Analysis of agricultural based commodities in Bolaang Mongondow Regency, North Sulawesi, Indonesia

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Abstract. The agricultural sector is still an important, and potential sector when compared with the other sectors. Therefore, the development of agricultural sector should prioritize the potential of environmental resources and the ability of its people. This study aims to identify agricultural based commodities in Bolaang Mongondow Regency, North Sulawesi Province. This study used secondary data from Agriculture and Plantation Agency, Bolaang Mongondow Regency and North Sulawesi Province in 2012-2016 and then analyzed using the Location Quotient method. The results show there are 15 agricultural based commodities in the regency which are potential to develop. They are green beans, soybeans, corn, rice, candelnut, coffee, cocoa, pineapple, mango, mangosteen, spinach, long beans, kale, eggplant, and potatoes. As for now, the commodities that are the government’s main focus are soybeans, corn, rice, cocoa, pineapple, and potatoes.

1. Introduction
The agricultural sector is still a potential sector in the Indonesian economy. Therefore, the indirectly agricultural sector will still be the basis of national economic development today, which in the future has a central color because it plays a role in laying a solid foundation for the majority of Indonesia’s population in general [1].

The agricultural sector itself holds an important role in the nation’s economy, and this is shown from the population or labor that mostly works in the agricultural sector. Based on survey data for 2017, 39.68 million people work in the agricultural sector itself or 31.86 percent of the total working population of 124,54 million people [2]. The important role of the agricultural sector has been proven of the success of the agricultural sector during the economic crisis in providing basic food needs in sufficient quantities and positive growth rates in maintaining the growth of the national economy. This situation becomes the main consideration for are a formulation of policies that stands toward the agricultural sector in expanding employment, eliminating poverty, and encouraging wider economic development.

According to Kamaluddin in Sofiyanto [3], in general, it can be said that agricultural development is directed at increasing income and the standards living of farmers and fishers, expanding employment and business chance, also filling and expanding markets, both domestic and foreign markets. This is done through advanced, efficient, and tough agricultural so that it can increase and diversify yield, improve the quality and degree of production processing, and support regional development.
One of an effort that can be done to increase agricultural sector contribution toward the regional economy and as well as a driving sector for regional economic growth is developing commodities that have the potential to become a superior or base commodities. Integrated base commodities developing in agribusiness systems, start from upstream to downstream sector expected to be able to give a contribution of region economic growth, increase society income, and absorption of labor. Superior commodities in region economic determine region economic growth as a whole, besides those from the relevant commodities also another related sector. The greater the activities of this sector in a region will increase income’s rate in region thereby increasing demand for goods and services from the results of this sector and other sectors which in turn the demand will increase the volume of other sector activities that subsequently will increase region income simultaneously [4].

Base commodities need to be optimized in development because it has a comparative advantage that capable of increasing economic and economic subject’s income. The comparative advantage that owned by a commodity can encourage the creation of a competitive advantage toward the same kind of commodity in a region. Those advantages give a benefit toward commodity in winning a market competition. A wide and best of the market’s share in the market’s competition has a positive effect on acceptance. The wider and better market share in a competition or have a power of high product competitiveness in the market allows these products to give high acceptance also from the sales process.

North Sulawesi itself as one of the provinces in the Republic of Indonesia, in the period 2013 to 2017 still makes the agricultural sector as a sector that gives the biggest contribution toward Regional Bruto Domestic Product. In the period 2013 to 2017, the agricultural sector contributed a total production value of 13,765.30 billion rupiah in 2013 and 15,811.34 billion rupiah in 2017.

Bolaang Mongondow Regency as one of the level II areas in North Sulawesi Province until today, still one of a region that makes a big contribution toward the income of North Sulawesi Province. Based on Regional Bruto Domestic Product data as at the basis 2010 constant price in Bolaang Mongondow Regency, the agricultural sector contributed amount 1896.8 billion in 2013 to 2,138.85 billion in 2017.

Relate to that, and government attention is needed in agricultural sector development through optimization on agricultural commodities development. The important principle in the implementation of a comprehensive and integrated regional development approach is the ability to identify the potential of existing regions for development with various development program inputs. One of the strategies that can be used in region economic development through the agricultural sector in the current era of regional autonomy is through the development of agricultural commodities for each region. The development of an agricultural commodity-based region is expected to boost the growth of a region that can finally increase society's income. Utilization of best and potential region optimally and integrated is a condition that needs to be considered so that the welfare and prosperity of the society can be achieved. This study aims to identify agricultural commodities, which became an agricultural base commodity in Bolaang Mongondow Regency.

