
2018	8.200	64.352	10.926	-11.139
2019	5.856	56.631	-28.591	-11.998
Average	**5.880**	**58.097**	**79.709**	**20.868**

Source: Processed data, 2020

As argued in Table 1, the average growth of onion commodity in Boalemo in 2016-2019 was 79.709%, manifesting a high increase in the specific commodity, whereas the trend of the same commodity in Gorontalo was only 20.868%. Nevertheless, regardless of the high productivity level, which was 5,580 tons per hectare, in 2019, onion production in Boalemo was considered low, attested by a decrease of 28.591%.

2. Spinach commodity

Table 3. Spinach Commodity

Year	Productivity (Ton/Ha)		Trend (%)	
	Boalemo	Province	Boalemo	Province
2016	0.621	6.427		
2017	0.900	7.702	44.966	19.833
2018	0.900	8.295	0.000	7.704
2019	0.827	8.814	-8.081	6.255
Average	**0.812**	**7.809**	**12.295**	**11.264**

Source: Data processed, 2020

In Table 3, the average growth of spinach commodity in Boalemo in 2016-2019, i.e., 12.295%, was higher than that in Gorontalo Province in the same years. However, in the last three years, spinach productivity in Boalemo consistently declined, even in the last four years, it is observed that one hectare of land could not produce a tonne of spinach per year. Thus, attempts to escalate spinach crop productivity in Boalemo should be made, considering the richness of health benefits in the crop.

3. Big chili commodity

Table 4. Big Chili Commodity

Year	Productivity (Ton/Ha)		Trend (%)	
	Boalemo	Province	Boalemo	Province
2016	1.096	31.163		
2017	5.520	33.742	403.781	8.275
2018	4.723	32.962	-14.437	-2.313
2019	3.975	60.953	-15.839	84.923
Average	**3.828**	**39.705**	**124.502**	**30.295**

Source: Processed data, 2020

As contended in Table 4, the average growth of big chili commodity in Boalemo in 2016-2019 was 124.502%, higher than that in Gorontalo Province. Big chili productivity in Boalemo is excellent because one hectare of land can produce 3,828 tonnes per year if other production inputs are optimized as red chilies are considerably susceptible to varied threats in farming.

4. Cayenne pepper commodity

Table 5. Cayenne Pepper Commodity

Year	Productivity (Ton/Ha)		Trend (%)	
	Boalemo	Province	Boalemo	Province
2016	2.907	63.215		
2017	14.165	95.717	387.343	51.417
2018	14.807	92.261	4.529	-3.611
2019	8.980	78.850	-39.351	-14.536
Average	**10.215**	**82.511**	**117.507**	**11.090**

Source: Data processed, 2020

Table 5 points out that the average growth of Cayenne pepper commodity in Boalemo in 2016-2019 was 117.507%. The highest growth trend was in 2016-2017, in which cayenne pepper increased appreciably in price and because of low cross-regional chili import rates. However, in the last two years, the growth declined due to fluctuating price of cayenne pepper and various other types of farming which showed good progress.

5. Long bean commodity

Table 6. Long Bean Commodity

Year	Productivity (Ton/Ha)		Trend (%)	
	Boalemo	Province	Boalemo	Province
2016	0.832	21.941		
2017	1.644	23.145	97.693	5.486
2018	3.025	31.123	83.953	34.471
2019	2.700	19.327	-10.744	-37.903
Average	**2.050**	**23.884**	**56.967**	**0.685**

Source: Processed data, 2020

As showcased in Table 6, the average growth of long bean commodity in Boalemo in 2016-2019 was 56.967%, and the highest growth was in 2017. Nevertheless, a significant decline hit in 2019. Meanwhile, in terms of average productivity, which is 2,050, one hectare of the land of cultivated long beans will produce 2,050 tonnes of long beans per year. Therefore, in the efforts to sustain this growth trend and optimize long bean farming, methods and technology exerted should be innovated.

6. Cucumber commodity

Table 7. Cucumber Commodity

Year	Productivity (Ton/Ha)		Trend (%)	
	Boalemo	Province	Boalemo	Province
2016	1.905	43.324		
2017	7.975	77.115	318.635	77.996
2018	10.967	78.500	37.513	1.796
2019	1.900	87.667	-82.675	11.677
Average	**5.687**	**71.652**	**91.158**	**30.489**

Source: Data processed, 2020

Table 7 demonstrates that the average growth of cucumber commodity in Boalemo in 2016-2018 was 91.158%, exhibiting a significant increase in the commodity in spite of a significant decrease in 2019. However, the average growth of cucumber in Boalemo is still higher than that in Gorontalo Province. Cooperation between farmers and restaurants in Boalemo, Gorontalo City, and Gorontalo District is foreseeable to bring a good result in cucumber production in Boalemo.

