

Regional Forest Governance of Industrial Plantation Forest (HTI) Development in Jambi Province

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Abstract

This study aims to analyze the impact of Industrial Plantation Forest (HTI) development on deforestation in Jambi Province and the role of forestry governance in influencing the relationship between the two. The study used a qualitative method with a literature study approach (library research) sourced from scientific journals, books, policy documents, and reports from related institutions. Data were analyzed descriptively and qualitatively through the stages of data collection, reduction, presentation, and drawing conclusions. The results show that HTI development contributes to deforestation through the conversion of natural forests to industrial plantations, changes in land use, and a decline in forest ecological quality. However, deforestation in Jambi is also influenced by other factors such as plantation expansion and infrastructure development. In addition, forestry governance plays a significant role in determining the level of HTI impact on deforestation. Effective governance can reduce pressure on forests, while weak governance has the potential to accelerate the rate of deforestation. Therefore, strengthening forestry governance is needed to support sustainable forest management in Jambi Province.

Keywords: Industrial Plantation Forest (HTI), deforestation, forestry governance, Jambi Province.

Introduction

Forests are a strategic natural resource with ecological, economic, and social functions that are crucial to the sustainability of human life. In addition to their role as carbon sinks and biodiversity providers, forests also provide a livelihood for millions of people living in and around forest areas (Krastiņa et al., 2025; W. Wang et al., 2020). However, in recent decades, various tropical countries have faced enormous pressure on their forest areas due to the expansion of various land-based sectors, such as oil palm plantations, mining, infrastructure development, and Industrial Plantation Forests (HTI) (Nobre et al., 2021). The Food and Agriculture Organization (FAO) noted that the world lost around 420 million hectares of forest between 1990 and 2020, although the rate of global deforestation has begun to slow in the last decade (Aggestam, 2024a).

Indonesia is one of the countries with the largest tropical forest area in the world after Brazil and the Democratic Republic of Congo. According to data from the Ministry of Environment and Forestry (KLHK), Indonesia's forest area will reach approximately 95.5 million hectares by 2024, or approximately 51% of the nation's total land area. These forest areas consist of conservation forests, protected forests, and production forests, which serve as the primary basis for the development of the national forestry sector. Furthermore, the forestry sector is also positioned as a driver of economic growth through the development of wood-based industries, including the development of Industrial Plantation Forests. (KLHK, nd) Industrial plantations (HTI) have grown rapidly since the issuance of various government policies in the 1990s, encouraging forestry investment through the granting of concession permits to private companies and state-owned enterprises. Conceptually, HTI aims to provide a sustainable supply of raw materials for the pulp, paper, plywood, and bioenergy industries, thereby reducing pressure on natural forests. However, in practice, HTI development in various regions often involves the conversion of natural forests and land previously used by indigenous and local communities (Forest Watch Indonesia, 2024). This condition has given rise to various ecological and social problems which are still a major challenge in Indonesian forestry governance.

Forest Watch Indonesia (FWI) data shows that Indonesia lost approximately 28 million hectares of forest cover between 2000 and 2023. Most of this loss occurred in production forest areas allocated for various concessions, including industrial timber plantations (HTI). Meanwhile, Global Forest Watch noted that Indonesia lost approximately 10.5 million hectares of tree cover between 2001 and 2024, with the majority of the loss occurring in Sumatra and Kalimantan, the centers of forestry and plantation industry development (Yitbarek et al., 2023). Although the government has succeeded in reducing deforestation rates in recent years through various forest fire control policies, a moratorium on new permits, and forest rehabilitation programs, pressure on production forest areas continues (Singh, 2025). Jambi Province is one of the provinces on the island of Sumatra that has experienced the most significant changes in its forest landscape over the last four decades (Pacheco, 2020; Suhartati et al., 2021; Tong et al., 2025).

