Analysis of Regional Economic Growth and Sustainability in West Nusa Tenggara: Insights From 2018-2023

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Abstract. This study examines the dynamics of regional economic development in the West Nusa Tenggara Province (NTB) with a focus on the transition of key sectors and the integration of economic development with environmental sustainability. The main goal of this research is to identify leading and potential sectors in NTB that can support the regional economy sustainably using Location Quotient (LQ), Dynamic Location Quotient (DLQ), and Klassen Typology analysis methods. The analysis reveals that the agricultural sector, especially corn production, has significant potential but is accompanied by the dilemma of land use which negatively impacts the environment, such as increased flood risks due to the conversion of forests into agricultural land. The results of this study can serve as a basis for formulating comprehensive economic development policies and strategies that focus not only on economic growth but also on environmental sustainability and resilience aspects.

Keywords: Regional Economics, Leading Sector Analysis, Regional Development.

1.   Introduction

West Nusa Tenggara (NTB) has a strategic position between Bali Province in the west and East Nusa Tenggara Province in the east, making it a crucial point in the regional trade corridor and tourist flow (Pemprov NTB, 2023). NTB is also known for its abundant natural beauty, defining the province as one of the top tourist destinations in Indonesia (Times Indonesia, 2020). Among these potentials, NTB faces challenges in other sectors. From an economic perspective, West Nusa Tenggara (NTB) Province shows substantial capacity in several key sectors such as agriculture, forestry, fisheries, trade, and tourism. This potential reflects the province's abundant natural resources as well as its strategic location as a gateway between Bali and East Nusa Tenggara. However, the dynamics of economic growth in NTB over the past few years have been characterized by significant fluctuations. In 2018, the province experienced an economic contraction of -4.56%, which was the result of natural disasters during that period (Kanwil DJPb NTB, 2021). These incidents illustrate the vulnerability of the regional economy to external factors and environmental changes. In response to these challenges, the provincial government has taken initiatives to diversify the economy through the development of sectors that have high growth potential (Bappeda NTB, 2023).

One of the interesting aspects of NTB is the transition of its mainstay sectors. Initially, the

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mining sector, particularly metal ore mining, was one of the main sectors driving NTB's economy. However, this sector has experienced a significant decline in recent years. In 2023, the mining sector experienced a negative growth of 10.39%, which had an impact on the overall low economic growth of NTB (Pemprov, 2024). In response to this decline, NTB began to shift its focus to the agricultural sector and the housing, industrial estate, and office sectors. The agricultural sector remains the backbone of NTB's economy with a significant contribution to the Gross Regional Domestic Product (GRDP) (Kementerian Pertanian, 2023). The provincial government is also encouraging the development of special economic zones such as the Mandalika Special Economic Zone (SEZ) which is expected to drive regional economic growth through investment and infrastructure development (Kemenko Perekonomian, 2023).

The transition of the mainstay sector is also manifested through the movement of investment levels in West Nusa Tenggara. Based on data on the development of investment realization from Kementerian Investasi (2024) the sectors with the highest percentage growth in investment are: 1) Housing, Industrial Estates and Offices; 2) Agriculture, Forestry and Fisheries; 3) Hotels and Restaurants; 4) Other Services; 4) Construction; and 5) Mining.
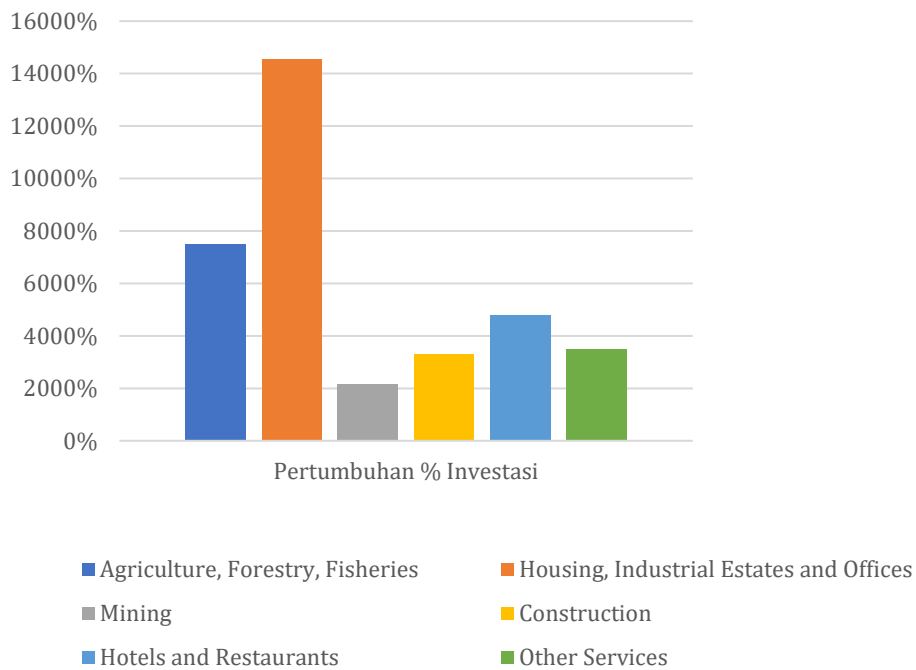

Figure 1. Percentage Growth of NTB Investment 2018-2023
Source: Kementerian Investasi (2024) (processed by the author)

Another challenge is that with its geographical condition consisting of several islands, NTB faces potential disasters such as floods, earthquakes, forest fires, liquefaction, and drought (Regional Development Planning Agency of NTB, 2023). When viewed from the level of

likelihood, floods occupy the highest position, where based on historical data, the number of flood disasters in NTB in 2023 reached 64 events out of a total of 124 natural disasters (Regional Disaster Management Agency of NTB, 2023). According to Zakaria (2021) the main cause of the high frequency of flood disasters in West Nusa Tenggara is the conversion of forests into corn fields. On the other hand, forest conversion is in line with the transition efforts of the mainstay sector in NTB, where the government began to shift to develop the agriculture, forestry and fisheries sectors, as evidenced by the high growth rate of investment in these sectors. This transition is not accompanied by adequate forest conservation efforts. Many forest areas in NTB have been severely damaged by illegal logging, land clearing for agriculture, and forest fires (Fahriza, 2018). This forest damage mainly occurs in the Dompu, Sumbawa and Bima districts (Fauzi Rahmat, 2021).

