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EVALUATION OF THE LEVEL OF SPECIALIZATION IN LEADING URBAN FOOD CROP COMMODITY SECTORS IN SEMARANG CITY

Artawati Ni Wayan Mutia Dewi[1,2], **Gayatri Siwi**[1], **Martini Tri**[2]
[1]Faculty of Animal and Agriculture, University of Diponegoro, Indonesia
[2]Research Center for Sustainable Production and LCA, National Research and Innovation Agency (BRIN), Tangerang Selatan, Indonesia
*E-mail: wayanmutiadewi01@gmail.com

ABSTRACT
In September 2023, Semarang City recorded the highest inflation rate in Central Java, primarily driven by the rising prices of food commodities, particularly rice derived from paddy crops. The imbalance between supply and demand was the main factor contributing to the price volatility. This study aims to analyze the leading food crop commodities in each district of Semarang City using the Location Quotient (LQ) method, as well as to measure the dynamics of production growth through the Dynamic Location Quotient (DLQ) approach. The data utilized consist of time-series data on the production of food crops—including paddy, maize, peanuts, cassava, and sweet potatoes from 2019 to 2023. The research presents a combined analysis of LQ and DLQ across nine districts in Semarang City: Mijen, Banyumanik, Gunungpati, Tembalang, Pedurungan, Genuk, West Semarang, Ngaliyan, and Tugu. The results categorize the food crop commodities into four groups in each district: leading, potential, prospective, and lagging commodities. The findings are expected to serve as a reference for planning the development of food crop commodities to reduce the rate of inflation caused by urban agricultural commodities, thereby contributing to the realization of food security in Central Java.

KEY WORDS
Food, inflation, leading commodities, food security.

In rapidly developing urban areas, food production has become a central issue requiring serious attention. Rapid population growth, ongoing urbanization, and dependence on food supplies from outside the city present significant challenges to ensuring an adequate food supply for urban populations (Kousar et al., 2021). In response to these developments, a planned and targeted approach is needed for the development of urban agricultural areas, along with specialization in the production of food crop commodities.

The development of urban agricultural areas has become crucial in ensuring a reliable and sustainable local food supply (Gunapala et al., 2025). This effort involves enhancing agricultural infrastructure, optimizing available land, and implementing efficient and environmentally friendly farming practices. Thus, the development of urban agricultural areas not only produces high-quality local food but also contributes to strengthening the local economy and enhancing food self-sufficiency at the city level. Moreover, specialization in the production of food crop commodities is essential for maximizing production yields and improving the efficiency of resource utilization (Azaki, 2024). By aligning production with local market demands and considering factors such as agroecological conditions and consumer preferences, food crop commodity specialization can enhance both the productivity and quality of agricultural outputs. This also creates opportunities for the development of local agricultural products with added value and competitive advantages in the market. Thus, the development of urban agricultural areas and specialization in food crop commodity production are two critical components in addressing food security challenges and ensuring sufficient food availability for the growing urban population. Collaborative efforts from the government, businesses, and communities are required to establish a sustainable urban agricultural system capable of meeting the increasingly complex food demands in rapidly developing urban environments.

In September 2023, Semarang City experienced an inflation rate of 0.42%, partly driven by the rising price of rice (BPS, 2023). Rice, which is derived from paddy crops, is a commodity that requires special attention, as it has been identified as a major contributor to inflation in Semarang City. This situation highlights the urgent need for a comprehensive analysis of the food crop commodity sector in Semarang City.

This study aims to provide a deeper understanding of the specialization of leading food crops in each district of Semarang City. The analysis employs the Location Quotient (LQ) and Dynamic Location Quotient (DLQ) methods to identify leading food crop commodities in each district of Semarang City. LQ is used to measure sectoral specialization within a region (Miller et al., 1991; Sausan et al., 2022). The findings of this study are expected to serve as recommendations for the government in developing food agricultural areas aligned with the potential of each district in Semarang City, thereby enhancing production and contributing to controlling inflation caused by food crop commodities, and supporting urban food security efforts (Handayani et al., 2018).

METHODS OF RESEARCH

This research was conducted in Semarang City, the capital of Central Java Province. Semarang City comprises 16 districts; however, only 9 of them produce food crops, namely Mijen, Banyumanik, Gunungpati, Tembalang, Pedurungan, Genuk, West Semarang, Ngaliyan, and Tugu Districts. Therefore, the data analyzed in this study focuses solely on the production data from these 9 districts.

This study utilized secondary data obtained from Semarang City Department of Agriculture (Oktaviani et al., 2023). The data used in this research consist of time-series data from 2019 to 2023 on food crop production including paddy, maize, peanuts, cassava, and sweet potatoes in each district of Semarang City.

The determination of future leading agricultural commodities is conducted using the Dynamic Location Quotient (DLQ), formulated by Mahendra & Suryawardani, 2024; Pujiyanto et al., 2022.

