



# Analysis of the influence of sustainable economic development on environmental quality in West Sumatra

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## ABSTRACT

Economic development aims to improve the welfare of the community, however, this process often has a negative impact on the environment. This research is a Quantitative research with a descriptive approach. In addition, this research also uses quantitative research methods and uses comparative analysis methods. West Sumatra's Environmental Quality Index (IKLH) from 2020 to 2024 is higher than the National IKLH. This indicates that West Sumatra's environmental quality is better than the national average. When Economic Growth decreases, the value of IKLH also decreases. However, per capita income during the study period experienced an increasing trend, but the quality of the environment in 2024 decreased. It can be concluded that sustainable economic development with environmental quality in West Sumatra shows complex dynamics.

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## INTRODUCTION

The discussion on the relationship between sustainable economic development and the environment is very important in light of today's global challenges such as climate change, pollution and ecosystem degradation. Economic development and environmental quality are often considered as two contradictory things, especially in developing regions. According to Law No. 32/2009 on Environmental Protection and Management, sustainable development is a conscious and deliberate effort to integrate environmental, social and economic aspects in a development strategy. The goal is to protect the integrity of the environment and ensure the safety, competence, well-being and quality of life of present and future generations (Pemerintah Indonesia, 2009). Economic development aims to improve people's welfare through improved infrastructure, industry and tourism. However, this process often leads to negative impacts on the environment, such as forest destruction, water and air pollution, and loss of biodiversity. In West Sumatra, with its abundant natural resources and rich culture, it is important to explore how economic development can go hand in hand with maintaining environmental quality. Economic development is a process that aims to increase the per capita income of the population in the long

term (Ria Armayani et al., 2022). This process not only aims to increase economic wealth, but also to create fundamental changes in the structure of the economy and a more equitable distribution of income throughout society. In addition, economic development often triggers the transformation of industry and service sectors, contributing to increased productivity and general welfare. This dynamic is important because sustainable economic development must also consider environmental and social aspects, including efforts to conserve natural resources to ensure long-term prosperity for future generations. The balance between economic growth and environmental preservation is key in achieving truly sustainable development.

Sustainable development centers on three fundamental pillars (Muhammad, 2021). economic progress, ecological or environmental progress, and community growth. The division between economic development and community development initially led to the idea of inclusiveness, emphasizing community involvement in economic progress. Likewise, the division between community development and ecological development gives rise to idealistic ideas, indicating the active involvement of society in environmental preservation. Finally, the division between economic development and ecological development gives rise to conservative ideologies, which are concerned with environmental sustainability and balance. The integration of these three slices results in the establishment of a framework for sustainable development, which is based on the basic principles of needs and constraints. The principle of needs centers on improving living standards for individuals, while the principle of constraints relates to the ability and capacity of the environment to meet those requirements. Consequently, achieving sustainable development mandates a harmonious balance between human needs and environmental restrictions.

Implementing development in accordance with sustainable principles is key to achieving harmony between the three pillars. Sustainable development not only aims to improve people's welfare, but also ensures that human needs and aspirations can be met without harming the environment (Ghifary et al., 2022). It is thus important to recognize that sustainable development also involves technological innovations and policies that support resource efficiency, as well as education that raises awareness of the importance of maintaining ecological balance. With a holistic and integrative approach, sustainable development can provide long-term solutions that benefit both people and the environment. Economic development is the most important prerequisite for any region that aims to witness expansion in its economic activities. The prosperity of a region can be defined by a notable increase in its economic progress. Nevertheless, the idea of sustainable development, which is focused on improving the quality of the living environment, cannot be ignored. As highlighted by Beckerman in (Febriana et al., 2019) there is a strong relationship between income levels and various environmental indicators, suggesting a favorable relationship. Moreover, in developing countries, economic progress is projected to increase the capacity to improve environmental conditions.

Sustainable economic development is an approach to economic growth that takes into account environmental protection and social justice. In the context of West Sumatra Province, this approach has begun to be explored through various regulations. In West Sumatra, various policies and regulations have been implemented to support sustainable development. One important regulation is the West Sumatra Provincial Regulation No. 3 of 2012 concerning the Regional Spatial Plan (RTRW). This regulation stipulates the spatial arrangement of West Sumatra for a period of 20 years, with the aim of utilizing the regional space optimally and sustainably. This includes zoning the area for various purposes such as agriculture, settlements, industry, and environmental conservation. This regulation prioritizes the protection of the environment, sustainable management of natural resources, and improvement of the quality of life of the people. However, it is important to note that environmental performance indicators in the RTRW could be further developed to be more conceptual and normative. While zoning directives, protected areas, and indications of development programs do show concern for sustainability, it is important to note that they do not fully include quantitatively measurable environmental targets, such as the extent

