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The Relationship Between Forest Area And Community Income Levels In Indonesia And Issues Related To Both

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ABSTRACT
This research examines the relationship between the extent of Indonesia's forests and the income levels of the Indonesian population. Using literature review and descriptive analysis of secondary data, this study aims to determine the extent to which Indonesian forests contribute to the economic well-being of the community. The research results show that there is no consistent relationship between the area of Indonesian forests and the income levels of the community. The fluctuating rate of deforestation in Indonesia's forests does not align with the steadily increasing income of the population during the period 2002-2022. The research also revealed a discrepancy in information regarding the contribution of the forestry sector to the national GDP, with percentages varying between 0.66% and 3.11% according to various sources. Through predictive analysis, it is projected that the area of primary forests in Indonesia will increase during the period 2035-2039 and after 2049, while Indonesia's GDP per capita is predicted to continue rising to USD 5,174 by 2050, although it will not yet reach the level of developed countries. This research suggests the need for a more systematic administration system in recording income from the forestry sector, alignment of global forest definitions, and an increase in the contribution of forest products to community welfare while maintaining environmental sustainability.

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INTRODUCTION

Forests play a vital role in the economic, social, and environmental welfare of communities around the world. The relationship between forest areas and the income levels of communities is a complex issue with many facets, requiring careful analysis and consideration (Stjernquist and Schlyter 2022). Forests also provide various economic benefits to communities, including timber and non-timber forest products, ecotourism opportunities, and ecosystem services such as carbon absorption and watershed protection (Paudel and Paudel 2021). Furthermore, it is stated that this economic contribution can have a direct impact on community income levels through job provision, income from the sale of forest products, and support for local businesses and industries. For example, in many rural areas, communities depend on forest resources for their livelihoods, including the collection of non-timber forest products such as fruits, nuts, and medicinal plants. These products can be sold in local and

regional markets, thereby contributing to household income and economic stability.

In addition, forests can attract tourists and outdoor enthusiasts, leading to the development of ecotourism initiatives that generate income for local communities (Cvijanović et al. 2020). Furthermore, it is stated that this can create job opportunities in the hospitality and service sectors, as well as sales of local handmade crafts and souvenirs. In other words, the existence of forests provides a country with the opportunity to earn income that can be utilized by its citizens. On the other hand, there are challenges and sacrifices in the relationship between forest areas and the income levels of communities because trade-offs will occur there (Hajjar et al. 2021). A trade-off is exchanging something of value, especially as part of a compromise (Dictionaries 2023).

It is further stated that the unsustainable exploitation of forest resources can lead to deforestation, loss of habitat, and environmental degradation, which ultimately undermines the long-term economic potential of forests. In addition, communities that are heavily reliant on forest resources may be vulnerable to market demand fluctuations, the impacts of climate change, and policy changes affecting forest management. Furthermore, it is elaborated that the conversion of forests for agricultural expansion or infrastructure development can significantly impact the income levels of communities. Although these activities may yield short-term economic benefits, they can also result in the loss of important ecosystem services, biodiversity, and the cultural heritage associated with forests.

It was further stated that Indonesia is experiencing a multidimensional crisis that impacts all aspects of government administration. This crisis has been followed by many policy reforms, including recent changes in decentralization and autonomy laws. These changes have implications for the use and management of information systems in the forestry sector and have also created new problems on the ground. It was then mentioned that due to a lack of concern and limited funding and resources from the Government, there have not been any serious efforts made by the Ministry of Finance or related institutions to address these issues. To assess the extent of the improvement in community welfare from the management of Indonesia's forests so far, and how it relates to the level of deforestation in Indonesia, as well as the level of income in Indonesia over time, it is necessary to conduct related research. The results of the research can reveal how much Indonesia's forests contribute to the income levels of the Indonesian people, and this research will eventually yield solutions for managing Indonesia's forests better.

