



Regional Development Based on Leading Agricultural Commodities of Food Crop in Cianjur Regency, West Java Province, Indonesia

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Abstract: In preparing the direction of the regional development plan, it is necessary to pay attention to determining the main focus of development. One of the strategies that can be used in Cianjur Regency is to develop areas based on leading agricultural commodities. This study aims to provide direction for regional development plan based on leading agricultural commodities of food crop in Cianjur Regency. The area that became the object of research consisted of 32 sub-districts. The data used in this study is harvest area of each commodities in 2019 - 2023. In determining the sub-district's leading commodities using Location Quotient, Differential Shift-Share analysis, and use Scalogram analysis to determining regional hierarchy. The results showed that paddy is the leading commodities on 15 sub-district's or 47% of the total sub-districts in Cianjur, followed by cassava 28%, soybean 25%, corn and sweet potatoes 22%, and peanuts 19%. 7 (seven) sub-districts are included in hierarchy I, other 7 (seven) sub-districts are included in hierarchy II, and other 18 (eighteen) sub-districts are included in hierarchy III. Priority direction for regional development in Cianjur Regency is leading commodities in sub-districts with hierarchy I as the main regional development or in hierarchy II as the supporting regional development. The result of this study can also serve as a resource for contextual science education in the region, strengthening local scientific literacy and planning capacity.

Keywords: Hierarchy; Leading Commodities; Regional Development; Sub-districts.

Introduction

Development is a total change of a society or an adjustment of the social system as a whole without ignoring the variation in the basic needs and desires of individuals and social groups in it. One of the development policies that is seen as appropriate and strategic in the context of regional development in Indonesia is the development of the local economy. Local economic development policies are based on the development of sectors that are the top priorities pursued in the economy of local communities (Wiranto, 2007). Economic development in developing countries faces various challenges, such as low incomes, high

unemployment rates, and slow regional economic development (Mukhlis et al., 2023). These challenges require comprehensive solutions that involve regional autonomy policies.

Agricultural development in Indonesia plays a vital role in the country's economic landscape. At the beginning of the New Order era, the regulations concerning agricultural prosperity greatly influenced the farming approaches within Indonesia (Sutanto, 2002; Mukhlis et al., 2024; Rauf et al., 2024).

According to Tumangkeng (2018); Purnaditya (2024), the theory of regional economic growth is used to analyze a region as an open economic system connected to other regions through the flow of

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production factors and the exchange of sectors and commodities. Economic conditions play a crucial role in influencing people's lives as a whole; the ability of people to create sustainability in their lives is highly dependent on economic growth. Therefore, it can be concluded that high welfare in society is a direct reflection of strong economic health at the same time. As a result, the dominant sector describes the basic structure of the economy and can therefore be considered as one of the aspects or characteristics that influence an economic system (Hajeri et al., 2015).

Cianjur Regency as the 2nd largest region in West Java Province has a development policy focus on economic growth and equity. In addition, Cianjur Regency is a region that implements regional autonomy and seeks to manage its regional economy by exploring existing regional potential. Although, Cianjur Regency is classified as a relatively underdeveloped area in West Java Province with a poverty rate of 10.14% compared to the poverty rate in West Java Province of 7.46% in 2024 (BPS, 2024). In order to improve the economy of Cianjur Regency, regional development can be carried out based on leading economic sectors. The economy in Cianjur Regency is supported by three main sectors, namely the Agriculture, Forestry, and Fisheries Sector, the Wholesale and Retail Trade Sector, and the Transportation and Warehousing Sector. In 2019-2023, the largest Gross Regional Domestic Product (GRDP) figure in Cianjur Regency came from the Agriculture, Forestry, and Fisheries Sector or this sector contributed the most at average of 32.52% of the total GRDP of Cianjur Regency in 2019-2023. The food crops subsector contributed the most at 15.80% in 2023 (BPS, 2024b). Hence, it is needed to determine the leading commodities agriculture in each sub-district's of Cianjur Regency to optimize regional development.

