Analysis of Coastal Community Poverty in North Sumatra and Its Influence from Several Other Macroeconomic Variables

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Abstract. The research analyzes poverty in coastal communities in North Sumatra, focusing on the impact of economic growth, income inequality, and unemployment. The study covers eight regencies/cities from 2018 to 2023, using data from BPS and various economic models. It reveals that poverty levels have declined in some areas due to government policies, but income inequality and unemployment remain key challenges. Coastal regions show varying economic performance, with growth fluctuations largely influenced by external factors such as the COVID-19 pandemic. The findings emphasize that poverty alleviation requires not only economic growth but also policies that address income inequality, unemployment, and access to resources.

Keywords: Poverty, economic growth, income inequality, unemployment

1. Introduction

Background

Economic growth and poverty are complex topics that have been the focus of debate among economists. Economic growth is an indicator of development success and a condition for reducing poverty levels [1]. The prerequisite is that the benefits of economic growth should be distributed across all social groups, including the poor [2]. Increased economic growth can create new jobs, enhance productivity, and raise per capita income. According to theory, this increase should benefit all layers of society, including the poor, through a trickle-down effect.

Welfare levels are the primary measure of poverty; the higher the poverty level, the more deteriorated the welfare condition, and vice versa. According to BPS (Central Bureau of Statistics), Indonesia's poverty level remains high despite the rise in economic growth. In 2026, the number of poor people in Indonesia was projected to be 3,930 million, many of whom live in poverty cycles. To address this, the Indonesian government has implemented various poverty reduction programs, such as the Non-Cash Food Assistance (BPNT) and the Pre-Employment Card program.

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People are poor because they are unable to do certain things, not because they lack something. The key to eradicating poverty, therefore, lies in "access," meaning access to education, healthcare, and infrastructure. Indonesia's high poverty rate is attributed to the population's lack of access to adequate education, limiting their ability to absorb the rapidly advancing information and technology.

Population growth tends to have a negative impact on the poor, especially those in extreme poverty. Most poor families have large household sizes, which exacerbates their economic conditions and deepens income inequality or welfare gaps. One of the causes of poverty is the unequal ownership of resources, which leads to income inequality.

According to BPS, the number of poor people in the Sumatra region in September 2022 reached 576 million, or 21.86%. Most of these people work in the marine and fisheries sectors, particularly in fish farming. Table 1.1 presents the percentage of poor people in North Sumatra's regencies/cities.

Table 1. Percentage of Poor Population in North Sumatra

Year	Poverty Rate (%)
2018	8.94%
2019	8.63%
2020	9.14%
2021	8.49%
2022	8.33%

As seen in Table 1., the poverty rate fluctuated, with a slight decline from 2021 to 2022 by 0.01%. This small decline in North Sumatra's poverty rate is largely due to the policies implemented by the province’s governor. Coastal areas are of particular concern because poverty remains high compared to urban areas. This condition is ironic and strengthens the assumption that poverty in coastal regencies/cities is inherited, making it a form of chronic poverty. Chronic poverty goes beyond consumption or what is typically referred to as transient poverty; it encompasses various other aspects of poverty measurement. Significant reductions in poverty levels can be achieved by addressing key factors such as economic growth, income inequality, and unemployment.

Problem Formulation

The research focuses on how to address poverty issues in coastal areas. Current government efforts aim to alleviate economic hardship and reduce the number of poor people in coastal regencies/cities. The policies proposed by the Ministry of Marine Affairs and Fisheries (KKP) focus on reducing poverty through economic growth and reducing income inequality in coastal areas. As part of its main duties and functions, the KKP supports the President in formulating and coordinating policies in the marine and fisheries sectors (Presidential Decree No. 94 of 2006). Since 2001, the KKP has launched stimulus assistance for coastal communities through the Coastal Community Economic Empowerment Program (PEMP). The formulation of this problem is descriptively about the state of poverty, economic growth, income inequality, and unemployment, as well as the impact of these three macroeconomic variables on poverty.