LITERATURE REVIEW

Indonesia, known for its vast and diverse forested areas, plays an important role in environmental conservation, biodiversity, and the livelihoods of millions of people. The extent of forest land in Indonesia makes it one of the countries with the largest forest areas in the world, which includes the richness of tropical rainforests, mangroves, and peatlands. Indonesia ranks 9th as the country with the largest forest area in the world after Russia, Canada, Brazil, the United States, China, Congo, and Argentina (Andieni and Allagan 2024). The forests in Indonesia are home to a variety of flora and fauna, including rare species such as the Sumatran tiger, orangutans, and various types of birds. The preservation of this ecosystem is crucial for global biodiversity and

environmental sustainability. The forests in Indonesia make a significant contribution to the country's economy through various channels. Furthermore, the forestry sector provides employment opportunities for a large number of Indonesians, particularly in rural areas where alternative livelihood options may be limited. In addition, the export of timber and non-timber forest products contributes to national revenue and foreign exchange earnings (Vantomme 2003).

A large portion of revenue from Indonesia's forestry sector, regarding how state revenues have been able to improve the welfare of the community, requires a deeper study. From the operational side of forestry, as stated by Hajjar et al. (2021), unsustainable exploitation of forest resources can lead to deforestation, loss of habitat, and environmental degradation, which ultimately weakens the economic potential of forests in the long term. In this regard, deforestation can be assumed to be the reduction of the area of forests in Indonesia that have been exploited over time. On the other hand, Cvijanović et al. (2020) remind us that the earth and water, along with the natural resources contained within, are controlled by the state and utilized for the greatest prosperity of the people

RESEARCH METHOD

The research will be conducted through a literature study carried out in November - December 2023. The type of research is literature study research using descriptive analysis. The data collected in this study are secondary data from independent data providers (Statista, BPS, Global Forest Watch, Rainforest, etc.). The data analysis method used to answer the objectives of this research is by using: The literature review is an academic writing that demonstrates knowledge and understanding of academic literature on a specific topic placed in context (Agustianti et al. 2022). It is further stated that the literature review also includes a critical evaluation of the material; which is the process of reviewing literature, as well as forming the writing.

The main purpose of the literature review is, firstly, to cover the content of existing research, theories, and evidence, and secondly, to provide a critical evaluation and discussion of the content itself. Generally, the literature review is part of or a section in a dissertation, research project, or long essay. However, it can also be established and assessed as a standalone work (Sugiyono 2013). Descriptive Analysis, which involves explaining the results of the analysis by comparing, outlining, and explaining analogously and in detail. Predictions from Secondary Data: conducted using Excel to predict future data from current data, followed by an analysis of the prediction results.

RESULT AND DISCUSSION

The Relationship Between the Extent of Indonesia's Forests and the Income Level of Indonesian Society

As previously stated, the development of the forest area in Indonesia is represented by the rate of deforestation, while the income level of the Indonesian people is approximated by the Gross Domestic Product Per Capita. Based on the graph of the increase in GDP per capita in Indonesia as a representation of the income level of the Indonesian people, the increase in GDP per capita in Indonesia is considered very good because it shows a significant increase. When compared to the rate of deforestation, which tends to decline, the relationship between the forest area in Indonesia and the

income level of the Indonesian people is less consistent. The following is a comparison of both graphs.

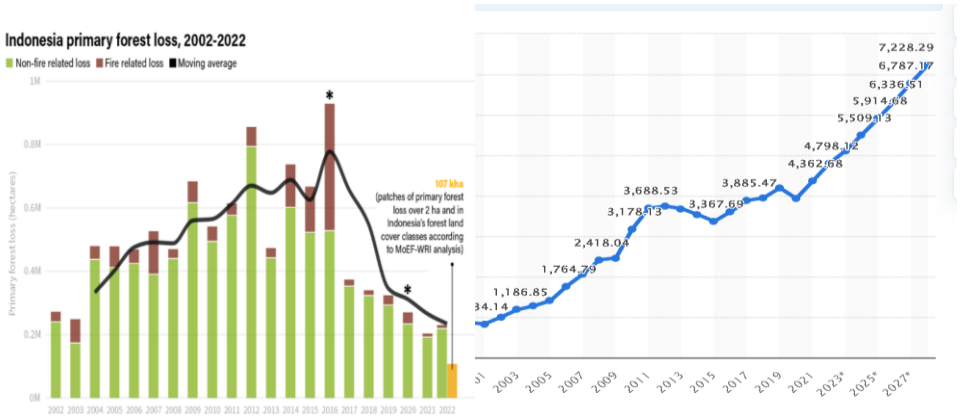

Figure 1. Comparison between the Rate of Deforestation and the Income Levels of Indonesian Society, 2002 – 2022
(Sources : WRI Indonesia, 2019)