Each sub-district in Cianjur Regency certainly has different facilities so that analysis is needed based on agricultural infrastructure data, agribusiness markets, the number of KUDs, and others. Determining the agricultural growth pole is one solution that can be taken to accelerate the development of a region. Amid of limited funds to carry out development, through the determination of the agricultural growth pole, the government can focus more on developing the region, which will later provide a positive multiplier effect to the areas behind it. Determining the agricultural growth pole through hierarchical analysis can make it easier for the Regional Government to accelerate the improvement of regional welfare. This study can also serve as a resource for contextual science education in the region, strengthening local scientific literacy and planning capacity.

This study aims: 1) to analyze the leading agricultural commodities of food crop in Cianjur Regency, 2) to analyze the agricultural growth pole in

Cianjur Regency, 3) Directions for regional development in Cianjur Regency.

Method

Location of Research

The research was conducted in Cianjur Regency, West Java Province, which is located at coordinates 106°42' - 107°25' East Longitude and 6° 21' - 7° 25' South Latitude or is located in the southern part of the equator.

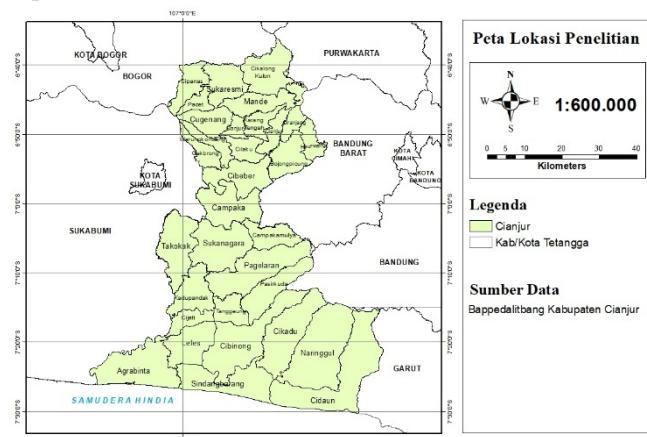


Figure 1. Location of Research

Data Collection Methods

The data used in this study is secondary data. Data collection methods were carried out by literature study. The literature study technique helps collect secondary data published by institutions related to leading food crop commodities development in Cianjur Regency. Secondary data are in the form of harvest area of paddy, cassava, soybean, sweet potatoes, peanuts, and corn from 2019-2023 in each sub-district and in Cianjur Regency. Also this study used latest village potential data collection (PODES) from Badan Pusat Statistik (BPS).

Data Analysis Method

The method used in this study is descriptive with a quantitative approach.

Location Quotient (LQ)

LQ is a method that uses the comparison of the share of harvest area in a particular comodities in a sub-district with the share of harvest area in the same commodities throughout the region (Harjanti et al., 2021). The LQ method aims to determine the leading commodities in each sub-district. This economic base theory was put forward by Richardson (2001); Lolowang et al (2014) which states that the main determinants of regional economic growth are directly related to the demand for goods and services from outside the region. From the point of view of the

economic base theory, each region is an integrated socio-economic system.

Basically, LQ analysis results in a relative comparison between the capacity of commodities in the surveyed area and the capacity of the same commodities in a wider area. According to Bendavid-Val in (Sapriadi & Hasbiullah, 2015), the formula is follows:

$$LQ = \frac{p_{ij}/pt_j}{P_i/P_t} \quad (1)$$

Note:

p_{ij} : harvest area of commodities i in sub-district j

pt_j : sum of harvest area of all commodities i in sub-district j

P_i : harvest area of commodities i in Cianjur Regency

P_t : sum of harvest area of all commodities in Cianjur Regency

If $LQ > 1$, commodities i is the base commodities in sub-district j and has the potential to be developed as a backbone of the regional economy.

If $LQ \leq 1$, commodities i is the non base commodities in sub-district j and less potential to be developed as a backbone of the regional economy.

