



Land Conversion, Flooding and Climate Change: A Critique of Forest Protection in Indonesia

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Abstract

The flooding phenomenon in Indonesia is empirical evidence of unsustainable land conversion. BPS data shows that in the 2019–2020 period, Indonesia experienced 115.2 thousand hectares of deforestation, with approximately 57% of this being driven by the conversion of forests to oil palm plantations. This expansion not only exacerbates flood risks but also raises serious questions about the implementation of Indonesia's commitment to achieving SDGs 15. This study aims to analyse the relationship between forest conversion and flood disasters and assess the implementation of Indonesia's commitment to SDGs 15 in sustainable terrestrial ecosystem management. This study uses a green perspective to analyse the factors driving oil palm plantation expansion policies in Indonesia, as well as their implications for terrestrial ecosystems and increased flood risk by referring to Indonesia's commitment to SDGs 15. The research method uses qualitative descriptive techniques with data collection techniques. The flooding phenomenon in Indonesia is empirical evidence of unsustainable land conversion. BPS data shows that in the 2019–2020 period, Indonesia experienced 115.2 thousand hectares of deforestation, with approximately 57% of this being driven by the conversion of forests to oil palm plantations. This expansion not only exacerbates flood risks but also raises serious questions about the implementation of Indonesia's commitment to achieving SDGs 15. This study aims to analyse the relationship between forest conversion and flood disasters and assess the implementation of Indonesia's commitment to SDGs 15 in sustainable terrestrial ecosystem management. This study uses a green perspective to analyse the factors driving oil palm plantation expansion policies in Indonesia, as well as their implications for terrestrial ecosystems and increased flood risk by referring to Indonesia's commitment to SDGs 15. The research method uses qualitative descriptive techniques with data collection techniques.

Key Words: Deforestation, Oil Palm Expansion, Flood Disasters, SDG 15, Green Political Economy

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INTRODUCTION

Flooding has evolved and is increasingly understood as a global environmental issue reflecting the close relationship between structural problems in land use management and terrestrial ecosystem crises, rather than simply the result of extreme weather events. Globally, according to Devitt et al., 2023, floods caused economic losses of up to USD 651 billion and affected 1.6 billion people worldwide between 2000 and 2019. Meanwhile, between 2018 and 2023, flood losses consistently exceeded USD 100 billion (Rogers et al., 2025). By the end of the 21st century, the upward trend in flood losses is projected to increase 20-fold. Asia is the region with the greatest exposure to risk, with approximately 75% of the global population exposed to flooding living in floodplains and areas vulnerable to urbanization pressures and limited safe land (Devitt et al., 2023).

Floods occur due to significant climate change and human activities that worsen conditions in river basins and terrestrial ecosystems. In Southeast Asia, flooding is one of the most frequent disasters, so that by 2025, flood disasters are estimated to reach around 67%, making it the most dominant disaster in the region (Wahani & Sutarno, 2025). This situation indicates the increasing influence of anthropogenic factors, such as deforestation, unplanned urbanization, and development along river basins, on the dynamics of hydrometeorological disasters. Spatial changes and forest degradation in upstream areas can significantly reduce soil absorption, accelerate surface runoff, and extend the duration of flooding in downstream areas, thereby increasing the risk of flooding in downstream areas. According to the World Bank in 2021, Indonesia, with its 99,093 kilometers of coastline, is highly vulnerable to flooding and sea-level rise (Mustikaningsih & Ananda, 2025). Indonesia ranks second out of 193 countries with the highest disaster risk, with flooding being one of the most frequent disasters (Frege et al., 2023 in Toboroza et al., 2025). Many regions in Indonesia experience seasonal flooding with increasing intensity and duration, which is caused not only by natural factors but also by uncontrolled urbanization, deforestation, and land-use changes (Pratiwi & Santosa, 2021). Uncontrolled land-use change is a major factor in decreasing baseflow and reducing groundwater infiltration, which triggers water overflows and significant water imbalances due to the reduction of water catchment areas and green open spaces (Toboroza et al., 2025; Ramadhan & Susetyo, 2021). Converting green areas to impermeable surfaces can increase runoff discharge up to two times the natural rate, thus accelerating and exacerbating flood disasters (Nuhun et al., 2024). A study by (Zein et al., 2025) shows that land-use change contributes significantly to increased flood risk by reducing environmental carrying capacity. In Indonesia, land use change to plantations in 2019 was recorded at approximately 12.15 ha

(Latief et al., 2021), indicating continued anthropogenic pressure on terrestrial ecosystems. This ecological impact is reflected in the increasing frequency and intensity of flooding, from an average of once a year to an average of two, three, or four times a year, with flood levels reaching more than 50 cm (Asrul et al., 2025). These findings confirm that flooding can no longer be understood solely because of extreme rainfall, but rather as an indication of structural failures in land use management and terrestrial ecosystem protection.

Indonesia, as a country with extensive tropical forest areas, holds a strategic position in the global supply chain, particularly with palm oil being the world's largest commodity. The total area of oil palm plantations in Indonesia in 2021 reached approximately 16.38 million hectares, consisting of 6.72 million hectares of smallholder plantations and 8.68 million hectares controlled by private companies (Martoyo & Kusumawati, 2024). This plantation area continues to increase, as recorded by the Central Statistics Agency, which shows that oil palm plantation area increased from 14.46 million hectares in 2019 to 16.83 million hectares in 2023, in line with the increase in national palm oil production, which reached 47,084 thousand tons in 2023 (Central Statistics Agency of Indonesia, 2023). In fact, small-scale oil palm plantations are predicted to reach almost 50% of the total oil palm plantation area in Indonesia by 2030 (Martoyo & Kusumawati, 2024). This shows the expansion of oil palm plantations, whether carried out by the state, corporations, or farmers.