2. Methods
The study used secondary data of agriculture and plantation, which is food plants commodity, farm plantation commodity, fruits commodity, and vegetable horticulture commodity in Bolaang Mongondow Regency and North Sulawesi Province in 2012 to 2016. This study uses the Location Quotient (LQ) data analysis method. Data input used is the amount of production per commodity sector. Besides that, the qualitative descriptive analysis will also be used in answering research purposes related to the government’s vision toward agricultural commodity conditions in Bolaang Mongondow Regency. The Location Quotient formula for the purpose of this study is as follows:

\[ LQ = \frac{v_i}{v_t} \times \frac{V_i}{V_t} \]
where:
\[ vi = \text{Commodity production at the level of Bolaang Mongondow Regency} \]
\[ vt = \text{Total commodity production at the level of Bolaang Mongondow Regency} \]
\[ vi = \text{Commodity production at the level of North Sulawesi Province} \]
\[ vt = \text{Total Commodity production at the level of North Sulawesi Province} \]

According to Arsyad [5], from the calculation result of LQ analysis, then can be categorized into three parts, which are:
- If \( LQ > 1 \), then commodity that analyzed in the study region more specialized compared to commodity in the reference region. The commodity of economic in the study region has a comparative base and categorized as a base commodity.
- If \( LQ = 1 \), the commodity that analyzed is concerned both in the study region and at the economic level of the reference region, has the same specialized level.
- If \( LQ < 1 \), then commodity that analyzed is concerned in the study region less specialize compare to the economic level of the reference region. Commodity in the study region does not have a comparative base and categorized as a non-base commodity.

3. Results and discussion

3.1. Commodity analyze of agriculture base bolaang mongondow regency

3.1.1. Location quotient analyzes of food plants commodity. Food plants commodity is all kinds of plants in which there are carbohydrates and proteins as a source of human energy. Food plants also can be said as the main plant that consumed by humans as food to give energy intake to bodies. In general, food plants are plants that grow in one season. Food plants commodity in every region are different according to the state of place and culture. Usually, food plants that used came from tubers like cassava, sweet potatoes, potatoes, and taro [6]. For the North Sulawesi province region and Bolaang Mongondow Regency itself, food plants commodity that cultivated is rice, corn, soybeans, peanuts, green beans, cassava, and sweet potatoes. As for the calculation result of food plants, a base commodity with a location quotient method can be seen in Table 1.

| No. | Commodity     | LQ Value | LQ Average |
|-----|---------------|----------|------------|
| 1   | Rice          | 0.970    | 0.907      | 1.003      |
| 2   | Corn          | 1.215    | 1.082      | 1.141      |
| 3   | Soybeans      | 2.214    | 0.950      | 1.548      |
| 4   | Peanut        | 0.534    | 0.833      | 0.663      |
| 5   | Green Bean    | 1.298    | 1.647      | 1.602      |
| 6   | Cassava       | 0.273    | 0.441      | 0.382      |
| 7   | Sweet Potatoes| 0.362    | 0.546      | 0.468      |

Location quotient result analyzes of food plants commodity in Bolaang Mongondow Regency Year 2012-2016 show that commodity that has LQ value more than one or commodity that fulfills index as a base commodity are green beans with LQ value 1.602; soybeans with LQ value 1.548; corn with LQ value 1.141; rice commodity with LQ value 1.003; This shows that those base commodities have a bigger relative role compare to the same commodity in the reference region. Besides that, this result shows that those commodities have the ability to be marketed outside Bolaang Mongondow region.
3.1.2. Location quotient analyzes of farm plantation commodity. Farm plantation is one of the plants that can be cultivated in tropical regions. Farm plantation grouped into two, which are one-season plants and annual plants. One season plants are plants that only harvested one time with once a year life cycle, for example, sugarcane, cotton, tobacco. Meanwhile, annual plants need a longer time to produce and can produce up to decades and can be harvested more than once, for example, coconut, oil palm, rubber, cacao, clove, coffee, etc. For Bolaang Mongondow Regency region itself, there are seven farm plantation commodities, which are coconut, clove, nutmeg, coffee, cacao, candlenut, and also sugar palm. As for calculation result of farm plantation base commodity with location quotient method shown in table 2.