Differential Shift-Share (DSS)

Shift-share analysis commonly used to analyze the economic changes in the structure of a regional economy relative to the economic structure of a wider administrative area as a comparison or reference within a certain period of time. Shift-share analysis consists of 3 components, namely the Share component, the Proportional Shift component and the Differential Shift component. This study used differential shift to show the competitiveness of commodities in the sub-district against the same commodities in region (Harjanti et al., 2021). If the deviation result is positive, hence called competitive commodities in the area (Hidayat, 2013). The differential shift-share calculation method used is as follows:

$$C_{ij} = P_{ij} (r_{ij} - r_n) \quad (2)$$

Where r_{ij} and r_n represent the growth rate of sub-district i and the growth rate of Cianjur Regency, which are respectively defined as follows:

$$r_{ij} = (P^{*ij} - P_{ij})/P_{ij} \quad (3)$$

$$r_n = (P^{*n} - P_n)/P_n \quad (4)$$

Note:

i : agricultural commodities studied

j : regional variables studied

C_{ij} : Competitive advantage of agricultural commodity i in sub-district j

P_{ij} : harvest area of commodity i in sub-district j in the base year

P^{*ij} : harvest area of commodity i in sub-district j in the final year

P_n : total harvest area of all commodity in Cianjur Regency in the base year

P^{*n} : total harvest area of all commodity in Cianjur Regency in the final year

r_n : Total growth rate of all commodities in Cianjur Regency in the base year

r_{ij} : Total growth rate of commodity i in sub-district j in the base year

Table 1. Leading commodities criteria

LQ / DSS	$DSS > 0$	$DSS \leq 0$
$LQ > 1$	Leading commodities	Non leading commodities
$LQ \leq 1$	Non leading commodities	Non leading commodities

The criteria for leading commodities is $LQ > 1$ and $DS > 1$, if one of the criteria does not meet, it is not considered as leading commodities. The combination of LQ and DS method were used in several previous studies to identify the leading commodities (Hendriany et al., 2024; Hariyanti and Syahza, 2024; Wazhari et al., 2023; Zamhari et al., 2017) and leading sectors in the region (Wahyuni et al., 2024; Wijaya et al., 2020).

Agricultural Growth Pole

The regional hierarchy is calculated using the weighted scalogram method (Rustiadi et al., 2011) as a form of refinement of the previously developed scalogram method. The scalogram method considers availability of infrastructure in the form of service facilities owned by an area (Ramadhani et al., 2022). The type of data used is sourced from the Podes data with several variables. The variables used in this study are modified variables with consideration of these variables in line with the research objectives and related to cultivation and agricultural institutions. The types of data used are the number of cooperatives, the number of active cooperatives, the number of Village Unit Cooperatives (KUD), the number of Non-KUDs, the number of Village-Owned Enterprises (BUMDES), the number of micro-businesses, the number of partnered micro-businesses, the number of people's markets, the number of farmer groups, the number of agricultural extension workers, the number of Plant Pest Control Office (POPT), the number of Community Food Estate (LPM) obtained from the Village Potential of Cianjur Regency in figures 2024. The equation used is:

$$K_{jr} = \frac{(X_{jr} - \min(X_r))}{\sigma_r} \quad (5)$$

where:

K_{jr} : standard value of hierarchy index for sub-district j and facility r

Min (Xr) : minimum value of facility index r
 Sr : standard deviation value of facility r

The determination of the level of development of the sub-district area refers to the value of the Sub-district Agricultural Development Index (SADI) (Panuju and Rustiadi, 2013):

Hierarchy I : SADI > stdev+average
 Hierarchy II : average ≤ SADI ≤ stdev+average
 Hierarchy III : SADI < average

Development Direction

Regional development direction is carried out by overlaying the result of leading commodities with the regional hierarchy with criteria seen on Table 2.

Table 2. Regional development direction

Criteria		
Leading commodity	Hierarchy	Direction
Yes	Hierarchy I	directed towards main development
Yes	Hierarchy II	directed towards supporting development
Yes	Hierarchy III	not directed
No	Hierarchy I/II/III	not directed

Result and Discussion

Leading commodities analysis

Food crop commodities in Cianjur Regency are paddy, corn, soybeans, peanuts, cassava, sweet potatoes, green beans, and taro in several sub-districts. Based on the harvest area data in 2019-2023, the commodities with the highest average harvest area are paddy (158,766 hectares) followed by soybeans (23,358 hectares), corn (22,846 hectares), cassava (8,403 hectares), peanuts (6,777 hectares), and sweet potatoes (1,153 hectares). The harvest area is spread across 32 sub-districts in Cianjur Regency (Food Crops and Horticulture Service of Cianjur Regency, 2024).