of forest cover or regional emission thresholds. Another regulation, West Sumatra Provincial Regulation No. 2/2014 on Environmental Management, regulates environmental protection and management efforts in West Sumatra, including pollution control, critical land rehabilitation, and biodiversity conservation. This policy emphasizes the importance of AMDAL (Environmental Impact Assessment) in every development project, and encourages active community participation in environmental conservation efforts. Thus, this regulation serves as a legal basis to maintain the balance of the ecosystem and ensure that development does not damage the environment. The Green West Sumatra program is another significant initiative in supporting sustainable development.

The West Sumatra provincial government again issued a regional regulation to regulate environmental protection and management. This regulation was issued through Regional Regulation No. 2 of 2020 concerning Environmental Protection and Management Plans. West Sumatra Province Regional Regulation No. 2 of 2020 concerning the RPPLH is a legal instrument that explicitly stipulates measurable environmental performance indicators, such as the Environmental Quality Index (IKLH), carrying capacity and environmental capacity, as well as a monitoring and evaluation scheme that is carried out regularly. This document even requires synchronization with long-term (RPJPD) and medium-term (RPJMD) development planning documents, indicating the formal integration of environmental indicators in regional development planning. In addition, implementation strategies and targets set out in the RPPLH also include biodiversity conservation, adaptation to climate change, and sustainable management of water and land resources.

These policies show the commitment of the West Sumatra Provincial Government in achieving sustainable development, which prioritizes the balance between economic growth, environmental conservation, and social welfare. Even though several regulations have been issued by the West Sumatra Regional Government, there is still some environmental damage. It is evident that several pivotal economic sectors in West Sumatra, including but not limited to agriculture, tourism, and mining, possess the capacity to exert a substantial influence on the local environment when compared to other economic sectors. The mining sector, in this case Semen Padang mining, has the potential to induce alterations in the quality of the environment, encompassing water, air, and soil quality. The tourism sector has the potential to cause environmental damage, particularly in areas that become popular tourist destinations. For instance, the Mandeh Tourism Area, Lake Singkarak, and Harau Valley have experienced significant development, which can impact the surrounding community's economy. Conversely, agriculture has the capacity to convert agricultural land into oil palm plantation areas, which can pose a threat to biodiversity and ecosystem balance. Based on these problems, the researcher conducted this study with the title Analysis of the influence of sustainable economic development on environmental quality in West Sumatra.

## RESEARCH METHOD

This research is Quantitative research with a descriptive approach. The quantitative method in this research is based on the philosophy of positivism and aims to investigate a specific population or sample (Sugiyono, 2016). In addition, this study also uses quantitative research methods and uses comparative analysis methods. The comparative analysis model is research that compares the state of one or more variables in two or more different samples, or two different times. This research aims to contribute to our understanding by comparing the quality of West Sumatra's environment with the national level. In addition, comparative analysis is used in this study to see how economic growth and environmental quality of life (IKLH) compare to the level of per capita income and IKLH in West Sumatra.

The data used in this study are data for 2020-2024 sourced from the West Sumatra Central Statistics Agency Website and the Indonesian Ministry of Environment as well as journals and book references related to this research. The study utilizes the time span from 2020 to 2024 as the analysis period, as it marks the initial period of implementation of Regional Regulation Number 2 of 2020 concerning Environmental Protection and Management Plan (RPPLH). The selection of this period also considers the availability of relatively complete statistical data related to economic and environmental indicators. In this study, the variables measured are the Environmental Quality Index (IKLH), Economic Growth and Per capita income.

## RESULTS AND DISCUSSIONS

Sustainable development is an important concept in regional development to ensure sustainable social, economic, and environmental well-being for current and future generations. Based on the Sustainable Development Goals (SDGs), sustainable development includes interrelated economic, social, and environmental aspects (Setianingtias et al., 2019). Sustainable economic development, which integrates economic, social, and environmental aspects, is becoming increasingly important to ensure community welfare and the preservation of natural resources (Febriansyah, 2022). The balance between economic growth and quality environmental is key in achieving truly sustainable development. The Environmental Quality Index (IKLH) is one indicator that can be used to see an overview of the condition of an environment in a certain scope and period. Environmental Quality (ILKH) as a quality standard that reflects environmental conditions (Febriana et al., 2019). Economic development can be reflected in economic growth and the level of community welfare which can be seen from the area's per capita income (Sihite, 2022).