The two graphs in Figure 1 show the fluctuations in the level of deforestation in Indonesian forests and the tendency for the income level of the Indonesian people to almost always increase during the same period (2002 – 2022). Certainly, the two graphs do not imply a consistent relationship (fluctuating vs consistently increasing). In other words, the extent of Indonesia's forests does not influence the income levels of the Indonesian people. Thus, the extent of Indonesia's forests does not have an impact on the income levels of the Indonesian people, nor does the opposite.

Discussion on Indonesia's Forest Results to Indonesia's Gross Domestic Product

(Tsujino et al. 2016) that Indonesia's forest resources have been the main engine of national economic development for the past three decades, and forest resources have made significant contributions to foreign exchange earnings, job creation, regional development, and economic growth. This means that Indonesia's forest products have made a substantial contribution to the national Gross Domestic Product. In fact, citing a 1990 report from the Ministry of Finance, forest products ranked second after oil and gas in terms of foreign exchange earnings (or export revenues). Furthermore, the FAO (2002) cites the 'Monthly Statistical Bulletin 1998' that, based on the percentage of total export income, wood products (including sawn timber, plywood, and paper) ranked second (18 percent) after textiles (19 percent), along with 'others', including processed food, chemicals, and animal feeds, contributing 47 percent of export revenues (Figure 1). The contribution of forest products is quite significant (18 percent), which is equal to the contribution of the agricultural sector, also 18%.

Moreover, the composition amount of 18% has not yet included the results obtained from forest product exports, namely: (i) forest management consent fees (IHPH); (ii) land and building tax (PBB); (iii) forest product fees (IHH/PSDH); (iv) reforestation fees (DR); (v) scaling and grading costs; and (vi) export tax on sawn

timber and minimum export prices (FAO, 2002). This means that the revenue-generating items for the state have not been organized neatly and in detail, making it uncertain whether these revenues are accounted for in the state revenue records. In other words, the government is advised to be more systematic in recording all state revenues, especially those from forest products, and to close any loopholes that would allow these revenues to escape into the hands of irresponsible parties. Loopholes that enable individuals to engage in fraud can be prevented with a more sophisticated administration system, ensuring that the official figures reported by the state are valid.

(Putra 2015) stated that currently, the forestry sector in Indonesia contributes only 0.66% to the National GDP, and this amount is relatively small compared to the vastness of Indonesia's forests. The statement from (Putra 2015) has already raised different opinions as expressed by FAO (2002). The most accurate answer, of course, comes from the Government that directly handles this issue. If (Putra 2015)'s statement reflects the true situation, then the Government should empower Indonesia's forests more effectively for the welfare of the community, certainly without accompanying forest destruction. Moreover, Coordinating Minister Airlangga also highlighted Indonesia's role within the framework of the Sustainable Development Goals (SDGs) 2030, where forests contribute to the achievement of 10 out of 17 SDG goals, especially in economic growth, industrial innovation, and infrastructure, as well as forestry development policies aimed at maximizing benefits for the prosperity of the people while preserving the ecological functions of forests.

(Putra 2015) also stated that the Government will continue to encourage the utilization of sustainable and preserved forests to support an increase in its contribution to the National GDP and the welfare of the people. A similar sentiment was expressed by the Coordinating Minister for Economic Affairs Airlangga Hartarto, who stated that forest resources are the leading support for sustainable economic growth (Putra 2015). It was further explained that forests can serve as an economic driving force in national development, thus forests must be preserved, managed, conserved, and utilized sustainably for the welfare of both current and future generations. Additionally, it was mentioned that forests also play a role as an economic driver, including being a source of foreign exchange, providing initial capital for the development of various sectors, and creating jobs through activities such as planting, maintenance, forest protection, and harvesting forest products as well as forest product industries.

