

Institutional Capacity of the Environmental and Forestry Agency (DLHK) in Environmental Governance in Riau Province

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ABSTRACT

This study examines the institutional capacity of Dinas Lingkungan Hidup Dan Kehutanan (DLHK) in implementing regional environmental governance. The main problems identified include: limited functional human resources, particularly Forestry Police and Environmental Supervisors; incomplete legal status determination of forest areas that hampers law enforcement; and overlapping authority and spatial data that triggers land tenure conflicts. This research employs a literature review method, drawing on data from the Riau Provincial Environmental Management Performance Information Document (DIKPLHD) 2023. The theoretical framework is grounded in Institutional Theory and Policy Implementation Theory. The results indicate that DLHK Riau's institutional capacity remains weak: of 672 total employees, only 191 hold functional positions, with Forestry Police personnel (94 persons) and Environmental Supervisors (5 persons) far below the requirements for overseeing an area of more than 5.4 million hectares. In 2022, there were 380 public complaints related to the environment and forestry, yet only 5 forestry criminal cases could be processed, with 3 losing at the pre-trial stage due to unclear forest area status. This weakness has resulted in widespread conversion of forest areas into plantations covering 1,891,286 hectares across all districts/cities in Riau Province. The research concludes that institutional reform, human resource strengthening, and spatial conflict resolution are essential prerequisites for effective environmental governance in Riau Province.

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1. Introduction

Environmental management is a strategic function of regional government within Indonesia's decentralization framework. Since the enactment of Law No. 23 of 2014 concerning regional government, the authority for environmental and forestry management at the provincial level has been further expanded, but this has also placed a greater burden of responsibility on regional governments. Riau Province, as one of Indonesia's most resource-rich provinces, faces a highly complex set of environmental issues. (Irma et al., 2018)

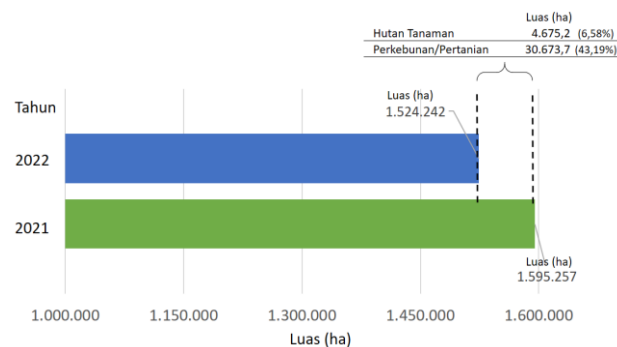


Figure 1 Decline in forest area from 2021 to 2022 due to land conversion

Riau Province has a forest area of approximately 5,406,992 hectares based on the Decree of the Minister of Environment and Forestry Number SK.903/MENLHK/SETJEN/PLA.2/12/2016. In addition, Riau is the province with the largest peat area in Indonesia, reaching 5.3 million hectares or 55.7% of the total peat area on the island of Sumatra (DIKPLHD Riau, 2023). This condition makes Riau Province a very vital ecological area, as well as an arena for competing interests between land-based economic development and environmental protection. (DIKPLHD, 2023)

Ironically, amidst its significant environmental management responsibilities, Dinas Lingkungan Hidup Dan Kehutanan (DLHK) faces serious institutional capacity challenges. Data from the Riau DIKPLHD (Regional Environmental Management Agency) for 2023 shows that of the 672 employees at the Riau Province DLHK, only 191 hold functional positions, with 94 Forestry Police and only five Environmental Supervisors. This number is grossly inadequate to oversee the millions of hectares of forest areas and thousands of land-based business permits spread across Riau Province.