2. Literature Review

Poverty

Various concepts of poverty have been proposed by experts. Todaro and Smith define absolute poverty as a condition in which people are unable to obtain sufficient resources to meet basic needs [3]. They live below a certain minimum real income level, or below the international poverty line. In addition to absolute poverty, some economists calculate a total poverty gap indicator, which measures the total income required to lift those below the poverty line above it. Relative poverty, on the other hand, measures income distribution gaps, often related to income distribution at or below the national average. The Gini ratio is a common indicator used to measure relative poverty.

The calculation of poor populations by BPS since its inception has used the same approach: the basic needs approach. In this approach, poverty is conceptualized as the inability to meet basic needs.

Economic Growth

Neoclassical growth theory, pioneered by Robert M. Solow, suggests that Gross National Product (GNP) growth is determined by two types of inputs: capital growth and labor growth [4]. Solow places significant emphasis on these inputs because economic growth requires capital intensification and wage increases to boost societal consumption due to rising incomes. In addition to capital and labor, Solow considers the exogenous factors of technological progress and improved workforce skills in using technology.

In Solow's model, the capital level is represented by savings, which indicates the size of the capital stock and the output level [5]. The higher the savings rate, the greater the capital stock and output. An increase in savings leads to rapid growth, but growth slows down once the economy reaches a new steady state. If an economy has more capital in a steady state, reducing savings will increase consumption at all points. Conversely, if the capital stock is low in the steady state, more savings are needed to raise output and consumption levels. In Solow’s model, population growth plays a key role in explaining growth levels. Population growth affects the growth of per-worker income.

Solow's model predicts that economies with high population growth will have low per-worker income levels. Population growth helps explain output growth. As the number of workers increases, so too must income growth at the same rate to maintain steady growth. Finally, Solow incorporates technological progress as a factor in sustainable growth in per-worker income. Technological progress leads to simultaneous increases in the values of various variables, such as output per worker and real wages, while rental prices remain constant. However, Solow treats technological progress as an exogenous variable.

Solow's theory can be expressed by a production function that relates total output (Y) to total capital (K) and labor (L), without considering technological progress: $Y=f(K,L)$ When technological progress is considered, the function includes capital, labor, and labor efficiency (E), as impacted by technological advancements: $Y=f(K,L\cdot E)$.

One objective of growth theory is to explain the long-term increase in living standards. Technological advancements, such as the steam engine and the development of computers and the internet, are examples of factors that drive economic growth by improving output quality and quantity. Solow's growth model shows that sustainable growth is driven by technological advancements, although the model assumes that technological progress comes from external factors (exogenous).

In contrast, endogenous growth theory, pioneered by Paul Romer, seeks to explain the rate of technological progress as an internal factor (endogenous) [6]. Romer's endogenous growth model uses the production function: $Y=A \cdot KY$. Here, Y represents output, A is a constant measuring the amount of output produced for each unit of capital, and K is the capital stock. Unlike neoclassical models, the endogenous growth model assumes that returns on capital do not diminish over time. Each additional unit of capital produces the same amount of output without considering the existing capital stock. This contrasts with Solow's model, where growth depends on technological progress. In the endogenous model, capital and investment can drive continuous growth. Knowledge and technology are considered forms of capital, leading to a steady increase in output through innovation.

Income Inequality

Income inequality is a factor that affects poverty, exacerbated by population growth. Population increases negatively impact the poor, especially those in extreme poverty. Many poor households have large families, worsening their economic conditions and exacerbating income inequality. Studies show that the elasticity of inequality in poverty reduction is higher than the elasticity of growth in poverty reduction [7]. One of the main causes of poverty is unequal resource ownership, leading to income distribution inequality.

