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The potential of the agricultural sector in Cirebon Regency, Indonesia: Application of LQ, DLQ, and Klassen Typology Methods for the 2020–2024 Period

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Abstract

This study aims to analyze the role and development of the agricultural sector in Cirebon Regency for the 2020–2024 period using the Location Quotient (LQ), Dynamic Location Quotient (DLQ), and Klassen Typology methods. The data used are the sectoral GRDP of Cirebon Regency (2020–2024) from BPS, as well as comparative data on the GRDP of West Java Province. The LQ method is used to identify the basic (leading) sector by comparing the contribution of the agricultural sector to local and provincial GRDP. The DLQ method takes into account the growth rate of each sector compared to the province. The Klassen Typology groups sectors based on their growth rate and GRDP contribution relative to the provincial average. The results show that the agricultural sector in Cirebon is a basic sector (LQ=1.77) but its growth is slower than the average (DLQ<1), so based on the LQ-DLQ analysis it is classified as basic but not prospective (Quadrant III). However, in the Klassen Typology, the agricultural sector falls into Quadrant I (developed and growing rapidly) because the sector's growth (5.9%) exceeds the provincial rate (5.56%), and its contribution (15.28%) exceeds the provincial rate (8.64%). This finding indicates that despite agriculture's substantial contribution and potential (Quadrant I), its economic growth is relatively weak. Therefore, policies are needed to strengthen the agricultural sector in Cirebon so that it can play a more optimal role in regional development.

Keywords: Location Quotient (LQ); Dynamic Location Quotient (DLQ); Klassen Typology; Cirebon Regency; Contribution of the Agricultural Sector

1. Introduction

Indonesia is an agrarian country, where the majority of its population works in agriculture. Indonesia is an archipelago with five main large islands: Sumatra, Java, Sulawesi, Kalimantan, Nusa Tenggara, and Papua. Each island has its own agricultural commodity strengths, such as Sumatra, which excels in palm oil, rubber, and coffee; Java, which excels in sugar cane and tobacco; Kalimantan, which excels in palm oil and rubber; Sulawesi, which excels in coconut, cocoa, and cloves; and Papua, which excels in forest products. Cirebon Regency is located on the island of Java, where it excels in rice, mangoes, shallots, and large chilies [1].

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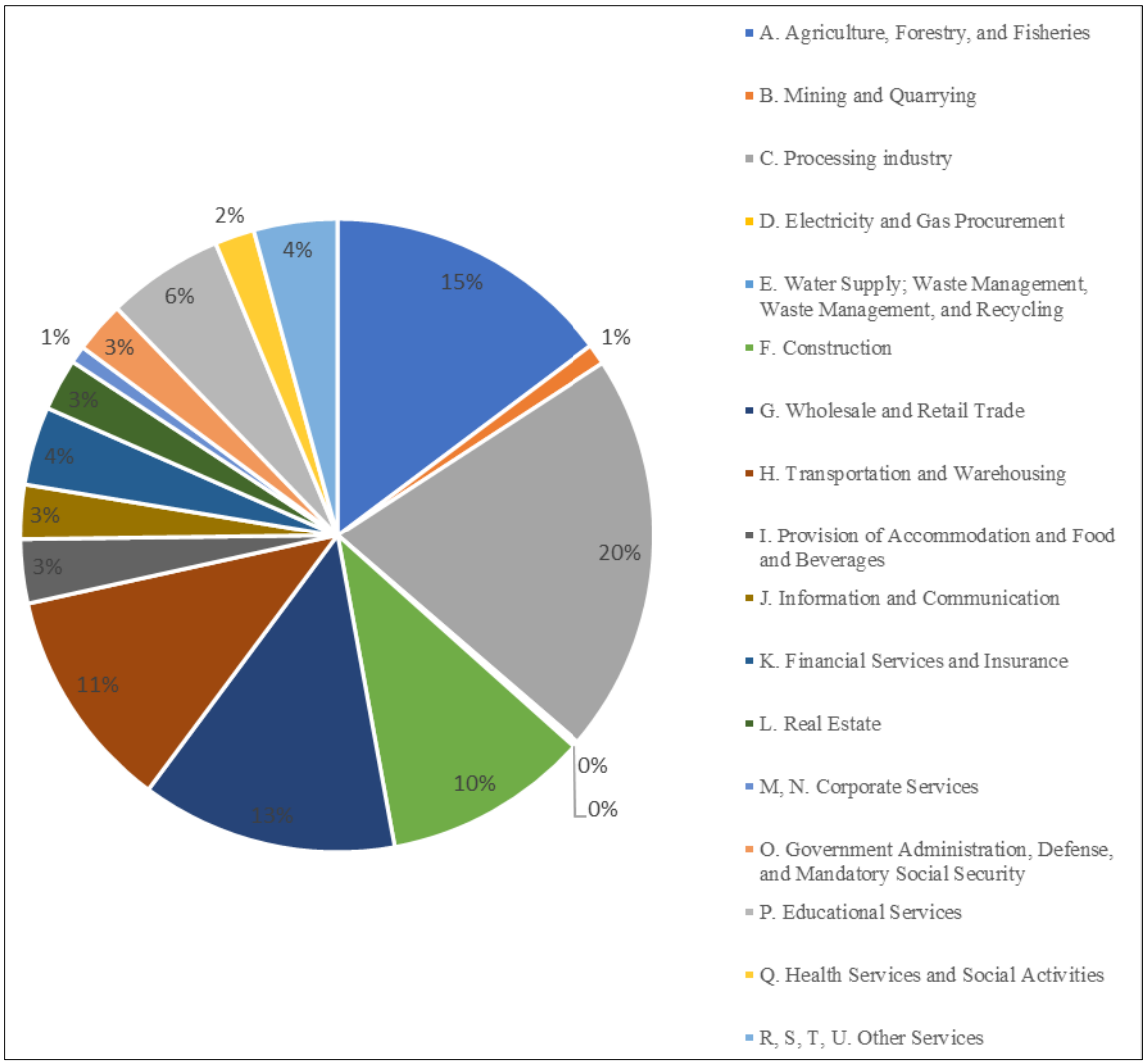