Based on the results of the LQ analysis and differential shift-share of the 2019-2023 harvest area of paddy, corn, soybeans, peanuts, sweet potatoes, and cassava in 32 sub-districts of Cianjur Regency, the distribution of leading commodities in each sub-district is as depicted in Table 3.

The criteria for leading commodities in each sub-district are LQ value > 1 and positive differential shift share (DS >0), meaning that the commodity is a base commodity and has a competitive advantage. Table 3, shows that each sub-district has leading food crop commodities that are prioritized for development. The sub-districts with the most leading food crop commodities are Sukaluyu and Ciranjang sub-districts, followed by Cianjur and Sukaresmi sub-districts.

Table 3. Leading food crop commodities in Cianjur Regency

Sub-districts	Leading Commodities						Total
	Paddy	Cassava	Corn	Soybean	Peanuts	Sweet Potatoes	
Sukaluyu	✓	✓	✓	✓	✓	-	5
Ciranjang	✓	✓	-	✓	✓	✓	5
Cianjur	✓	✓	✓	-	-	✓	4
Pacet	✓	✓	-	-	-	-	4
Sukaresmi	-	✓	✓	-	✓	✓	4
Sindangbarang	✓	✓	-	✓	-	-	3
Pasirkuda	-	-	-	✓	✓	✓	3
Cibeber	✓	-	✓	-	-	✓	3
Warungkondang	✓	-	✓	-	-	✓	3
Cikadu	✓	-	-	-	✓	-	2
Tanggeung	-	-	✓	-	-	✓	2
Cilaku	✓	-	-	-	✓	-	2
Mande	✓	✓	-	-	-	-	2
Cikalongkulon	✓	-	-	✓	-	-	2
Agrabinta	-	-	-	✓	-	-	1
Leles	✓	-	-	-	-	-	1
Cidaun	✓	-	-	-	-	-	1
Naringgul	-	-	✓	-	-	-	1
Kadupandak	-	-	-	✓	-	-	1
Cijati	-	-	-	✓	-	-	1
Takokak	✓	-	-	-	-	-	1
Sukanagara	-	✓	-	-	-	-	1
Campakamulya	-	✓	-	-	-	-	1
Haurwangi	✓	-	-	-	-	-	1
Total	15	9	7	8	6	7	54
%	47%	28%	22%	25%	19%	22%	

Note: LQ > 1, DS > 0

Paddy are a priority for development in 15 sub-districts or 47% of the total sub-districts, cassava is a priority for development in 9 sub-districts or 28% of the total sub-districts, soybeans are a priority for development in 8 sub-districts or 25% of the total sub-districts, corn and sweet potatoes are a priority for development in 7 sub-districts or 22% of the total sub-districts, and peanuts are a priority for development in 6 sub-districts or 19% of the total sub-districts. Meanwhile Cibinong, Pagelaran, Campaka, Gekbrong, Bojongpicung, Karangtengah, Cugenang, and Cipanas are sub-districts that did not have leading food crop commodities.

Based on Wibisonya (2021), the potential that exists and has various unique advantages if utilized and managed professionally will be able to help the government in poverty alleviation programs in Cianjur Regency. This potential can be seen in the area of agricultural land in Cianjur Regency. Cianjur Regency has an agricultural land area of 237,500 hectare spread across each sub-district.

The results of the analysis of leading food crop commodities in each sub-district can be the basis for compiling a synergistic regional development strategy by looking at which commodity can be developed

quickly as it is the resource potential and have comparative and competitive advantages to be developed so that they can improve the welfare of the community (Hariyanti & Rendra, 2022; Surachman et al., 2022; Gustia et al., 2024).

