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ANALYSIS OF LEADING COMMODITY OF AGRICULTURAL, FORESTRY, AND FISHING SUBSECTORS IN ACEH

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ABSTRACT

Growth Regional Domestic Product (GRDP) is an indicator to measure the success of economic condition. The 27,92 percent Aceh's GRDP is contributed by agricultural, forestry, and fisheries sector, but this sector's growth is decreased. This study aims to explore the leading subsector/commodity in agricultural, forestry, and fisheries sector. This study uses secondary data in the form of Aceh's GRDP and Indonesia GDP from 2017-2021 taken from the Aceh BPS and Indonesia BPS Websites. Data is analyzed with three approaches namely Static Location Quotient (SLQ), Dynamic Location Quotient (DLQ) and Differential Shift (DS). It is found that the superior subsectors are horticultural crops, husbandry, and agricultural services & hunting with leading commodities namely large chilli, cayenne pepper, shallots, long beans, cucumber, bananas, papaya goats, broilers, free-range chickens, and ducks Furthermore, the sub-sector that has the potential to become a leading sector in the future is palm oil.. Although the competitiveness of the agricultural, forestry and fisheries sectors is still lower than the national level. However, this sector still plays a large role towards Aceh's GRDP.

INTRODUCTION

The economic success of a region can be seen from the Gross Regional Domestic Product (GRDP) value. GDRP is the added value generated by all economic units in a certain period. It is also an indicator of the economic growth of a region/country. GRDP of a region can be related to the welfare of its people and is able to describe the condition of the economy, whether the economy is good or not.

Aceh is one of the provinces in Indonesia whose capital city is in Banda Aceh. Consisting of 23 districts/cities, Aceh is given the status of a special region and special economic authority. Aceh is located on the northern tip of the island of Sumatra and is the westernmost province of Indonesia.

Aceh is also one of a province in Indonesia which its GRDP depends on the agricultural, forestry, and fishing sector. This table 1 presents the GRDP of Aceh Province at 2010 constant prices by sectors from 2017 until 2021:

Table 1. GRDP of Aceh Province at 2010 constant prices by sectors, 2017-2021 (billion rupiahs)

Sector	2017	2018	2019	2020	2021
Agricultural, Forestry, &Fishing	**34,052.85**	**35,426.16**	**36,626.71**	**37,899.52**	**37,768.0**
Mining and Quarrying	8,581.30	9,152.51	9,688.84	10,485.33	10,385.70
Manufacturing	5,921.44	6,410.26	6,339.51	6,058.65	6,212.09
Electricity &Gas	183.98	197.74	211.49	217.37	216.91
Water Supply, sewerage, waste Management & Remediation Activities	38.76	41.54	51.60	50.11	51.38
Construction	11,631.12	11,949.48	12,566.59	13,900.44	13,837.07
Wholesale &Retail Trade; Repair of Motor Vehicles &Motorcycles	18,962.35	19,730.31	20,324.49	19,238.23	20,051.15
Transportation &Storage	9,328.49	9,577.63	9,861.28	7,056.69	8,433.30
Accommodation &Food Service Activities	1,544.95	1,672.91	1,785.44	1,649.24	1,548.50
Information &Communication	4,305.40	4,401.24	4,632.57	5,187.37	5,580.29
Financial &Insurance Activities	2,063.20	2,081.25	2,342.97	2,355.95	2,236.32
Real Estate Activities	4,860.86	5,156.65	5,511.00	5,445.68	5,666.65
Business Activities	769.83	820.69	868.55	840.81	842.99
Public Administration &Defence; Compulsory Social Security	10,807.85	11,486.17	11,851.14	11,459.04	12,190.19
Education	3,009.11	3,248.12	3,529.03	3,651.65	3,696.48
Human Health &Social Work Activities	3,509.14	3,712.30	3,991.56	4,170.44	4,575.35
Other Services Activities	1,670.36	1,759.41	1,886.80	1,914.46	1,957.15
Gross Regional Domestic Product	**121,240.98**	**126,824.37**	**132,069.57**	**131,580.97**	**135,249.59**

Sources : (BPSAceh, 2022)

The table above shows that the most contributed sector to the revenue for Aceh is the agricultural, forestry, and fisheries sector which can earn 37,768.08 billion Rupiah. This sector also contributes 27,92 percent of Aceh's GRDP. Nonetheless, in 2021, compared to the previous year, this sector's growth decreased which was 0,35 percent.