When compared to its two flanking provinces, NTB shows a somewhat different economic growth trend. Figure 2 shows the economic growth trend of Bali and Nusa Tenggara region. It is clear that NTB experienced contraction in several quarters, especially in the first and second quarters of 2023 with growth rates of -1.18% and -1.54%. Meanwhile, Bali and NTT show more stable and positive growth. Bali, for example, achieved the highest growth in the fourth quarter of 2021 at 8.1% and despite experiencing a sharp contraction in the first quarter of 2023, recorded positive growth again in the second quarter of 2023 at 3.09%. NTT also showed stability with positive average growth, reaching 4.04% in the second quarter of 2023.
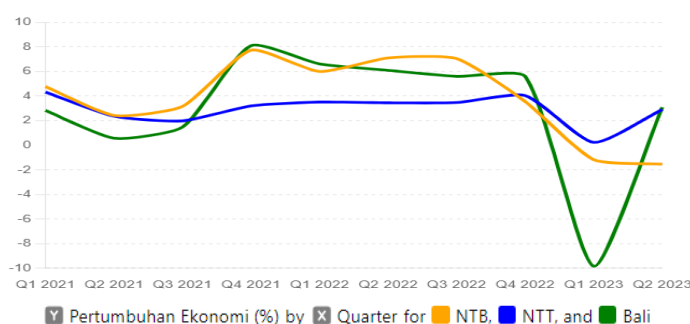

Figure 2. Comparison of Bali and Nusa Tenggara Regional Economic Growth
Source: DJPK Kemenkeu (2023) (Processed by the author)

Given this comparison, the research focus on NTB is particularly relevant to identify potential sectors that could support more stable and sustainable economic growth in the province, as well as to understand the challenges faced in the context of regional economic development. Furthermore, the agricultural sector in NTB consists of three main subsectors: food crops, horticulture, and plantation (Statistics Indonesia, 2024b). Agricultural production in NTB continues to increase, with significant contributions to food security and exports of agricultural commodities (Kementerian Pertanian, 2023). In addition, the housing and industrial estate sectors have also shown positive growth, with a significant increase in investment and infrastructure development (Statistics Indonesia, 2024a).

With all its unique geographical, socio-cultural, and economic conditions, NTB is an interesting region to be studied further regarding the integration of economic development and

environmental sustainability. Location Quotient (LQ), Dynamic Location Quotient (DLQ), and Klassen Typology analysis can provide a comprehensive picture of the leading and potential sectors in NTB and their influence on regional economic sustainability. The results of this analysis are expected to be an input for the provincial government in formulating sustainable and environmentally sound economic development policies.

Several studies have explored regional economic development and environmental sustainability separately. However, there is a gap in the literature that specifically combines regional economic analysis (such as LQ, DLQ, and Klassen Typology) with environmental sustainability indicators in a regional context such as in West Nusa Tenggara (NTB) Province. So far, existing studies have generally focused on the 17 main sectors of GRDP. While these studies have provided an overview of the contribution of these sectors to the regional economy, there are still some unresolved issues related to budget optimization. One of the reasons is the lack of attention to the many subsectors within each sector that have important roles but have not been discussed in depth.

This study aims to fill the research gap by digging deeper into the contribution of subsectors from each main sector. Thus, this study will provide a more comprehensive understanding of the regional economic dynamics in NTB. To achieve this goal, this study will combine three sectoral analyses, namely Location Quotient (LQ), Dynamic Location Quotient (DLQ), and Klassen Typology. With this approach, this research is expected to make a significant contribution in formulating more effective and optimal economic development policies in NTB, as well as assisting in the optimization of a more targeted budget. Furthermore, this research also aims to provide a more comprehensive analysis to support more sustainable regional economic development in NTB, by integrating environmental sustainability indicators in regional economic analysis.

2.   Literature Review

Economic growth according to the Solow growth model emphasizes the importance of capital accumulation, labor growth, and technological progress in determining the output level of an economy. According to Solow (1988), in the long run, economic growth is highly dependent on productivity increases driven by technological progress. The model also introduces the concept of "steady-state", a condition in which the economy reaches a constant growth rate of output per capita, due to the dampening effect of capital accumulation. One of the important contributions of the Solow model is the introduction of the Solow residual concept, which measures the part of output growth that cannot be explained by capital and labor growth. This residual is often attributed to technological change or the efficiency of total factor productivity (TFP) (Solow, 1988). In a regional context, the Solow model can be applied to analyze how investments in infrastructure, education, and technology can drive long-term economic growth.