Source: BPS Data [2] Processed by the Author

Figure 1 GRDP According to Business Sector of Cirebon Regency

Regional economic development is an important component in implementing regional autonomy policies. As explained in Law No. 23/2014, regional autonomy gives regional heads the authority to manage local resources to accelerate the economy [3]. Improving the regional economy will also support sustainable and equitable national development. GRDP (Gross Regional Domestic Product) can be a macroeconomic indicator for measuring the regional economy [4,5]. GRDP analysis allows for the identification of sectors that contribute to regional growth [5]. The contributing sectors include agriculture, mining, industry, electricity and gas supply, water supply, construction, trade, transportation, accommodation provision, information, financial services, real estate, and services.

The agricultural sector plays a strategic role in regional economic development, including in Cirebon. As one of the rice-producing areas on the Pantura route [6], the agricultural sector contributes a significant percentage to Cirebon's GRDP. Based on Figure 1 and BPS data from Cirebon Regency in 2025 [2], the contribution of the agricultural sector (including forestry and fisheries) reached 15% of GRDP in 2024, ranking second after the processing industry sector. With the growth rate seen in Figure 2, the agricultural sector's GRDP experienced a decline in growth rate of -1.8% in 2020, and consistently experienced growth from 2021 to 2024, with a growth percentage reaching 8.2% in 2024 [2]. This is interesting to study further, because the agricultural sector also plays an important role in reducing unemployment and maintaining local food security [7].

To assess the position and potential of the agricultural sector in Cirebon Regency, common regional analysis methods can be used, such as the Location Quotient (LQ) Method, Dynamic Location Quotient (DLQ), and Klassen Typology Analysis. LQ measures based on a comparison of sectors in the study area and the reference area. DLQ overcomes the

weaknesses of the LQ method by calculating the growth rate so that it can assess the potential for future sector/commodity development [8,9]. Meanwhile, Klassen Typology groups regions into 4 quadrants based on the contribution of sectors/commodities and growth rates compared to larger reference areas [10]. These three analyses are commonly used by researchers to identify superior sectors and sector development in a region [11–15].

Several studies have applied a combination of LQ, DLQ, and Klassen Typology to determine leading sectors and regional development plans [16]. This comprehensive approach is needed to understand the agricultural sector of Cirebon Regency as an economic base while evaluating its competitiveness and growth.

2. Materials and Methods

This study applies a descriptive quantitative method. The aim is to observe, describe, and interpret the collected data. This study uses secondary data, namely the GRDP of Cirebon Regency and West Java Province for the 2020–2024 period, as published by the Central Statistics Agency. Data analysis used the LQ, DLQ, and Klassen Typology Analysis methods [2,17,18].