In the early 1970s, much of Jambi was still dominated by lowland tropical rainforest. However, from the 1980s onward, the forest area has undergone significant changes due to the expansion of oil palm plantations, industrial timber plantations (HTI), mining, and infrastructure development (Chebe & Minja, 2026; Verma et al., 2023). Various studies show that forest cover in Jambi has decreased by more than half compared to conditions in the early 1970s (Fadillah et al., 2020; Lestari et al., 2023). Based on Ministry of Environment and Forestry data, the forest area in Jambi Province reaches approximately 2.09 million hectares, but the actual forest cover area continues to decline due to changes in land use. Forest Watch Indonesia noted that the majority of forest cover loss in Jambi occurred in production forest areas and Other Use Areas (APL) adjacent to HTI concessions and oil palm plantations. This condition indicates that land use changes in Jambi are not solely influenced by a single sector, but are the result of the interaction of various natural resource-based development policies.

On the other hand, Jambi Province is also one of the regions with the largest industrial timber plantation (HTI) development in Sumatra. Several large companies have obtained permits to utilize forest areas for HTI development, which supplies the national pulp industry. These concessions are spread across various regencies such as West Tanjung Jabung, East Tanjung Jabung, Muaro Jambi, Batanghari, Tebo, and Sarolangun. The HTI concession area in Jambi is estimated to exceed 600,000 hectares, the majority of which is controlled by companies affiliated with the national pulp industry group (Truong, 2023; C. Wang et al., 2026). The sheer scale of these concessions makes HTI a key player in landscape transformation in Jambi Province. While HTI contributes to regional economic growth through investment, employment, and non-tax revenue, its presence also creates various environmental impacts (Lyons et al., 2022; Nayak, 2026). One of the most widely recognized impacts is the increasing rate of deforestation due to the conversion of natural forests to monoculture plantations, particularly acacia and eucalyptus. This conversion results in the loss of wildlife habitat, reduced biodiversity, disrupted hydrological functions, increased carbon emissions, and increased risk of forest and land fires, particularly in peat areas (Aggestam, 2024; Phillips, 2023).

In addition to ecological issues, the development of industrial timber plantations (HTI) has also given rise to various tenure conflicts between companies and communities. The Agrarian Reform Consortium (KPA) consistently reports that the forestry sector is one of the

largest contributors to agrarian conflicts in Indonesia. These conflicts are generally related to overlapping land ownership claims, unclear forest boundaries, minimal recognition of indigenous peoples' rights, and weak community participation in the concession permit granting process (Ma et al., 2026; Muhlisin & Budiarto, 2023; Siqueira et al., 2021). In Jambi Province itself, various tenure conflicts have occurred between HTI companies and village communities and indigenous communities, such as the Orang Rimba, who depend on forest areas for their livelihoods. These tenurial conflict cases in Jambi demonstrate that the primary problem lies not only in the existence of HTI, but also in weak regional forestry governance. Forestry governance encompasses aspects of planning, permit issuance, interagency coordination, oversight, law enforcement, transparency, and conflict resolution mechanisms. Various studies have shown that weak coordination between the central government, regional governments, companies, and communities often results in ineffective forest management. As a result, various land conflicts persist for long periods without comprehensive resolution (Liu et al., 2024; Zhu et al., 2021).

Following the enactment of Law No. 23 of 2014 concerning Regional Government, most forestry management authority was transferred from district/city governments to provincial and central governments. This change in governance has consequences for the mechanisms for monitoring, controlling, and resolving forestry conflicts in the regions. On the one hand, the centralization of authority is expected to increase the effectiveness of forest management. However, on the other hand, this change also presents new challenges in the form of increasingly limited public access to forestry decision-making processes. From an environmental governance perspective, the success of forest resource management is measured not only by increased investment and forest product production, but also by the government's ability to guarantee ecological sustainability, social justice, and certainty of rights to natural resources (Yudhanegara, 2021). Therefore, analysis of the impact of HTI development is not sufficient to only look at the economic aspects or changes in forest cover, but also needs to examine how the forestry governance system influences the emergence of deforestation and tenurial conflicts at the regional level.