Table 2. Location quotient calculation result of farm plantation commodity farm plantation

| No | Commodity | LQ Value 2012 | LQ Value 2013 | LQ Value 2014 | LQ Value 2015 | LQ Value 2016 | LQ Average |
|----|-----------|--------------|--------------|--------------|--------------|--------------|------------|
| 1  | Coconut   | 0.922        | 0.908        | 0.933        | 0.919        | 0.921        | 0.921      |
| 2  | Clove     | 1.435        | 0.825        | 0.904        | 1.203        | 0.627        | 0.999      |
| 3  | Nutmeg    | 0.065        | 0.068        | 0.075        | 0.069        | 0.069        | 0.069      |
| 4  | Coffee    | 5.060        | 5.407        | 5.870        | 6.021        | 7.213        | 5.914      |
| 5  | Cacao     | 3.554        | 5.030        | 2.745        | 2.647        | 3.575        | 3.510      |
| 6  | Candlenut | 5.819        | 6.293        | 6.441        | 6.628        | 7.143        | 6.465      |
| 7  | Sugar Palm| 0.194        | 0.224        | 0.226        | 0.396        | 0.730        | 0.354      |

Location quotient analyzes the result of farm plantation in Bolaang Mongondow Year 2012-2016 show that commodities that have LQ value more than one or commodity that fulfills index as a base commodity are candlenut, coffee, and cacao commodity. Candlenuts have an LQ average amount of 6.654. Meanwhile, coffee and cacao have an average of LQ values are 5.914 and 3.510. This result shows that candlenuts, coffee, and cacao have a better specialization compare to the same commodity in the reference region. For dominant plantation commodities cultivated in Lolayan District, Southeast Dumoga, West Dumoga, East Passi, Bilalang and Lolak.

- Location quotient analysis of fruits commodity
  Fruit plants are included in Spermatophyta division or seed plants. The seed came from a seed that usually called *makrosporangium*; inside is produced *makrospora* which never left its place, next *makrospora* develop into makroportalium with arkegonium with their eggs.
  Besides its benefits and ingredients full of vitamins and its role in the metabolism process. Fruits have a high economic value that can be an income source to society and farmers, as well as on a small scale, middle scale, and big scale. That fruit plant excellence is high selling value, diversity of types, availability of land resources and technology, as well as the potential for the uptake in the domestic and international market that continues to increase [7]. For locational quotient analysis results of fruits, the commodity can be seen in table 3.

Table 3. Location quotient analysis result of fruits commodity

| No | Commodity | LQ Value 2012 | LQ Value 2013 | LQ Value 2014 | LQ Value 2015 | LQ Value 2016 | LQ Average |
|----|-----------|--------------|--------------|--------------|--------------|--------------|------------|
| 1  | Mango     | 1.333        | 1.318        | 1.737        | 0.608        | 1.375        | 1.274      |
| 2  | Durian    | 0.579        | 0.642        | 0.506        | 1.182        | 0.877        | 0.757      |
| 3  | Oranges   | 0.660        | 0.679        | 0.578        | 0.000        | 0.152        | 0.414      |
| 4  | Banana    | 0.774        | 1.124        | 0.787        | 0.132        | 0.188        | 0.601      |
Location quotient analysis result of fruits commodity in Bolaang Mongondow Regency Year 2012-2016 shows that commodities that have LQ value more than one or commodity that fulfills index as a base commodity are pineapple, mango, and mangosteen commodity. Pineapple commodity has an average of LQ values amount of 3.891. Mango has an average of LQ value amount 1.274, and mangosteen has an average of LQ value amount of 1.109. With this result show, there is an ability from fruits base commodity to be marketed outside the area. Also, they have a relatively bigger role than the same commodity in the reference region for fruits commodity, especially pineapple dominant cultivated in Lobong Village, West Passi District.

This is strengthened by the determination of the government Bolaang Mongondow Regency which makes Lobong Village the center of development industry of pineapple in increasing business capacity for small and medium businesses through One Vilaage One Product (OVOP) approach [8].

- Location quotient analysis of horticultural commodity

According to Zulkarnain [9], horticultural came from Latin, which is hortus (farm) and colere (growing). To the letter, horticultural means the study of garden cultivation. Horticultural is plant-based agriculture for plants other than agronomic plants (food and feed) and forestry plants.

