

Structural Transformation And Agribusiness Marginalization Amid LNG Industry Expansion In Teluk Bintuni Regency

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Abstract

This study examines the structural transformation of the economy in Teluk Bintuni Regency caused by the expansion of the Liquefied Natural Gas (LNG) industry and its effects on the agribusiness sector from 2020 to 2024. Using a descriptive quantitative approach with secondary data on Gross Regional Domestic Product (GRDP) at current prices (ADHB) and constant 2010 prices (ADHK), the study applies growth analysis, Location Quotient (LQ), and shift-share methods. Findings reveal the increasing dominance of the LNG sector, rising from 86.48% in 2020 to 94.05% in 2024, while agribusiness contribution declined from 3.51% to 2.17%, with LQ values below one, indicating structural marginalization. The gap between overall economic growth and agribusiness reached 28.17% in 2024, reflecting a growth paradox. Real agribusiness value decreased from IDR 640.52 billion to IDR 611.10 billion in 2023, with only slight recovery in 2024. The study underscores the need for policies to enhance agribusiness productivity, integrate it with modern sectors, and develop local value-added activities for inclusive and sustainable growth.

Keywords: *Structural transformation, agribusiness marginalization, LNG industry, Location Quotient.*



INTRODUCTION

The Liquefied Natural Gas (LNG) industry has made it possible for Teluk Bintuni Regency to serve as a critical strategic pillar for the national energy sector. The introduction of a large-scale, extractive industry has the potential, in theory, to have positive multiplier impacts on the economy of the region. This includes the potential to drive development in the agribusiness sector due to increasing demand for food and more jobs. Based on resource-centered development theory, if adequate policies are put in place, development of the extractive sectors will lead to stronger economic linkages at the local level. (Venables, 2016). Most of the development literature and practice has focused on resource-rich countries. Development economists and policy analysts have tended to cite them as an example when discussing extractive-based, resource dependent economies.

In resource-dependent regions, relatively high macroeconomic growth may provide a means to transfer food security and improve the living standards of the local population, especially farmers located close to industrial centers. Many studies have reported that the use of extractive industries has resulted in a lack of development in other productive sectors of the economy. This has resulted in the regional economies experiencing a structural imbalance (Lashitew et al., 2021). This is a phenomenon development economists and policymakers have referred to as the resource curse or as the Dutch Disease, which describes the impact of the dominance of extractive industries on the performance of non-extractive sectors and economic diversification (Badeeb et al., 2017).

Many existing studies have examined the major issues that this study highlights. However, most of this research have been focused on the macro-level, at the national or inter-regional scale. Integrative studies on the structural economic transformation of an export-industry-dominated region, such as Teluk Bintuni, are even more rare. In addition, studies that address the possible relationships between the expansion of the LNG industry and the dynamic of agribusiness at the local level are still lacking. Therefore, this study examines the local economic structural transformations and the position and role of the agricultural sector during the expansion of the LNG industry from 2020 to 2024.

This study is the first of its kind to investigate at a local scale, integrate agriculture in the analysis, and study agribusiness supply chains and linkages using contemporary research. It is anticipated that the findings will offer new and practical understandings of the concepts of integrated sectors and their agribusinesses in a resource-rich region.



RESEARCH METHODS

This study uses secondary time-series data from the Central Bureau of Statistics (BPS) of Teluk Bintuni Regency covering 2020–2024 (BPS Kabupaten Teluk Bintuni, 2025). The dataset includes Gross Regional Domestic Product (GRDP) by industry at current and constant 2010 prices, economic growth rates, and GRDP per capita. These indicators allow systematic assessment of sector contributions, economic performance, and trends in agribusiness amid the expansion of the LNG industry.

The analysis in this study focuses on economic structural transformation and the sectoral growth paradox within Teluk Bintuni Regency. To evaluate the impact of LNG-based industrial dominance on the agribusiness sector, this study employs eight mathematical formulations. Structural transformation analysis is used to illustrate the shift of economic activities among sectors, for example from agriculture to industry or services, which affects productivity and regional economic growth. The contribution of each sector to total Gross Regional Domestic Product (GRDP) is calculated using a widely applied formula in current literature (Herrendorf et al., 2014), as follows:

$$C_s = \frac{NTB_s}{\sum NTB_{\text{all sectors}}} \times 100\%$$

In this formula, C_s represents the contribution of sector s to total GRDP in percentage, while NTB_s denotes the gross value added of the corresponding sector. This formula enables researchers to identify dominant sectors and observe how structural changes occur over time.