Basically, a lot of research has been done on deforestation in Jambi Province. Study (M. Chen et al., 2026) for example, it focuses more on the factors causing deforestation using a spatial approach, while research examining the agrarian conflict between the community

and PT Wirakarya Sakti. Meanwhile, discusses forestry governance in general without focusing on the Jambi case. Thus, there remains a research gap because no study has specifically analyzed the relationship between HTI development and deforestation in Jambi Province from a regional forestry governance perspective. Therefore, this study aims to fill this gap by integrating aspects of HTI development, deforestation, and forestry governance within a comprehensive analytical framework (Liang et al., 2025a, 2025; Muhlisin & Budiarto, 2023).

Methods

This study employed a qualitative research method with a library research approach. This approach was chosen because the study aimed to understand and analyze the impact of Industrial Plantation Forest (HTI) development on deforestation in Jambi Province through a review of various relevant written sources. Qualitative research is used to understand a phenomenon in depth based on the interpretation of various data and information obtained from relevant sources (Kurniawan et al., 2023). Research data was obtained from secondary sources in the form of scientific journal articles, books, government agency reports such as the Ministry of Environment and Forestry, data from the Central Statistics Agency, policy documents, previous research results, and reports from organizations related to forestry and environmental issues. The literature review technique allows researchers to collect, review, and synthesize various research results and documents related to the problem being studied (Lestanata & Kurniawan, 2025.). The collected data were then analyzed using descriptive-qualitative analysis techniques through the stages of data collection, data reduction, data presentation, and drawing conclusions to produce a comprehensive understanding of the relationship between HTI development, deforestation, and regional forestry governance in Jambi Province.

Findings and Discussion

Historically, Jambi Province has been one of the provinces with the highest rates of forest cover change on the island of Sumatra. Various studies have shown that from the 1970s to the present, forest area in Jambi has experienced a significant decline due to the expansion of various land-based sectors, such as oil palm plantations, industrial timber plantations (HTI),

mining, and infrastructure development. One study stated that in the 1970s, approximately 72% of Jambi's territory was still forested (Muchlis et al, 2016). The 1990s were a crucial period of change in Jambi's forest landscape. The government began encouraging the development of Industrial Plantation Forests (HTI) to meet the needs of the pulp and paper industry through policies such as Government Regulation No. 7 of 1990. After the 1998 reforms, forest exploitation did not immediately stop (Budi et al., nd). Decentralization of government has given regional governments greater authority in natural resource management, which in some cases has actually accelerated the granting of land use permits. Entering the 21st century, the landscape of Jambi has changed drastically. While in the 1970s, forests still covered approximately 72% of its territory, by the end of the 2010s, forest cover was estimated to remain at around 920,000 hectares, or approximately 18% of Jambi's area (KKI Warsi, 2026). At the same time, Jambi's landscape is dominated by oil palm plantations, industrial timber plantations (HTI), and other land uses. The following table shows the distribution of HTI areas in Jambi Province.

Table 1. Data on the Distribution of Industrial Plantations in Jambi Province

No	Perusahaan	Luas (Ha)	Sebaran Utama
1	PT Wirakarya Sakti (WKS)	287.116	Tanjung Jabung Barat, Tanjung Jabung Timur, Muaro Jambi, Batang Hari, Tebo
2	PT Lestari Asri Jaya (LAJ)	61.495	Tebo dan Bungo
3	PT Rimba Hutani Mas (RHM)	51.260	Tanjung Jabung Timur dan sekitarnya
4	PT Mugitriman International	37.500	Tebo–Bungo
5	PT Samhutani	35.955	Tebo dan Batanghari
6	PT Hijau Artha Nusa	32.620	Sarolangun–Merangin
7	PT Gading Karya Makmur	27.703	Tebo
8	PT Malaka Agro Perkasa	24.485	Tebo–Bungo
9	PT Agronusa Alam	22.525	Batanghari
10	PT Tebo Multi Agro	19.770	Tebo
11	PT Limbah Kayu Utama	19.300	Batanghari–Muaro Jambi
12	PT Jebus Maju	15.012	Batanghari)

13	PT Alam Lestari Nusantara	10.785	Sarolangun
14	PT Arangan Hutan Lestari	9.400	Tebo
15	PT Wana Mukti Wisesa	9.264	Tebo
16	PT Wanakasita Nusantara	8.784	Tebo
17	PT Rimba Tanaman Indonesia	8.155	Sarolangun
18	PT Wana Perintis	6.900	Batanghari
19	PT Delonix Lestari Jaya	5.050	Bungo