This article formulates the research problem in three main dimensions. First, limited functional human resources, particularly forestry police and environmental supervisors, have resulted in low intensity of environmental supervision and law enforcement. Second, the incomplete determination of the legal status of forest areas in Riau Province has resulted in a weak legal basis for enforcing forestry violations. Third, overlapping authority and spatial data have triggered tenure conflicts between communities, companies, and the government. (Maryudi, 2016)

Based on these problems, this article aims to: (1) analyze the institutional capacity of the Riau Province Environmental Agency (DLHK) in regional environmental governance; (2) identify factors inhibiting the implementation of environmental policies in Riau Province; and (3) formulate recommendations for strengthening institutional capacity to increase the effectiveness of environmental governance. (Arifin & Rachman, 2019)

The theoretical study in this research is based on two main theories. First, institutional theory, developed by DiMaggio and Powell (1983), emphasizes that the effectiveness of public organizations is not solely determined by technical efficiency but also by institutional factors such as rules, norms, and socio-political environmental pressures. In the context of environmental governance, institutional capacity encompasses the dimensions of human resources, regulatory frameworks, information systems, and coordination mechanisms between actors. (North, 1990)

Second, Policy Implementation Theory, developed by Van Meter and Van Horn and Mazmanian and Sabatier, provides an analytical framework for understanding why environmental policies often fail to be implemented effectively at the regional level. Key factors influencing the success of policy implementation include clarity of policy objectives, resource availability, characteristics of implementing agents, socio-economic conditions, and support from political actors. The weakness of these aspects in the Riau Province Environment and Forestry Agency (DLHK) is the focus of analysis in this article. (Van Meter & Van Horn, 1975).

2. Method

This study employed a qualitative research method with a library research approach. A library study is a data collection method conducted through the search of official documents, government reports, scientific journals, and relevant secondary data sources (Moleong, 2017). This approach was chosen because it allows for a comprehensive analysis of policy data, regulations, and the empirical conditions of environmental governance in Riau Province based on available documents.(Hadipuro & Indriana, 2014)

The primary data source in this study is the 2023 Riau Province Regional Environmental Management Performance Information Document (DIKPLHD), published by Dinas Lingkungan Hidup dan Kehutanan. This document presents comprehensive quantitative and qualitative data.(DIKPLHD, 2023)

Secondary data sources include environmental and forestry laws and regulations, reports from the Riau Province Central Statistics Agency, scientific journals in the fields of government and public policy, and relevant academic studies. Data were collected through documentation techniques, namely the collection, selection, and analysis of various documents relevant to the research problem.(North, 1990)

Data analysis was conducted using content analysis and policy analysis techniques. Content analysis was used to identify themes and patterns emerging from the various documents reviewed, while policy analysis was used to evaluate the gap between environmental policy objectives and their implementation conditions on the ground. The analytical framework is based on two main theories:

First, institutional theory was used to analyze how formal structures (regulations, organization, and procedures) and informal structures (norms, culture, and isomorphic pressures) influence the effectiveness of environmental management at the Riau Province Environmental Agency (DLHK). This analysis included a review of organizational structure, human resource capacity, budget availability, and institutional coordination mechanisms.(Ndraha, 2010)

Second, Policy Implementation Theory was used to identify factors hindering environmental policy implementation at the regional level. This analysis referred to top-down and bottom-up implementation models, as well as key variables influencing implementation success, such as policy clarity, bureaucratic capacity, and resource support.

Data validity was maintained through source triangulation techniques, which compare and verify data from various different sources to ensure the consistency and reliability of the research findings. All data used was selected based on relevance, source credibility, and up-to-date information.

3. Results and Discussion

3.1 Human Resource Capacity of the Riau Province DLHK

Human resource capacity is the primary foundation of a public organization's institutional capacity. In the context of environmental governance, the adequacy of the number and competence of personnel significantly determines the effectiveness of environmental oversight, law enforcement, and service delivery.

Based on 2023 data from the Riau Province Environmental Management Agency (DIKPLHD), the Riau Province Environmental Agency (DLHK) had 672 employees in 2022. This staffing structure comprised 88 Class IV civil servants, 421 Class III civil servants, and 163 Class II civil servants. Of these, only 191 held specific functional positions, while the remainder comprised structural and administrative staff.