7. Chinese cabbage commodity

Table 8. Chinese Cabbage Commodity

Year	Productivity (Ton/Ha)		Trend (%)	
	Boalemo	Province	Boalemo	Province
2016	34.600	13.710		
2017	1.800	11.563	-94.798	-15.662
2018	0.100	11.357	-94.444	-1.766
2019	0.870	7.808	770.000	-31.253
Average	**9.343**	**11.109**	**193.586**	**-16.230**

Source: Data processed, 2020

Based on Table 8, the average growth of Chinese cabbage in Boalemo in 2019 was 193.586%, indicating a significant increase in the commodity. Meanwhile, the Chinese cabbage commodity in Gorontalo Province in the same year was -16.230%. Furthermore, the average productivity is 9.343 so a hectare of land can produce 9.343 tonnes of Chinese cabbage per year. Therefore, in 2019, Chinese cabbages had seven orders of increase higher than that in the previous year.

8. Eggplant commodity

Table 9. Eggplant Commodity

Year	Productivity (Ton/Ha)		Trend (%)	
	Boalemo	Province	Boalemo	Province
2016	0.796	25.621		
2017	6.860	41.646	761.416	62.545
2018	3.714	48.772	-45.856	17.110
2019	2.000	56.972	-46.154	16.814
Average	**3.343**	**43.253**	**223.135**	**32.156**

Source: Data processed, 2020

As conveyed in Table 9, the average growth of eggplant commodity in Boalemo in 2016-2019 was 223.135%. Moreover, the annual observation demonstrates that production increase happened in 2016-2017 only, whereas in the last two years, the production experienced a decreasing trend. However, the average trend of eggplant commodity in Boalemo is still better than that in Gorontalo Province.

9. Tomato commodity

Table 10. Tomato Commodity

Year	Productivity (Ton/Ha)		Trend (%)	
	Boalemo	Province	Boalemo	Province
2016	1.757	45.040		
2017	14.726	94.300	738.161	109.370
2018	14.852	109.222	0.855	15.824
2019	6.968	106.081	-53.084	-2.876
Average	**9.576**	**88.661**	**228.644**	**40.772**

Source: Data processed, 2020

Referring to Table 10, the average growth of tomato commodity in Boalemo in 2016-2019 was 228.644%, indicating a significant increase in the commodity. The growth was higher than that in Gorontalo Province in the same year. Productivity of tomato crops in Boalemo in 2017-2018 increased but declined in 2016 and 2019 because of different causes, either internal or external, from tomato farming in the district.

Vegetables were inclined to have a positive growth or trend but in the last two years, they consistently declined. Hence, agricultural sector potentials, specifically horticulture, in Boalemo are becoming unproductive owing to land use transfer and building construction in the district. However, regardless of the decline in many commodities, Chinese cabbages demonstrated a significant increase in 2019 because of public enthusiasm in some areas, particularly Wonosari and Paguyaman, whose community largely consumed this product or commodity.

Horticultural crops become less favorable as farmers prefer disease-resistant crops which cost less and because of the unstable price of the first crops. It is commensurate with Irawan (2011), that in aggregate, domestic vegetable products grow less competitive than international ones, result in imported products catering to domestic vegetable needs. In facing off trading liberalization, improving horticultural agribusiness competitiveness is necessary to drive the growth of the sector. Empirically, agribusiness sector competitiveness is exhibited by the ability to produce and market products in accordance with consumer needs (types of the product by quantity, place, and time) and preference (organoleptic quality, physical quality).

B. Analysis of Territorial Superiority Pertaining Horticultural Crops in Boalemo

1. Location Quotient (LQ) analysis

Table 11. Result of Location Quotient (LQ)

No.	Commodity	LQ					Category
		2016	2017	2018	2019	Average	
1	Onion	0.428	0.410	0.981	1.138	0.739	Non-base
2	Spinach	1.089	0.224	0.064	3.259	1.159	Base
3	Big chili	2.265	1.443	0.857	0.823	1.347	Base
4	Cayenne pepper	0.956	1.014	1.050	1.078	1.025	Base

5	Long bean	0.738	0.253	0.191	0.387	0.392	Non-base
6	Cucumber	1.072	0.435	0.537	0.178	0.556	Non-base
7	Chinese cabbage	1.836	1.330	0.023	5.818	2.252	Base
8	Eggplant	0.749	0.693	0.336	0.132	0.477	Non-base
9	Tomato	1.612	1.251	0.779	0.667	1.077	Base

Source: Data processed, 2020

Referring to Table 11, spinach, big chili, cayenne pepper, Chinese cabbage, and tomato commodities have a Location Quotient (LQ) above 1 and thus belong to the base category. Farming of those commodities is able to increase the farming target, i.e., promoting farmer income and welfare. Production of those commodities should gain continuous attention from the government, which is expected to confer more stimuli to the sectors and accrue farmer income. Additionally, the base category is because those commodities have a better and more progressive trend than the others.