This expansion is inseparable from the strategic position of palm oil as Indonesia's primary export commodity with very high economic value. In 2022, the value of Indonesian palm oil exports reached US\$27.6 billion, or approximately 15% of total national exports (Abdullah & Akbariyah, 2024). Furthermore, Indonesia also controls approximately 50% of the global palm oil market share, with major export destinations including China, India, the European Union, and Pakistan, which collectively absorbed approximately 62% of Indonesia's total palm oil exports, valued at US\$15.1 billion in 2019 (Patone et al., 2020). The competitiveness of Indonesian palm oil products in the international market consistently ranks first and continues to improve based on the Revealed Comparative Advantage (RCA) score (Situngkir, 2022). This superiority demonstrates Indonesia's dominance in the global market.

High global demand for palm oil has made this commodity a highly profitable source of revenue for governments and businesses. Profits from palm oil exports reach hundreds of trillions of rupiah, encouraging the government to continue expanding to maintain the national economy (Ronaully, 2024). The Indonesian

government continues to expand export markets and increase palm oil production to meet global demand, which is expected to continue to increase in line with population and global economic growth (Abdullah & Akbariyah, 2024). In practice, oil palm plantation expansion is carried out not only by large companies through Land Use Rights (HGU) but also by smallholders who clear land around their homes, thereby increasing pressure on forest areas and terrestrial ecosystems (Irawan et al., 2024). Although oil palm expansion is often promoted as an economic driver, various studies show that these profits actually carry high environmental costs, such as forest degradation, increased carbon emissions, and contributions to global climate change (Utami et al., 2017).

Over the past four decades, the expansion of oil palm plantations has transformed the tropical landscape, where in Bireuen Regency, land cover data shows a decrease in forest area from 63,181.17 ha in 2020 to 60,863.62 ha in 2024. This data can be interpreted as meaning that the average deforestation rate reaches 579.39 ha per year with an annual percentage of 0.92% indicating that although the percentage scale looks relatively small, the ecological impact remains significant. According to Maqfirah et al. (2025), even the smallest changes in forest cover can trigger environmental degradation, such as reduced hydrological function, increased risk of landslides, and loss of habitat for forest-dependent wildlife.

Furthermore, the expansion of oil palm plantations is inextricably linked to a government regulatory framework that still strongly favors economic profit over environmental protection. Licensing and land management policies often provide ample scope for investors, while ecological sustainability remains a primary priority. Many policies favor the interests of large industries, neglecting the well-being of local communities dependent on these resources (Pasaribu et al., 2025). Meanwhile, the concept of environmental justice demands that law enforcement and development decision-making take ecosystem sustainability into account. Various literature shows that actors such as leaders, business owners, and politicians have an important role in the land conversion process to support plans to increase economic profits and further strengthen policy biases that prioritize short-term profits (Bahri & Utami, 2025; Ansar et al., 2024). This situation has the potential to hinder the achievement of SDG 15, which explicitly targets the protection, restoration, and sustainable use of terrestrial ecosystems. Therefore, palm oil expansion not only reflects local, national, and international environmental issues but also demonstrates a structural failure to integrate the economic agenda with global commitments to terrestrial ecosystem protection.

Literature Review and statement of art

Previous studies have highlighted this issue as complex. Austin et al. (2019) found that deforestation in Indonesia is driven by the expansion of large-scale oil palm and timber plantations as the primary driver of deforestation. Furthermore, small-scale agriculture and plantations are the main drivers of forest loss outside Indonesia's main islands. The study found that forest conversion to grassland increased sharply after periods of severe forest fires, particularly in 2016. Meanwhile, Makruf et al. (2023) identified several obstacles to forest protection policies in North Konawe, including an imbalance between personnel and forest area, budget constraints, organized illegal mining activities, and coordination challenges due to the centralized authority in Makassar. They also emphasized that environmental factors and policy characteristics are crucial for successful implementation at the local level (Makruf et al., 2023).

While the two studies above highlight the causes of deforestation, Damiti et al. (2025) found that deforestation directly impacts biodiversity loss, habitat fragmentation, hydrological system disruption, and increased carbon emissions. Illegal activities such as illegal logging and mining exacerbate environmental degradation and threaten ecosystem resilience to climate change (Damiti et al., 2025). Pertiwi et al. (2025) stated that deforestation contributes to the climate crisis due to the loss of forests' function as carbon sinks and oxygen providers. In fact, deforestation contributes up to 63% of total greenhouse gas emissions in Indonesia (Pertiwi et al., 2025). Furthermore, economic activities in forests create a trade-off between efforts to improve community welfare and potential environmental damage (Mulyana & Moeis, 2022).

From the literature above, it can be concluded that deforestation in Indonesia is multidimensional and has a serious impact on ecosystems. This is also relevant to the author's previous research, which found that Indonesia received a "red report" on SDG 15 (Life on Land), meaning progress has stagnated or increased by less than 50% of the expected level. This is partly due to the paradox between the government's environmental commitments (such as the REDD+ program and the Forest City concept in the National Capital Region) and extractive national strategic projects, such as the Food Estate and nickel mining in conservation areas like Raja Ampat (Putra et al., 2025). The various studies mentioned above tend to focus on the causes and impacts of deforestation in Indonesia. However, flooding, a consequence of deforestation, will have a domino effect, triggering a series of other negative consequences. This will be felt not only by local communities but also by the wider public. Therefore, this study aims to provide a more in-depth analysis that

the flash floods in Sumatra are not merely a natural disaster but also serve as empirical evidence to evaluate Indonesia's commitment to SDG 15. The study's findings can provide policy recommendations, including the importance of collaboration and strategic steps that can be taken by stakeholders to address this problem and prevent a long-term domino effect.