Aiyar and Ebeke state that income inequality hampers growth and makes redistribution policies more expensive [8]. Income inequality occurs when most people receive low incomes, while a small proportion of the population enjoys high incomes. The larger the income gap, the greater the inequality. According to Todaro and Smith (2006), high inequality between the rich and poor can lead to two main problems:

1. Economic inefficiency, where many people, especially the poor, struggle to access credit, while the wealthy tend to spend excessively on luxury goods.
2. Weakened social stability and solidarity.

Several indicators are used to measure income inequality, including the Gini index, the Theil index, the World Bank criteria, and the Williamson index. The Gini index is the most commonly used indicator due to its ease of calculation and its ability to use various approaches, such as expenditure or income. This allows the Gini index to measure real differences in purchasing power. For this reason, this study uses the Gini index to measure income inequality. The Gini index is calculated using household expenditure data collected annually by BPS through the National Socioeconomic Survey (SUSENAS). Expenditure data is used as a proxy for household income, as it is considered to reflect actual conditions more accurately.

Unemployment

Unemployment refers to individuals in the labor force who are actively seeking but unable to find employment. It does not include those who are not actively looking for work, such as homemakers, students, or retirees. Unemployment is calculated as the percentage of unemployed individuals in the total labor force:

Unemployment Rate = (Number of Unemployed Labor Force) ×100%

Several factors contribute to unemployment, including high population growth, low education and skill levels, a mismatch between job requirements and workforce skills, technological advancements, and economic instability.

Unemployment is a measure of productivity in the economy, with employed individuals contributing to the production of goods and services. The labor force consists of those working (employed) and those unemployed but actively seeking work (unemployed). Those not in the labor force are individuals not engaged in or attempting to engage in productive activities.

3. Research Methodology

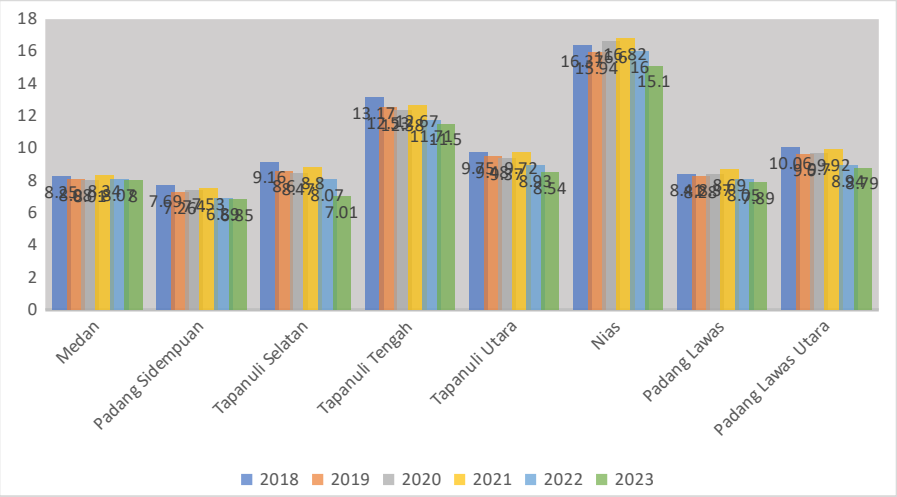
he scope of this research is focused on the state of poverty, economic growth, income inequality, and unemployment, as well as the impact of these three macroeconomic variables on poverty in the coastal areas of North Sumatra, in eight regencies/cities as the sample, analyzed from 2018 to 2023. The regions covered in this study are: (1) Medan, (2) Padang Sidempuan, (3) Tapanuli Selatan, (4) Tapanuli Tengah, (5) Tapanuli Utara, (6) Nias, (7) Padang Lawas, and (8) Padang Lawas Utara.

Then, to find the answers to the research objectives, a descriptive analysis was conducted.

4. Results And Discussion

Based on the research results, the first is the performance of poverty levels, economic growth, income inequality, and unemployment in the coastal areas of North Sumatra across eight regencies/cities, analyzed from 2018-2023 as follows:.