Agricultural Growth Pole

The scalogram provides a picture of the hierarchy or ranking order of regions based on the type and number of development facility units from the most to the least so that the growth pole can be determined. In the scalogram analysis, to determine the level of regional growth based on the availability of regional facilities according to the number and type of units (Rondinelli, 1985; Wahyudin, 2022). In this analysis, PODES data was used with a total of 12 facilities that are directly or indirectly related to the sustainability of the agricultural process in Cianjur Regency. The determination of the level of development of the sub-district area refers to the value of the Sub-district Agricultural Development Index (SADI). Sub-districts with SADI values $>$ stdev+average are classified as Hierarchy I, sub-districts with average values $<$ SADI $<$ stdev+average are classified as Hierarchy II, and sub-districts with SADI values $<$ average are classified as Hierarchy III (Panuju & Rustiadi, 2013). The hierarchy of the Cianjur Regency area can be seen in Table 4.

Hierarchy I in this study has a SADI value of $>$ 18.27, there are 7 sub-districts, namely Cianjur, Campakamulya, Agrabinta, Cijati, Kadupandak, Naringgul, and Sukaluyu, which means that the seven sub-districts are centers of agricultural growth in Cianjur Regency in terms of adequate facilities and supporting the agricultural process that runs well directly or indirectly, it can also be said that the seven sub-districts have a high level of development in the agricultural sector. Meanwhile, for Hierarchy II, it has a SADI value between or equal to 14.44 - 18.27, there are 7 sub-districts, namely Sukanagara, Leles, Cikadu Cidaun, Karangtengah, Cibinong, and Cilaku, which means that the sub-district has a moderate level of agricultural development and needs further development. Hierarchy III has a GPA value $<$ 14.44, there are 18 sub-districts, which means that the low level of agricultural development dominates Cianjur Regency. This is not in line with the economic structure in Cianjur Regency which is dominated and supported by the agricultural sector so that it is necessary to improve agricultural facilities to support the implementation of regional development activities based on the agricultural sector optimally.

In order to grow rapidly, a region needs to have one or more regional growth pole, which are expected to trigger growth for other regions around it (Restiatun, 2009). Rapid growth in growth pole is expected to trickle down, one of which is expected to absorb the

potential work of weak regions. In addition, an economic sector is needed that is able to accelerate development for other sectors so that a region can experience accelerated growth (Rustiadi et al., 2011).

Table 4. Regional Hierarchy of Cianjur Regency

Hierarchy	Sub-districts	SADI	Sum of types of facilities
Hierarchy I	Cianjur	22.54	8
	Campakamulya	22.43	10
	Agrabinta	21.52	10
	Cijati	18.95	10
	Kadupandak	18.86	11
	Naringgul	18.85	11
	Sukaluyu	18.31	11
Hierarchy II	Sukaluyu	18.31	11
	Campakamulya	22.43	10
	Agrabinta	21.52	10
	Cijati	18.95	10
	Kadupandak	18.86	11
	Naringgul	18.85	11
	Sukaluyu	18.31	11
Hierarchy III	Sindangbarang	13.68	10
	Ciranjang	13.33	11
	Pasirkuda	12.54	7
	Takokak	12.54	10
	Cugenang	12.54	10
	Warungkondang	11.90	10
	Mande	11.89	9
	Tanggeung	11.74	10
	Sukaresmi	11.68	9
	Campaka	11.43	11
	Cipanas	11.43	10
	Bojongpicung	11.20	10
	Cikalongkulon	10.81	11
	Pacet	10.53	9
	Cibeber	10.47	11
	Gekbrong	10.39	9
	Haurwangi	10.10	10
	Pagelaran	9.43	10
Average		14.44	9.91
Stdev.		3.83	1.00

Note: Hierarchy I : SADI $>$ 18.27, Hierarchy II : 14.44 \leq SADI \leq 18.27, Hierarchy III: SADI $<$ 14.44.

Direction of Regional Development in Cianjur Regency

Based on the results of the LQ, DS, and scalogram analysis, leading food crop commodities in each sub-district were obtained with LQ values $>$ 1, DS $>$ 0 or positive, and the highest regional hierarchy based on agricultural support facilities and infrastructure, both directly and indirectly. By combining the three analysis results, the direction of regional development can be formulated using the overlay technique, which can be seen in Figure 2.