Source: Jambi Provincial Forestry Service 2022

Industrial plantation development often involves converting natural forests into monoculture plantations dominated by specific species, such as acacia and eucalyptus. Administratively, these areas are still classified as forests, but ecologically, fundamental changes have occurred to the structure and function of the ecosystem. This is where the main debate in deforestation studies lies. The government often uses a forest cover approach, even though the conversion of natural forests to industrial plantations can still be considered a form of deforestation because it causes loss of biodiversity, changes in vegetation structure, and a decline in the forest's ecological function (Basu, 2023).

Table 1. above shows that one of the companies holding the largest HTI permit in Jambi Province is PT Wirakarya Sakti (WKS), which has a concession area of approximately 293,812 hectares spread across the regencies of West Tanjung Jabung, East Tanjung Jabung, Batanghari, Muaro Jambi, and Tebo. The extent of this concession demonstrates a very large scale of spatial change. Within this area, natural forests containing hundreds of plant species and complex ecological structures have largely been converted into industrial plantations dominated by fast-growing species such as acacia and eucalyptus to meet the raw material needs of the pulp industry. Changes in vegetation cover resulting from PT Wirakarya Sakti's production activities have resulted in certain environmental impacts, one of which is the implementation of a silvicultural system of clear-cutting with replanting, which has the potential to increase the risk of erosion due to reduced vegetation cover at certain phases in the forest production cycle. This finding is important because it shows that the impact of HTI on the environment does not only appear at the initial land clearing stage but also continues throughout the production cycle. When an area experiences repeated logging and replanting,

changes occur in soil conditions, water management and ecosystem stability that are different from those in natural forests (Dharma & Bast, 2025; Kato et al., 2023; Rahman et al., 2025). Furthermore, several studies have shown that the development of industrial timber plantations (HTI) also influences forest fragmentation. Fragmentation occurs when previously connected forest areas are fragmented by production roads, canals, and blocks of industrial plantations. Ecologically, fragmentation is a form of forest degradation because it reduces habitat connectivity and increases pressure on remaining forest areas (Cox et al., 2021; Ikonen et al., 2020).

The Impact of HTI's Existence on Tenurial Conflicts in Jambi Province

The development of Industrial Plantation Forests (HTI) in Jambi Province has been a significant factor influencing the dynamics of forest resource control and tenurial conflicts over the past three decades. Prior to the widespread implementation of HTI development policies in the early 1990s, much of Jambi Province's landscape was dominated by lowland tropical rainforest, which served as a livelihood for local communities, farmers, and indigenous peoples, including the Orang Rimba. Studies indicate that in the early 1970s, approximately 72% of Jambi Province remained covered in natural forest, which communities utilized for hunting, gathering, collecting non-timber forest products, practicing shifting cultivation, and developing traditional rubber plantations. During this period, community relations with forest areas were largely regulated through customary norms and hereditary tenure, resulting in relatively rare large-scale land use conflicts. Although the government had granted Forest Concession Rights (HPH) to several companies since the 1970s, these activities were primarily oriented toward timber harvesting without converting entire areas into permanent cultivation areas, thus retaining community access to most of the forest.

Change began to occur when the government implemented a policy for the development of Industrial Plantation Forests through Government Regulation Number 7 of 1990 concerning Industrial Plantation Forest Concession Rights, which was later strengthened by Law Number 41 of 1999 concerning Forestry. This policy aims to provide raw materials for the pulp and paper industry through the development of fast-growing plantation forests such as *Acacia mangium*, *Acacia crassicarpa*, and *Eucalyptus pellita*. In its implementation, Jambi Province was designated as one of the priority areas for HTI development due to its extensive production forest area and strategic location for the pulp industry in Sumatra. Since then, the

government has begun granting concession permits to various large-scale forestry companies. Data shows that almost 39% of the forest area in Jambi Province is under the control of HTI companies. These concessions are spread across various districts such as West Tanjung Jabung, East Tanjung Jabung, Muaro Jambi, Batanghari, Tebo, and Sarolangun, most of which are areas that have long been used by rural communities and indigenous communities as living spaces and sources of livelihood.