Poverty



Source: BPS (processed data)

Fig. 1. Poverty Levels in Eight Coastal Areas of North Sumatra (2018-2023)

Based on Figure 1, the performance of poverty levels in the eight coastal areas of North Sumatra from 2018-2023 is as follows:

- **Medan**:

  Poverty levels remained relatively stable with slight fluctuations, indicating effective government efforts to maintain the poverty rate. The decrease from 8.25% to 8.04% over six years suggests some success in poverty reduction.

- **Padang Sidempuan**:

  A significant reduction in poverty, from 7.69% to 6.85%, shows a positive trend in poverty alleviation programs.

- **Tapanuli Selatan**:

  Despite some stability, there has been slow progress, with a reduction from 9.16% to 7.01%, indicating challenges in further reducing poverty.

- **Tapanuli Tengah**:

  A significant reduction, from 13.17% to 11.50%, demonstrates successful poverty reduction programs.

- **Tapanuli Utara**:

  Poverty reduction from 9.75% to 8.53% indicates effective efforts in decreasing poverty levels.

- **Nias**:
  Nias had the highest poverty rate throughout the study period. Despite a decline from 16.37% to 15.10%, poverty reduction has been slow.

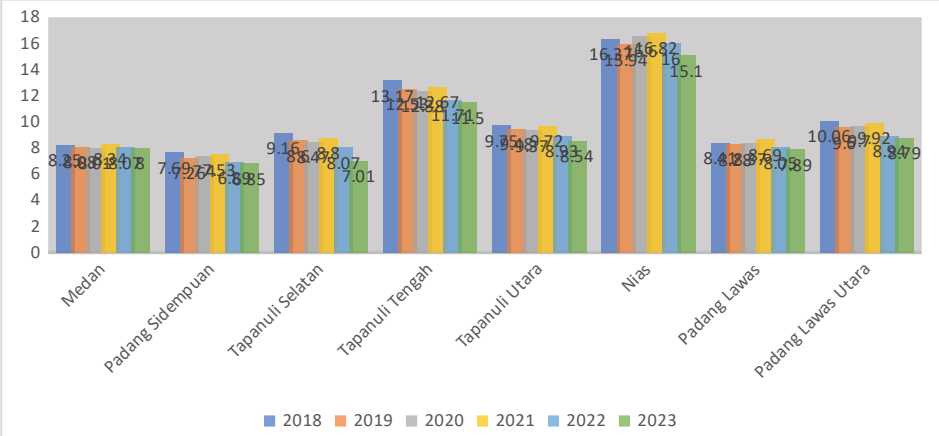
- **Padang Lawas**:

  The poverty rate fell from 8.41% to 7.89%, indicating gradual improvements.

- **Padang Lawas Utara**:

  A decline from 10.06% to 8.78% shows moderate progress in reducing poverty.

Economic Growth



Source: BPS (processed data)

Fig. 2. Economic Growth Rates in Eight Coastal Areas of North Sumatra (2018-2023)

Based on Figure 2, the performance of economic growth in the eight coastal areas of North Sumatra from 2018-2023 is as follows:

- **Medan**:

  Economic growth fluctuated, with a sharp decline in 2020, likely due to the COVID-19 pandemic. Economic recovery was evident by 2022 and 2023, with growth increasing from -1.98% in 2020 to 4.71% in 2022.

- **Padang Sidempuan**:

  Economic growth remained relatively stable, reflecting a resilient economy able to adapt to external changes.

- **Tapanuli Selatan:**

  Large fluctuations in growth reflect an economy sensitive to external shocks, but recovery after negative growth indicates potential for future improvement.

- **Tapanuli Tengah**:

  The region experienced significant economic fluctuations, though recovery is evident post-pandemic.

- **Tapanuli Utara**:

  Similar fluctuations as other regions, with a gradual recovery from negative growth during the pandemic.

- **Nias**:

  The economy also experienced fluctuations, but recovery from negative growth demonstrates economic resilience.