From an institutional theory perspective, the imbalance between structural and functional personnel reflects fundamental institutional issues. Public organizations that prioritize structural positions over functional positions tend to experience inefficiency due to the lack of a direct correlation between job positions and the technical functions they must perform (North, 1990). In the DLHK environment, functional positions such as forestry police, environmental supervisors, and environmental extension workers are the operational backbone of environmental supervision.

Table 1 Distribution of Functional Positions within the Riau Province DLHK, 2022

No.	Functional Position	Number of Perso	Proportion (%)	Description
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		<i>nnel</i>		
1	Forestry Police	94	49.21%	The largest group, yet still insufficient
2	Forestry Extension Officer	21	10.99%	–
3	Environmental Extension Officer	31	16.23%	–
4	Environmental Impact Controller	28	14.66%	–
5	Environmental Supervisor	5	2.62%	Critical shortage
6	Forest Ecosystem Controller	4	2.09%	–
7	Others (Planner, Analyst, etc.)	8	4.19%	–
Total		191	100%	28.42% of 672 total employees

Source: Riau Province DIKPLHD, 2023, adapted by the author

The data in Table 1 demonstrates a poor situation, particularly for the environmental supervisory position, which only has five employees. This is despite the fact that the environmental supervisory function encompasses monitoring thousands of business permits and activities with the potential to cause environmental impacts throughout Riau Province, which covers over 87,000 km². This ratio indicates that, on average, one environmental supervisor must oversee an area of approximately 17,400 km², a figure that is almost impossible to effectively manage.(Mukherjee, 2020)

This issue aligns with the findings of, who stated that inadequate human resource capacity is a major bottleneck in environmental policy implementation in developing countries. Within the framework of policy implementation theory, Van Meter and Van Horn asserted that the availability of resources, including human resources, is the primary determinant of successful policy implementation. Insufficient resources will always hinder the implementation of regulations, regardless of their quality.(Pramusinto & Purwanto, 2019)

3.2 Weaknesses in Law Enforcement and Unclear Status of Forest Areas

Environmental law enforcement is a critical instrument for effective environmental governance. Without firm law enforcement, all policy instruments, from licensing and supervision to sanctions, lose their effectiveness. In Riau Province, weaknesses in environmental law enforcement are systemic and closely related to unresolved institutional issues.(Suharjito & Darusman, 2012)

Data from the Riau Environment and Forestry Department (DIKPLHD) for 2023 revealed that in 2022, there were 380 public complaints related to the environment and forestry. The most frequent complaints concerned land contaminated by oil and gas companies, followed by forest encroachment and land tenure conflicts. However, of these hundreds of complaints, only five cases were successfully processed as forestry criminal cases. Even more worrying, three of these five cases were lost in pre-trial hearings.

The failure of these pre-trial hearings was not solely due to the weaknesses of the investigative team but rather to a fundamental problem: the legal status of the forest area at the location of the

crime had not been officially determined by the minister of environment and forestry. This ambiguity creates a legal loophole exploited by the defendant, as without a valid forest area status determination, it is difficult to prove that the actions taken occurred within a legally protected area.

This situation reflects a deep-seated institutional problem. From an institutional theory perspective, distinguishes between formal institutions (laws, regulations, and contracts) and informal institutions (norms, customs, and conventions). In Riau Province, the weakness of formal institutions, particularly the incomplete determination of forest area status, creates legal uncertainty that weakens the entire environmental law enforcement system. As a result, violators can easily escape prosecution, while law enforcement officials lack the legal instruments necessary to take action.