The decrease in the growth of the agricultural, forestry, and fishing sector is certainly a problem that must be overcome by the government of Aceh Province, on the consideration the importance of this sector which is the largest industry in the formation of Aceh's GRDP. It is known that Aceh Province has an area of 5,677,081 hectares which certainly has abundant leading sectors, starting from agricultural, forestry, plantations, livestock, and also fisheries. The length of the coastline and the breadth of the sea in Aceh Province is also believed to be very promising potential in the fisheries sector. Per year, Aceh produces 180,000 tons of captured fisheries (BPSAceh, 2021).

Each region certainly has its own potential sectors as a source of regional income and this can cause the government in every region/province are required to give more attention to the most potential sector (Zuhdi, 2021). The government of Aceh is expected to be capable of exploring the existing potential/ leading sectors. Exploring the leading sectors and commodities of a region is very useful for increasing the GRDP value.

The agricultural, forestry, and fisheries sectors have a very strategic role in the development of the national economy (Sari & Bangun, 2019). The agricultural, forestry, and fisheries sector is a human business activity which includes farming, fishing, animal husbandry and forestry activities (Nooralam et al., 2019) . This sector also can absorb a large number of laborers (Hayati et al., 2017), most poor people in developing countries depend on the agricultural, forestry, and fisheries (Ramlawati, 2020). Based on data published by BPS, this sector was able to absorb 37,40 percent of the workforce in February 2021 (BPSAceh, 2021). In addition, the agricultural, forestry, and fisheries sectors are providers of basic needs for the community as well as a provider of raw materials produced by other economic sectors (Rashidghalam, 2020). Thus, the agricultural, forestry and fisheries sectors have a role in the development of the industrial sector in a region (Kurniawati, 2020). A successful agricultural, forestry, and fisheries sector is a prerequisite for the development of the industrial and service sectors (Rante et al., 2018). Field studies show that several countries in the world managed to build sustainable economy and its economy driven by the industrial sector and the service sector after being initiated by the success of the agricultural, forestry, and fisheries sector (Niara & Zulfa, 2019).

This study aims to find the leading sub-sectors/commodities in the agricultural, forestry and fisheries sectors by using the Static Location Quotient (SLQ), Dynamic Location Quotient (DLQ), and Differential Shift (DS) approaches. By knowing the leading subsectors/commodities, it is hoped that

Aceh government will be able to intensify the commodities' production, make policies that increase the added value of the commodities, and minimize the problems faced by this sector.

Compared to the previous study, this study is becoming interesting, because this study combines three different approaches (SLQ, DLQ, and DS) in determining the leading subsector/commodities in the agricultural, forestry, and fisheries sectors in Aceh province. Besides, similar studies have never been conducted in Aceh. So, this study is expected can contributes to Aceh's government to increase the added value to its GRDP so that economic development will occur in Aceh.

RESEARCH METHODS

Method of Collecting Data

This study was conducted in Aceh Province, Indonesia. The considerations for selecting study sites because Aceh province has a large agricultural and coastal area. However, the value of GRDP in the agricultural, forestry and fisheries sectors has decreased.

This research is quantitative descriptive research with secondary data taken from BPS Aceh province. The data taken is in the form of GRDP values for the agricultural, forestry and fisheries sectors at constant prices by sectors from 2017 to 2021.

Data Analysis Method

The analytical method used in this study uses the Static Location Quotient (SLQ), Dynamic Location Quotient (DLQ), and Differential Shift (DS) method to explore the potential that exists in a region.

Static Location Quotient (SLQ)

Static Location Quotient (SLQ0 is an indicator used to measure sectors, subsectors, and basic/leading commodities in a region (Maasawet et al., 2021). SLQ can also be defined as a comparison between the magnitude of the role of a sector/industry in a region on the magnitude of the role of the sector/industry nationally (Wati & Arifin, 2019). Sector/commodity is the leading sector if the value of SLQ>1 which show the sector is capable serving the market both inside and outside the region. A sector is not a leading sector/commodity if the value of SLQ < 1, which indicates a sector has not been able to serve the market in the region (Amalia & Yulistiyono, 2020).