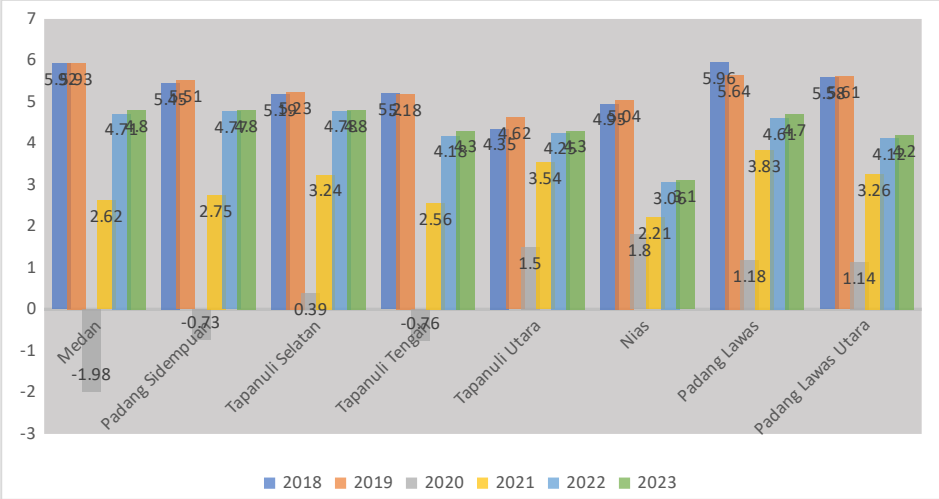
- **Padang Lawas**:

  The region showed large fluctuations, with potential for future recovery.

- **Padang Lawas Utara**:

  Like Padang Lawas, North Padang Lawas experienced fluctuations, but signs of recovery are visible.

Income Inequality



Source: BPS (processed data)

Fig. 3. Income Inequality in Eight Coastal Areas of North Sumatra (2018-2023)

Based on Figure 3, the performance of income inequality in the eight coastal areas of North Sumatra from 2018-2023 is as follows:

- **Medan**:
  Increasing inequality, with the Gini index rising from 0.3144 to 0.373, suggests widening income disparities.
- **Padang Sidempuan**:

  A decrease in inequality, from 0.398 to 0.267, shows significant improvement in income distribution.
- **Tapanuli Selatan**:

  The Gini index fell from 0.2467 to 0.219, reflecting improved income distribution.
- **Tapanuli Tengah**:

  Inequality decreased slightly, showing progress in narrowing income gaps.
- **Tapanuli Utara**:

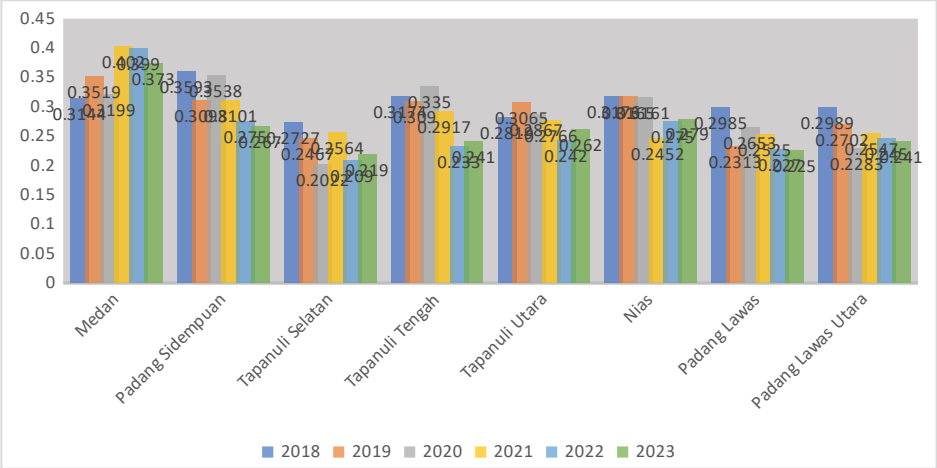
  A reduction in the Gini index from 0.2819 to 0.242 shows improved equity.
- **Nias**:

  Despite improvements, Nias still faces challenges in achieving income equality.
- **Padang Lawas**:

  Income distribution improved, as indicated by a reduction in the Gini index from 0.2985 to 0.225.
- **Padang Lawas Utara**:

  Income inequality also improved, with the Gini index decreasing from 0.2989 to 0.241.