Based on data from 2020 to 2024, the Environmental Quality Index (IKLH) of West Sumatra Province shows an increasing trend from year to year, with a slight decrease in the last year 2024. The IKLH in West Sumatra increased from 72.79 in 2020 to 75.85 in 2023, then experienced a slight decrease to 74.76 in 2024. Nationally, Indonesia's IKLH also shows a similar trend with a consistent increase from 70.27 in 2020 to 73.53 in 2024. The following is a graph of the IKLH trend from 2020 to 2024.

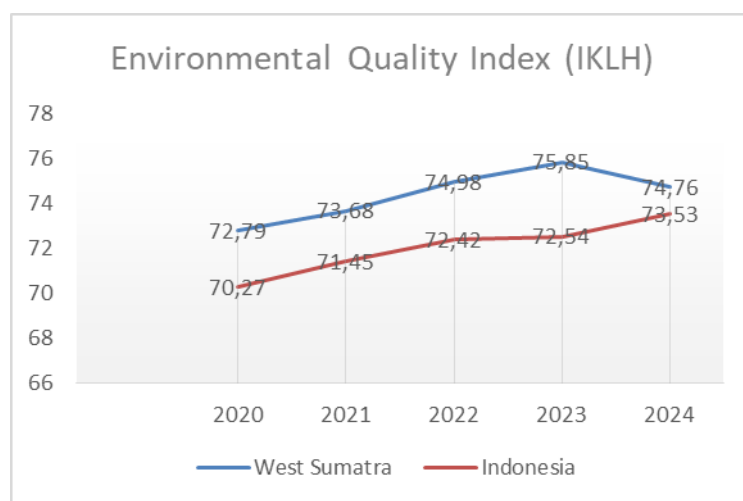


Figure 1. Graph of the Quality of Living Environment in West Sumatra and Indonesia in 2020-2024 (source: Ministry of Environment and Forestry and BPS West Sumatra)

Based on Figure 1, the Environmental Quality Index (IKLH) data from 2020 to 2024, there is a consistent upward trend both at the national level but not in West Sumatra. In 2020, the national IKLH value was recorded at 70.27, slightly lower than West Sumatra which had a value of 72.79. This trend continued in the following years with a gradual increase each year. In 2021, the national IKLH rose to 71.45 while West Sumatra increased to 73.68. This increase continued in 2022 with the national value reaching 72.42 and West Sumatra 74.98. Until 2023, the national IKLH value reached 72.54, while West Sumatra remained slightly higher at 75.85.

The increase in the IKLH value in West Sumatra during the 2020-2023 period indicates the success of environmental programs run by the local government. An increase in the IKLH value can be interpreted as a positive impact of the implementation of sustainable economic development principles (Dellaconi et al., 2024). However, a decline in 2024 could be an early indicator of environmental destabilizing factors that require in-depth investigation and measured adaptive responses. Environmental damage caused by industries in West Sumatra can lead to a drastic decline in the quality of IKLH if there is no serious action from the government and local communities. The Padang Cement Industry in West Sumatra is one example of an industry that has a major impact on the environment such as air pollution (Bachtiar & Sanggar Rani, 2017) and water pollution (Wirananta & Frinaldi, 2025). Sustainable business performance can be achieved through strong business ethics and environmental leadership in the industrial sector (Hutahuruk et al., 2023). The link between environmental ethics and economic performance suggests that companies that adopt environmentally friendly practices can not only improve their reputation, but also contribute to environmental sustainability in the long run. Thus, environmentally sustainable economic development can be achieved.

When compared to the national average, West Sumatra has consistently recorded higher IKLH values every year. This indicates that West Sumatra has a relatively better environmental quality than the national average, which could be due to geographical factors, lower population density. In addition, this could be an indication of the successful implementation of policies and programs related to the environment in the region. The decline in 2024 at the provincial level, while the national level actually increased, is an important indication that environmental challenges are local and require a region-specific approach. Thus, this IKLH data not only informs about current environmental conditions, but also provides a basis for better decision-making in order to maintain and improve environmental quality.