2.1. Location Quotient (LQ)

The Location Quotient (LQ) method divides the economic sector into two sectors, namely the basic and non-basic sectors. The basic sector shows that the sectors/commodities of the study area (Cirebon Regency) are significantly superior when compared to the sectors of the reference area (West Java Province). The LQ calculation uses the formula formulated by Bendavid Val [5], namely:

$LQ = \frac{Xi/_{PDRBi}}{Xa/_{PDRBa}}$	Note Xi = Regional Sector *i* Xa = Reference Area Sector *a* $PDRBi$ = Regional GRDP *i* $PDRBa$ = GRDP of reference area *a*

The interpretation of the LQ calculation results is as follows

- If LQ > 1, then the sector is a basic sector (superior/specialist). This means that region *i* has export-oriented sectors/commodities
- If LQ < 1, then the sector is a non-basic sector. This means that region *i* production of these sectors/commodities is only sufficient to meet the region's internal needs
- If LQ = 1, then region *i* has the same proportion as reference region *a*

2.1.1. Dynamic Location Quotient (DLQ)

Dynamic Location Quotient (DLQ) is a method for measuring sector growth compared to total growth in a wider reference area, thus showing the prospects for future sector/commodity development in the study area. The LQ calculation uses a formula formulated by Bendavid Val [5], namely:

$DLQ = (\frac{1 + gik/_{1 + gk}}{1 + gtp/_{1 + gp}})^t$	Note: gik = Average sectoral GRDP growth rate of the region *i* gk = Average growth rate of regional GRDP *i* gtp = Average sectoral GRDP growth in the reference region *a* gp = Average GRDP growth of reference region *a* t = Time (years)

The interpretation of the DLQ calculation results is as follows:

- If DLQ > 1, then the sector is a Prospective Sector. This means the growth rate of region *i* is higher than that of reference region *a*

- If DLQ < 1, then the sector is a Non-Prospective Sector. This means the growth rate of region *i* is lower than that of reference region *a*
- If DLQ = 1, this means the growth rate of the study region (*i*) is the same as that of reference region (*a*)

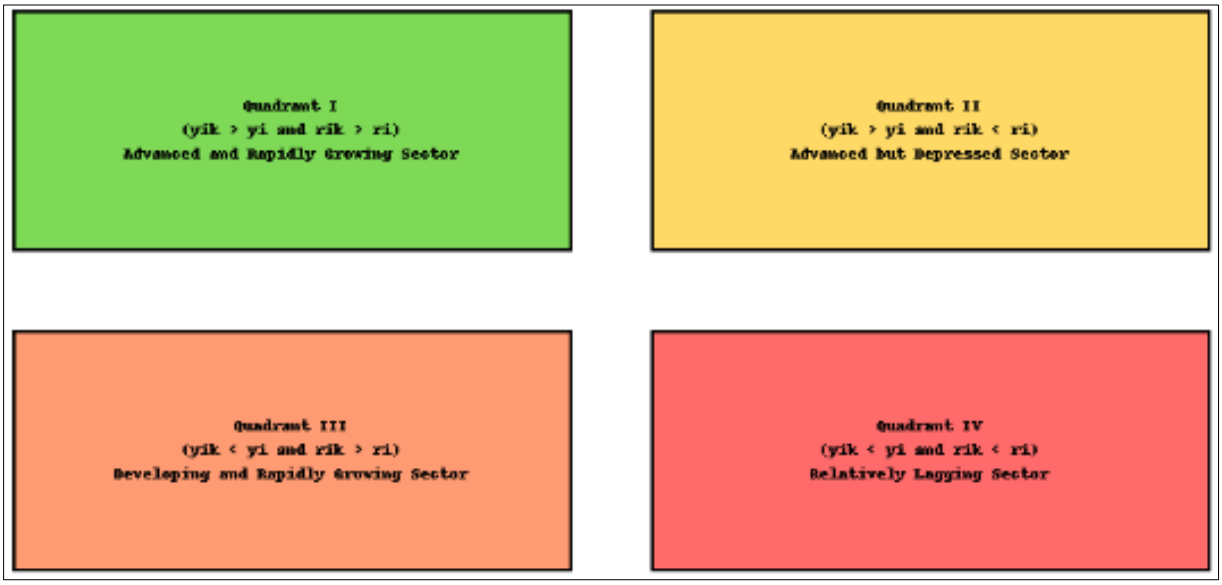
2.2. Analisis LQ dan DLQ

After calculating the LQ and DLQ analysis, referring to Hutajulu (2025) [19], LQ DLQ calculations can be classified into four types:

- Type I: Regions included in the Prospective Basic Sector/Commodity. This category contains regions that are currently classified as basic and will remain so in the future
- Type II: Regions included in the Prospective Non-Basic Sector/Commodity. The region will experience a repositioning from the non-basic sector to the basic sector in the future
- Type III: Regions included in the Basic Sector/Commodity but not in the Prospective Sector. The region has experienced a repositioning and will not be able to become a basic sector in the future
- Type IV: Regions included in the Non-Basic Non-Prospective Sector/Commodity. The region has not experienced a repositioning and will remain a non-basic sector in the future

2.3. Klassen Typology

The Klassen typology classifies sectoral and regional economic characteristics based on GRDP data and its growth dynamics. This method classifies units into four quadrants: 1) Advanced and Rapidly Growing Sectors, 2) Advanced but Depressed Sectors, 3) Potential Sectors or Sectors with the Potential to Develop Rapidly, and 4) Relatively Underdeveloped Sectors. The categorization is based on two key parameters: the average growth rate and the average sector/commodity contribution [5,17].



Source: Hilmiyah, 2025 [5]

Figure 2 Sectoral Matrix Klassen Typology Method

2.3.1. Keterangan

- *yik* = Average sectoral contribution in the region *i*
- *yi* = Average sectoral contribution in the reference area *a*
- *rik* = Average rate of economic growth in the region *i*
- *ri* = Average economic growth rate in the reference area *a*

Referring to Kuncoro (2004) as cited by Hilmiyah, 2025 [5], regions will be classified into four quadrants:

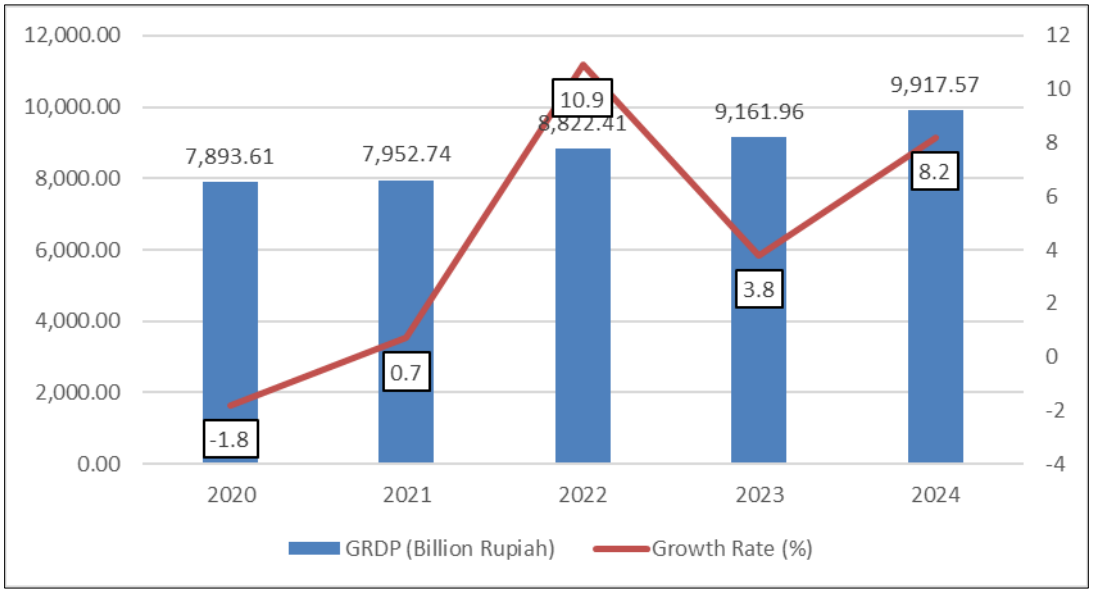
- Quadrant I: regions in the Advanced and Rapidly Growing Sector. This category contains regions with growth rates and contributions exceeding those of the reference region
- Quadrant II: regions in the Advanced but Depressed Sector. Regions with a greater contribution than the reference region, but with a lower growth rate
- Quadrant III: regions in the Potential Sector or those with the Potential to Develop Rapidly. Regions with a higher growth rate than the reference region, but with a lower contribution
- Quadrant IV: regions in the Relatively Underdeveloped Sector. Regions with a growth rate and contribution lower than those of the reference region