In a regional context, economic development explores the use of natural resources, labor, and capital to advance the economy of a region, by applying in-depth economic theory (Ridwan, 2016). Theories such as export base theory, location theory, agglomeration, and growth poles, play a vital role in understanding and optimizing development potential that varies across regions. An effective planning process is key, requiring careful and realistic planning that involves active community participation and good coordination between various stakeholders. In addition, local social, cultural, political and economic conditions have a significant influence

on the direction and effectiveness of regional economic development. Human resources, in particular, play a crucial role in bringing innovation and technological advancements that support growth (Ridwan, 2016). To ensure that regional development contributes to national economic goals, there needs to be strong integration with macroeconomic policies. Through an integrated and sustainable approach, regions such as West Nusa Tenggara can achieve sustainable and inclusive economic growth.

Bartelmus (2010) emphasizes that economic development does not have to come at the expense of the environment. Instead, governments can take an approach that integrates environmental considerations into every economic policy, including the efficient use of natural resources. Contributors to the economy, such as government spending, are expected to influence economic efficiency and growth, as well as equitable distribution functions. Some literature supports the assertion that government spending on health, education, economy or infrastructure, and social protection, can encourage economic growth (Ambya, 2020; Johansson, 2016), reduce inequality (sson, 2016; Balakrishnan et al., 2013), reduce poverty (Taruno, 2019; Danladi & Olarinde, 2015; Claus et al., 2012) and creating more inclusive growth (Fitrianasari et al., 2022; Safitri et al., 2021).

The concept aims to achieve social justice and improve welfare without compromising the needs of future generations, in line with the basic principle of sustainable development that prioritizes meeting the needs of the present without compromising the capabilities of future generations. By focusing on pro-growth, pro-jobs, pro-poor, and pro-environment policies, economic and environmental integration is expected to not only help reduce social inequality but also support global initiatives in addressing the challenges of climate change and environmental sustainability (Ahmad Drajat, 2023).

3.   Methodology

This research was conducted in West Nusa Tenggara Province using descriptive analysis method. The main data analyzed was the Gross Regional Domestic Product (GRDP) of 65 business sectors at constant 2010 prices, covering the period 2018 to 2023 (six years). Data collection was conducted through literature studies sourced from the official website of the Central Bureau of Statistics of West Nusa Tenggara Province, the NTB One Data Portal, other official government websites, as well as books, journals, and previous research. Furthermore, data analysis was conducted using the Location Quotient (LQ), Dynamic Location Quotient (DLQ), and Klassen Typology methods.

Location Quotient (LQ) Analysis

LQ analysis is an approach that is often used in identifying the economic base of a region. LQ analysis is applied to assess the role of a region as an exporter or importer of goods, services, or labor in certain economic activities or sectors (Schaffer, 2020). This analysis also serves as an indicator in identifying leading sectors in a region (Basuki & Mujiraharjo, 2017) as well as the driving sectors of economic activity (Pribadi, 2021). According to Isserman (2007), calculation of the LQ method can be formulated as follows:

$$LQ = \frac{S_{ib}/S_b}{S_{ia}/S_a}$$

Description:

S_{ib} = income/labor of sector i in the lower region (in this case NTB province)
S_b = total income/labor of all sectors of the lower region (in this case NTB province)
S_{ia} = income/labor i at the national level/upper region (in this case Indonesia)
S_a = income/labor of all sectors at the national/upper region level (in this case Indonesia)

Tarigan (2014), outlines three possibilities as an interpretation of the results of the Location Quotient (LQ) calculation that have been described, namely: 1) If the LQ is greater than 1 (LQ>1), it means that the role of the sector at the provincial level is more dominant than at the national level. This sector is categorized as a basic sector and has advantages in the production of commodities that not only meet local needs but can also be sold or exported to other regions; 2) If the LQ is equal to 1 (LQ=1), this means that the sector has the same advantages at the provincial and national levels. In other words, the production of commodities from this sector is only enough to meet local consumption needs; and 3) If the LQ is less than 1 (LQ<1), the sector is classified as a non-base sector because the level of specialization in the province is lower than at the national level. This means that the production of commodities from this sector is not enough to fulfill local consumption needs.

Dynamic Location Quotient (DLQ) Analysis

The Dynamic Location Quotient (DLQ) method is an evolution of the Location Quotient (LQ) method that incorporates the factor of economic sector output growth over time (Pribadi, 2021). The purpose of DLQ analysis is to predict whether sectors that are currently considered as bases will remain as bases or change to non-bases in the future. From this analysis, a classification can be produced about the role and priority of which sectors have the potential to be developed in the future (Afrizha Gustian Putri & Huda, 2023). By integrating LQ and DLQ, policy makers can better understand the role and long-term prospects of economic sectors in a broader economic context. The calculation formula for the DLQ method according to Sihombing (2018) is as follows:

$$DLQ = \left(\frac{(1+gin)/(1+gn)}{(1+Gi)/(1+G)} \right)^t$$

Description:

gin = Growth rate of sector i in the province (in this case NTB)
gn = Average growth of all sectors in the province (in this case NTB)
Gi = Economic growth rate of sector i nationally
G = Average growth of all sectors nationally
t = Difference between year-end and year-start periods

The interpretation of the results of this formula is, if the Dynamic Location Quotient (DLQ) value of a sector is greater than 1, it indicates that the sector has great potential to be developed and is considered prospective, because its growth rate is faster than the national level. Conversely, a DLQ value of less than 1 indicates that the sector is less prospective to become the economic base sector in the location or analysis area, as its growth is slower than the national level. Furthermore, according to Rahmadiansyah et al. (2023) the combination of LQ and DLQ calculation results can be categorized as follows:

Table 1. Categorization of LQ DLQ Analysis Results

SCORE	DLQ > 1	DLQ < 1
LQ > 1	LEADING	PROSPECTIVE
LQ < 1	MAINSTAY	LAGGING

Source: Rahmadiansyah et al. (2023)

Nurfani et al. (2020) interpreted each category as follows: 1) **Leading sectors** are business sectors that have a significant role in spurring local economic growth. Goods/services in this sector can be produced efficiently, allow for increased exports, and have the potential to grow rapidly; 2) **Prospective sectors** are business sectors that have a high probability of contributing to regional economic growth in the future. Despite its export potential, growth in the production of goods/services in this sector is gradual as the development process takes a relatively long time; 3) **Mainstay sectors** are business sectors that currently do not contribute much to the local economy but have the capacity to grow faster. Despite its potential, the production of goods/services in this sector is not yet able to fully meet local demand; and 4) **Lagging sectors** are business sectors that currently do not have a significant impact on regional economic growth. The production of goods/services in this sector is growing slowly and is not yet able to meet local demand.