Sectoral disparity analysis is used to measure the imbalance between major sectors, particularly LNG and agribusiness. The disparity between these sectors can be measured using the disparity ratio, which is commonly applied in regional economic analysis (Arsyad, 2010). The formula is expressed as follows:

$$RD = \frac{C_{LNG}}{C_{Agribusiness}}$$

In this formula, RD indicates the comparative contribution of the LNG sector to the agribusiness sector. A higher RD value reflects stronger dominance of LNG over agribusiness in the regional economic structure.

The Location Quotient (LQ) is used to determine whether agribusiness is a base sector in a region. This method compares the contribution of agribusiness in the regional



economy with its contribution at the national level (Arsyad, 2010). The formula is presented as follows:

$$LQ = \frac{C_{\text{Agribusiness, Region}}/C_{\text{Total, Region}}}{C_{\text{Agribusiness, National}}/C_{\text{Total, National}}}$$

The LQ value provides a measure of regional specialization in the agribusiness sector relative to the national level. A value greater than one indicates that agribusiness is a base sector with comparative advantage, while a value less than one suggests that agribusiness is not a base sector in the region.

Economic growth and growth paradox analysis are used to examine whether agribusiness growth is consistent with overall regional economic growth. The growth of a sector can be calculated using the shift-share method, which is commonly employed to evaluate sectoral performance (Saswono et al., 2025). The formula is written as follows:

$$g_{\text{sector}} = \frac{NTB_t - NTB_{t-1}}{NTB_{t-1}} \times 100\%$$

In this equation, g_{sector} represents the growth rate of a particular sector over a certain period, based on the difference in gross value added between two consecutive periods.

The growth gap between the overall economy and the agribusiness sector is calculated to assess whether agribusiness follows the general economic trend. The formula is expressed as follows:

$$Gap = g_{\text{economy}} - g_{\text{agribusiness}}$$

The growth gap reflects the difference in performance between total economic growth and agribusiness sector growth. This calculation is essential for identifying whether agribusiness grows in line with the overall economy or experiences relative stagnation despite regional economic expansion.

The proportional shift is used to describe the magnitude of growth differences between sectors. In this study, the proportional shift is represented by the growth gap, as shown in the following formula:

$$PS = Gap$$

The proportional shift reflects the magnitude of sectoral growth shifts and helps explain structural imbalances or growth paradoxes in the regional economy. A high proportional shift indicates that economic growth may be concentrated in dominant sectors such as LNG, while agribusiness may lag behind.



Real value and Gross Value Added (GVA) analysis are used to assess the actual performance of the agribusiness sector after adjusting for inflation. To remove the effect of price changes, nominal GVA is converted into real GVA using the implicit index, as suggested in recent studies (Wardana & Nurjanana, 2023). The formula is written as follows:

$$NTB_{real} = \frac{NTB_{nominal}}{Implicit\ Index} \times 100$$

In this formula, NTB_{real} represents the gross value added of the agribusiness sector adjusted for inflation, while $NTB_{nominal}$ refers to the value at current prices. This calculation allows comparison across periods without distortion from price fluctuations.

The growth of real GVA in the agribusiness sector is calculated to evaluate productivity trends and real sectoral performance over time. The formula is expressed as follows:

$$g_{NTB} = \frac{NTB_{real,t} - NTB_{real,t-1}}{NTB_{real,t-1}} \times 100\%$$

In this formula, g_{NTB} represents the percentage growth of real GVA in the agribusiness sector. This indicator is crucial for assessing whether agribusiness experiences real economic growth or merely increases in nominal value due to inflation. Therefore, the overall analytical method provides a comprehensive framework to examine structural transformation, sectoral disparity, growth imbalance, and the real economic performance of agribusiness in Teluk Bintuni Regency.