Furthermore, 2022 data also shows at least 174 documented complaints related to various environmental issues, with 150 related to hazardous and toxic materials (B3) waste pollution, 12 cases of land conflicts, and 7 cases of water pollution. The high number of complaints that cannot be fully followed up reflects a significant gap between the need for oversight and available capacity.(Syafaruddin, 2015)

3.3 Overlapping Authority, Spatial Data, and Tenurial Conflicts

One of the most complex issues in environmental governance in Riau Province is overlapping authority and spatial data. This situation not only creates legal uncertainty but also triggers horizontal conflicts between indigenous communities, farmers, plantation companies, and the government regarding land ownership and use.(Yusuf, 2018)

Data from the Riau Environmental Management Agency (DIKPLHD) for 2023 shows that forest areas in Riau Province have been converted to plantations. This area is spread across various forest functions, including 95,056 hectares of Nature Reserves/Nature Conservation Areas (KSA/KPA), 75,500 hectares of Protected Forests (HL), 448,370 hectares of Limited Production Forests (HPT), 586,359 hectares of Production Forests (HP), and 686,001 hectares of Convertible Production Forests (HPK).

This widespread conversion of forest areas is inextricably linked to the weak spatial control system of the local government. Inaccurate and inconsistent spatial data between forest area maps, plantation permit maps, and village administration maps are the root cause of many tenure conflicts. From a policy implementation perspective (Irma et al., 2018), this situation reflects a failure to ensure clarity and consistency of policy objectives, as various sectoral policies on forestry, plantations, and land conflict and are not well integrated.

The issue of overlapping authority also occurs at the government level. Forest area management involves the Ministry of Environment and Forestry (central), the Provincial Environment and Forestry Office, and district/city governments, while land affairs are managed by the National Land Agency. This fragmentation of authority, without an effective coordination mechanism, creates a situation where no single party is fully responsible for resolving tenure conflicts.(Perdana, 2024)

From an institutional theory perspective, this situation can be explained as an institutional design failure. Ostrom (1990), in his study of common-pool resource management, emphasized the importance of clear, well-defined rules supported by effective monitoring and enforcement mechanisms. When these principles are not met, as is the case in Riau Province, natural resource management tends to lead to degradation, often referred to as the 'tragedy of the commons'.

3.4 Budget Capacity Analysis in Environmental Governance

Budget capacity is another important dimension of institutional capacity. The availability of adequate funding is a prerequisite for the effective implementation of environmental management programs. Based on data from the Riau Environmental Management Agency (DIKPLHD) for 2023, the 2022 regional environmental management budget allocation for Riau Province can be broken down as follows: land use (Rp 15.1 billion), water quality (Rp 6.12 billion), air quality (Rp 5.6 billion) (with Rp 1.35 billion from the Environment and Forestry Agency), disaster risk (Rp 13.5 billion), and governance/institutional matters (Rp 8.9 billion).

Compared to the breadth of responsibilities, this total budget is grossly inadequate. As an illustration, the Rp 6.12 billion budget for water quality monitoring of all water bodies in Riau Province, which has over 250,000 km² of inland waters, results in a very low average expenditure per square kilometer. These budget limitations confirm the findings of various studies that low fiscal capacity is a structural obstacle to the effectiveness of environmental governance in the regions. (Agustino, 2020)

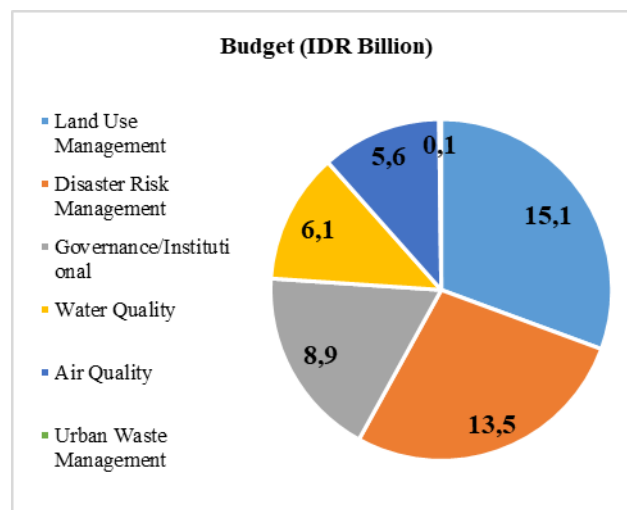


Figure 2 Budget Allocation for Environmental Management in Riau Province, 2022 (in billion IDR)

This figure shows the largest budget allocation for land use (Rp 15.1 billion), followed by disaster risk management (Rp 13.5 billion) and governance/institutions (Rp 8.9 billion). Meanwhile, the budget for urban waste management is very small (Rp 0.1 billion), disproportionate to the magnitude of the problem faced, with Riau Province's waste generation projected to reach over 1.1 million tons per year by 2022.