Klassen typology

Klassen typology is an analytical method used to identify priority or leading sectors, subsectors, businesses, or commodities in a region. According to Sjafrizal (2008), Klassen's typology is also one of the regional economic analysis tools used to determine the description of the pattern and structure of economic growth in a region. Klassen's typology is carried out by comparing the economic **growth of** the analyzed region with the economic growth of the reference region (national), as well as comparing the **contribution of the** region with the contribution of the reference or nationally. The growth rate of a sector, subsector, or commodity can be defined as the change in the development of the value of the sector, subsector, or commodity from year to year (the difference in the value of GDRP sector i, GDRP subsector i or the production value of commodity i in year t divided by the value of GDRP sector i, GDRP subsector i or the production value of commodity i in the previous year (year t-1), then multiplied by 100%). Meanwhile, contribution is the amount of contribution from an economic activity, which is calculated by comparing the contribution of sectors, subsectors or commodities with the average contribution of the overall GRDP in the region. The criteria for a large contribution is when the contribution of a sector, subsector, or commodity is greater than the average contribution of GRDP. Meanwhile, a small contribution is defined when the contribution of a sector, subsector, or commodity is smaller than the average contribution of GRDP.

Based on publications from Statistics Indonesia (2015), the results of Klassen's typology analysis can be categorized into four quadrants, namely (1) advanced and developing sectors, (2) developing but depressed sectors, (3) potential sectors, and (4) lagging sectors. The Klassen Typology contribution matrix according to Sjafrizal (2008) namely:

Table 2. Categorization of Klassen Typology Analysis

	$y_i > Y_i$	$y_i < Y_i$
$(r_i > R_i)$	**Quadrant I** Advanced and Emerging Sectors	**Quadrant II** Emerging but Depressed Sector
$(r_i < R_i)$	**Quadrant III** Potential Sectors	**Quadrant IV** Disadvantaged Sector

Source: Sjafrizal (2008)

Description:
y_i = contribution of the i-th sector in the analysis area
Y_i = i-th sector contribution of the reference region
r_i = growth rate of the i-th sector of the analysis region
R_i = growth rate of the i-th sector of the reference region

The meaning of each quadrant is: 1) **Quadrant I** consists of developed and growing business sectors, where the growth rate and sector contribution to GRDP in the analysis area is greater than the reference area (national); 2) **Quadrant II** consists of sectors that have developed, but are depressed. This is characterized by a higher growth rate in the analysis region than the reference region, but the sector's contribution to GRDP in the analysis region is lower than the reference region; 3) **Quadrant III** consists of potential business sectors, where the sector's growth rate to GRDP in the analysis region is lower than the reference region, while the sector's contribution to GRDP in the analysis region is higher than the reference region; and 4) **Quadrant IV** consists of underdeveloped business sectors, where the sector's growth rate and contribution to GRDP in the analysis region are lower than the reference region.

4.   Results And Discussion

4.1.   Descriptive Analysis

Economic growth reflects changes in people's welfare as well as changes in the economic structure in a region, whether for the better (positive) or otherwise (negative growth). Therefore, economic growth can be an indicator of the success of a region's development. Economic growth can be measured through an increase in added value in the economic category, as reflected in the Gross Regional Domestic Product (GRDP). From 2018 to 2023, the economic growth of West Nusa Tenggara Province generally experienced an upward trend, except in 2020. This is due to the COVID-19 pandemic which has caused negative growth in most regions in Indonesia (Kanwil DJPb NTB, 2024). However, in 2021, NTB's economic growth trend increased again, and continued the positive trend until 2023.
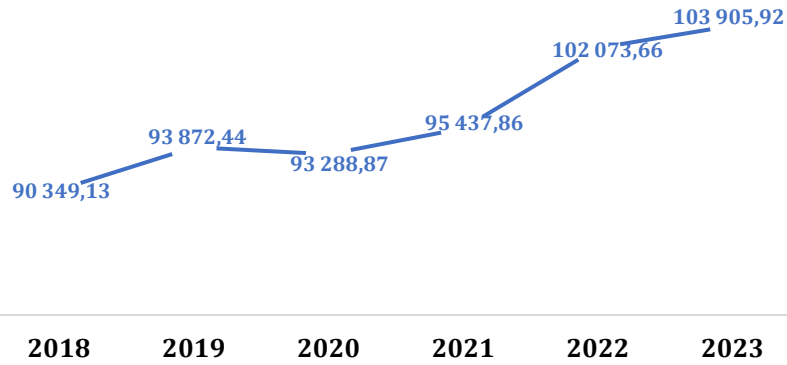
Figure 3. Trend of NTB GRDP 2018-2023
Source: Statistics Indonesia (2024) (processed by the author)