Sustainable economic development in relation to the environment can be analyzed through the IKLH value as an indicator to measure the performance of environmental management in an area (Dhesinta, 2019). Sustainable economic development can be measured through economic growth to achieve a dynamic balance between economic growth and environmental management (Asteria et al., 2021). According to Kuznets, environmental degradation will increase with economic growth, but will decrease after reaching a certain point (Ramadhani & Marwan, 2023)

Economic growth in a region is considered an absolute prerequisite for the creation of wealth. The prosperity of a region can be measured by a significant increase in its economic growth. However, in order to maintain a balance, high economic growth must be accompanied by optimal environmental protection. This shows the importance of harmony between economic growth and environmental sustainability. Thus, regional development that successfully maintains good environmental quality can create prosperity for the people in the region..

Table 1. Value of IKLH and Economic Growth of West Sumatra 2000-2024

Year	2020	2021	2022	2023	2024
IKLH	72.79	73.68	74.98	75.85	74.76
Economic Growth	-1.61	3.29	4.36	4.62	4.36

(Source: BPS West Sumatera)

Economic growth is the process by which the production of goods and services in society continues to increase, ultimately improving the welfare of society. However, it's important to note that production growth can be subject to variability due to various factors. It has been observed that economic development can, on occasion, experience a decline in momentum, or even be stunted, due to instances where the potential of actual production is not fully realized (Zulfikar et al., 2019). Data shows that in 2020, West Sumatra experienced an economic contraction of -1.61% due to the impact of the COVID-19 pandemic. In that year, the IKLH was at 72.79. Despite the decline in economic growth due to external factors such as the pandemic, the relatively high IKLH indicator indicates a sustainable effort in maintaining environmental quality. As the economy recovered, economic growth increased to positive in the following years, and the IKLH value also showed an increase. Between 2020 and 2023, positive economic growth is accompanied by a consistent increase in the IKLH, indicating that increased economic activity does not necessarily reduce environmental quality. Instead, this could reflect the better implementation of sustainable development policies and environmentally friendly technologies.

A sustainable economy is a model that aims to integrate economic growth with environmental and social sustainability. In this context, it would be wise to consider the three pillars—economic, social, and environmental—in a holistic way, with the aim of promoting growth that prioritizes economic benefits while also ensuring that economic activity does not damage the environment. In 2024, it can be seen that although economic growth remains quite high (4.36%), the IKLH value has decreased from 75.85 to 74.76. This indicates that pressure on the environment is starting to increase along with intensified economic activity. In the context of regional development, the economic sector, among others, has the potential to influence environmental quality, where high economic growth may not always be positively correlated with environmental health (Setiawan & Primandhana, 2022). This underscores the importance of continuous evaluation and adjustment of economic development strategies to remain aligned with environmental conservation objectives (Ismail et al., 2021). The implementation of a circular economy can strengthen sustainable development by reducing waste and creating value from that waste, which in turn can support sustainable economic growth (Rusiadi et al., 2024).

Per capita income in a province in Indonesia can reflect the level of community welfare which also illustrates the condition of economic development in the area. Per capita income is derived from dividing the total national income by the total population (Sukirno, 2016). Per capita income in the Province can be calculated by dividing the Gross Regional Domestic Product of an area by the number of people in the area reflects the average income received by each individual in a geographical area over a certain period of time (Zasriati, 2022). When associated with empirical data in West Sumatra, it can be seen how the interaction between per capita income and IKLH can provide a comprehensive picture. The following is the development of per capita income and IKLH of West Sumatra from 2020-2024.

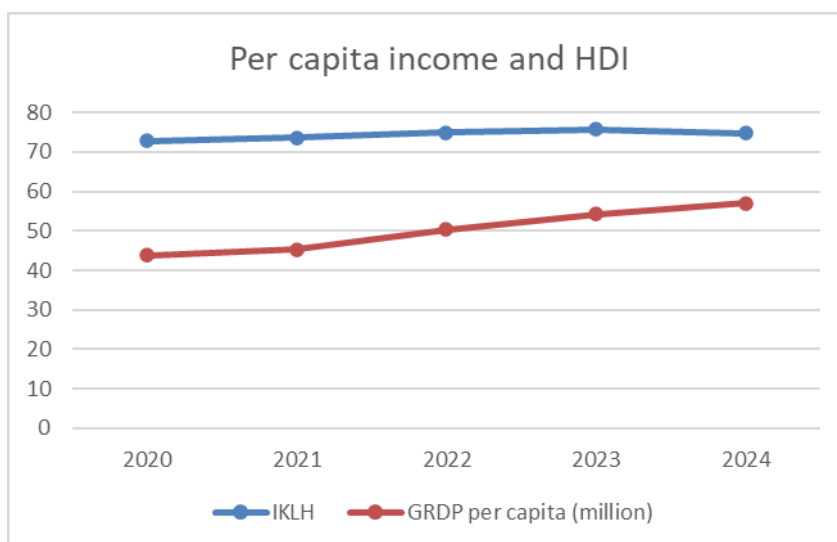


Figure 2. Development of per capita income and HDI of West Sumatra from 2020-2024  
(Source: BPS West Sumatera)