The horticultural plant's sector is currently a profitable commodity because the economic growth is increasing at the moment helped trigger an increase in horticultural consumption. Horticultural consumption increase because the consumption structure of food tends to shift to non-food ingredients on relatively income elasticity materials such as horticultural commodities. Society consumption currently tends to avoid food that high in cholesterol, like livestock origin food products.

Horticultural also acts as a source of society nutrition, employment provider, and supporting agrotourism and agroindustry activities. This shows that horticultural development relates to the wider aspect, which is techno-economy with socio-culture farmers. Reviewed by the production time process, the short growing season allows faster capital turnover and can minimize uncertainty due to natural factors. The location quotients analysis result of the horticultural commodity in Bolaang Mongondow Regency shown in table 4.

| No | Commodity    | 2012 | 2013 | 2014 | 2015 | 2016 | LQ Average |
|----|--------------|------|------|------|------|------|------------|
| 1  | Potatoes     | 1.404| 0.681| 1.399| 1.614| 2.086| 1.437      |
| 2  | Cabbage      | 1.037| 0.040| 0.704| 0.357| 0.314| 0.491      |
| 3  | Eggplant     | 0.328| 4.423| 0.943| 1.545| 1.289| 1.685      |
| 4  | Tomato       | 0.155| 1.225| 0.124| 0.252| 0.480| 0.447      |
| 5  | Kale         | 0.261| 4.168| 0.949| 2.123| 1.540| 1.808      |
| 6  | Cayenne Pepper| 0.421| 2.144| 0.344| 0.582| 0.580| 0.814      |
| 7  | Long Beans   | 0.434| 5.073| 0.787| 1.755| 1.177| 1.845      |
Table 4 show that commodities that have LQ value more than one or commodity that fulfills index as a base commodity are a spinach, long beans, kale, eggplant, and potatoes commodity. Spinach has the average LQ value amount 3.081; Long beans have the average of LQ value amount 1.845; Kale has the average of LQ value amount 1,808 also potatoes and eggplant both have the average of LQ value amount 1.685 and 1.437. Refer to those results show that the five commodities have a comparative advantage compare to other commodities and capable of fulfilling market needs outside Bolaang Mongondow Regency region. For the dominant region to cultivate horticultural commodities is Insil Village in East Passi District.

3.2. Government’s view related to agricultural commodity

In the food plants commodity sector itself, Bolaang Mongondow Regency makes rice the main focus. Need to know that Bolaang Mongondow Regency is an area with the highest rice production in North Sulawesi Province, above Minahasa Regency and South Minahasa Regency. Rice production of Bolaang Mongondow in 2016 gives contribution amount 46.35% or about 312.499 tons from a total of 674.169 tons of rice towards rice production in North Sulawesi Province.

For 2018, the government of Bolaang Mongondow Regency has planned to add 500 hectares of new rice field. For rice land, itself will get rice seed assistance of 900 hectares of rice field. As for the rice field, it will be given seed assistance to 480 farmers spread across 200 villages in Bolaang Mongondow. Processed products from rice, namely rice, are not only used to fulfill needs in Bolaang Mongondow and also Regencies/Cities around such as East Bolaang Mongondow and Kotamobagus but also be marketed to the region of Manado City and Gorontalo Province. Besides rice, the government also makes corn and soybeans currently the main commodity. About 68% of North Sulawesi’s corn production itself comes from Bolaang Mongondow Regency. Meanwhile, soybeans contribute 51.26% production of the total soybeans production in North Sulawesi.

In 2018, besides rice, corn, and soybeans, get helped in the form of seeds from the central government. For corn itself is allocated will receive seeds assistance for an area of 3,848 ha and for soybeans will receive seeds assistance for an area of 2000 ha. However, in recent times compared to 2017, the interest of farmers to cultivate soybeans commodity tends to decrease. This is because the selling value of soybean commodities tends to fluctuate, and the marketing purpose of soybean commodities also decreases (in this case, tofu, and tempeh processing industry). Besides that, weather condition and the burden of transportation given to farmers in marketing production of soybeans also causes a decrease in farmers’ interest in growing soybeans.