The DLQ calculation results are categorized by Arif et al., 2023:

- DLQ ≥ 1: The production potential of commodity i in the district/city is growing faster than that of the same commodity at the provincial level. Thus, commodity i has the potential to become a leading commodity in the future;
- DLQ < 1: The production potential of commodity i in the district/city is growing slower than that of the same commodity at the provincial level. Therefore, commodity i is less likely to become a leading commodity in the future.

After obtaining the results of the LQ and DLQ analyses, a combined analysis is conducted. The categories for the combined LQ and DLQ analysis are described by Patiung & Wisnujati, 2020:

- Leading Commodities (LQ ≥ 1 & DLQ ≥ 1). These commodities are base commodities in the analyzed district and exhibit a growth rate that is faster than or comparable to the same commodities at the city level.
- Prospective Commodities (LQ ≥ 1 & DLQ ≤ 1). These commodities are base commodities in the analyzed district but have a slower growth rate compared to the same commodities at the city level.
- Potential Commodities (LQ ≤ 1 & DLQ ≥ 1). These commodities are not base commodities in the analyzed district; however, it is growing at a faster or comparable rate compared to the same commodities at the city level.
- Lagging Commodities (LQ ≤ 1 & DLQ < 1). These commodities are neither base commodities in the analyzed district nor growing as fast as the same commodities at the city level.

RESULTS AND DISCUSSION

Several districts in Semarang City show potential in leading food crop commodities. The following table presents the leading food crop commodities in Semarang City:

able 1 – LQ Values of Food Crop Commodities in Semarang City

District	Average LQ Coefficient Value for Food Crop Subsectors Production									
	Paddy		Maize		Cassava		Sweet Potato		Peanut	
	Value	Status	Value	Status	Value	Status	Value	Status	Value	Status
Mijen	0,97	N	0,94	N	1,95	B	2,01	B	0,33	N
Banyumanik	0,87	N	2,07	B	2,84	B				
Gunungpati	1,02	B	0,7	N	1,31	B	1,59	B	3,93	B
Tembalang	0,96	N	1,89	B	0,4	N			0,58	N
Pedurungan	1,08	B	0,2	N						
Genuk	1,02	B	1	B						
West Semarang	1,08	B	0,14	N						
Ngaliyan	1,1	B	0,35	N	0,01	N			0,1	N
Tugu	1,06	B	0,5	N					0,74	N

Source: Processed data, 2025. Notes: B=Base, N=Non Base.

Table 2 – DLQ Values of Food Crop Commodities in Semarang City

District	Average DLQ Coefficient Value for Food Crop Subsectors Production									
	Paddy		Maize		Cassava		Sweet Potato		Peanut	
	Value	Status	Value	Status	Value	Value	Status	Value	Status	Value
Mijen	1,15	B	2,39	B	1,98	B	1,3	B	2,02	B
Banyumanik	1,26	B	28,05	B	4,3	B				
Gunungpati	1,01	B	18,05	B	1,51	B	3,89	B	1,41	B
Tembalang	1,18	B	4,32	B	2,07	B			2,03	B
Pedurungan	1,1	B	2,16	B						
Genuk	1,35	B	86,63	B						
West Semarang	1,04	B	0	N						
Ngaliyan	1,36	B	7,78	B	0	N			0	N
Tugu	1,14	B	11,49	B					1,48	B

Source: Processed data, 2025. Notes: B=Base, N=Non Base.

Table 3 – Combination of LQ and DLQ for Food Crop Commodities in Semarang City

Criteria	DLQ≥1	DLQ≤1
LQ≥1	Leading	Prospective
	1. Mijen District Cassava & sweet potatoes	1. Mijen District -
	2. Banyumanik District Maize & Cassava	2. Banyumanik District -
	3. Gunungpati District Paddy, cassava, sweet potatoes, and peanuts	3. Gunungpati District -
	4. Tembalang District Maize	4. Tembalang District -
	5. Pedurungan District Paddy	5. Pedurungan District -
	6. Genuk District Paddy, maize	6. Genuk District -
	7. West Semarang District Paddy	7. West Semarang District -
	8. Ngaliyan District Paddy	8. Ngaliyan District -
	9. Tugu District Paddy	9. Tugu District -
LQ≤1	Potential	Lagging
	1. Mijen District Paddy, maize, peanuts	1. Mijen District -
	2. Banyumanik District Paddy	2. Banyumanik District -
	3. Gunungpati District Maize	3. Gunungpati District -
	4. Tembalang District Paddy, Cassava, peanuts	4. Tembalang District -
	5. Pedurungan District Maize	5. Pedurungan District -
	6. Genuk District -	6. Genuk District -
	7. West Semarang District -	7. West Semarang District Maize
	8. Ngaliyan District Maize	8. Ngaliyan District Cassava, peanuts
	9. Tugu District Maize, peanuts	9. Tugu District -

Source: Processed data, 2025.