Several HTI companies operating in Jambi include PT Wirakarya Sakti (WKS), PT Rimba Hutani Mas (RHM), PT Tebo Multi Agro (TMA), PT Wanakasita Nusantara, PT Wanamukti Wisesa, PT Wana Perintis, PT Wana Teladan, PT Dyera Hutani Lestari, PT Samhutani, PT Limbah Kayu Utama, PT Arangan Hutan Lestari, and PT Gamasia Hutani Lestari. The concession areas of these companies reach hundreds of thousands of hectares and are spread across several districts in Jambi. The large scale of spatial control by these companies increases the potential for overlapping areas with areas long managed or claimed by communities surrounding the forest.

The expansion of HTI concessions directly changed the land tenure structure in Jambi Province. Areas previously managed by communities based on customary rights or hereditary tenure were transformed into company concessions through state licensing mechanisms. This change created a dualism in land tenure: *de jure* control by the state through permits granted to companies, and *de facto* control by the communities who had utilized the areas for generations (Barrette et al., 2021; Hynes et al., 2021). The mismatch between state legal recognition and social realities on the ground is one of the main causes of tenure conflicts. In many cases, communities lack formal ownership evidence because the area is administratively categorized as state forest, even though they have historically managed it long before the HTI permit was issued (Hardiansyah et al., 2025). This condition causes the permit granting process to often ignore the rights of local communities and indigenous peoples, thus triggering long-term disputes.

As the area of HTI concessions has increased, the intensity of land tenure conflicts in Jambi Province has also increased significantly. A study by the Impartial Mediator Network (IMN) showed that in 2017, Jambi Province ranked second nationally in the number of land tenure conflicts, with 28 cases of agrarian conflict, mostly involving companies holding HTI, HPH, and oil palm plantation permits. These conflicts were generally triggered by

overlapping land ownership claims, unclear forest area boundaries, minimal public consultation prior to permit issuance, and suboptimal conflict resolution mechanisms at the regional level. Meanwhile, the Agrarian Reform Consortium (KPA) recorded that throughout 2020, there were 21 agrarian conflicts in Jambi Province, covering an area of approximately 17,988 hectares, of which nine cases occurred in HTI concession areas. This data indicates that the forestry sector, particularly HTI, remains a major contributor to agrarian conflict in Jambi Province (KPA, 2025).

Similar findings were also reported by the Indonesian Forum for the Environment (WALHI) Jambi (2022), which recorded 156 agrarian conflicts in Jambi Province throughout 2018. Of these, 57 conflicts were related to the activities of HTI companies spread across various districts. These conflicts encompassed not only land boundary disputes but also restrictions on community access to forest areas, evictions from cultivated land, criminalization of residents, and even physical clashes between communities and company security forces. One of the most impacted communities is the Orang Rimba community, which has traditionally depended on forest areas in Tebo, Batanghari, and Sarolangun Regencies for its livelihoods. The reduction in living space due to the expansion of HTI concessions has caused indigenous communities to lose access to food sources, non-timber forest products, and hunting grounds that have long been part of their livelihoods.

Compared to conditions before the development of HTI, these changes indicate a significant increase in pressure on the tenure system in Jambi Province. Before 1990, land tenure conflicts were mostly local and related to village boundaries or between individuals. However, after the development of HTI, these conflicts shifted into structural conflicts involving communities, companies, and the government as the permit issuer. This shift demonstrates that tenure conflicts are not solely caused by the presence of HTI companies, but rather by forestry governance that has failed to accommodate the rights of communities who have long controlled and utilized forest areas. The top-down process of determining forest areas, the lack of participatory mapping, weak recognition of customary territories, and suboptimal coordination between the central government, regional governments, and companies are factors that increase the potential for conflict (Koç et al., 2025).

One conflict case that also illustrates this issue occurred between the Orang Rimba community and the industrial timber plantation company PT Lestari Asri Jaya (LAJ) in the

South Sumay River area of Tebo Regency. The company's expansion and control of the area were seen as threatening the living space of the Orang Rimba, who have traditionally depended on the forest for their livelihood. The ongoing conflict was not only related to land ownership but also concerned the sustainability of the social identity, culture, and traditional livelihood systems of the indigenous people who depend on the forest.