Analysis of the GRDP of West Nusa Tenggara (NTB) Province during the 2018-2023 period shows significant contributions from various economic sectors. The three sectors with the largest nominal and percentage contributions are Agriculture, Forestry, and Fisheries; Agriculture, Livestock, Hunting, and Agricultural Services; and Food Crops. The Agriculture, Forestry, and Fisheries sector recorded a GRDP of IDR 21,262.43 billion in 2018, with a contribution of 23.53%. Although its contribution declined slightly in 2019 to 22.96%, and continued to decline until it reached 21.74% in 2023, this sector remains one of the main sectors in the NTB economy with an average contribution over the period of 22.63%.
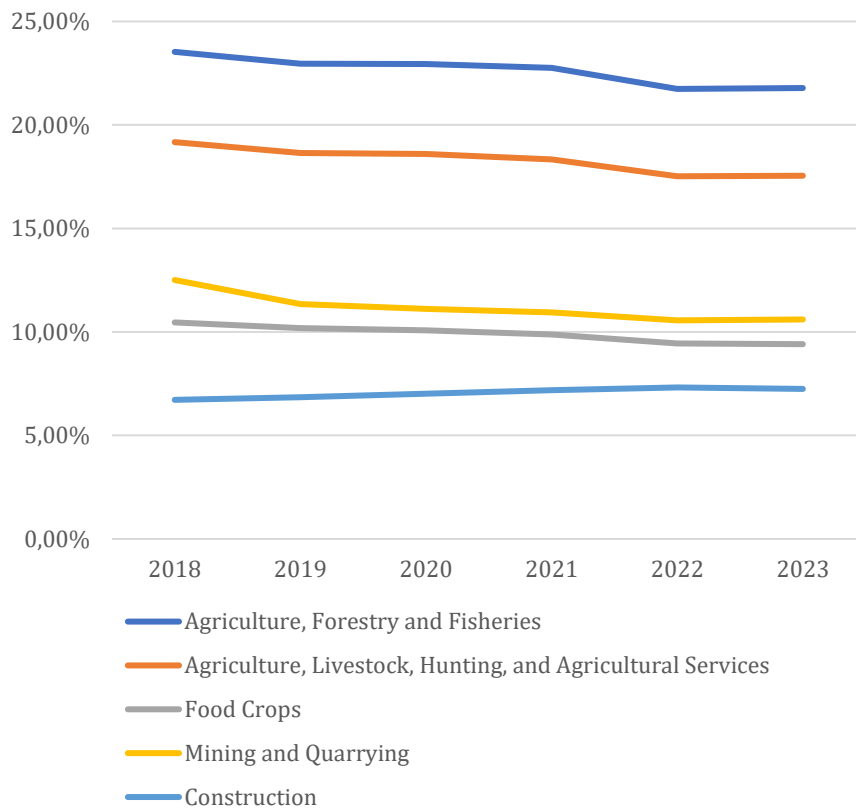
Figure 4. Trends in Contribution of GRDP Sectors and Sub-Sectors
Source: Statistics Indonesia (2024) (processed by the author)

The Food Crops sub-sector shows the largest contribution with an average contribution of 9.91% during the 2018-2023 period. GRDP for Food Crops increased from IDR 9,446.20 billion in 2018 to IDR 9,780.66 billion in 2023. The Mining and Quarrying sub-sector has a significant contribution to the NTB economy, with GRDP of IDR 11,253.67 billion in 2018. However, its contribution decreased from 12.51% in 2018 to 10.56% in 2023, with an average contribution of 11.53%. The Construction sector also made a sizable contribution with a GRDP of IDR 6,045.84 billion in 2018. Its contribution increased from 6.72% in 2018 to 7.32% in 2023, with an average contribution of 7.10%.

The trend of nominal GRDP contribution shows some fluctuations over the period 2018-2023. The Agriculture, Forestry and Fisheries sector experienced a slight decline in contribution from 23.53% in 2018 to 21.74% in 2023, but remains a key sector in the NTB economy. The Mining and Quarrying sub-sector showed a decline in contribution from 12.51% in 2018 to 10.56% in 2023, indicating challenges in maintaining a stable contribution. In contrast to the agriculture and mining sectors, the construction sector shows an increasing trend in contribution from 6.72% in 2018 to 7.32% in 2023, signaling positive growth in this sector.

LQ Analysis Result

The results of the LQ analysis of the NTB Provincial GRDP data from 2018 to 2023, show that out of 65 business sectors and subsectors, there are 26 sectors and subsectors that are classified as basic, as in Table 1 of the Appendix. Among the sectors are: 1) Agriculture, Forestry and Fisheries; 2) Mining and Quarrying; 3) Construction; 4) Wholesale and Retail Trade, Car and Motorcycle Repair; 5) Transportation and Warehousing; 6) Real Estate; 7) Government Administration, Defense and Compulsory Social Security; 8) Educational Services; 9) Health and Social Services; and 10) Other Services.

DLQ Analysis Results

The results of the DLQ analysis of NTB Province's GRDP data from 2018 to 2023, show that out of 65 GRDP sectors and subsectors, there are 26 sectors and subsectors that are classified as prospective. The 10 sectors and subsectors with the highest average DLQ are: 1) Gas Procurement and Ice Production; 2) Food Crops; 3) Mining and Quarrying; 4) Forestry and Logging; 5) Electricity and Gas Procurement; 6) Electricity; 7) Education Services; 8) Government Administration, Defense and Compulsory Social Security; 9) Construction; and 10) Food and Drink Supply. Details of the DLO analysis results are further outlined in Table 2 of the Appendix.

Based on the results of the LQ and DLQ analysis that has been carried out, there are 12 sectors and subsectors in NTB Province that are included as leading sectors (Quadrant I) with LQ and DLQ values of more than one (LQ>1, DLQ>1). This means that the twelve sectors are basic sectors as well as very prospective to be developed in the future.