The literature above leads to the use of Green Theory as analytical tools, which criticize in which the relationship between the state and the environment is often dominated by economic interests. This theory in International Relations is a post-positivist perspective rooted in the tradition of critical theory. Unlike traditional state-centered theories, Green Theory seeks to address the challenges of the global environmental crisis by demanding theoretical and practical transformations in world politics (Dyer, 2018). Green Theory focuses on ecocentrism, which is understood as an environmental ethical paradigm that views ecological communities as the main object of environmental concern (Munir, 2023). In this context, humans are no longer the sole measure of everything (anthropocentrism). Ecocentrism asserts that the survival and welfare of entire ecosystems are interdependent components of nature (Priyono et al., 2025).

In line with the criticism, A. Dobson argues that green politics rejects the anthropocentric approach that views nature solely as an instrument of human interests and emphasizes the limitation of economic interests because they can create contemporary environmental crises (Frestisa, 2022). However, on the other hand, Saward emphasizes that the urgency often emphasized by environmentalists in raising environmental issues has the potential to produce counterproductive effects when not accompanied by realistic institutional strategies and policies (Doherty & Geus, 2003). Finally, this theory encourages the process of "greening", namely careful planning of environmental policies and their implementation in state structures and social institutions (Joseph, 2023). This framework can be used to analyze forest protection in Indonesia to see the extent to which normative environmental commitments can be implemented into consistent policy practices. In the context of international relations studies, the issues discussed in this research often relate to cross-border activities such as international trade. Furthermore, although these activities occur domestically, their impacts can be felt globally. Specifically, this case of deforestation is linked to the international framework within the sustainable development agenda, particularly regarding the protection of terrestrial ecosystems. The relevance of green theory here lies in its critique of stakeholders deemed negligent in prioritizing economic activities at the expense of the environment.

METHOD

This study uses a qualitative method with an explanatory approach. This approach aims not only to describe phenomena, but also to explain the cause-and-effect relationships behind these phenomena using qualitative methods. This approach focuses on a deep understanding of how and why a phenomenon occurs, by collecting interpretive and contextual data, such as in-depth interviews and observations (Næss, 2015; Næss, 2018). This study focuses on the various impacts of disasters such as floods and landslides because of weak policies and protection of forests in Indonesia. To obtain data, this study used literature review techniques from various sources such as books, journal articles, research papers, reports, mass media articles, and other relevant sources related to the research subject. Then, for data analysis techniques, the author conducted document analysis. Bowen explains document analysis as a qualitative research method that involves periodic review and interpretation of documents to gain understanding and generate insights (Bowen, 2009).

Indonesia and the Migrant Workers Convention: An Analysis of Governance Performance. In document analysis techniques, there is one approach that explains its stages. The approach in question is READ, popularized by Dalglish et al. (2020), where the stages include preparing materials, extracting data, analyzing data, and refining your findings. In the first stage, researchers must set parameters based on the research question, including the topic, the document's date range, and a list of search locations (such as ministry archives or online databases). In the second stage, researchers thoroughly read the document, including attachments, to extract information into a tool such as an Excel spreadsheet or thematic coding software. In the third stage, researchers need to critically examine the document by analyzing the purpose of its creation, who created it, and whether there are hidden agendas or internal contradictions. The final stage is carried out when saturation has been reached (the researcher feels they have sufficiently understood the phenomenon being studied). The findings are then refined, illustrated with quotes or conceptual graphs, and linked with results from other research methods (triangulation) (Dalglish et al., 2020). The author explored various relevant data related to the rate of deforestation and land conversion, forest protection policies, and supporting evidence that shows the real impact of weak forest protection, such as floods and landslides. The whole phase of document analysis is implemented to provide a comprehensive analysis of the research.

RESULT AND DISCUSSION

Rate of Deforestation and Land Conversion in the Past Decade

Indonesia is known as a country with abundant natural resources that are highly valuable to human life, one of which is forests (Dewi et al., 2023). With the existence of forests, various benefits can be enjoyed by humans and other living creatures. However, over the past ten years, Indonesia has experienced unstable changes in the dynamics of deforestation and land conversion. Dewi et al. (2023) mention that the rate of deforestation in Indonesia has occurred at a very rapid pace. Overall, these changes indicate that there is great pressure on forest areas. One of the visible impacts of land conversion is increasingly widespread deforestation, which threatens the sustainability of local ecosystems and reduces the natural carrying capacity of communities (Siswadi & Supriadi, 2024).

In the early 2014-2015 decade, Indonesia faced a major challenge with net deforestation reaching 1.09 million hectares, largely triggered by forest and land fires caused by the El Nino phenomenon. In the 2015-2019 period, the rate of deforestation began to decline gradually in line with the moratorium policy on granting new permits in primary natural forests and peatlands. Meanwhile, in the 2020-2024 period, the net deforestation rate in 2024 is recorded at 175.4 thousand hectares. This figure is obtained from gross deforestation of 216.2 thousand hectares minus reforestation of 40.8 thousand hectares. The majority of gross deforestation occurred in secondary forests, covering an area of 200.6 thousand hectares (92.8%), with 69.3% occurring within forest areas and the rest outside forest areas (Indonesian Central Statistics Agency, 2024). This figure shows a slight increase compared to the 2021–2022 period, but overall, the trend over the last decade reflects a decline of more than 75% from its peak in 2015.

Although the rate of deforestation has declined in certain years, this trend does not represent a substantive strengthening of forest protection, as the decline has been largely influenced by temporary policies and economic factors. On the other hand, land conversion practices continue through legal mechanisms, particularly changes in forest area zoning that legitimize the use of forests for development purposes. This land conversion is divided into several areas, such as plantations, mining, infrastructure, and settlements. However, it is estimated that 57 percent of deforestation in Indonesia occurs due to land conversion to oil palm plantations, and another 20 percent comes from the pulp and paper industry (Ariana, 2017 in Wahyuni & Suranto, 2021).