The general formula of SLQ is as follows:

$$\mathbf{SLQ}=\frac{(X_i^r/X^r)}{(X_i^n/X^n)}$$

Where :

SLQ : the value of agricultural, forestry, and fishery sectors in Aceh Province

X_i^r : Added value of the agricultural, forestry and fisheries sector in Aceh Province

X^r : GRDP of Aceh Province

X_i^n : Added value of the agricultural, forestry, and fisheries sectors in Indonesia

X^n : GDP of Indonesia

With these following criterias:

1. SLQ = 1, it indicates that the level of specialization in agricultural, forestry, and fisheries subsector in Aceh Province is equal with the same subsector in Indonesia. In other words, this subsector is only sufficient to meet Aceh's needs.
2. SLQ > 1, this explains the level of specilization in agricultural, forestry, and fisheries subsector in Aceh is higher than similar sector in Indonesia. It also shows that this subsector is capable serving the market needs, both inside and outside the region (basis/leading commodities).
3. SLQ < 1, this explains the specialization of this subsector is lower than similar subsectors in Indonesia. It indicates this sub sector has not been able to serve the market in Aceh (non basis/leading commodities).

Dynamic Location Quotient (DLQ)

To analyze the role of sub sectors that have the potential to become leading commodities in the future, this research uses Dynamic Location Quotient (Umasugi, 2019). The criteria for the DLQ test results are as follows if DLQ > 1 : subsector/commodity can still be expected to become the leading sector/commodity in the future or it can be said that it is a prospective sector. Conversely, if DLQ < 1, the subsector/commodity cannot be expected to become the prospective leading subsector/commodity (Sihombing, 2018). DLQ can be calculated by the following formula:

$$\boldsymbol{DLQ} = \frac{(\mathbf{1}+\boldsymbol{gik})/(\mathbf{1}+\boldsymbol{gk})^{\boldsymbol{t}}}{(\mathbf{1}+\boldsymbol{gtp})/(\mathbf{1}+\boldsymbol{gp})}$$

Where :

DLQ : Dynamic Location Quotient

gik : The average GRDP growth of agricultural, forestry, and fishing subsector in Aceh province

gtp : The average GDP growth of agricultural, forestry, and fishing subsector in Indonesia
gp : The average growth of total GRDP in Indonesia
t : time (year)

Differential Shift (DS)

Differential Shift is used to measure the net Aceh Province shift caused by industrial sectors that grow faster or slower than the Indonesia level (Negara & Putri, 2020). DS is an indicator that gives explanation/information in determining the competitiveness of regional industries with economy at a higher level (Basuki & Mujiraharjo, 2017). Regions that have locational advantages, such as good resources will have a positive differential shift component (D>0), whereas areas that do not have locational advantage will have a negative differential shif component (D<0) (Muharam & Sutoni, 2020). This method can use the following formula:

$$\boldsymbol{Dsr, i, t = \frac{Er, i, t}{Er, i, t-n} - \frac{EN, i, t}{EN, i, t-n}}$$

Where :
Dsr : Differential Shift
Er,i,t : GRDP to agricultural, forestry, and fishing subsector final year of Aceh
Er,i,t-n : GRDP to agricultural, forestry, and fishing subsector the first year of Aceh
EN,i,t : GDP to agricultural, forestry, and fishing subsector final year of Indonesia
EN,i,t-n : GDP to agricultural, forestry, and fishing subsecto in the first year of Indonesia

RESULTS AND DISCUSSION

The Agricultural, Forestry, and Fisheries Sector

Economic development has several staple element which means the economic changes that occur continuously, there is an increase in income per capita and lasts in the long term (Bembok et al., 2020). The success of economic development can be assessed through Gross Regional Domestic Product (GRDP) (Bungkuran et al., 2021). GRDP is composed of various sectors economy such as agricultural, forestry, and fisheries, industrial sector, sector processing, financial services sector as well other sectors (Rahman et al., 2019).

Aceh is a province in Indonesia whose GRDP value is mostly contributed by the agricultural, forestry and fisheries sectors. This sector contributes 27,92 percent to Aceh's GRDP, the total contribution of this sector is the largest

compared to other sectors. But the GRDP value in this sector decreased by 0.35 percent.

The decline in the value of GRDP in this sector must be overcome due to the agricultural, forestry, and fisheries sectors is the sector that provides food, fodder, and other goods through crop cultivation and animal husbandry **(Frouz & Frouzová, 2022)**. This sector is the root of the resource economics because if the population increases, this sector will the function as a food provider (Aruga, 2022). Many developing countries have a comparative advantage in some form of agricultural, forestry, and fisheries activity. This sector is composed of sub-sectors of food crops, horticulture, animal husbandry, plantations, forestry and fisheries.