3. Result and Discussion

3.1. Agricultural Sector in Cirebon Regency

In the agricultural sector, Cirebon Regency is known as a major rice producer along the Pantura route [6]. Based on data from the Central Statistics Agency (BPS) in 2025 [2], in 2024 the Agriculture, Forestry, and Fisheries Sector contributed 15% of Cirebon Regency's total GRDP, and ranked second behind the processing industry, which contributed 20%. Figure 2 shows that the growth rate of the Agriculture, Forestry, and Fisheries Sector showed a decline in 2020, and consistently increased from 2021 to 2024.

The growth rate of the agricultural sector in 2024 is around 8.2%, which is considered high [2]. The agricultural sector plays a significant role in the socio-economy, not only providing food but also providing employment [20]. Ellis (2000) [20] states that increased productivity will improve the welfare of farming families. FAO (2022) [20] adds that agricultural development in rural areas will reduce economic inequality and strengthen social stability.



Source: BPS Data [2] Proccessed by the Author

Figure 3 Dynamics of GRDP and Growth Rate of the Agriculture, Forestry, and Fisheries Sector in Cirebon Regency 2020 – 2024

3.2. Analysis of LQ and DLQ Cirebon Regency

The Location Quotient (LQ) calculation is performed to determine the basic and non-basic sectors, using data from the Cirebon Regency GRDP and the West Java Province GRDP. The following are the results of the LQ calculation for Cirebon Regency for 2020-2024

Table 1 Cirebon Regency LQ 2020 - 2024

Sector	2020	2021	2022	2023	2024	LQ
A. Agriculture, Forestry, and Fisheries	1.726	1.777	1.816	1.770	1.754	1.769
B. Mining and Quarrying	0.955	0.969	0.932	1.026	1.091	0.995
C. Processing industry	0.500	0.494	0.487	0.485	0.495	0.492
D. Electricity and Gas Procurement	0.397	0.407	0.389	0.407	0.409	0.402
E. Water Supply; Waste Management, Waste Management, and Recycling	1.076	1.075	1.096	1.258	1.353	1.172
F. Construction	1.328	1.310	1.338	1.268	1.242	1.297
G. Wholesale and Retail Trade	0.992	1.020	0.986	0.942	0.903	0.969
H. Transportation and Warehousing	1.582	1.625	1.640	1.728	1.819	1.679
I. Provision of Accommodation and Food and Beverages	1.108	1.122	1.130	1.119	1.063	1.108
J. Information and Communication	0.753	0.698	0.698	0.683	0.735	0.713
K. Financial Services and Insurance	1.392	1.386	1.440	1.496	1.440	1.431
L. Real Estate	2.112	2.073	2.079	2.031	2.273	2.114
M, N. Corporate Services	2.076	2.076	2.044	2.078	1.909	2.037
O. Government Administration, Defense, and Mandatory Social Security	1.361	1.493	1.490	1.543	1.460	1.470
P. Educational Services	1.790	1.827	1.870	1.945	1.824	1.851
Q. Health Services and Social Activities	2.645	2.656	2.634	2.615	2.489	2.608
R, S, T, U. Other Services	1.688	1.702	1.773	1.872	1.800	1.767

Source: BPS Data [2,18] Proccesed the Authors

Based on the results of the LQ calculation (Table 1), 12 of the 17 sectors are Basic Sectors, including the Agriculture, Forestry, and Fisheries Sectors. This indicates that the contribution of the agricultural sector in Cirebon Regency is relatively greater than that of West Java Province. Based on the LQ criteria, this sector is not only able to meet domestic needs, but can also focus on exports/fulfillment of external/surrounding areas [4,9]. On the other hand, 5 sectors have an LQ value <1, meaning that the contribution of this sector is relatively lower than that of West Java Province. Although these sectors are non-basic, these 5 sectors still play a role in local economic growth and have the potential to become basic sectors.