Deforestation has occurred in several regions in Indonesia. The expansion of oil palm plantations is one of the main factors driving deforestation. According to WWF (2021), many conservation areas have been converted into oil palm plantations, either through illegal encroachment or through problematic licensing (Bahri & Utami, 2025). Spatially, the highest rates of deforestation in the last decade have been concentrated in Sumatra, Kalimantan, and Papua. Based on Nahriyah's (2024) findings in Putra et al, (2025), CIFOR states that around 168,741 hectares of natural forest in Papua have been converted into oil palm plantations, and this figure is predicted to continue to increase. In addition, in Kalimantan, there are also practices of mining and logging as economic priorities over the environment. Various violations in licensing practices still occur, ranging from the absence of environmental impact assessments (AMDAL), activities without business rights, to document falsification (Frestisa, 2022). Even the existence of permits does not guarantee forest protection, as seen in the many cases of customary land grabbing legitimized through government permits without meaningful involvement of indigenous peoples, especially in Papua, where the legal system tends to favor economic and investment interests (Romdonah & Ikomatussuniah, 2025). This increase in deforestation ultimately exacerbates carbon emissions and accelerates climate change (Wahyuni & Suranto, 2021).

On the other hand, Sumatra Island is also one of the clearest examples of deforestation in Indonesia. In the last ten years, Sumatra has faced a major problem with forest loss due to the increase in oil palm plantations. Land conversion in Sumatra has occurred in various areas, one of which is Hutaraja Tinggi District, Padang Lawas Regency, North Sumatra, where the majority of the population works as rubber and oil palm farmers (Hasibuan et al., 2020). Meanwhile, in South Sumatra, the conversion of rice fields to oil palm plantations has been widespread in Ogan Komering Ilir and Ogan Komering Ulu Timur, which has not only reduced food production and disrupted irrigation, but has also been driven by economic considerations, as oil palm is considered more profitable and requires less labor (Mulyani et al., 2016). In North Sumatra, forest cover now only remains at around 29% of the land area, while Aceh and West Sumatra have cumulatively lost more than 1.5 million hectares of natural forest in the last two decades. Generally, land conversion in Sumatra is dominated by the expansion of oil palm plantations and illegal gold mining activities, as is still the case in Jambi and West Sumatra. This diverse data shows that deforestation is not only caused by illegal activities, but is also institutionalized through development policies that treat forests as economic land reserves.

This phenomenon shows that economic benefits are often obtained at the expense of long-term environmental balance ((Epo, 2022) in (Firmansyah et al., 2025)). Large-scale land conversion has a direct impact on increasing the risk of hydrometeorological disasters, particularly flooding. The loss of forest function, which should be able to absorb water directly, especially in the upper reaches of watersheds, has now lost its ability to do so, triggering an instant increase in river discharge. Experts confirm and emphasize that upstream forests that have been converted into open land or plantations are no longer able to maintain soil stability. As a result, any rainfall with high intensity now has the potential to become a deadly disaster for communities downstream.

Inconsistent Forest Protection and Its Impact on the Socio-Environment

Forest protection within the scope of environmental policy and governance refers to the state's efforts to ensure the sustainability of the ecological, social, and economic functions of forests through legal frameworks, institutions, and mechanisms for monitoring and law enforcement. According to Article 1 paragraph (1) of Law Number 18 of 2013 concerning the Prevention and Eradication of Forest Destruction (P3H Law), forests are defined as an inseparable ecosystem between biotic and abiotic elements (BPK, 2023). This definition places forests not only as an economic resource, but also as a life system that supports ecological balance and human welfare. In addition, this policy also focuses on eradicating forest destruction that is carried out in an organized and structured manner with the aim of destroying forests but does not include community groups that practice traditional farming. The Indonesian government has established various policies to protect and preserve forests so that they can continue to provide benefits for sustainable living. Forest areas are controlled by the state and used for the greatest prosperity of the people as stipulated in Article 4 of Law Number 41 of 1999 (BPK, n.d.). This principle is in line with Article 33 paragraph (3) of the 1945 Constitution, which states that state control of natural resources is intended for public welfare, not merely as a market commodity to drive domestic economic growth (Kusuma & Surakusumah, 2024). Normatively, these policies reflect the state's commitment to protecting the sustainability of terrestrial ecosystems, particularly forests, with the aim of maintaining the welfare and prosperity of the Indonesian people in a sustainable manner.

At the global level, forest protection is an integral part of the sustainable development agenda contained in the SDGs, particularly Goal 15: Life on Land. This goal encourages countries around the world to manage, protect, restore, and

support the sustainable use of terrestrial ecosystems, combat deforestation, and prevent the loss of biodiversity (Muzaki et al., 2021). This agenda is reinforced by the 2022 State of the World's Forests Report published by the FAO, which states that forest restoration can be achieved by halting deforestation, maintaining forests, and promoting sustainable forest use (Prasetyaningtyas & Trimurtini, 2024). Furthermore, SDG 15 urges countries around the world to maintain terrestrial ecosystems to achieve sustainable forest management by 2030 (Mawaddah & Zulkarnaini, 2025).

Forests, as the lungs of the world, should be preserved and protected because they play an important role in the survival of living creatures. In addition to functioning as a source of natural resources and habitat for flora and fauna, forests in Indonesia play an important role in the global carbon cycle, water cycle regulation, climate change mitigation, and the provision of vital ecosystem services for the wider community (Damiti et al., 2025). Furthermore, forests also protect water sources and protect ozone in space (Arba et al., 2023). Deforestation contributes significantly to greenhouse gas emissions that accelerate global climate change, while also worsening air pollution. In addition, changes in ecosystem structure due to deforestation increase sedimentation and erosion, which impact biodiversity degradation and decline. However, the adoption of these global standards into national policy often experiences distortions in implementation. Although Indonesia has established relatively comprehensive regulations, their implementation is still not optimal. There are many obstacles to implementing these policies, ranging from weak communication to unclear operational standards (Makruf et al., 2023). The implementation of forest protection policies at the domestic level still shows significant inconsistencies between applicable laws and practices in the field.