The priority for regional development based on leading food crop commodities is in Sukaluyu District with leading food crop commodities of rice, cassava, corn, soybeans, and peanuts supported by a high level

of agricultural development indicated by obtaining an SADI values > 18.27 or Hierarchy I. Sukaluyu District and Cianjur District can be made as a center for the development of leading food crop commodities in Cianjur Regency, while Ciranjang & Sukaresmi Districts cannot yet become centers for the development of leading food crop commodities considering that the

infrastructure does not yet support the agricultural process or is in hierarchy III. Sukaluyu and Cianjur district as the agricultural growth pole in Cianjur regency expected to trickle down leading food crop commodities of other sub-district that has weak agriculture development.

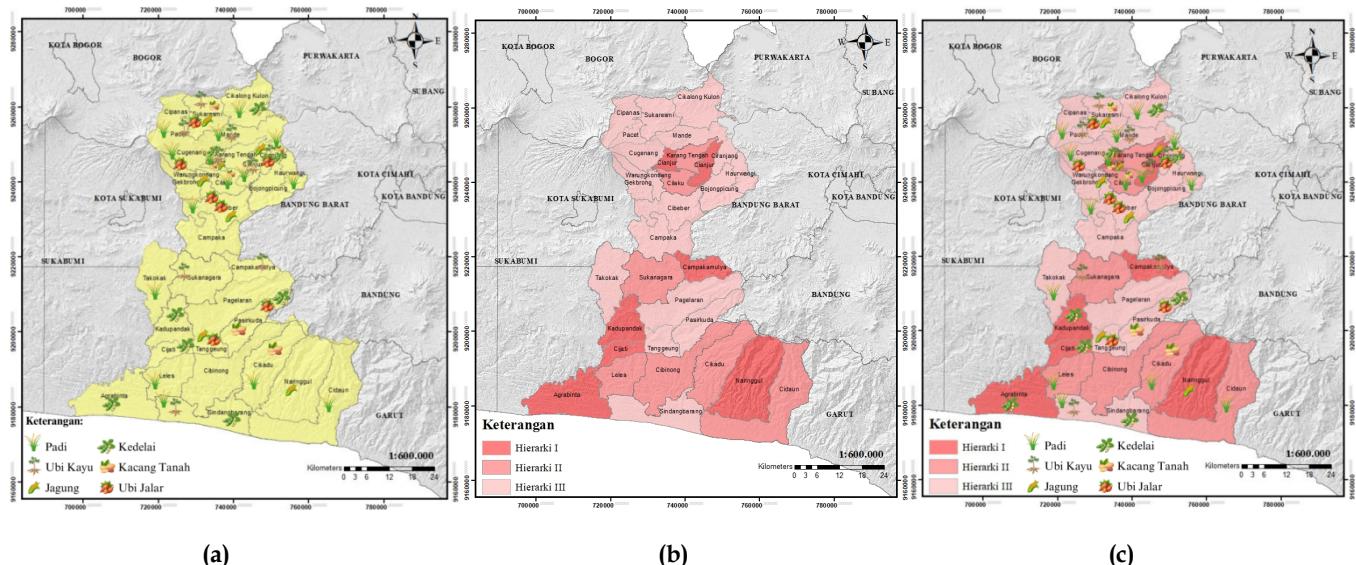


Figure 2. (a) Map of leading food crop commodities in Cianjur Regency, (b) Map of regional hierarchy in Cianjur Regency, (c) Map of direction for development of leading food crop commodities in Cianjur Regency

Based on the scalogram analysis, 2 (two) categories of development direction for each commodity were obtained, namely those that can be developed in the main sub-district (Hierarchy I) and supporting sub-district (Hierarchy II), which can be seen in Table 5.