2. LQ_{Share} and LQ_{Shift} analysis

Table 12. Result of LQ_{Share} and LQ_{Shift}

No.	Commodity	LQ_{Share}	LQ_{Shift}	Sector Category
1	Onion	0.708	1.735	Developing
2	Spinach	1.902	2.154	Progressive
3	Big chili	1.762	4.913	Progressive
4	Cayenne pepper	1.003	0.796	Slow
5	Long bean	0.974	2.321	Developing
6	Cucumber	0.736	2.350	Developing
7	Chinese cabbage	3.246	3.538	Progressive
8	Eggplant	0.560	2.405	Developing
9	Tomato	1.016	1.021	Progressive

Source: Data processed, 2020

As defined in Table 12, the LQ_{Share} and LQ_{Shift} of the commodities are as follows:

a. Onion

The $LQ_{Share} < 1$ and $LQ_{Shift} \geq 1$ and hence the onion commodity is a developing sector.

b. Spinach

The $LQ_{Share} \geq 1$ and $LQ_{Shift} \geq 1$ and hence the spinach commodity is a progressive sector.

c. Big chili

The $LQ_{Share} \geq 1$ and $LQ_{Shift} \geq 1$ and hence the big chili commodity is a progressive sector.

d. Cayenne pepper

The $LQ_{Share} \geq 1$ and $LQ_{Shift} < 1$ and hence the cayenne pepper commodity is a slow sector.

e. Long bean

The $LQ_{Share} < 1$ and $LQ_{Shift} \geq 1$ and hence the long bean commodity is a developing sector.

f. Cucumber

The $LQ_{Share} < 1$ and $LQ_{Shift} \geq 1$ and hence the cucumber commodity is a developing sector.

g. Chinese cabbage

The $LQ_{Share} \geq 1$ and $LQ_{Shift} \geq 1$ and hence the Chinese cabbage commodity is a progressive sector.

h. Eggplant

The $LQ_{Share} < 1$ and $LQ_{Shift} \geq 1$ and hence the eggplant commodity is a developing sector.

i. Tomato

The $LQ_{Share} \geq 1$ and $LQ_{Shift} \geq 1$ and hence the tomato commodity is a progressive sector.

The analysis indicates that spinach, big chili, cayenne pepper, Chinese cabbage, and tomato commodities have a Location Quotient (LQ) above 1 and thus belong to the base category. Farming of those commodities is able to increase the farming target, i.e., promoting farmer income and welfare. Production of those commodities should gain continuous attention from the government, which is expected to confer more stimuli to the sectors and accrue farmer income.

Besides, the LQ_{Share} and LQ_{Shift} analysis points out that of nine commodities with good progress in Boalemo, four, i.e., spinach, big chili, Chinese cabbage, and tomato, are in the progressive category, implying that the commodities have a high specialization/concentration level and competitiveness/change rate. They are considered contributive to elevate farmer income and welfare in Boalemo. Moreover, four other commodities, namely onion, long bean, cucumber, and eggplant, are considered developing for they have a low specialization/concentration level but a relatively high change rate. Hence, the commodities are considered good in prospect and may play an important role in enhancing farmer income and welfare in Boalemo. Meanwhile, cayenne pepper, which used to be the favorite commodity, is now considered a slow one since, despite its high specialization/concentration level, it has a low competitiveness/change rate. The commodity is rivaled by the same commodity imported from other regions which also escalates farmer income and welfare in Boalemo.

It is in conforming with Ilsan et al. (2016), vegetable crops are the horticultural commodity considerably needed by consumers and one of the causes of the national inflation. Aware of this, the Boalemo government, through the Department of Agriculture, holds multiple cultivation training, maintenance, and marketing. The specific potential which can support vegetable crop development is the market potential, either local or export. Additionally, land supports for vegetable crop cultivation are considered good. However, the primary issue in chili cultivation is crop diseases which lead to crop failure. To make the vegetable crops a preeminent commodity from the comparative flank and hence escalate farmer income, the institutional and marketing systems should be fixed.