The inconsistency between normative and practical approaches is reflected in the high rates of deforestation and forest degradation, including in protected forest areas. Deforestation contributes to changes in terrestrial ecosystem structure and significant air pollution through greenhouse gas emissions, resulting in environmental damage and biodiversity loss (Makruf et al., 2023). Fauna habitats have also declined because of land conversion activities that do not prioritize environmental sustainability. This condition not only impacts ecosystems but also creates social and economic pressures for communities that depend on forest resources for their livelihoods. According to the Ministry of Forestry of the Republic of Indonesia, in 2024, the net deforestation rate reached 175.4 thousand hectares, which was obtained from a gross deforestation rate of 216.2 thousand hectares

minus reforestation results of 40.8 thousand hectares (Indonesian Ministry of Forestry, 2024).

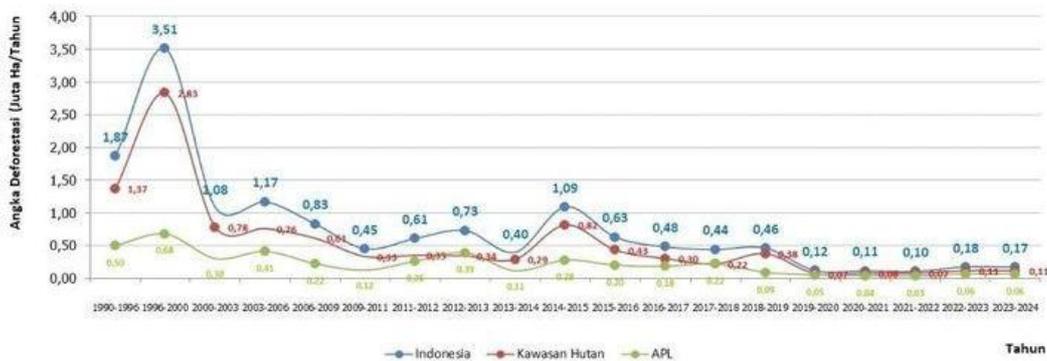


Figure 1. Graph of Indonesia's Deforestation Rate from 1990 to 2024
Source: Indonesian Ministry of Forestry (2024)

The figure shows that the rate of deforestation in Indonesia has fluctuated significantly. Although there has been a decline, indicating recovery efforts, the much larger scale of forest loss indicates that the rate of deforestation still exceeds the overall recovery capacity of forest ecosystems. This condition shows that forest protection efforts have not been able to offset structural pressures resulting from land conversion and massive forest exploitation for specific interests. This is reinforced by Global Forest Watch data, which records that from 2002 to 2024, Indonesia lost 11 million hectares of primary wet forest, accounting for 34% of the total tree cover loss during the same period (Global Forest Watch, 2020). The loss of primary rainforest has far more significant ecological implications than the loss of secondary forest. This is because primary forests play an important role in environmental sustainability, such as long-term carbon storage, the foundation of biodiversity, and contributing to the hydrological cycle. The scale of primary forest loss indicates that terrestrial ecosystem degradation has the potential to cause long-term environmental and social impacts.

In 2024, Indonesia lost 260,000 hectares of primary forest, equivalent to 190 Mt of CO₂ emissions, and had 89% of its primary forest area remaining (Global Forest Watch, 2020). Based on this data, deforestation is one of the factors contributing to greenhouse gas emissions and directly contradicts Indonesia's commitment to climate change mitigation and the achievement of SDG 15. Although Indonesia still has 89% of its primary forest area remaining, if the trend of deforestation continues to fluctuate, or even increases significantly each year, the existence of Indonesia's primary forests will be far from sustainable. The existence of Indonesia's forests will

become increasingly vulnerable if it is not accompanied by strong efforts, commitments, and law enforcement to effectively preserve and protect the forests.

The Indonesian government's inconsistency in preserving forests is also evident in its weak law enforcement, resulting in poor implementation of policies. Another factor is the vested interests of the political elite and the apathy of local governments towards raising public awareness of the importance of forest integrity (Makruf et al., 2023). Despite the existence of numerous regulations and organizations, obstacles such as poor communication, low public awareness, limited knowledge and infrastructure, and budget constraints have increased the potential for forest disturbance due to suboptimal implementation. This condition can be seen in the increasing activities of illegal logging, mining, and massive land conversion to plantations (Kusuma & Surakusumah, 2024). Forest areas damaged by illegal logging and mining reached around 41 million hectares out of 130.68 million hectares of forest area in Indonesia (Utami et al., 2025). Furthermore, the government has enacted Law No. 32 of 2009 concerning Environmental Protection and Management, but this regulation is not being obeyed by the community, and even the government itself is not implementing it properly (Arba et al., 2023). The government, which should be responsible for protecting forest sustainability and ensuring that business activities do not cause negative impacts, has instead become one of the contributors to forest destruction itself. These findings show that forest protection faces not only technical challenges, but also structural problems involving actors with vested interests in the exploitation of natural resources.