Figure 2 shows the per capita income and environmental quality index (IKLH) from 2020 to 2024. The increase in GRDP per capita from year to year reflects regional economic growth that tends to be positive, as well as an increase in community welfare. On the other hand, the IKLH value, which has also increased over the same period, indicates that economic growth does not directly sacrifice environmental quality. This upward trend allows for an increase in people's income without having to sacrifice environmental quality (Ganar et al., 2021). This result strengthens the hypothesis that sustainable economic development can go hand in hand with environmental conservation efforts. This provides a positive signal that the implementation of sustainable economic development policies in West Sumatra has begun to show encouraging results.

However, the decline in the IKLH in 2024 even though GRDP per capita continues to increase indicates that there is pressure on the environment due to increasingly intensive economic activities, and this requires more attention to the implementation of more environmentally friendly development strategies. In this case, it is necessary to evaluate various economic activities that have the potential to have a negative impact on the environment, such as the industrial, agricultural and tourism sectors (Eliza Noviriani et al., 2023). The tourism sector in West Sumatra has the potential to contribute to regional and community income, though it also poses significant challenges related to environmental impact. For example, the rapid development of tourism in West Sumatra has had a significant economic impact on the community, with an increase in income from tourism. However, this development has also had some negative environmental impacts, such as coastal abrasion, mangrove forest damage, and water pollution (Tan et al., 2019). In addressing environmental concerns arising from the development of tourist areas, the enhancement of green economic capacity in tourist villages demonstrates the potential for collaborative efforts between local communities and natural resource management, offering a multifaceted approach to fostering sustainable development (Rahmayani et al., 2022).

The results of the data on the value of IKLH, economic growth and per capita income indicate that the implementation of sustainable economic development in West Sumatra in the 2020-2024 period shows an interesting and complex trend, but this is still far from perfect and still requires continuous evaluation and innovation. Positive trends in the form of economic growth and per capita income in line with the increase in IKLH until 2023 provide hope that economic development and environmental conservation can go hand in hand. However, the decline in IKLH

in 2024 is a reminder that pressure on the environment can increase along with the intensification of economic activity. The decline then indicates that the existing economic development model needs to be evaluated and refined to be more sustainable.

To achieve optimal sustainable economic development, West Sumatra needs to continue to invest in environmentally friendly technologies, strengthen environmental law enforcement, and increase public awareness of the importance of environmental conservation (Dellaconi et al., 2024). So that economic development can continue without compromising environmental quality. The theory of the green economy underscores the significance of implementing strategies that support environmentally friendly economic growth. As Anwar explains, it is essential to engage various stakeholders to achieve an effective green economy (Anwar, 2022). It is my understanding that actions that combine growth, environmental conservation, and social welfare are key elements in achieving this goal. The use of green financing, for example, has been shown to reduce carbon emissions and encourage companies to shift to sustainable practices (Pratama & Firmansyah, 2024). This suggests a potential connection between sustainable economic development and green investment in terms of maintaining environmental quality in the long run.

## CONCLUSION

From the results of the analysis of IKLH, economic growth, and per capita income during the 2020-2024 period, it can be concluded that sustainable economic development in West Sumatra shows complex dynamics. Economic development, as measured by economic growth and per capita income, should ideally go hand in hand with environmental conservation efforts, but the reality in 2024 shows that there are challenges in achieving this balance. Increasing sustainable economic development is not in line with the quality of West Sumatra's environment. Adaptive and responsive strategies to changing environmental conditions and economic dynamics are needed, including encouraging investment in research and development of green technologies, and strengthening collaboration between the government, private sector and communities in maintaining environmental sustainability. The West Sumatra Provincial Government is working on developing priority policies that focus on strengthening spatial utilization control, reducing industrial and transportation emissions, rehabilitating critical areas, and managing waste and garbage in an integrated manner. In addition, it would be beneficial to consider integrating environmental indicators into development planning and budgeting documents. The West Sumatra government is interested in encouraging investment in research and development of green technology, building a transparent and digital-based environmental quality monitoring system, and strengthening collaboration between the government, the private sector, and the community in preserving the environment. Further research is needed to identify the specific factors that cause a decline in the IKLH in 2024, as well as to formulate more targeted policy recommendations.

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