(Irawan et al. 2022) provided information that the contribution of the forestry sector to GDP in the period 2015-2020 was consecutively 3.11%, 3.00%, 2.86%, 2.75%, 2.66%, and 2.75%, indicating the size of the forestry sector's contribution to development. These figures are considered very low and show that Indonesia's forest resources have not made a significant contribution to the income level of the Indonesian people. In other words, the increase in the income of the Indonesian people, represented by the Gross Domestic Product per capita, does not come from significant contributions from Indonesia's forest products, but instead comes from other sectors that are completely unrelated to forests. The second point is that the explanations from (Irawan et al. 2022) and FAO (2002) have a significant gap in the difference of information. Meanwhile, as explained in section 2.4, (Wahyudi 2012) in his research findings states that the forestry sector is considered not to have made a significant contribution to national income, estimated from the forestry sector's contribution to the national GDP of

no more than 0.9%; which is far from its actual potential. This opinion is also different from the two previous opinions. Meanwhile, both sources of information come from the Government (Forest Indight and the Department of Finance in FAO (2002). Therefore, it is suggested that the Government apply the same information to the public so that explanations from any party will have more or less the same understanding. In his research findings (Wahyudi 2012), he recommends that the Government implement economic rent from forest empowerment calculations. This may also be a consideration for the Government, so that the contribution of Indonesia's forests to the welfare of the Indonesian people can be improved.

Reduction of Primary Forests in Indonesia

Based on data from (Tapprest, 2022), the graph of the results from this data is as follows:

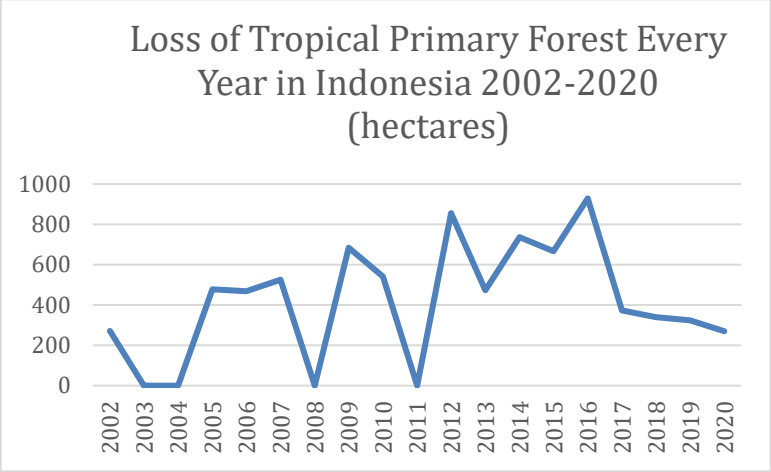

Figure 2. Loss of Tropical Primary Forest Each Year in Indonesia 2002 - 2020

From the image above, it shows that the loss of Indonesia's primary forest fluctuates from year to year. As stated by FAO (2002), the forests of Indonesia are referred to as permanent forests, which consist of (1) Protected forests, (2) Conservation/fully protected forests and recreation forests, (3) Production forests. These different definitions result in varying explanations. It is hoped that the government will establish an agreement on the definition of forests that can be aligned with the global understanding of forests, so that the understanding of deforestation and similar issues can lead to a common understanding. Similarly, the question (Rohmah 2022) about whether there has been and whether there has already been a reduction in forest area, especially concerning permanent reductions through the release of forest areas that have occurred since the 1970s and recorded as a reduction in forest area? Is it possible that the permanent reduction of forest area in Indonesia for more than half a century (1970-2022) has decreased by no more than 2 million hectares? Has the figure of a permanent reduction of 7.3 million hectares been recorded as a decrease from the original forest area of 122 million hectares? These questions should be clearly articulated by the Government as part of their national duties. Because, as has been reminded (Hamzah 2019), that land and water and the natural resources contained within are controlled by the state and utilized for the greatest prosperity of the people, can be implemented effectively.