As a country with palm oil as its main commodity, Indonesia dominates the global palm oil market share. By 2024, the area of palm oil plantations will reach 16.83 million hectares with a production of 46.82 million tons in 2022 (Berutu et al., 2025). This dominant position makes Indonesia's palm oil exports one of the main pillars of the national economy, which is expected to grow every year. This condition shows that global market dynamics play a significant role in shaping the direction of national development policies, where the increase in demand for palm oil has encouraged the Indonesian government to expand palm oil areas. The palm oil sector is positioned as one of the strategic sources of growth and foreign exchange for the country. However, in practice, development oriented towards export-based economic growth, which on the one hand strengthens the national economy, but on the other hand risks increasing environmental degradation and pressure on terrestrial ecosystems. Although it strengthens the national economy, the expansion of palm oil plantations risks accelerating environmental degradation due to large-scale land conversion and weak protection of forest ecosystems in Indonesia (Maruwatal et al., 2025). This situation reflects a structural imbalance

between national development goals and the responsibilities of the state and economic actors in maintaining environmental sustainability in the practice of environmental policy in Indonesia.

The high growth of the palm oil market and demand for Indonesian palm oil products has encouraged countries and companies to expand palm oil plantations in various regions of Indonesia (Vanisha et al., 2022). The process of converting land to palm oil plantations facilitated by the state often ignores the social and ecological interests of local communities. Many policies have been established by the Indonesian government, such as ISPO, but their implementation shows significant internal contradictions when faced with pressure from market dynamics and global regulations (Ikbal et al., 2025). On the one hand, ISPO is designed as a sustainable governance instrument, but on the other hand, its effectiveness is reduced by global market pressures, investment interests, and weak law enforcement in accordance with sustainability standards. As a result, efforts to achieve terrestrial ecosystem balance and preserve forests have been ineffective and suboptimal because they prioritize economic interests. The expansion of oil palm plantations without considering sustainability demonstrates the government's structural failure to consistently integrate environmental commitments into national development policies. The gap between regulations and reality has consequences, such as increased sedimentation, disruption of watershed hydrological functions, and loss of vegetation cover that disturbs the balance of terrestrial ecosystems (Mokodongan et al., 2025). In addition, deforestation also has an impact on social aspects, resulting in a reduction in food resources, poverty, unemployment, disruption to physical health, and a crisis in forest protection policy (Ansar et al., 2024).

The phenomenon of increasingly intense and prolonged flooding in several regions of Indonesia can be understood as an empirical manifestation of inconsistent forest protection policies and weak land use governance. Flooding is not only triggered by extreme rainfall, but is also a structural consequence of deforestation, which eliminates the ecological function of forests as hydrological buffers (Ansar et al., 2024). As a result, degraded forest land loses its ability to resist erosion and regulate water flow naturally. In this context, the floods in Sumatra are a case in point, given that this region accounts for around 47% of total national deforestation, and therefore experiences far greater ecological pressure than other regions (Supyan et al., 2025). Although the flooding was triggered by high and unstable rainfall, the severity and duration of the prolonged flooding indicate the significant role of environmental degradation and land use change in exacerbating its impact (Fandhy et al., 2026). A study by Ridwan & Sarjito (2024) states that the Kapuas watershed

has experienced a 12% decline in forest cover and an 18% increase in plantation land, which correlates with a fourfold increase in the frequency of flooding per year. Additionally, in the Upper Citarum River Basin, land conversion from natural vegetation to other uses has caused significant changes in hydrological patterns, marked by an increase in the frequency of flooding. In this context, flooding demonstrates the weak ecological function of forests and the failure of the state to maintain the balance of terrestrial ecosystems.

According to Green Theory, environmental protection cannot be assessed solely on the basis of formal regulations that have been established but must also consider the extent to which the state is able to detach itself from its interest in exploiting natural resources as the main foundation for economic growth. Green Theory views the state as part of a political-economic structure that often engages in ecological exploitation through development policies. As explained above, the state has responsibility and authority over forests in Indonesia, which means that the state must be able to set aside economic interests above ecological interests. The gap between normative commitments and practices in the field shows a structural contradiction, where environmental regulations are only symbolic. When the state faces global market pressures and economic interests, these regulations are reduced, and their existence does not become the basis for decision-making. This condition shows the role of the state as a facilitator of capital accumulation, where development policies are more oriented towards supporting industrial needs that override ecological concerns. This growth-based development shows an anthropocentric approach that can result in repeated environmental crises and have a direct impact on the social life of the community. This contradicts Green Theory, which adopts an eco-centric view by prioritizing ecosystem health as an indicator of human well-being and recognizing nature itself (Dyer, 2017). Thus, flooding indicates a socio-ecological crisis resulting from inconsistent forest protection policies and the dominance of economic interests over environmental sustainability, which directly contradicts the achievement of SDG 15.

Collaboration and Strategic Steps in Forest Restoration in Indonesia

In the previous section, we identified governance gaps in forest protection in Indonesia. These gaps include weak oversight, indecisive law enforcement, and inconsistent government policies. In response to these governance gaps, more comprehensive forest protection measures involving various stakeholders are needed. This section discusses the strategic steps that have been taken and their relevance to the current situation. It also elaborates the extraordinary actions that can be taken to address forestry issues in Indonesia.

As a country that ratified the Paris Agreement in 2016, Indonesia certainly has a national target to achieve Net Zero Emissions (NZE) by 2060. This national target is known as the Nationally Determined Contribution (NDC). Indonesia first submitted its NDC to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015, which has been updated several times since then, with the latest version being the updated NDC in 2022. In this latest version, the GHG emission reduction target is 31.89% unconditionally and 43.20% with international support by 2030 (Arrafisena, 2025). Emission reductions are focused on five main sectors, namely Energy, Waste, IPPU (Industrial Process and Product Use), Agriculture, and Forestry and Other Land Use (FOLU) (UNFCCC, 2026). The forestry (FOLU) and energy sectors are the largest contributors to emissions and are also a primary focus in achieving targets (Novita et al., 2022; Suroso et al., 2022; UNFCCC, 2026). This demonstrates the government's commitment to protecting forests from the threat of deforestation.