Among the various HTI companies operating in Jambi, PT Wirakarya Sakti (WKS) is the most prominent case to study because it owns the largest concession area, approximately 293,812 hectares spread across the regencies of West Tanjung Jabung, East Tanjung Jabung, Batanghari, Muaro Jambi, and Tebo. The sheer scale of this concession makes PT WKS a key actor in landscape transformation and changes in forest tenure patterns in Jambi. Several records indicate that conflicts between PT WKS and communities have occurred across various concession areas, with the total conflict area reaching approximately 37,000 hectares and involving communities across the five regencies. These conflicts have even resulted in various legal proceedings involving community members in several courts in Jambi.

The conflict between PT WKS and the community can also be seen in a case in Tebo Regency, particularly in Lubuk Mandarsah Village. The conflict between the community group and the company has been ongoing since around 2007 and is related to differing claims regarding boundaries and land ownership within the concession area. Tensions escalated again in 2020 when members of a farmers' group were reported for allegedly encroaching on the company's concession land. For the community, the land represents a source of livelihood that they have managed, while the company bases its claim on its concession permit. This case illustrates how tenurial conflicts are not only a matter of land ownership but also concern the community's access to economic resources and the sustainability of their livelihoods. Furthermore, research on the management of PT WKS's Industrial Timber Plantation (HTI) indicates that conflicts with communities surrounding forest areas are also related to land use for community rubber and oil palm plantations. Research in the District VI area of PT WKS, which includes the villages of Tebing Tinggi, Kelagian, and Senyerang in West Tanjung Jabung Regency, found that land conflicts are one of the obstacles in HTI management due to overlapping between the company's concession area and the land used by the community to meet their economic needs (Zhang et al., 2024; Zhou & Zhang, 2020).

Forest Governance Influences the Relationship between Industrial Timber Plantations (HTI) and Deforestation in Jambi Province

Forestry governance is a crucial factor in explaining the relationship between Industrial Plantation Forest (HTI) development and deforestation in Jambi Province. Deforestation is not viewed solely as a consequence of forestry economic activities, but rather as the result of the interaction between policies, institutions, licensing systems, oversight, and government capacity to control forest resource utilization (S. Chen et al., 2023). Therefore, when discussing the impact of HTI on deforestation, attention is directed not only to the company's activities, but also to how the state regulates these activities. In the Jambi context, the relationship between HTI and deforestation is greatly influenced by the quality of forestry governance that has developed since the decentralization era.

Theoretically, the concept of forest governance explains that the success of forest management is not only determined by the existence of rules and policies, but also by the effectiveness of implementation, institutional capacity, and the relationships between actors involved in managing forest resources (Forest-People Interfaces, 2012). From this perspective, forestry governance encompasses aspects of transparency, accountability, participation, law enforcement, institutional coordination, and oversight capacity to ensure sustainable forest utilization (Schimetka & Ingram, 2024). If these various aspects are not implemented optimally, the potential for forest degradation and deforestation will increase. Therefore, the existence of Industrial Plantation Forests (HTI) does not automatically cause deforestation; rather, its impact is greatly influenced by how the government implements the forestry governance system through effective licensing, monitoring, and regulatory enforcement.

The dynamics of forestry governance in Jambi Province have undergone significant changes following the implementation of decentralization. At the beginning of the reform era, some natural resource management authority was transferred to regional governments. This policy was essentially aimed at increasing the efficiency of resource management and strengthening the role of regions in development. However, various studies have shown that decentralization has also created new challenges in the form of increased complexity in decision-making and weak coordination between actors in forest area management. Research (Nakahata et al., 2025) This study shows that forestry governance in Jambi still faces various

issues, ranging from the distribution of authority, licensing mechanisms, information provision, to stakeholder involvement in decision-making. According to them, the quality of forestry governance significantly determines the government's ability to maintain a balance between economic interests and environmental sustainability. In the context of HTI development, the first issue that needs to be analyzed is the licensing system. In forestry governance, permits are the primary instrument that determines who has the right to manage forest areas and how those areas are utilized (Iqbal et al., 2020). Therefore, every decision regarding permits has direct consequences for the condition of forest cover in a region. In practice, HTI development in Jambi occurs through the granting of large-scale concessions to forestry companies. Normatively, these permits aim to increase the productivity of production forest areas while meeting the need for industrial raw materials. However, HTI concessions are often not located on degraded land. In some cases, concessions are granted in areas that still have relatively good natural vegetation cover. This situation means that HTI expansion has the potential to drive significant changes in forest cover.