Table 5. Regional development direction

Commodity	Regional Development Direction	
	Main Sub-district	Supporting Sub-district
Paddy	Sukaluyu & Cianjur	Cikadu, Leles, Cilaku
Cassava	Campakamulya, Sukaluyu, Cianjur	Sukanagara
Corn	Naringgul, Sukaluyu, Cianjur	-
Soybean	Agrabinta, Cijati, Kadupandak, Sukaluyu	-
Peanuts	Sukaluyu	Cilaku
Sweet potatoes	Cianjur	-

The direction of rice commodity development is in the main sub-districts (Hierarchy I) of Sukaluyu and Cianjur Sub-districts and supporting sub-districts (Hierarchy II) of Cikadu, Leles, and Cilaku Sub-

districts. For cassava commodities, commodity development is directed at the main sub-districts (Hierarchy I) of Campakamulya, Sukaluyu, and Cianjur and supporting sub-districts (Hierarchy II) of Sukanagara Sub-district. Corn commodities are in the main sub-districts (Hierarchy I) of Naringgul, Sukaluyu, and Cianjur Sub-districts. Soybean commodities are in the main sub-districts (Hierarchy I) of Agrabinta, Cijati, Kadupandak, and Sukaluyu. Peanut commodities are in the main sub-districts (Hierarchy I) of Sukaluyu Sub-district and supporting sub-districts of Cilaku Sub-district. Sweet Potato Commodity, namely the main sub-district (Hierarchy I) of Cianjur sub-district.

Leading commodities that have the potential to be developed optimally and can be a resource to drive the economy in each sub-district, the local government needs to continue to optimize these commodities so that they continue to grow progressively by increasing investment in each sector or by providing supporting facilities and infrastructure. As mention by (Ristianingrum et al, 2016), the sustainability of paddy rice business in Cianjur Regency need government support related to the infrastructure. By this result, the local government can be focus in determining the annual budget for regions which are agricultural growth pole, especially for leading food crop

commodities that have large contribution to improving the economy in Cianjur Regency. Also this study can also serve as a resource for contextual science education in the region, strengthening local scientific literacy and planning capacity.

Conclusion

Paddy are the leading food crop commodities in 15 sub-districts or 46.88% of the total sub-districts, cassava commodities are the leading food crop commodities in 9 sub-districts or 28.13% of the total sub-districts, soybean commodities are the leading food crop commodities in 8 sub-districts or 25.00% of the total sub-districts, corn and sweet potatoes are the leading food crop commodities in 7 sub-districts or 21.88% of the total sub-districts and peanut commodities are commodities Superior food crops in 6 sub-districts or 18.75% of the total sub-districts. Hierarchy I with a GPA of > 18.27 there are 7 sub-districts, namely Cianjur, Campakamulya, Agrabinta, Cijati, Kadupandak, Naringgul, and Sukaluyu. Hierarchy II with a GPA of 14.44-18.27 there are 7 sub-districts, namely Sukanagara, Leles, Cikadu Cidaun, Karangtengah, Cibinong, and Cilaku. The rest of 18 sub-districts are on Hierarchy III with a GPA of < 14.44.

The direction of paddy development is in the main sub-districts (Hierarchy I) of Sukaluyu and Cianjur and the supporting sub-districts (Hierarchy II), namely Cikadu, Leles, and Cilaku. For cassava commodities, the development of commodities is directed to the main sub-districts (Hierarchy I) of Campakamulya, Sukaluyu, and Cianjur as well as the supporting sub-district (Hierarchy II) of Sukanagara District. Corn commodities in the main sub-districts (Hierarchy I) of Naringgul, Sukaluyu, and Cianjur Districts. Soybean commodities in the main sub-districts (Hierarchy I) Agrabinta, Cijati, Kadupandak, and Sukaluyu. Peanut commodities in the main sub-district (Hierarchy I) are Sukaluyu sub-district and the supporting sub-district of Cilaku District. The Sweet Potato Commodity is the main sub-district (Hierarchy I) of Cianjur sub-district. By this result, this study can also serve as a resource for contextual science education in the region, strengthening local scientific literacy and planning capacity.

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Author Contributions

Conceptualization and methodology: G.K.S; validation: S.M and A.E.P; formal analysis: G.K.S; data curation: S.M and A.E.P; preparation of initial draft: G.K.S; writing review and editing: G.K.S., S.M and A.E.P.

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Conflicts of Interest

In writing this article the authors do not have any conflict of interest.

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