RESULTS AND DISCUSSION

Structural Transformation of the Economy: Dominance of the Liquefied Natural Gas (LNG) Industry
Sectoral Contribution Structure

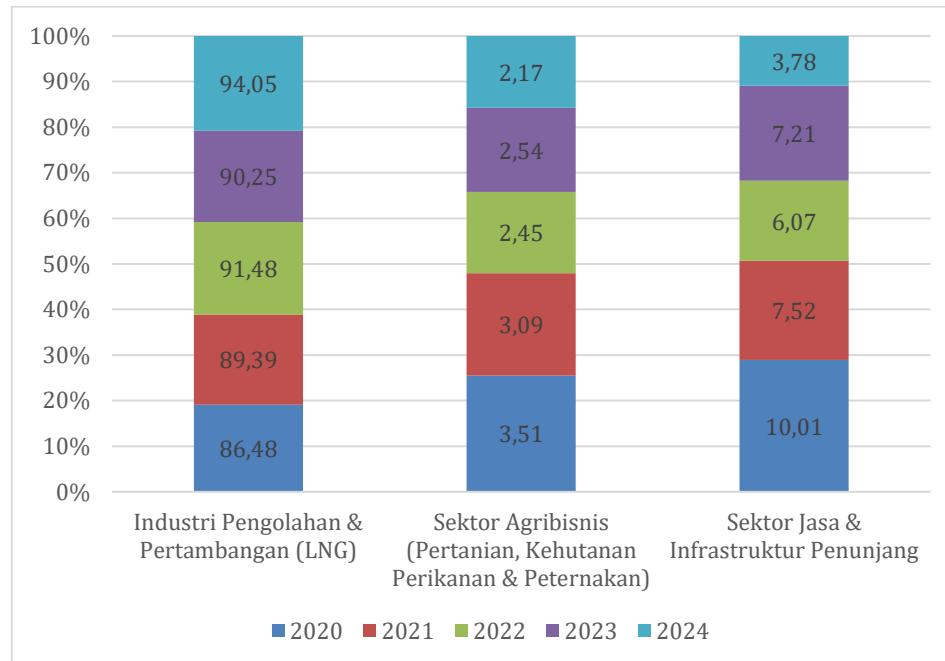


Figure 1: Trend of Economic Sector Contributions, 2020–2024

The structural transformation of the Teluk Bintuni Regency economy during the 2020-2024 period shows a significant shift toward dominance by the Liquefied Natural Gas (LNG)-based processing and mining industries. Base on Figure 1, the industrial sector's contribution increased from 86.48% in 2020 to 94.05% in 2024. Conversely, the agribusiness sector experienced a decline in its contribution from 3.51% to 2.17% during the same period. Meanwhile, the services and supporting infrastructure sector also experienced a relative contraction, from 10.01% to 3.78%.

This condition indicates an unbalanced structural transformation process, with the expansion of the extractive industry sector taking place predominantly without a corresponding strengthening of other economic sectors, particularly agribusiness. This indicates a sharp increase in structural inequality in the regional economy. This condition reflects the weak integration of the extractive industry sector with the local economy,

740

potentially creating barriers for domestic suppliers and limiting the creation of inclusive added value. This condition also indicates the characteristics of an enclave economy, where the modern sector develops relatively isolated from the community economy (Adewuyi & Oyejide, 2012; Gallagher & Zarsky, 2007). Furthermore, limited capacity and human resource regeneration in the agribusiness sector also weakens the ability to adapt and innovate in responding to economic dynamics, thereby increasing the risk of the sector's long-term marginalization (Herpina et al., 2026; Gbadago et al., 2023).

Sectoral Disparities and Location Quotient (LQ)

Table 1. Average Disparity Ratio and Estimated LQ of Agribusiness

No.	Year	Disparity Ratio (LNG/Agribusiness)	Estimated Agribusiness LQ
1	2020	24.63	0.35
2	2021	28.93	0.31
3	2022	37.34	0.25
4	2023	35.55	0.26
5	2024	43.34	0.22

Source: Processed by researchers, 2026

Base on Table 1, the disparity ratio between the LNG industry and the agribusiness sector increased significantly, from 24.63 in 2020 to 43.34 in 2024. This indicates widening inequality between sectors. The Location Quotient (LQ) of the agribusiness sector is consistently below one ($LQ < 1$), indicating that this sector is not a basic sector and lacks a comparative advantage in the regional economy.

The combination of increasing disparity and low LQ values indicates the structural marginalization of the agribusiness sector due to the dominance of the extractive industry sector. Non-basic sectors are limited in driving regional economic growth because their role tends to depend on demand from the basic sector, while inequality between sectors will increase if economic activity is concentrated in certain dominant leading sectors (Miller & Blair, 2009; Sjafrizal, 2018).