The Dynamic Location Quotient (DLQ) calculation is performed to determine prospective and non-prospective sectors, using data on the sectoral economic growth rate of Cirebon Regency and the economic growth rate of West Java Province (as a reference). The following are the results of the DLQ calculation for Cirebon Regency

Table 2 Cirebon Regency DLQ 2020 - 2024

Sector	(1+gik) / (1+gk)	(1+gtp) / (1+gp)	t	DLQ
A. Agriculture, Forestry, and Fisheries	0.661	0.670	5	0.933
B. Mining and Quarrying	0.846	0.560	5	7.903
C. Processing industry	0.841	0.930	5	0.605
D. Electricity and Gas Procurement	0.616	0.587	5	1.268
E. Water Supply; Waste Management, Waste Management, and Recycling	1.423	0.867	5	11.910
F. Construction	0.747	0.987	5	0.249
G. Wholesale and Retail Trade	0.587	0.886	5	0.127
H. Transportation and Warehousing	1.716	1.427	5	2.511
I. Provision of Accommodation and Food and Beverages	0.939	1.129	5	0.398
J. Information and Communication	0.743	0.843	5	0.531
K. Financial Services and Insurance	0.918	0.891	5	1.161
L. Real Estate	1.130	0.991	5	1.931
M, N. Corporate Services	1.005	1.309	5	0.266
O. Government Administration, Defense, and Mandatory Social Security	0.501	0.353	5	5.786
P. Educational Services	0.638	0.630	5	1.065
Q. Health Services and Social Activities	0.798	1.025	5	0.287
R, S, T, U. Other Services	1.273	1.177	5	1.477

Source: BPS Data [2,18] Proccesed the Authors

Based on the DLQ calculation (Table 2), 8 of the 17 sectors are non-prospective, including the agricultural sector. This indicates that the growth rate of Cirebon's agricultural sector is lower than that of West Java Province. The DLQ of the Agricultural Sector is <1, meaning that the proportion of the agricultural sector's economic growth rate in Cirebon Regency is lower than that of West Java Province. In other words, although the agricultural sector is considered a base sector, its growth rate is much slower. Therefore, more effort is needed to develop the agricultural sector compared to prospective sectors. On the other hand, the remaining 9 sectors are prospective sectors. This means that these sectors show potential for better development in the future compared to West Java Province.

Table 3 LQ and DLQ Sectoral Matrix

Quadrant I	**Quadrant II**
(Prospective Base Sector) E,H,K,L,O,P,(R,S,T,U)	(Prospective Non-Basic Sectors) B,D
Quadrant III	**Quadrant IV**
(Basic Sector, but Non-Prospective) A,F,I,(M,N),Q	(Non-Basic and Non-Prospective Sectors) C,G,J

Source: Proccesed the Authors

The combined analysis of LQ and DLQ places the agricultural sector in Quadrant III (Basic but Non-Prospective Sector) as shown in Table 3. In this matrix, Quadrant III shows an LQ value > 1, DLQ < 1, meaning the agricultural sector is experiencing a growth slowdown [21]. This is in accordance with the statement of Saharuddin (2006) [21], that sectors with basic but non-prospective criteria require special policy strategies. The agricultural sector of Cirebon Regency has

been proven to support the local economy, but to become a driver of greater growth, greater supporting capacity is needed, such as technology investment, market development, and human resource investment.

4. Klassen Typology Analysis of Cirebon Regency

The Klassen Typology analysis and calculations were conducted to identify priority sectors in Cirebon Regency. This analytical approach uses two key parameters in Cirebon Regency and West Java Province, namely: 1) Sectoral Contribution, and 2) Economic Growth Rate [10]. The following are the results of the Klassen Typology calculations and analysis:

Table 4 The Klassen Typology analysis

Sector	yik	rik	yi	ri	Quadrant
A. Agriculture, Forestry, and Fisheries	15.28%	5.95%	8.64%	5.56%	I
B. Mining and Quarrying	1.07%	7.90%	1.08%	4.48%	II
C. Processing industry	20.52%	7.84%	41.68%	8.10%	IV
D. Electricity and Gas Procurement	0.19%	5.47%	0.48%	4.75%	III
E. Water Supply; Waste Management, Waste Management, and Recycling	0.12%	13.96%	0.10%	7.49%	I
F. Construction	10.93%	6.86%	8.43%	8.66%	II
G. Wholesale and Retail Trade	14.02%	5.17%	14.48%	7.67%	IV
H. Transportation and Warehousing	9.36%	17.03%	5.55%	12.97%	I
I. Provision of Accommodation and Food and Beverages	3.22%	8.87%	2.91%	10.05%	II
J. Information and Communication	2.76%	6.8%	3.87%	7.25%	IV
K. Financial Services and Insurance	4.07%	8.65%	2.85%	7.72%	I
L. Real Estate	2.47%	10.88%	1.17%	8.69%	I
M, N. Corporate Services	0.89%	9.56%	0.44%	11.81%	II
O. Government Administration, Defense, and Mandatory Social Security	2.83%	4.27%	1.93%	2.45%	I
P. Educational Services	6.29%	5.70%	3.40%	5.16%	I
Q. Health Services and Social Activities	2.08%	7.39%	0.80%	9.03%	II
R, S, T, U. Other Services	3.88%	12.38%	2.19%	10.52%	I