Static Location Quotient (SLQ)

By exploring the leading sectors/commodities, the Aceh government can determine regional potential in this sector, make policies to accelerate the pace of economic growth, and help the government determine project areas. To see the potential in the agricultural, forestry and fisheries sectors, this research uses the SLQ method. As for the results of the calculation of the SLQ value of agricultural sub-sector commodities in Aceh province forestry and fisheries are presented in the table 2:

Table 2. Calculation results of SLQ (Location Quotient) in Aceh Province 2017-2021

Sector	**SLQ**				
Agricultural, Forestry, & Fishing	**2017**	**2018**	**2019**	**2020**	**2021**
Agricultural, Husbandry, Hunting & Agricultural Service	1,02	1,02	1,03	1,02	1,04
a. Food Crops	0,84	0,82	0,81	0,77	0,71
b. Horticultural Crops	1,18	1,16	1,16	1,10	1,22
c. Plantation	0,92	0,93	0,94	0,92	0,98
d. Husbandry	1,16	1,16	1,16	1,14	1,16
e. Agricultural Services &Hunting	2,48	2,48	2,48	2,41	2,53
Forestry &Logging	1,06	1,04	0,98	0,96	0,81
Fishery	0,88	0,88	0,89	0,92	0,87

From table 2 we can conclude that the forestry sub-sector is not a leading sub-sector because the SLQ value is < 1. Although, in 2017 and 2018 this sub-sector was a leading sub-sector, in the following years the SLQ value was always below 1. The fisheries sub-sector is also not a leading sub-sector because the SLQ value < 1.

Futhermore, the agricultural, husbandry, hunting & agricultural service sub-sectors are the leading sub-sectors which SLQ > 1. Since year 2017 to 2020 this sub-sector has become a leading sector with an SLQ value that is always

more than one. Even though there is a decrease in the added value of GRDP in this sector in 2021, the SLQ value > 1.04 in 2021 shows an increase compared to the previous year where the SLQ value was > 1.02 in 2020. This indicates that the Aceh province is able to meet the needs in its territory in this sub-sector and is also able to meet the needs in outside areas (exports) due to a surplus in these three subsectors.

In other words, Aceh Province specializes in these three sub-sectors. Specifically, for the horticultural crops are the leading sub-sector because the SLQ value is above one. With the leading commodities are large chili, followed by cayenne pepper, shallots, long beans, and cucumber. These commodities have very wide planting area and abundant production every year. If viewed from the type of fruit, bananas, and papaya are the leading commodities in the province of Aceh.

Table 2 also shows that the husbandry is the leading subsector, with the leading commodities are goats, broilers, free-range chickens, and ducks. Production's amount of these commodities increase compared to the previous year. It is also shown that Agricultural Services & Hunting is the leading subsector which has SLQ value > 1. The SLQ's value of this subsector is the highest among other subsector.

Based on theory, these leading subsectors/commodities are able to meet demand and be able to export outside the region. SLQ analysis able to assist Aceh province in determining leading commodities in its region (Nazipawati, 2007). The agricultural, forestry, and fishing sub-sector is the largest contributor to Aceh's GRDP. Aceh is very dependent on this subsector. So that the decline in GRDP in this sector should be a serious concern. Determining the leading sub-sectors is believed to provide an accurate analysis of which commodities should be given special attention so their growth in production will be increased. The abundant production will be exported outside Aceh province and generate profits for the province of Aceh (Nazipawati, 2007).

The sales results obtained can certainly be used to develop commodities that are already leading commodities and also increase the amount of production of commodities that are not yet superior such as food crops, plantation crops, forestry, and fisheries to the point where they can afford it become the leading sectors/commodity.