Unemployment



Source: BPS (processed data)

Fig. 4. Unemployment Rates in Eight Coastal Areas of North Sumatra (2018-2023)

Based on Figure 4, the performance of unemployment rates in the eight coastal areas of North Sumatra from 2018-2023 is as follows:

- **Medan**:

  Unemployment increased during the COVID-19 pandemic but has since decreased, although it remains higher than pre-pandemic levels.

- **Padang Sidempuan**:

  Unemployment fluctuated, indicating challenges in creating stable job opportunities.

- **Tapanuli Selatan**:

  The unemployment rate decreased, reflecting improvements in job creation.

- **Tapanuli Tengah**:

  Unemployment remained stable, although challenges in generating jobs persist.

- **Tapanuli Utara**:

  Unemployment declined, indicating positive job market trends.

- **Nias**:

  Unemployment showed a steady decline, demonstrating job market stability.

- **Padang Lawas**:

The unemployment rate showed some fluctuations, highlighting ongoing job market challenges.

- **Padang Lawas Utara**:

  Similarly, fluctuations in the unemployment rate reveal difficulties in creating stable employment opportunities.

Secondly, the effects of the three macro variables (economic growth, income inequality, and unemployment) on poverty in the coastal areas of North Sumatra from 2018-2023 are as follows:

- The economic growth of the eight coastal areas in North Sumatra showed significant fluctuations during this period. Although some areas experienced positive growth after the downturn caused by the COVID-19 pandemic in 2020, areas such as Medan showed significant economic recovery in 2022 and 2023. However, these fluctuations pose challenges to achieving stable poverty reduction. Economic growth plays an important role in reducing poverty, but regions with volatile growth tend to experience slower poverty reduction.
- Income inequality in these coastal areas also affects poverty levels. Some areas, like Medan, experienced a significant increase in inequality, with the Gini ratio rising from 0.3144 to 0.373. This indicates uneven income distribution, which could exacerbate poverty. On the other hand, regions like Padang Sidempuan succeeded in reducing income inequality, which coincided with poverty reduction. This indicates that equitable income distribution is a key factor in poverty reduction.
- Unemployment rates varied significantly across these regions. Areas like Medan experienced an increase in unemployment, especially in 2020 due to the pandemic. High unemployment can slow poverty reduction because fewer job opportunities hinder household income. However, other areas like Nias successfully reduced unemployment from 5.04% to 2.31%, which contributed to a reduction in poverty.

These findings align with previous literature, particularly the established link between these three factors (economic growth, income inequality, and unemployment) and poverty in various regions, especially in economically vulnerable coastal areas. The explanation is as follows:

- **The Impact of Economic Growth on Poverty.** This study shows that while most areas experienced fluctuations in economic growth, overall recovery occurred after the COVID-19 pandemic. Regions like Medan, which saw significant recovery in 2022 and 2023, also saw poverty reduction. This is consistent with Todaro and Smith's (2015) assertion that sustainable economic growth is key to poverty reduction, as growth creates jobs and increases household income [9]. However, the instability of economic growth in other regions, such as Tapanuli Selatan, shows that economic instability hampers efforts to reduce poverty. This finding is consistent with Ravallion's (2004) research, which suggests that economic growth alone is not enough to reduce poverty if not accompanied by policies that support fair resource distribution [10].