Source: BPS Data [2,18] Proccesed the Authors

Based on the data in Table 4, Cirebon's agricultural sector has a growth rate of 5.95% and a contribution of 15.28%, while the average growth rate in West Java Province is 5.56% and a contribution of 8.64%. Because both the growth rate and contribution are greater than those of West Java Province, the Agricultural Sector of Cirebon Regency is included in Quadrant I based on the Klassen Typology analysis (Table 5) [10]. Quadrant I is included in the category of Advanced and Rapidly Growing Sectors, this indicates that the agricultural sector is a superior sector with rapid growth.

Table 5 Klassen Typology Sectoral Matrix

Quadrant I	**Quadrant II**
(Advanced Sector-Fast Growth) A,E,H,K,L,O,P,(R,S,T,U)	(Developing Sector But Under Pressure) B,F,I,(M,N),Q
Quadrant III	**Quadrant IV**
(Potential/Developable Sectors) D	(Relatively Underdeveloped Sector) C,G,J

Source: Procced the Authors (2025)

In other words, according to the Klassen Typology Analysis, Cirebon's agricultural sector still possesses the characteristics of a leading economic sector that has the potential to drive regional growth. Its Quadrant I position indicates that, although considered unpromising (see table and explanation of DLQ), the agricultural sector is still growing relatively faster and contributing more than the average for West Java Province. These results reinforce the finding that agriculture is a strong base in the Cirebon region [9,10]. This is in accordance with the principle that regional development needs to prioritize leading sectors [10,20].

The differences in agricultural sector classification in Cirebon Regency using LQ-DLQ Analysis (Quadrant III) and Klassen Typology Analysis (Quadrant I) show two different perspectives. LQ-DLQ Analysis emphasizes current conditions and future growth trends, while Klassen Typology Analysis focuses on the current relative position. This means that Cirebon Regency shows a slowing base, with rapid growth compared to West Java Province [10,21]. For the local government, this finding indicates the need for stability and accelerated growth of the agricultural sector in accordance with its potential [20,21].

4.1. Potential of the Agricultural Sector in Cirebon Regency

The results of the LQ analysis indicate that the agricultural sector of Cirebon Regency is included in the Basic Sector, the DLQ analysis indicates that this sector is included in the Non-Productive Sector, and the results of the Klassen Typology place the agricultural sector in Quadrant I (including the Developed and Growing Sectors). This shows that the Agricultural Sector in Cirebon Regency is a superior export-oriented sector, but this sector has experienced a relative growth slowdown compared to West Java Province, and this sector still has the opportunity to advance and grow in the future.

5. Conclusion

Based on the analysis of the LQ, DLQ, and Klassen Typology in Cirebon Regency for the 2020–2024 period, it can be concluded that the agricultural sector in Cirebon Regency serves as a basic sector (LQ > 1) with a GRDP exceeding the average for West Java Province. However, its growth rate is relatively slow (DLQ < 1), thus categorizing it as a Basic but Not Prospective Sector according to the LQ-DLQ classification. Furthermore, according to the Klassen Typology, the agricultural sector in Cirebon Regency falls into Quadrant I (Advanced and Rapidly Growing Sectors), indicating that in terms of contribution and economic growth rate, the agricultural sector in Cirebon Regency outperforms West Java Province.

This illustrates that the agricultural sector is a mainstay of the local economy with high potential, but requires policy intervention to accelerate its growth. Policy recommendations include improving agricultural infrastructure, supporting technological extension, and strengthening market access so that this sector can contribute more optimally to the development of the Cirebon region.

Compliance with ethical standards

Disclosure of conflict of interest

The author declares that there is no conflict of interest, either current or past, with any affiliated institutions.

Declaration

The views expressed in this paper are solely those of the author and do not represent any affiliated institutions. This work was conducted independently as part of the author's research activities. All results, proposals, and findings are based on the cited literature.

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