Dynamic Location Quotient (DLQ)

To see the fast or slow growth rate in the agricultural, forestry and fisheries sectors in Aceh Province, this study uses the Dynamic Location Quotient (DLQ) method. This method is also used to see the prospects of a sector/commodity. If DLQ > 1, it can be concluded that this sub-sector/commodity can become a leading sub-sector/commodity in the future. And conversely if DLQ < 1 then the sector in the future will not be a leading

sector (Anggraini et al., 2023). The results of the calculation of DLQ can be seen in table 3 below:

Table 3. Calculation results of DLQ (Dynamic Location Quotient) in Aceh Province

Sector	gik	1+gik	gtp	1+gtp	(1+gik)/(1+gk)	(1+gtp)/(1+gp)	T	DLQ	Explanation
Agricultural, Forestry, & Fishing	3,16	4,16	3,01	4,01	1,022	0,916	5	1,73	**prospective sector**
Agricultural, Husbandry, Hunting &Agricultural Service	3,57	4,57	2,768	3,768	1,122	0,861	5	3,763	**prospective sector**
a. Food Crops	-0,97	0,03	0,842	1,842	0,008	0,421	5	0	non-prospective sector
b. Horticultural Crops	5,23	6,23	4,18	5,18	1,531	1,183	5	3,63	prospective sector
c. Plantation Crops	5,65	6,65	3,55	4,55	1,633	1,039	5	9,575	prospective sector
d. Husbandry	3,74	4,74	3,27	4,27	1,166	0,975	5	2,438	prospective sector
e. Agricultural Services &Hunting	3,79	4,79	2,688	3,688	1,178	0,842	5	5,345	prospective sector
Forestry &Logging	-4,12	-3,12	1,064	2,064	-0,767	0,471	5	-11,403	**Non prospective sector**
Fishery	3,34	4,34	4,56	5,56	1,067	1,27	5	0,419	**Non prospective sector**

From table 3 above, the DLQ value can be interpreted if the value DLQ>1 means that the sub-sector in Aceh Province is developing quickly or it can be said that this sub-sector has the potential to become a leading sub sector/commodity in the future. Furthermore, if DLQ<1, That is, the sub-sector is growing slowly, or it could also be assessed that this sub-sector/commodity is predicted not to become a leading sector/commodity in the future. Table 3 above presents data that the sub-sector that has the potential to become a leading sector in the future is horticultural crops which DLQ= 3,63>1, plantation crops DLQ= 9,575 > 1, animal husbandry which DLQ= 2,438>1, and agricultural services and hunting which DLQ 5,345 > 1.

Based on the results of data analysis, the Aceh government can intensify production of sub-sectors/commodities that have the potential/prospective to become leading sectors in the future that is plantation. The plantation sub-sector based on the results of the SLQ analysis is not a leading sub-sector. However, the high growth rate makes this sub-sector potentially to become a leading sub-sector in the future which indicates by DLQ value 9,75 > 1. This DLQ calculation is proven to be used as a reference to find out which commodities will become the leading sub-sectors in the future (Nurul Hidayah et al., 2023)

In this plantation sub-sector, the leading commodity is palm oil. This is due to the increasing number of oil palm plantations in Aceh. This large area of oil palm fields causes to the increasing production continuously. This prospective commodity is expected to become a leading commodity in Aceh. The government of Aceh should provides some policies to improve the quality and quantity of seeds and seedlings to maintain this fast commodities' growth. In the future this subsector can be developed to become a leading subsector in Aceh. And also this indicates that in the future, the commodity of palm oil will increase become the main source of GRDP for the province of Aceh

Differential Shift (DS)

Differential Shift serves to describe the deviation between the growth of agricultural, forestry, and fishery sectors in Aceh Province against growth in the agricultural, forestry, and fisheries sectors in Indonesia. Differential Shift is used to determine sector competitiveness in Aceh's agricultural, forestry, and fisheries sectors when compared to growth at the national level (Adi, 2017)**.** The differential shift assessment indicator is if the DS is positive then the sub-sector has high competitiveness when compared at the national level. Conversely, if DS is negative then the competitiveness of the agricultural, forestry and fisheries sub-sectors is low compared to the national level.