- **The Impact of Income Inequality on Poverty.** Rising income inequality in some regions, such as Medan and Tapanuli Utara, has slowed poverty reduction. According to Kuznets' (1955) theory, income inequality tends to rise in the early stages of economic growth and then declines as society becomes more prosperous [11]. However, in vulnerable coastal areas, increasing inequality can seriously impede poverty reduction. Regions with high inequality tend to face more difficulty in reducing poverty, as noted by Bourguignon (2004), who emphasized that income inequality can slow the poverty-reducing effects of economic growth [12]. In contrast, regions like Padang Sidempuan and Tapanuli Selatan, which experienced declining inequality, saw more significant poverty reductions. This supports the findings of Dollar and Kraay (2002), who stated that more equitable income distribution contributes better to poverty reduction than merely relying on economic growth [13].
- **The Impact of Unemployment on Poverty.** The varying unemployment rates in coastal areas also significantly contributed to poverty performance. Regions like Nias and Padang Lawas, which managed to reduce unemployment, showed more consistent poverty reductions, consistent with Fields' (2004) research that emphasizes the direct impact of significant unemployment reduction on poverty reduction [14]. Conversely, regions like Medan and Padang Sidempuan, which experienced rising unemployment during several years, especially during the pandemic, showed stable or increased poverty levels. This is in line with findings by the ILO (2020), which noted that unemployment caused by the pandemic severely disrupted labor markets globally, particularly in informal sectors dominant in coastal areas [15].

5. Conclusions And Recommendations

4.1 Conclusions

Some important conclusions that can be drawn are:

1. Economic growth in the coastal areas of North Sumatra showed significant fluctuations, particularly due to the impact of the COVID-19 pandemic. Regions that successfully recovered significant economic growth, like Medan, experienced a reduction in poverty. However, volatile economic growth in other regions made poverty reduction more challenging.
2. Income inequality is one of the main obstacles in poverty alleviation efforts. Regions experiencing increasing inequality, such as Medan, showed slower poverty reduction. Conversely, regions with declining inequality, such as Padang Sidempuan, experienced more significant poverty reductions.
3. Unemployment remains a major challenge, especially in areas that experienced rising unemployment during the period. Regions with declining unemployment,

such as Nias, managed to reduce poverty more effectively, while regions with increasing unemployment, like Medan, faced challenges in reducing poverty.

4. Overall, this research confirms that poverty reduction cannot rely solely on economic growth. Income inequality and unemployment must also be addressed concurrently to achieve optimal results in poverty alleviation.

4.2 Policy Recommendations

Based on the research findings, here are some policy recommendations that can be considered to reduce poverty in the coastal areas of North Sumatra:

1. Local governments need to focus on policies that promote inclusive economic growth. This means that economic growth should be accompanied by policies ensuring that the benefits of growth are felt by all social groups, especially the poor. For example, investment in infrastructure that creates local employment opportunities and the development of more evenly distributed economic sectors across coastal regions.

2. Governments need to strengthen income redistribution programs, such as through more progressive tax reforms and increasing poor communities' access to education and healthcare services. Policies supporting financial inclusion, such as providing microcredit to small and medium-sized enterprises in coastal areas, can also help reduce inequality.

3. Governments should promote the creation of more stable employment, especially in sectors with high potential, such as tourism, fisheries, and agribusiness. Developing job training programs tailored to industry needs in coastal areas is also crucial for reducing unemployment. Additionally, the government can encourage the development of local resource-based industries that can create many job opportunities.

4. Expanding the coverage of social protection programs, such as cash assistance for poor families and social insurance programs for informal sector workers, can help alleviate the burden on vulnerable communities during economic crises. These programs can also serve as effective safety nets in reducing the impact of income inequality and unemployment.

5. Given the significant differences between the regencies/cities in the coastal areas of North Sumatra, cooperation between regions in sharing resources and experiences related to poverty alleviation policies is essential. Local governments can facilitate this cooperation through regular discussion forums and the exchange of best practices across regions.

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