The leading food crop commodities in Mijen District are cassava and sweet potatoes. These commodities can already meet local demand, and their growth potential in Mijen exceeds that of the same commodities at the city level. This indicates that cassava and sweet potatoes still hold strong potential as base commodities in the future. Meanwhile, paddy, maize, and peanuts are categorized as potential commodities, meaning they currently cannot meet local demand but are growing faster than similar commodities at the city level. These commodities are expected to become base commodities in the future.

The leading commodities in Banyumanik District are maize and cassava. These commodities can meet local demand, with growth rates surpassing those of the same commodities at the city level, indicating their strong potential as future base commodities. Paddy is classified as a potential commodity, as it cannot yet meet local demand but shows faster growth than at the city level, suggesting future development into a base commodity.

Leading commodities in Gunungpati District include paddy, cassava, sweet potatoes, and peanuts. These commodities meet local demand and demonstrate faster growth than their counterparts at the city level, suggesting a strong future as base commodities. Maize is considered a potential commodity, currently unable to meet local demand but growing faster than at the city level, with prospects to become a future base commodity.

The leading commodity in Tembalang District is maize. This commodity meets local demand and grows faster than the same commodity at the city level, maintaining its potential as a future base commodity. Meanwhile, paddy, cassava, and peanuts are categorized as potential commodities, unable to meet local demand but showing higher growth rates than the city level, suggesting future potential.

The leading commodity in Pedurungan District is paddy. It can already meet local demand and its growth potential surpasses that at the city level, indicating it remains a strong base commodity. Maize is classified as a potential commodity, currently not meeting local demand but with faster growth compared to the same commodity at the city level.

The leading commodities in Genuk District are paddy and maize. These commodities meet local demand and exhibit growth rates higher than those at the city level, confirming their potential as future base commodities.

The leading commodity in West Semarang District is paddy, meeting local demand with a growth rate exceeding that at the city level, ensuring its future as a base commodity. In contrast, maize is categorized as a lagging commodity, unable to meet local demand and growing more slowly than at the city level.

The leading commodity in Ngaliyan District is paddy, which meets local demand and has a growth rate higher than the city level, maintaining its future base status. Maize is classified as a potential commodity, unable to meet local demand but growing faster than the city average. Cassava and peanuts are considered lagging commodities, both unable to meet local demand and showing slower growth compared to the same commodities at the city level.

The leading commodity in Tugu District is paddy, capable of meeting local demand and showing a higher growth rate than at the city level, ensuring its base commodity status for the future. Meanwhile, maize and peanuts are categorized as potential commodities, as they currently cannot meet local demand but are growing faster than the same commodities at the city level, suggesting future prospects as base commodities.

CONCLUSION AND RECOMMENDATIONS

Based on the LQ and DLQ analysis, food crop commodities in Semarang City were classified into leading, potential, prospective, and lagging categories. In Mijen District, cassava and sweet potatoes are identified as leading commodities, while paddy, maize, and peanuts are classified as potential commodities. In Banyumanik District, maize and cassava are leading commodities, while paddy is considered a potential commodity. In Gunungpati District, paddy, cassava, sweet potatoes, and peanuts are categorized as leading commodities, whereas maize is classified as a potential commodity. In Tembalang District, maize is a leading commodity, while paddy, cassava, and peanuts are classified as potential commodities. In Pedurungan District, paddy is a leading commodity, and maize is categorized as a potential commodity. In Genuk District, the leading commodities are paddy and maize. In West Semarang District, paddy is identified as a leading commodity, while maize is classified as a lagging commodity. In Ngaliyan District, paddy is a leading commodity, maize is a potential commodity, and peanuts and cassava are considered lagging commodities. In Tugu District, paddy is a leading commodity, whereas maize and peanuts are categorized as potential commodities.

Efforts should focus on reinforcing the leading food commodities in each district through more intensive extension services to farmers, aimed at motivating them to continue producing leading commodities. In addition, technological support is crucial to boost production, ensuring that the current leading commodities maintain their status in the future.

Several potential food commodities in each district currently cannot fully meet local demand. However, given their growth trends, these commodities have the potential to become leading commodities in the future. Therefore, government support is needed through incentives for farmers to encourage the production of potential food commodities. Moreover, intensive technical assistance and technological support are necessary to strengthen this development.

It is necessary to promote alternative diversification strategies for more adaptive food commodities. This should be integrated into Semarang City's food security policies to strengthen urban food self-sufficiency and reduce dependence on external supplies. Furthermore, optimizing urban agricultural areas based on zoning and implementing smart agriculture practices are important strategies to maximize productivity on limited land. Regular monitoring and evaluation of commodity development should also be conducted to adjust development strategies in response to changes in production dynamics and market demand.

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