Table 3. Leading Sectors and Subsectors

GRDP Sector	Average LQ	Des.	DLQ	Des.
a. Food Crops	3.735693	Base Sector	6556.704548	Prospective
B. Mining and Quarrying	2.269060	Base Sector	150.1483027	Prospective
3. Metal Ore Mining	12.347516	Base Sector	1.319349278	Prospective
4. Other Mining and Quarrying	2.171213	Base Sector	1.048915017	Prospective
3. Tobacco Processing Industry	1.411240	Base Sector	1.369715055	Prospective
F. Construction	1.022535	Base Sector	4.961531488	Prospective
G. Wholesale and Retail Trade, Repair of Cars and Motorcycles	1.069644	Base Sector	1.570472763	Prospective
2. Wholesale and Retail Trade, Not Cars and Motorcycles	1.107705	Base Sector	2.454141181	Prospective
1. Financial Intermediary Services	1.169243	Base Sector	1.02723845	Prospective

GRDP Sector					
L. Real Estate	1.073737	Base Sector	2.987490005	Prospective	
O. Government Administration, Defense and Compulsory Social Security	1.588996	Base Sector	5.010484298	Prospective	
P. Education Services	1.569120	Base Sector	9.956278088	Prospective	

Source: Statistics Indonesia (2024) (processed by the author)

Klassen Typology Analysis Results

Based on the results of the Klassen Typology analysis, there are only 7 sectors and subsectors in West Nusa Tenggara Province that are included in Quadrant I, including:

Table 4. Advanced and Developing Sectors and Subsectors

GRDP Sector	Indonesia		NTB		Description
	Average Rate	Average Contribution	Average Rate	Average Contribution	
a. Food Crops	-0.00665	2.66%	0.00708	9.91%	Advanced and Emerging Sectors
B. Mining and Quarrying	0.02755	7.42%	0.07984	16.81%	Advanced and Emerging Sectors
F. Construction	0.02449	9.88%	0.03172	10.11%	Advanced and Emerging Sectors
2. Wholesale and Retail Trade, Not Cars and Motorcycles	0.03380	10.69%	0.03602	11.84%	Advanced and Emerging Sectors
L. Real Estate	0.02803	2.91%	0.03156	3.13%	Advanced and Emerging Sectors
O. Government Administration, Defense and Compulsory Social Security	0.01662	3.27%	0.02227	5.20%	Advanced and Emerging Sectors
P. Education Services	0.02275	3.09%	0.03554	4.85%	Advanced and

	Emerging Sectors

4. Discussion

Prospects for NTB's Economic Transition

Based on the results of the LQ, DLQ, and Klassen Typology analysis, there are six potential sectors and subsectors that are capable of becoming *game changers for* NTB's future economic growth, as shown in Table 4 (other than the Mining and Quarrying Sector). This transition is crucial to be carried out in order to reduce the dependence of the NTB economy on the mining and quarrying sector, because changes in product prices from the sector, which are sensitive to international markets, can greatly affect the performance of the NTB economy (Datanesia, 2022).

If narrowed down, three sectors that have the potential to drive the NTB economy in the future, as an alternative to the mining and quarrying sector, are agriculture, construction, and trade. These three sectors not only contribute significantly, but also show a higher growth rate compared to NTB's economic growth in general. According to Pribadi (2021), prospective sectors have the potential to support increased economic growth if given more attention and more intensive development support. One manifestation of the attention and support for these three sectors can be seen from the value of investment allocated for their development. Based on data from Kementerian Investasi (2024) investment in the three sectors continues to experience very high growth from year to year, both in terms of the number of projects and the value allocated.

Table 5. NTB Sectoral Investment (in Million Rupiah)

Sektor	2018		2019		2020		2021		2022		2023	
	Proyek	Nilai	Proyek	Nilai	Proyek	Nilai	Proyek	Nilai	Proyek	Nilai	Proyek	Nilai
Pertanian	1	1,609.9	8	225,489.4	14	3,519.3	18	35,288.1	20	59,363.5	23	121,891.4
Konstruksi	3	4,654.0	11	2,614.6	76	12,185.7	287	69,581.0	348	401,874.9	721	158,117.2
Perdagangan	24	290,430.2	74	79,932.7	494	166,159.1	643	537,125.4	630	490,076.7	816	1,227,949.3
Total	28	296,694.1	93	308,036.7	584	181,864.1	948	641,994.5	998	951,315.1	1,560	1,507,957.9

The trend of investment growth from 2018 to 2023 is an optimism that also shows the government's commitment in encouraging the development of the agriculture, construction and trade sectors (Kanwil DJPb NTB, 2024). On the other hand, the local government of West Nusa Tenggara (NTB) has also made significant efforts to encourage increased productivity in the agricultural sector, especially in the food crop subsector such as corn. One important step taken is the establishment of the Biological Agents Laboratory of the Agricultural Plant Control Center (BPTP) which aims to protect food crops from pest attacks. Policies for the development of strategic food crops such as rice and corn have also been carried out through the provision of capital injections, technology, and information to farmers (Agricultural Instruments Standardization Agency of NTB, 2024a).

The Food Production Acceleration Movement program is a strategic step to ensure national food

security. According to a publication from Agricultural Instruments Standardization Agency of NTB (2023), this program aims to increase agricultural productivity to face the challenges of food security in the future by involving all stakeholders in the food production chain. The Minister of Agriculture's working visit to NTB, which involved various parties from the local government to farmers and fertilizer retailers, is expected to strengthen cooperation and coordination in increasing agricultural production. The Minister of Agriculture set a target not only for food self-sufficiency but also massive exports, supported by an additional Rp 14 trillion in fertilizer subsidies from President Jokowi. Rice and corn seed assistance and additional fertilizer subsidies are expected to increase food production in NTB, which by 2023 will contribute 880.99 thousand tons of rice and 1.2 million tons of corn (Agricultural Instruments Standardization Agency of NTB, 2023).