C. Analysis of the Improvement of Horticultural Crop Commodity Farmer Welfare in Boalemo

Table 13. Analysis Result of Horticultural NTP in Boalemo

No.	Commodity	2016	2017	2018	2019
1	Onion	162.939	185.241	185.241	193.548
2	Spinach	145.455	130.178	159.763	159.763

3	Big chili	150.000	146.718	146.718	131.274
4	Cayenne pepper	206.557	212.166	189.911	228.956
5	Long bean	127.586	124.138	124.138	124.138
6	Cucumber	95.092	111.043	111.043	111.043
7	Chinese cabbage	112.782	112.782	150.376	120.301
8	Eggplant	116.667	123.333	123.333	123.333
9	Tomato	181.250	150.000	200.000	195.000
Average		**144.259**	**143.955**	**154.503**	**154.151**
NTP After Living Cost		**99.560**	**99.522**	**104.703**	**103.951**

Source: Data processed, 2020

Based on Table 13, NTP in 2016, 2017, 2018, and 2019 was 144.259%, 143.955%, 154.503%, and 154.151%, demonstrating surplus for farming carried out. However, if we include the living cost spent by farmers during farming (waiting for the harvesting time) in the cost element of NTP, the NTP will decrease or even experiences a deficit. As we can observe in 2016-2017, NTP for horticultural crops was 99.560% and 99.522%, respectively. The NTPs are below 100, exhibiting a deficit suffered by horticultural crop farmers. The increase in produced product prices is relatively less significant than that in consumed product prices. Farmer welfare levels in a particular period indicate a decreasing trend. Thus, farming is considered incapable of giving an optimum effect on increasing farmer household income. Meanwhile, in 2018-2019, NTP grew into 104.703% and 103.951%, respectively. The NTPs exceed 100, indicating that farmers had earned a small amount of significant surplus. As the increase in production costs is higher than that in consumption price, farmer income also grows higher than their expenditure, escalating their welfare level.

Also, horticultural crop advantages contribute to increased farmer welfare. From horticultural NPT quantification, in 2016, 2017, 2018, and 2019, the NTP was 144.259%, 143.955%, 154.503%, and 154.151%, respectively. The NTPs indicate surplus for farming carried out. However, if we include the living cost spent by farmers during farming (waiting for the harvesting time) in the cost element of NTP, the NTP will decrease or even experiences a deficit. As we can observe in 2016-2017, NTP for horticultural crops was 99.560% and 99.522%, respectively. The NTPs are below 100. Meanwhile, in 2018-2019, NTP grew into 104.703% and 103.951%, respectively. The NTPs exceed 100, indicating that farmers had earned a small amount of surplus. It breeds a gap, in which farmers and their farming activities deliver a large contribution to GRDP but belong to the poor community because of having a big responsibility and even loans from the beginning of cultivation.

We also notify an interesting issue here, albeit cayenne pepper crops point out positive progress or trend, they belong to the slow category. Other districts or Gorontalo Province are close to the marketing center, whereas many Boalemo farmers have become less interested in cultivating cayenne pepper.

However, those who persistent in cultivating the pepper consistently promote their cultivation land area, bringing about high welfare levels. High cayenne pepper production in 2016, 2017, and 2018 was brought on by the cayenne pepper cultivation trends for, in the years, cayenne pepper was exceptionally high in price.

As stated by Rachmat (2013), one of the tools to measure farmer welfare is Farmer Exchange Rate (NTP). NTP is the ratio of the price accepted by farmers (HT) and the price paid by farmers (HB). This concept elucidates purchasing power of farmer income. Another concept, i.e., the NTP quantification concept using a fixed quantity (Laspeyres index), cannot indicate farmer welfare indicators. An increase in product prices accepted by farmers does not explain the increase in farmer income, rather, it indicates rare agricultural supply/production. Besides, the NTP quantification concept does not accommodate productivity development and technology and development advancement. Pertinent to farmer welfare indicators, NTP quantification rectification should be conducted through a value approach, by including the quantity element. In the end, NTP is the ratio of income and outcome.

CONCLUSION

Based on results and discussion, we draw the following conclusions.

1. Vegetable horticultural crops tended to show a positive growth or trend but in the last two years, they consistently declined. In other words, agricultural sector potentials, especially horticulture, in Boalemo grow unproductively.
2. Our analysis showcases that spinach, big chili, cayenne pepper, Chinese cabbage, and tomato commodities have a Location Quotient (LQ) above 1 and therefore belong to the base category. Meanwhile, the LQ_{Share} and LQ_{Shift} analysis shows off that four commodities, namely spinach, big chili, Chinese cabbage, and tomato, belong to the progressive category. Four other commodities, which are onion, long bean, cucumber, and eggplant are all developing sectors, while cayenne pepper is a slow sector.
3. Farmer Exchange Rate (NTP) in 2016, 2017, 2018, and 2019 was 144.259%, 143.955%, 154.503%, and 154.151%, demonstrating surplus for farming carried out. However, if we include the living cost spent by farmers during farming (waiting for the harvesting time) in the cost element of NTP, the NTP will decrease or even experiences a deficit in 2016 and 2017.

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