Predictions of Primary Forest Loss 2021 – 2050

From the data in Figure 3 above (data in Appendix 1), the predictions for primary tropical forest loss data for the years 2021 – 2050 can be predicted as follows:

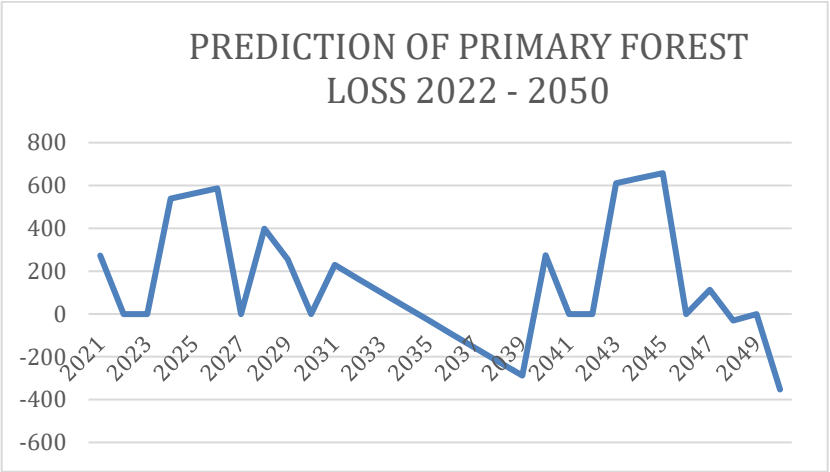

Figure 3. Prediction of Primary Forest Loss in Indonesia 2022 – 2050
Source: Data Processed 2025

The prediction results show that the loss of primary forests in Indonesia follows a pattern that has occurred previously (2002-2020), and even in the years 2035-2039 it will halt, with the area of primary forest increasing (as seen in the graph that decreases from zero), but then by 2040, the loss of primary forest will rise again until 2045, which will then decline again in 2049 as it did in 2035, as indicated by the decreasing graph below zero. This prediction also provides insight that the Indonesian government is expected to be able to curb the rate of forest destruction or deforestation, and even increase the area of primary forests. This means that Indonesia has the potential to preserve and expand primary forests. This is of course supported by many parties globally, as has been repeatedly stated, the preservation and extension of primary forests is very important for global biodiversity, climate regulation, and sustainable development. Indonesia, with its rich natural resources and diverse ecosystems, has great potential to maintain primary forests and even increase forest areas in the future.

This is certainly to be appreciated, as Indonesia's primary forests have faced significant threats in recent decades, including deforestation, illegal logging, and land conversion for agriculture and development. These activities have contributed to the loss of biodiversity, carbon emissions, and ecological imbalance, posing threats to the country's natural heritage and the well-being of its people. Therefore, the Indonesian government recognizes the importance of preserving primary forests and has taken several steps to address these challenges. One important initiative is the establishment of protected areas and national parks to protect important habitats and species. Additionally, policies aimed at sustainable forest management and reforestation efforts have been implemented to restore degraded ecosystems and combat deforestation.

Moreover, local communities and indigenous groups have been actively involved in conservation efforts, utilizing their traditional knowledge and practices to protect and sustainably manage primary forests (Haqiqi et al. 2025). It is further stated that collaborative approaches empowering communities to take ownership of conservation initiatives have shown promising results in preserving biodiversity and promoting sustainable land use. In recent years, Indonesia has also explored innovative mechanisms to incentivize forest conservation, such as ecosystem service payments and carbon trading (Press 2023). It is further stated that by assessing the environmental services provided by primary forests, these economic incentives create opportunities for sustainable forest management practices that benefit both the environment and the livelihoods of local communities.