However, the facts on the ground show otherwise. High emissions are driven by the conversion of forest land to non-forest land for the expansion of oil palm plantations, mining activities, and infrastructure development projects (Wongkar, 2021). Furthermore, flash floods in Sumatra that washed away large amounts of logs are evidence that deforestation has become a very serious problem in Indonesia. Furthermore, Indonesia has extensive peatlands, where damage to these ecosystems (such as canal drainage or fires) releases significantly higher emissions than ordinary terrestrial forests (Novita et al., 2022; UNFCCC, 2026). This makes achieving sustainable development targets for this sector (life on land) utopian (Putra, 2025). To prevent this impossibility, strategic and integrative steps involving various relevant actors are needed. Furthermore, the NDC allows the Indonesian government to collaborate with international partners to achieve the NZE target.

One important collaboration is the bilateral partnership between Indonesia and Norway within the Reducing Emissions from Deforestation and Forest Degradation

(REDD+) framework. This collaboration is strengthened through a Letter of Intent (LoI) in which Norway commits to providing incentives of up to USD 1 billion if Indonesia successfully reduces emissions in the forestry sector, with Central Kalimantan designated as a pilot province for the implementation of national and provincial strategies under this scheme (Haeda et al., 2020). In this context, the Green Climate Fund (GCF) acts as the official financial institution of the UNFCCC and is one of the largest donors to the REDD+ program in the world (Gatto & Richard, 2025). Indonesia has received financial support from the GCF for its achievements in reducing emissions through the REDD+ scheme, particularly for the period 2014–2016. To date, the total assistance received by Indonesia from international donors, including the GCF, has reached a significant amount, although it is still below the total national climate investment needs (Gatto & Richard, 2025). This kind of mechanism is an alternative that can be used to reduce the level of circulating emissions.

REDD+ has proven to be an effective tool for reducing carbon emissions in Indonesia. Between 2013 and 2017, the program resulted in annual reductions of approximately 50 million tons of CO₂, and this figure quadrupled between 2018 and 2020. Overall, Indonesia's success in reducing GHG emissions and achieving its Nationally Determined Contribution (NDC) targets is largely due to the performance of the forestry sector through this mechanism (Gatto & Richard, 2025). This information demonstrates the project's impact. Although it has been expanded to several other regions, the project still has limitations, including the fact that its activities are concentrated in Central Kalimantan.

In the National Development Planning (NDC) document, the forestry and other land use (FOLU) sector targets the rehabilitation of 8.3 million hectares of degraded land by 2030 (UNFCCC, 2026). Data from 2024 shows that reforestation has contributed to reducing gross deforestation, with 40.8 thousand hectares successfully reforested (Putra et al., 2025). Reforestation itself is a key part of the REDD+ framework in Indonesia, which conceptually encompasses efforts to increase forest carbon stocks (Wongkar, 2021). However, it is important to emphasize that protecting and rehabilitating forests should not be done solely for the sake of obtaining incentives. This action must be the responsibility of all parties, from the government and businesses to the community. This means that if one party acts as a free rider, it could endanger Indonesia's forests and set a precedent for other actors in the future.

In this context, there is a concept called responsibilities. Responsibilities refers to the process of making individuals or groups responsible for aspects of their well-

being previously considered the responsibility of the state. This transfer of responsibility extends governance beyond the state, into individual habits and societal functions (Lemke, 2001). This process extends governance beyond the state to individual habits and societal functions. In Indonesia, responsibilities is manifested in the expansion of social forestry programs, where responsibility for forest management and resource rights is transferred to user groups (Erbaugh, 2019). While this can increase the scope of forestry governance, it is vulnerable to abuse and requires more intensive and comprehensive coordination. This is because management is top-down.

Erbaugh (2019) also noted contradictions in this process, such as community welfare targets that do not always align with environmental benefits for the community, as well as resource asymmetries where the community is burdened with responsibility. In this context, the government, as policymaker, appears to have delegated this enormous responsibility to the community without providing adequate resources during the process. This situation can certainly complicate the community as an actor in the field. Monitoring and evaluation activities must also be carried out regularly and consistently to ensure that what is achieved is in line with the plan. However, optimism about this concept must also be fostered. This can also open up new job opportunities for the community. Therefore, financial support and competency must be continuously strengthened so that the community involved can fulfil the plan's expectations.

Alonso & Glennie (2015) propose a concept called development cooperation. Development cooperation refers to activities explicitly aimed at supporting national or international development priorities, not solely driven by profit, providing positive discrimination (special benefits) for developing countries, and based on cooperative relationships that seek to enhance the ownership of these developing countries. This cooperation includes financial (and in-kind) transfers, capacity building, and policy changes (Alonso & Glennie, 2015). This support can accelerate the development process. This support can come from various parties, such as private actors, philanthropic companies, and even northern (developed) countries. This means there needs to be synchronization between accountability approaches and support within development cooperation. This synchronization allows communities to obtain adequate resources for forest conservation and protection. At the same time, this support can also help countries overcome funding constraints.

In addition to the REDD+ initiative, international support also comes from other entities such as GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit),

USAID (United States), and CIDA (Canada). According to Sahide et al., (2016), GIZ is the most powerful and influential international actor in pioneering and developing Forest Management Units (FMUs) in Indonesia. GIZ plays a role in bringing civil society elements into forestry policy discussions and promoting professionalism in forest governance through direct access to the central government (Sahide et al., 2016). Overall, GIZ has been the most involved actor in introducing FMU development since the early 2000s, from the policy discussion stage to the implementation of real models in the field. The FMU concept in Indonesia, particularly in Java, is largely adopted from the German forest management model (Sahide et al., 2016).