In the construction sector, the NTB local government issued Governor Regulation (Pergub) Number 20 of 2019 concerning Guidelines for the Implementation of Procurement of Construction Services through Providers within the NTB Provincial Government. This policy aims to increase the participation of small and medium enterprises in construction and consultancy services. This regulation requires companies from outside the region to cooperate with local construction service business entities on certain qualifications, thus increasing the capacity and competitiveness of local companies. In addition, the provincial government has also built various infrastructures to support NTB as a leading national tourism destination. The infrastructure includes road networks, water resources and irrigation, electricity, and tourism areas such as Mandalika and SAMOTA (Department of Public Works and Spatial Planning of NTB, 2018).

Furthermore, according to a publication from the official website NTB Provincial Government (2024) for the trade sector, the NTB government focuses on developing logistics networks to improve the efficiency and effectiveness of goods distribution. Cooperation with district/city governments and other provinces, such as East Kalimantan, has been carried out to strengthen the trade network. The industrialization program is also one of the NTB provincial government's flagship programs, which aims to develop an industrial sector based on local potential. The program includes various initiatives to increase production capacity and competitiveness of local products in national and international markets. In addition, the NTB Mall program is expected to facilitate trade and marketing of local products so that NTB's superior products can be more easily accessed by consumers, both domestically and abroad.

While the outlook for NTB's economic transition shows great potential in the agriculture, construction and trade sectors, there are significant challenges in the food sector, particularly in maize production on Sumbawa Island. This dilemma reflects how efforts to increase food productivity can negatively impact the environment, requiring a sustainable approach to achieve a balance between economic growth and environmental sustainability.

A Way Out of the Food Sector Dilemma
The food sector in NTB shows very high values according to LQ, DLQ, and Klassen Typology analysis. One of the biggest contributors to the growth of the food sector is corn production in the districts and cities in Sumbawa Island (Umniyah et al., 2023). This indicates that the food sector, with an emphasis on maize production, has a vital role as a base sector that outperforms overall regional economic growth and shows significant growth potential in the future. The government has identified the importance of this sector and is actively encouraging the

acceleration of its productivity, targeting a substantial increase in maize output as part of a strategy to strengthen food security and local economic development (Agricultural Instruments Standardization Agency of NTB, 2024b). Such efforts are mirrored by publications from NTB Provincial Government (2024a) in Table 6 below:

Table 6. Maize Production, Harvested Area, and Productivity in NTB Province 2001-2022

Year	Harvested Area (Ha)	Yield/Hectare (Ku/Ha)	Production (Ton)
2001	24969	20.34	50778
2002	28847	20.03	57785
2003	31217	20.57	64228
2004	33140	21.51	71275
2005	39380	24.49	96459
2006	40617	25.60	103963
2007	42955	28.08	120612
2008	59078	33.22	196263
2009	81543	37.88	308863
2010	61593	40.43	249005
2011	89307	51.16	456915
2012	117030	54.92	642674
2013	110273	57.47	633773
2014	126577	62.09	785864
2015	143117	67.08	959972
2016	206887	61.79	1278271
2017	310990	68.40	2127324
2018	484716	50.70	2457323
2019	353455	67.18	2374425
2020	282893	61.03	1726580
2021	288768	62.72	1811121
2022	333876	69.44	2318432

Source: NTB Provincial Government (2024a) (processed by the author)

However, the expansion and intensification of maize production on Sumbawa Island has not been without ecological consequences. The conversion of mountains into corn fields has caused serious environmental problems, including soil erosion and loss of forest cover that previously acted as a rainwater sink. This has led to a decrease in the soil's capacity to absorb water, leading to an increase in the risk and frequency of flooding during the rainy season. This dilemma illustrates a complex situation where efforts to increase food sector productivity and achieve short-term economic goals indirectly contribute to greater environmental vulnerability, complicating sustainable development efforts in the region.

As an illustration, the sad story of the residents of Sumbawa Island reported by Kompas (2024) revealed the real impact of environmental damage due to land conversion. According to the report, flash floods submerged thousands of houses in several districts on Sumbawa Island, causing significant material losses and deep trauma to local communities. This damage is exacerbated by the practice of illegal cultivation and land clearing by burning, which destroys forest ecosystems and reduces the soil's capacity to retain rainwater.

Head of the NTB Environment and Forestry Agency, Julmansyah, emphasized that the increase in forest destruction is in line with the increase in corn productivity. The expansion of this monoculture crop is exacerbated by the construction of corn drying factories in Sumbawa, Dompu, and Bima, which have no strict regulations regarding the source of the corn received. As a result, farmers encroached on forest areas to plant maize, expanding the area of deforested land. Data shows that out of more than 400,000 hectares of forest area in NTB, 190,000 hectares have been planted with corn (Kompas, 2024).

Therefore, food sector development policy in NTB requires a more integrated and sustainable approach, which not only focuses on short-term economic output but also on environmental sustainability.

Optimizing the productivity of existing maize land in NTB is an important key to a sustainable agricultural development strategy, without having to damage forest functions through land conversion. The data in Table 8 shows that despite significant improvements in maize land productivity, there are still opportunities to achieve higher efficiency and productivity figures. This can be realized through the implementation of more advanced and environmentally friendly farming practices, such as the use of efficient irrigation technologies, the use of maize varieties that are more resistant to pests and diseases, and soil management techniques that aim to improve soil structure and fertility (Amalia Ningrum et al., 2022).