In the future, Indonesia has the potential to further enhance its efforts in preserving primary forests. By leveraging technological advancements, such as remote sensing and geospatial monitoring, the country can improve forest oversight and law enforcement to combat illegal logging and deforestation. Additionally, integrating conservation goals into land use planning and development strategies can help align economic growth with environmental sustainability. The preservation and expansion of Indonesia's primary forests are not only important at the national level but also hold significant global importance. As one of the countries with the highest biodiversity in the world, Indonesia's forests harbor unique species and ecosystems that contribute to the ecological balance of the planet. Furthermore, the role of these forests in carbon absorption and climate change mitigation underscores their global relevance in the context of sustainable development and environmental management. Indonesia is at a critical point in its efforts to preserve primary forests, and the path it chooses will have significant implications for biodiversity conservation, climate action, and sustainable development. By leveraging existing initiatives, engaging diverse stakeholders, and implementing innovative approaches, Indonesia has the potential not only to conserve its primary forests but also to increase its forest area, thus contributing to a more resilient and sustainable future for both parties.

The preservation and expansion of primary forests are crucial for global biodiversity, climate regulation, and sustainable development. Indonesia, with its rich natural resources and diverse ecosystems, has significant potential to maintain primary forests and even increase forest area in the future. Indonesian primary forests have faced major threats in recent decades, including deforestation, illegal logging, and land conversion for agriculture and development. These activities have contributed to the loss of biodiversity, carbon emissions, and ecological imbalance, posing a threat to the country's natural heritage and the well-being of its people. However, the Indonesian government realizes the importance of preserving primary forests and has taken several steps to address this challenge. One important initiative is the establishment of protected areas and national parks to safeguard critical habitats and species. In addition, policies aimed at sustainable forest management and reforestation efforts have been implemented to restore degraded ecosystems and combat deforestation.

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The utilization of forest resources is carried out in accordance with the functions contained within them, namely environmental, social, cultural, and economic functions, and must also enhance the economic and ecological added value of the forest (Asiyah 2017). Furthermore, it is explained that the policy for organizing the forestry sector must also apply the principles of 'green economy' so that forest management is sustainable and can contribute to low-carbon economic development. This principle is adopted through efforts for sustainable production and consumption, management, protection, and restoration for adaptation and mitigation of climate change. It is also further explained that forests play a role in providing oxygen, regulating water resources, preventing erosion and flooding, and other biodiversity values that are not included in the national economic calculations. One noteworthy aspect is that Indonesia has implemented a Satellite Account in an effort to preserve Indonesia's forests and calculate the real contribution of the forestry sector to the GDP. The goal of supplementing the calculation of the forestry subsector's contribution to the GDP is to enable the Government to monitor and evaluate forest results, thereby achieving a more proportional assessment in the calculation of GDP coming from the forestry subsector from upstream to downstream along with its distribution. The Forestry Satellite Database is calculated using the 2019 Indonesian Standard Classification of Economic Activities (KBLI), consisting of 5 digits with 89 components (Statistics 2005).

The Growth of Indonesia's Current Income Level

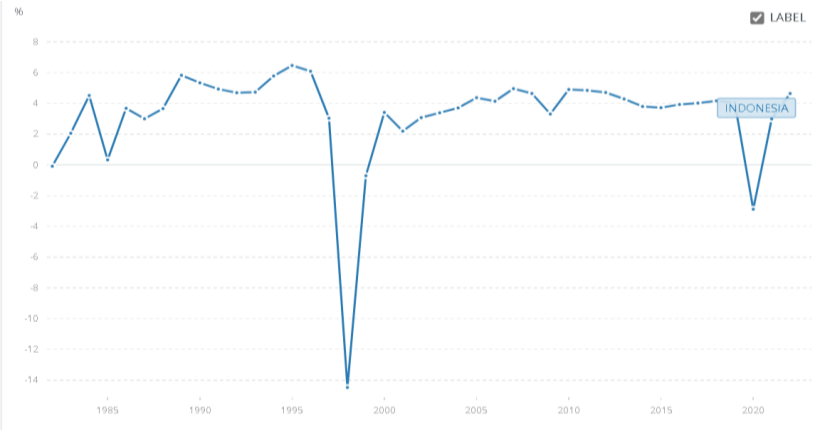

Figure 4. Development of Indonesia's GDP Per Capita 1990 – 2022 (Sources : Tompepinsky, 2022)