GIZ and Indonesia have established development cooperation that takes several forms. GIZ actively collaborates with the Ministry of Forestry's Education and Training Center to develop a capacity-building curriculum for Forest Management Unit (FMU) managers. GIZ is also involved in enhancing the capabilities of Forestry Vocational High Schools (SMK Kehutanan) and training field staff for selected FMU models (Sahide et al., 2016). Furthermore, GIZ provides technical and financial support for the establishment of the National Secretariat for FMU Development, which serves as a centre for information, coordination, and monitoring of FMU implementation across Indonesia. They also bring civil society into forestry policy discussions and promote professional forest governance through direct access to the central government (Sahide et al., 2016). In other words, GIZ's support for forest protection is holistic, including accommodating civil society aspirations in policymaking.

In addition, USAID is also another actor providing support. Suroso et al., (2022) stated that USAID acts as a bilateral donor agency that provides long-term funding support to the public and private sectors to finance climate change adaptation and mitigation projects. They are also involved in a partnership to develop the "Future Forest Scenario Analysis" document to help formulate the direction of Indonesia's forestry industry policy until 2020 (Suroso et al., 2022). In the context of capacity building, USAID supports the "Local Heroes for Forest Protection" initiative through the Alumni Engagement Innovation Fund (AEIF), which empowers youth in Southeast Sulawesi, West Papua, and NTT through capacity training, native tree planting activities, and environmental awareness campaigns (Hermudananto et al., 2025). Another contributing actor is Canada, where Canada is a member of the International Partner Group (IPG) that supports the Just Energy Transition Partnership (JETP) program in Indonesia. As a member of the IPG, Canada has committed to mobilizing a total of USD 20 billion to support Indonesia's transition

to a low-carbon and climate-resilient future (Askandar & Putro, 2025). This support from international actors is summarized in the following table:

Table 1. Existing International Actors Supports

No	Actor	Form of Supports
1	REDD+	Results-Based Payment
2	GIZ	Development of the Forest Management Unit Model (FORCLIME (Forest and Climate Change Programme))
3	USAID	Long-term funding, <i>Local Heroes for Forest Protection</i>
4	Canda	Funding, Soft Loans, and Grants

Source: Processed by the author from various sources

The above support is, on the one hand, a breath of fresh air for Indonesia in its efforts to respond to climate change, particularly regarding forest protection and conservation. However, it is important to emphasize that this support should not be interpreted as the sole means of forest protection. This is because such support is curative. Forest protection measures must be preventative, meaning forests should not be allowed to deteriorate before conservation begins. Conversely, conservation activities are no longer necessary once preventive measures have been properly implemented. To maximize preventive measures, good forestry governance is essential. This relates to strict regulations on deforestation and their strict enforcement. It also refers to clear rules and strict sanctions against perpetrators of forest destruction. This also relates to the issuance of permits to irresponsible companies. This is reinforced by alarming deforestation data. Based on data processed by MADANI from a release from the Ministry of Forestry, 206,000 hectares of natural forest were lost in 2024, an increase of 71,000 hectares compared to the previous period. Most deforestation (72%) occurs within forest areas, particularly in permanent production forests (Madani Berkelanjutan, 2025).

The problem culminated in flooding in three Sumatran provinces, which revealed numerous stranded logs, suspected to be part of illegal logging. This situation sparked criticism of the government from various groups, including the public, academics, and environmental activists. The resulting criticism and pressure ultimately prompted the Ministry of Forestry (Kemenhut) to conduct an audit of 24 Forest Utilization Business Permits (PBPH) following landslides and flooding in Sumatra (Prihatini, 2026). Subsequent sources reported that the Minister of

Forestry, Raja Juli, revoked 22 PBPH permits covering a total area of 1,012,016 hectares. Of these, approximately 116,168 hectares were located in Sumatra (BPMI Setpres, 2025).

"On the President's instructions, I will revoke 22 PBPH (forest utilization business permits) covering 1,012,016 hectares, including 116,168 hectares in Sumatra. I will convey details of these revocations in a decree," - Indonesian Minister of Forestry, Raja Juli Antoni

This statement demonstrates the government's positive commitment to forest protection. However, it is important to note that this action could be considered a delay, given that permits have already been issued and damage has already occurred. This emphasizes the importance of preventive measures rather than curative measures, to ensure that similar situations do not become precedents in the future. In other words, licensing procedures must be more stringent, including environmental impact assessments (AMDAL). The AMDAL process must also be conducted in a measured manner and in accordance with the facts on the ground. This aims to minimize discrepancies between reports and the facts on the ground. Furthermore, AMDALs often involve third parties who provide inaccurate assessments, posing a threat to the wider environment. Therefore, collaborative measures involving communities and academics, along with international support, can be a key option for creating ideal forest governance.

CONCLUSION

In conclusion, this study confirms that systematic forest conversion, particularly for the expansion of oil palm plantations, has caused structural degradation of ecological functions in Indonesia. This directly increases regional vulnerability to flooding. The study's findings indicate that the fluctuating decline in deforestation rates over the past decade does not represent a strengthening of forest protection but rather reflects temporary policy dynamics that fail to address the root causes of land-use governance. In this context, disasters such as flooding must be understood as a manifestation of the state's failure to maintain the primary function of forests as the primary buffer for terrestrial ecosystems. Furthermore, this study identifies an inconsistency between Indonesia's commitment to SDGs 15 and its policy implementation. The development orientation remains centered on anthropocentrism rather than ecocentrism. From a green theory perspective, this condition reflects a contradiction in the state's role as both guardian of public interests and facilitator of capital accumulation, ultimately weakening the resilience

of terrestrial ecosystems and increasing socio-ecological vulnerability. Therefore, this study reaffirms that strengthening terrestrial ecosystem protection cannot be achieved solely through formal regulatory instruments, but rather through a coherent reorientation of the development paradigm between economic objectives and ecological sustainability. Thus, this research offers a collaborative strategy involving the government, communities, academics, and international support to be the main choice in creating ideal forest governance.

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