On the other hand, the agriculture, forestry, and fisheries sectors play an important role in reducing flood disaster risk in NTB. Through sustainable forest management, such as the rehabilitation of critical land and the implementation of agroforestry, as well as environmentally friendly agricultural practices (reduction of chemical use and implementation of crop rotation), it is possible to reduce soil erosion and increase water infiltration capacity. This directly contributes to the reduction of surface runoff and lowers the risk of flooding.

Furthermore, rehabilitation and protection of forest areas as well as increasing community awareness and participation in natural resource management are important strategies that must be strengthened (Amalia Ningrum et al., 2022). By involving local communities in social-based forestry programs and massive socialization related to environmental issues, it can increase efforts to conserve forests and use sustainable agricultural practices (Astuti & Hidayat, 2020).

An analysis of the NTB Provincial Environment and Forestry Agency (DLHK) budget shows that the budget allocation is still dominated by operational expenditure, while the allocation for direct activities related to forest conservation is relatively small. Of the total budget of Rp 43,403,214,479, most of it is allocated for salaries and allowances for civil servants, reaching Rp 30,924,998,204. In addition, capital expenditure for infrastructure development, such as office buildings and public facilities, reached Rp 185,000,000, while expenditure for forest management and conservation programs only amounted to Rp 40,300,000.

Other operational expenditures, such as office stationery, meeting food and beverages, and official travel, reached significant figures. For example, office stationery expenditure amounted to IDR 36,825,200 and meeting food and beverages amounted to IDR 428,440,000. Expenditure for official travel also reached Rp 1,755,239,720, indicating a heavy focus on operations rather than direct environmental conservation activities.

In addition, the government needs to strengthen policies that support sustainable land use and provide incentives for farmers who succeed in increasing land productivity without converting forests, such as financial assistance, access to markets, or infrastructure support (Iqbal & Sumaryanto, 2007). One of the breakthroughs that can be optimized by the government is the Tunda Tebang Credit financing program, which provides loans to community forest farmers and the general public, using trees as collateral. The purpose of this program is to encourage farmers not to cut down trees on their land, thus helping in the maintenance and preservation of the environment (MOEF, 2018).

By integrating this approach, the agricultural sector, particularly food crops, in NTB will not only contribute to increased productivity and community welfare, but also to improved resilience to natural disasters and environmental sustainability. The implementation of these integrated and sustainable solutions will lead NTB towards more effective natural resource management and inclusive economic development.

Scenario Analysis of GRDP Decline without Mountain Land Diversion
This scenario analysis is expected to provide an initial understanding of the economic implications of not converting mountainous land to maize cultivation. Therefore, future exploration of sustainable development strategies in West Nusa Tenggara can be done with more comprehensive considerations. This scenario analysis uses general assumptions and approaches based on available information.

Data used

Maize Productivity Level	**Based on publications from Kementerian Pertanian (2024), the productivity level of maize in Sumbawa Island, NTB, reaches 8 tons per hectare.**
Maize Price Level	In the second quarter of 2024, the farm-gate price of dried pipil maize was set by the National Food Agency at IDR 4,300 per kg, but the market price can reach IDR 12,000 per kg (National Food Agency, 2024).
Contribution of Agriculture Sector to GRDP	According to a publication by the PPA II Section of the Kanwil DJPb NTB, the agricultural sector, including maize, is the main contributor to GRDP in NTB with a contribution of 22.8% (Arief, 2022).

Analysis
For one hectare of mountainous land that is not converted to corn cultivation, the calculation of the potential decrease in GRDP is as follows:

Maize Production Potential	**8 tons per hectare**	**8,000 kg per hectare**
Potential Income from Maize Production	8,000 kg x Rp4,300	IDR 34,400,000 per hectare.

The decrease in GRDP due to the non-use of one hectare of mountain land for corn cultivation can be calculated by considering the contribution of the agricultural sector to GRDP. However, since GRDP is the aggregate value added of all economic sectors, the direct decrease in GRDP due to the non-use of one hectare of mountain land, amounting to IDR 34,400,000 per hectare, is relatively small in proportion to the total GRDP of NTB, which reached IDR 26.86 trillion in 2023 (Statistics Indonesia, 2024a).

However, while the decline appears minimal in the context of NTB's overall economy, the decision to maintain mountain land functions has more significant implications. It not only supports the preservation of local ecosystems and biodiversity, but also contributes to mitigating the risk of natural disasters, such as floods and landslides, which are often triggered by land degradation, and cause high asset and financial losses. Furthermore, by keeping mountain land from being converted, the government can ensure the sustainability of natural resources, which is an important foundation for the long-term well-being of the community.

5. Conclusion

This research reveals the complexity and dynamics of sustainable regional economic development in West Nusa Tenggara Province. Based on Location Quotient (LQ), Dynamic Location Quotient (DLQ), and Klassen Typology analysis, the agriculture, construction, and trade sectors have very potential prospects to reduce the dependence of the NTB economy on the mining and quarrying sector in the future.

The food crop subsector, particularly maize production, while showing great growth potential and contribution, faces the dilemma of negative environmental impacts from the conversion of forest land to agricultural land. This expansion has caused significant environmental damage, particularly erosion and increased flood risk. This study suggests that increasing the productivity of existing land, through more efficient and environmentally friendly farming techniques, is key to reducing the need for forest conversion to new agricultural land. Furthermore, the study emphasizes the importance of sustainable natural resource management for disaster mitigation, as well as government policies and support in optimizing sustainable regional economic development programs.

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