According to Databoks, the journey of Indonesia's GDP per Capita from 1967 to 2018 is as follows:

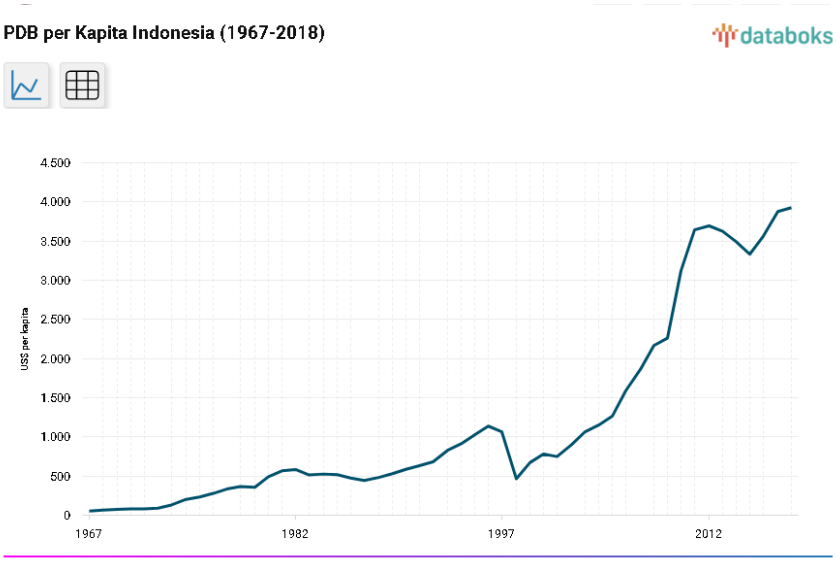

Figure 5. Indonesia's GDP per Capita from 1967 to 2018 Sources : Databoks, 2019

The two images above show similar pictures, indicating that the journey of GDP per capita or the income level of the Indonesian people has continued to increase since 1967, or after 23 years of Indonesia's independence. This shows that the struggles of the Government and the people of Indonesia together have produced significant results with continuously rising income levels. There is a visible decrease in GDP per capita, which has a strong reason, namely during the Monetary Crisis (1998) and 2020 (Pandemic).

The graph displayed in Image 8 shows that the decline in income levels of the Indonesian people in 1998 (during the Monetary Crisis) was far worse compared to the Pandemic period. This also serves as a clarification for several parties who assess that the crisis during the pandemic was more severe than the Monetary Crisis. The graph presented above shows real and accountable results as it is based on accurate data.

Predictions of Indonesia's Income Levels in the Future (2023 - 2050)

From Databoks data, predictions can be made through the Excel approach and the following graph is obtained:

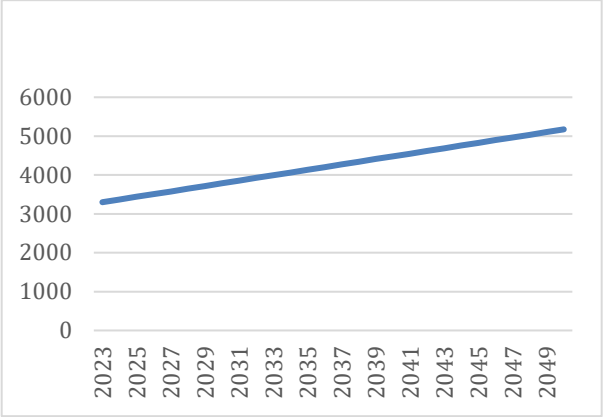

Figure 6. Indonesia's Per Capita GDP Projection 2023 – 2050
Source: Data Processed 2025

From Figure 6, it can be seen that Indonesia's GDP per capita tends to increase year by year, but not as high as the GDP per capita of a developed country, which is generally more than USD 20,000 per year per capita. According to predictions, Indonesia's GDP per capita in 2050 is expected to be USD 5,174 per year per capita. In other words, by 2050, Indonesia is predicted not to have the income levels of developed countries (GDP per capita of the United States in 2023: USD 80,412 per year (Statista, 2023).