Furthermore, the main problem lies not in the existence of the permit itself, but rather in the quality of the planning process before it is granted. When the process of determining the location of a concession is not based on adequate ecological studies, the risk of forest loss increases (Li et al., 2025). Conversely, if the government can ensure that industrial timber plantations (HTI) are developed only on degraded land, pressure on natural forests can be minimized. This suggests that the relationship between HTI and deforestation is mediated by the quality of government decision-making, including planning, institutional coordination, and the alignment of policies with ecological conditions on the ground.(38)In other words, industrial timber plantations (HTI) are a cause of deforestation not solely due to their industrial nature, but rather due to governance decisions that allow the conversion of forested areas into production areas. Another aspect influencing the relationship between HTI and deforestation is oversight. From a forestry governance perspective, oversight is a crucial instrument for determining the effectiveness of policy implementation, as weak institutional coordination and oversight capacity can lead to suboptimal forest management policies (Putri et al., 2024). Jambi Province faces significant challenges in monitoring due to the vast forest areas it manages. At the same time, government institutional capacity is often disproportionate to the size of the areas under its control. Consequently, the government's

ability to monitor changes in land use is limited. This situation often results in changes in forest cover often only being discovered after they have already occurred on a significant scale. From this perspective, weak forestry governance can exacerbate the impact of industrial timber plantations on deforestation. When monitoring systems are ineffective, the government will struggle to ensure that companies are fulfilling their environmental management obligations in accordance with applicable regulations.

This orientation has long been evident in Jambi Province, reflected in the government's strong focus on the development of natural resource-based sectors, including industrial timber plantations (HTI). From an economic perspective, this policy is understandable, as the forestry sector contributes to regional income and job creation. However, from an environmental perspective, an overly production-oriented approach can increase pressure on forest areas. Forestry governance in Jambi demonstrates that the greatest challenge lies not in the lack of regulation, but in how it is consistently implemented. This situation demonstrates that deforestation around HTI areas cannot be explained solely through an ecological approach. Deforestation is also an institutional issue related to how the state regulates and oversees natural resource utilization. Recent research on the PT Wirakarya Sakti HTI area shows that the HTI production system can impact environmental conditions through changes in vegetation cover and increased erosion risks at certain phases of the production cycle. These findings suggest that the environmental impact of HTI is determined not only by the presence of industrial plantations but also by how their management practices are regulated and monitored. The relationship between HTI and deforestation in Jambi Province is complex. Industrial timber plantations (HTI) do have the potential to drive changes in forest cover, but the magnitude of these impacts is heavily influenced by the quality of forestry governance. Therefore, solutions to deforestation cannot be achieved simply by limiting HTI expansion, but also through improvements in forest governance, including planning, licensing, oversight, transparency, and accountability in forest resource management.

Conclusion

The development of Industrial Plantation Forests (HTI) in Jambi Province contributes to deforestation through the conversion of natural forests to plantations, changes in land cover, and the decline in the ecological quality of forest areas. However, HTI is not the sole cause of

deforestation, as other factors such as plantation expansion, infrastructure development, and other land use activities contribute to the reduction in forest cover in Jambi. This study also shows that forestry governance plays a crucial role in determining the relationship between HTI and deforestation. An effective system of licensing, monitoring, law enforcement, and forest area planning can mitigate the negative impacts of HTI development on the environment. Conversely, weak forestry governance has the potential to increase pressure on forests and accelerate the rate of deforestation. Therefore, strengthening sustainable forestry governance is key to balancing economic interests and forest conservation in Jambi Province.

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