For horticultural plants commodity, the government more focus on potatoes commodity. This is due to a large amount of production, and the number of farmers cultivating these plants is sufficient. For potatoes, as the most cultivated commodity contributes 37% of the total production of potatoes in North Sulawesi and is in the second position as the biggest contributor after South Minahasa Regency. In addition to potatoes, for 2018, the government is working with the Directorate General of Horticulture to develop the commodity of garlic. This is because all this time, people of Bolaang Mongondow only get supplies of garlic from outside the region of Bolaang Mongondow, such as East Boolang Mongondow Region and South Minahasa Regency. In an effort to increase the amount of production, the government tends to focus on fostering female farmers in West Passi and East Passi District, which are centers of potatoes commodity.

For the fruits commodity itself, the government focuses more on pineapple plants. Especially for pineapple itself has become a special characteristic of Bolaang Mongondow as the largest pineapple producer in North Sulawesi. Besides that, the government also paid more attention to pineapple commodity because the contribution of this commodity to the province’s pineapple production reached almost 90% in 2016. Also besides that, the regency government cooperates with the province
government in developing pineapple commodity by making Lobong Village that located in West Passi District as the One Village One Product production center of pineapple in order to develop the small and medium business industry. For farm plantation that is currently the commodity, which is the priority of Bolaang Mongondow Regency government is cacao. Cacao itself contributes the result of the total production amount of 46.2% of the total production of cacao in North Sulawesi. For cacao itself currently become the main commodity based on the result of the Development Plan Conference.

Since 2017 until now, a nursery process has been held in West Passi, and East Passi District and then will be cultivated in Konarom Village, Southeast Dumoga District, with a total land expansion of ± 100 ha. In the nursery using the shoot grafting method. In addition, there are other things that are a concern to the government toward cacao commodity, namely in the post-harvest process, which is still drying manually without a fermentation process that can improve the quality of the cacao beans themselves.

4. Conclusions
Based on the research results above, for an agricultural commodity that which are agricultural base will be described as follows: Food plants commodity, which is commodity base, have an average LQ value of > 1, namely green beans with an average LQ value of 1,602; Soybeans with an average LQ value of 1,548; Corns with an average LQ value of 1,141 and rice with an average LQ value of 1,003. The commodities that are the main focus of government are soybeans, corn, and rice. Although a commodity base, in fact, the cultivation of green beans commodity is less famous to the people of Bolaang Mongondow Regency. Farm plantation commodity, which is commodity base have an average LQ value of > 1, namely candlenut with an average LQ value of 6,465; coffee with an average LQ value of 5,914 and cacao with an average LQ value of 3,510. The commodity that is the main focus of the government is cacao. Fruits commodity, which is commodity base, have an average LQ value of > 1, namely pineapple with an average LQ value of 3,891; Mango with an average LQ value of 1,274 and mangosteen with an average LQ value of 1,109. The commodity that is the main focus of the government is pineapple. Vegetable horticultural plants commodity which is the commodity base have an average LQ value of > 1 namely spinach with an average LQ value of 3,081; Long beans with an average LQ value of 1,845; Kale with an average LQ value of 1,808; also eggplant and potatoes both have an average LQ value of 1,685 and 1,437. The commodity that is the main focus of the government is potatoes.

References
[1] Saragih B 2005 Agribisnis Paradigma Baru Pembangunan Ekonomi Berbasis Pertanian (Bogor: Yayasan Mulia Pesada)
[2] BPS 2017 Keadaan Angkatan Kerja di Indonesia Agustus 2017
[3] Sofiyanto 2015 Analisis Peran Sektor Pertanian Dalam Pembangunan Daerah Di Kabupaten Batang (Pendekatan Location Quotient dan Shift Share Analysis) Skripsi. (Universitas Islam Negeri Syarif Hidayatullah. Jakarta)
[4] Sembiring S A 2012 Analisis Pengaruh Komoditi Jagung Terhadap Pengembangan Wilayah Di Kabupaten Dairi
[5] Arsyad L 2010 Ekonomi Pembangunan (Yogyakarta: UPP STIM YKPN)
[6] Luvianita A A 2017 Analisis Komoditas Unggulan Pertanian Tanaman Pangan Berdasarkan Metode Location Quotient (LQ) di Kabupaten Karanganyar Tahun 2014-2016
[7] Hortikultura D J 2013 Manfaat Buah-buahan
[8] KlikBMR.com. 2017 Pemprov Sulut Apresiasi Produksi Nanas Lobong Makassar (Makassar)
[9] Zulkarnain 2009 Definisi Hortikultura