Factors Affecting the Relationship between Forests and Community Income Levels

Forests play an important role in maintaining environmental sustainability and supporting ecosystem diversity. However, their impacts are not just ecological; they also have a significant influence on economic welfare. The relationship between forests and income is very complex and has many facets, with various factors affecting this dynamic interaction. The most common forest products are timber, but there are also non-timber forest products, both of which can contribute as forest outputs that can potentially increase the income of local communities. Timber forest products can provide raw materials for various industries, including construction and furniture manufacturing, for example, thus creating jobs and fostering economic growth. Non-timber forest products such as medicinal plants, fruits, and tubers also contribute to the livelihoods and income diversification of local communities. Ecotourism and recreational forests are increasingly recognized for their potential to attract tourists and nature enthusiasts, thus generating income for local people. Ecotourism initiatives centered around forest areas offer nature-based experiences, including hiking, bird

watching, and wildlife observation. These activities not only support the tourism sector but also create demand for hospitality services, handicrafts, and other related businesses, thereby enhancing the overall economic landscape.

Carbon Absorption and Climate Change Mitigation As the global community intensifies efforts to combat climate change, forests have emerged as an important figure in carbon absorption and climate regulation. Mechanisms like REDD+ (Reducing Emissions from Deforestation and Degradation) offer financial incentives for forest conservation and sustainable management (Oladeji 2023). By preserving forests, communities potentially gain access to carbon credits and financial rewards, thus linking forest conservation with increased income. Forest Water Resource Management plays a critical role in regulating the water cycle, protecting watersheds, and ensuring sustainable freshwater supply (Chang et al. 2024). It is later mentioned that these ecosystem services are highly valuable for agriculture, energy production, and human consumption. Additionally, healthy forests contribute to reducing soil erosion and improving water quality, thereby supporting livelihoods that depend on these resources. Although there are potential economic benefits associated with forests, there are challenges and positive impacts that need to be considered. Unsustainable logging practices, deforestation, and land-use changes can lead to long-term economic losses, including reduced ecosystem services, decreased biodiversity, and increased vulnerability to natural disasters.

Thus, the relationship between forests and income is closely related to many factors, ranging from direct forest products to ecosystem services and climate change mitigation. Recognizing the diverse economic contributions of forests is crucial in designing sustainable management strategies and harnessing their full potential to enhance welfare. Balancing economic interests with the importance of conservation remains an important endeavor, highlighting the need for a holistic approach that protects forests and livelihoods. The complex interaction between forests and income underscores the necessity for an integrated and sustainable approach.

CONCLUSION

Based on the discussion results, the conclusions drawn about the relationship between forest area and the income level of Indonesian society are as follows:

(1) The area of Indonesian forests is not related to the income level of the Indonesian community.

(2) Indonesian forests do not yet have a clear understanding of how precisely they contribute to the Gross Domestic Product that represents the income level of Indonesian society.

(3) The percentage contribution of Indonesian forests to the Gross Domestic Product varies from one department to another

(4) The explanation of primary forests differs between the global understanding and the understanding of the Indonesian Government.

(5) The reduction of Indonesia's primary forests is decreasing year by year, indicating a better trend.

(6) Indonesia's primary forests are predicted to improve further in the future (up to 2050).

(7) The growth rate of the income of Indonesian society is expected to continue

increasing until 2050, but it has not yet reached the level of a developed country.

The suggestion of this research are :

1. The government should implement a more organized and detailed system regarding the forest products obtained into the same posts and have the same understanding from one department to another.
2. Indonesia's forest products could significantly and better contribute to the income levels of the Indonesian people.
3. The government should create a clearer classification regarding the division of forests, so that the understanding of forests globally becomes consistent/uniform.
4. The government should consider proposals regarding the economic rent from forest empowerment.

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