Analysis of Economic Growth and Paradoxes**Comparison of Economic Growth and Agribusiness****Table 2. Economic Growth, Agribusiness Growth, and Proportional Shift (PS)**

No.	Year	Economic Growth (%)	Agribusiness Growth (%)	Gap (%)	PS (%)
1	2020	-0,88	-4,35	3,47	-3,47
2	2021	2,52	1,81	0,71	-0,71
3	2022	2,12	-4,07	6,19	-6,19
4	2023	6,70	-2,19	8,89	-8,89
5	2024	29,22	1,05	28,17	-28, 17

Source: Processed by researchers, 2026

Base on Table 2, the agribusiness sector in Teluk Bintuni Regency exhibited a relatively slower growth trend than economic growth during the 2020–2024 period. The negative growth gap and proportional shift (PS) values indicate a growth disparity between the agribusiness sector and the overall economy. This disparity peaked in 2024, with a gap of 28.17 points and a PS of -28.17%, illustrating a growth paradox, where the economy grew rapidly but the agribusiness sector remained relatively stagnant.

This is due to the dominance of the LNG and processing industries, which absorb the majority of local investment, labor, and resources. This situation results in the agribusiness sector lacking structural support and access to technology, resulting in unbalanced growth compared to the dominant sector. Several studies also report that the dominance of the extractive sector tends to hinder the transformation of traditional sectors and reduce the competitiveness of non-extractive sectors through mechanisms similar to Dutch disease (Cust & Poelhekke, 2015; Rahma et al., 2021).

Strategies that can be implemented to increase agribusiness's contribution to local economic growth include: strengthening access to capital and technology, developing partnerships between agribusiness and dominant industries, and intensive training and mentoring programs for agribusiness actors. Implementing these measures is expected to reduce growth disparities and increase the competitiveness of the agribusiness sector.



Table 3. Real Value of the Agribusiness Sector (Constant Prices 2010)

No.	Year	Nominal GRDP	Real GRDP	Real Agribusiness GVA	Agribusiness Growth (%)	Implicit Index
1	2020	971.16	633.20	640.52	-3.31	151.33
2	2021	997.01	644.66	622.10	-2.88	141.89
3	2022	1,011.04	618.41	614.27	-1.13	151.57
4	2023	1,037.42	604.89	611.10	-0.52	158.82
5	2024	999.81	613.53	613.52	1.05	158.45

Source: Processed by researchers, 2026

Base on Table 3, the real value of the agribusiness sector in Teluk Bintuni Regency contracted during 2020–2024, although the nominal value remained relatively stable. The nominal value increased from 971.16 billion rupiah in 2020 to 999.81 billion rupiah in 2024. However, the real value, corrected using the implicit index (2010 base), decreased from 633.20 billion rupiah to 604.89 billion rupiah in 2023, rising to 613.53 billion rupiah in 2024. This reflects significant producer price pressures, resulting in nominal growth not keeping pace with real output, indicating that the increase in value was more influenced by price inflation than by production volume growth (Sirait et al., 2025). The real value added of the agribusiness sector decreased from 640.52 billion rupiah (2020) to 611.10 billion rupiah (2023), with NTB growth largely negative (-3.31% to -0.52%) and only slightly positive in 2024 (+1.05%). This finding confirms the real contraction of the agribusiness sector, despite rapid regional economic expansion, particularly in the LNG sector. A fluctuating implicit index (141.89–158.82) was used to adjust nominal values to real values, allowing for analysis of real growth without price distortions (Fernando et al., 2015).

This study emphasizes the urgency of policies to strengthen agribusiness through increased productivity, development of local added value, and integration with modern sectors to create a more equitable distribution of economic benefits. Dependence on a single primary export commodity often results in deindustrialization of other primary sectors (Baffes & Haniotis, 2016). Therefore, the expansion of the LNG industry in Teluk Bintuni Regency does not have a stimulating impact on agribusiness productivity, but rather is significantly correlated with the ongoing degradation of regional food production capacity.



CONCLUSIONS

This study concludes that economic transformation in Teluk Bintuni Regency during 2020-2024 was unbalanced and highly dominated by the LNG-based industrial sector. This dominance has not been followed by the strengthening of agribusiness, as shown by low LQ values, widening sectoral disparities, negative proportional shift, and weak real growth.

The findings indicate that agribusiness remains a non-base sector and is increasingly marginalized within the regional economy. Although regional economic growth appears high, its benefits have not significantly reached the agribusiness sector. Therefore, policy support is needed to improve agribusiness productivity, develop local value-added activities, and strengthen linkages between agribusiness and the modern industrial sector to achieve more inclusive and sustainable growth.

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