In general, the competitiveness of the agricultural, forestry, and fisheries sectors in Aceh is still lower when compared to the national level. However, the results of the Differential Shift assessment presented in table 4 below, show that there are subsectors that have high competitiveness at the national level, namely horticultural crops, plantation, husbandry, and Agricultural Services & Hunting with positive Differential Shift calculation results. Furthermore, the following table 4 presents the results of calculating the Differential Shift values for the agricultural, forestry and fisheries sub-sectors in the province of Aceh:

Table 4. Calculation results of DS (Differential Shift) in Aceh Province 2017-2021

Sector	2017	2018	2019	2020	2021
A. Agricultural, Forestry, & Fishing	0,0133	0,00149	-1,0361	0,01703	-0,0222
1. Agricultural, Husbandry, Hunting &Agricultural Service	0,0249	0,00315	-1,0331	0,01104	-0,0002
a. Food Crops	0,0576	-0,0166	-0,9827	-0,0361	-0,0746
b. Horticultural Crops	0,0087	-0,0155	-1,0553	-0,0417	0,10164
c. Plantation Crops	0,0186	0,01851	-1,0456	-0,0134	0,07044
d. Husbandry	0,0039	0,00764	-1,0778	-0,0069	0,01633
e. Agricultural Services &Hunting	0,0209	0,00146	-1,0317	-0,0165	0,04965
2. Forestry &Logging	-0,0019	-0,0173	-1,0037	-0,0064	-0,1712
3. Fishery	-0,0348	0,00156	-1,0573	0,05016	-0,0817

This following table 5 shows the analyzed data of agricultural, forestry, and fishery subsector of Aceh in 2021 by using SLQ, DLQ, and DS.

Table 5. Analyzed data of agricultural, forestry, and fishery subsector of Aceh in 2021 by using SLQ, DLQ, and DS

Sector	SLQ	DLQ	Differential Shift
A. Agricultural, Forestry, & Fishing			
1. Agricultural, Husbandry, Hunting &Agricultural Service	1,04	1,73	-0,0002
a. Food Crops	0,71	3,763	-0,0746
b. Horticultural Crops	1,22	3,63	0,10164
c. Plantation Crops	0,98	9,575	0,07044
d. Husbandry	1,16	2,438	0,01633
e. Agricultural Services &Hunting	2,53	5,345	0,04965
2. Forestry &Logging	0,81	-11,403	-0,1712
3. Fishery	0,87	0,419	-0,0817

After analyzing the data with three approaches, it can be concluded that in general, the agricultural, forestry, and fisheries sectors are the leading sectors that play a very important role in the formation of Aceh's GRDP, marked by an SLQ value = 1.04 > 1 with the leading subsectors namely horticultural crops, husbandry and agricultural services & hunting. This sector is also predicted to remain a leading sector for the next few years due to the DLQ value = 1.73 > 1. The Aceh government is deemed necessary to develop the potential that exists in the region, and stimulate the production of sub-sectors that have rapid development such as cash crops which is predicted to be the leading subsector.

Even though in general the competitiveness of this sector is still lower compared to the national level which can be seen from the Differential Shift calculation which has a negative sign, the Aceh government is expected to take strategic steps to increase the competitiveness of this sector. The Aceh

government can consider improving the quality of raw materials for production, forming a research institute to find superior seeds in this sector, creating derivative products to increase selling value, carry out promotions, and carry out biotechnology innovations.

CONCLUSIONS AND SUGGESTIONS

Conclusions

Based on the results of data analysis, it can be concluded that the agricultural, forestry and fisheries sectors play an important role in the formation of Aceh's GRDP. This can be indicated by an SLQ value > 1 which means that this sector is a leading sector and is predicted to still be a leading sector in a few years later by seeing the DS value which more than 1. Although the competitiveness of this sector is still low, the Aceh government is expected to be able to add value to this sector.

The findings from this study are that horticultural crops, husbandry, and agricultural services and hunting are the leading sub-sectors with their leading commodities namely, large chili, cayenne pepper, shallots, long beans, cucumber, bananas, papaya goats, broilers, free-range chickens, and ducks. However, forestry and fisheries are not the leading sub-sectors of the agricultural, forestry and fisheries sectors

The sub-sector that is predicted to have the potential to become a leading sub-sector is plantations and palm oil is the potential commodity. Although this sub-sector is not leading one but this sub-sector has the opportunity to become a leading sub-sector in the future. Competitiveness for this sector is also considered to be still lower compared to the national level. However, there are several subsectors that have high competitiveness. In general, the agricultural sector still plays a very important role in increasing GRDP in Aceh Province.

Suggestion

Based on the results of this study, the researchers suggest to the Aceh government improve the quality of raw materials, create technological development innovations in accelerating harvests as well as creating superior seeds and seedlings, and developing derivative products from this sector. after this improvement, it is hoped that the production output of this sector will increase which in turn will increase the GRDP value of Aceh province.

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