This mismatch between budget allocation and environmental priority issues reflects weaknesses in evidence-based policy planning and budgeting processes. From a policy implementation perspective, this has the potential to create a disparity between policy intention and the policy outcomes expected by the public.

3.5 Institutional Implications for Environmental Degradation

The institutional capacity weaknesses of the Riau Province Environment and Forestry Agency (DLHK) have had significant implications for the region's environmental conditions. Data shows that forest cover in Riau Province decreased by 71,015 hectares, or 4.45%, in just one year (2021-2022). This decline was caused by the conversion of 30,673 hectares (43.19%) of forest cover to plantations/agriculture and 4,675 hectares (6.58%) to tree plantations.

The peat ecosystem in Riau Province is also in critical condition. Based on Decree of the Director General of Pollution and Environmental Damage Control No. SK.40/PPKL/PKG/PKL.0/3/2018, peat in Riau Province is in a state of slight damage, 13.20% moderate damage, 3.79% severely damaged, and 0.08% extremely damaged, with only 0.48% remaining in good condition. This peatland degradation has a direct impact on the increased risk of forest and land fires and flooding, which in 2019 resulted in 90,550 hectares of forest and land fires.

Water quality is also a serious concern. The Water Quality Index (IKA) for Riau Province fluctuated between 2018 and 2022 but remained in the very poor category, with the latest score being 53.88 in 2022. This condition is exacerbated by the continued increase in industrial and domestic wastewater volume, which reached 6,473,510 liters in 2019, a significant increase from 4,105,770 liters in 2010.

This series of environmental degradation is inextricably linked to the institutional weaknesses discussed previously. Within the DPSIR analysis framework, weak institutional capacity (Response) ultimately fails to offset the significant pressure (Pressure) generated by land-based economic activities, resulting in continued environmental deterioration and increasingly widespread impacts (Impact) felt by the community. (Maryudi, 2016)

4. Conclusion

Based on the analysis presented, it can be concluded that the institutional capacity of the Riau Province Environmental Agency (DLHK) in regional environmental governance remains weak. This weakness is multidimensional, encompassing human resources, law enforcement, spatial data, institutional coordination, and budget capacity.

First, from a human resources perspective, the number of functional staff, particularly environmental supervisors, with only five to oversee the vast territory of Riau Province, represents the most critical institutional deficit. This situation confirms the argument of policy implementation theory that adequate resources are essential for successful policy implementation.

Second, the incomplete determination of the legal status of forest areas has created legal loopholes that weaken the DLHK's ability to prosecute violations. The fact that three out of five forestry criminal cases in 2022 were lost in pre-trial proceedings due to unclear status is a clear indicator of institutional failure that needs to be addressed immediately.

Third, overlapping spatial data and authority between institutions has resulted in massive tenure conflicts, as evidenced by the extensive conversion of forest areas to plantations, reaching 1,891,286 hectares. From an institutional theory perspective, this reflects a failure of institutional design that requires systemic reform.

These weaknesses directly contribute to ongoing environmental degradation, including the decline in forest cover, the destruction of peat ecosystems, and the deterioration of water quality. Therefore, strengthening institutional capacity is not merely a bureaucratic agenda but rather an ecological prerequisite that determines the future of the environment and the well-being of the people of Riau Province.

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Declarations

Author contribution. All authors contributed to the study conception and design. Muhammad Adrian Perdana led the conceptualization, methodology development, and writing of the original draft. Vina Valentina was responsible for formal analysis, data curation, and critical review of the

literature synthesis. Tahniah Nafasya Mandadhita contributed to the investigation, resource gathering, visualization of conceptual frameworks, and writing – review and editing. All authors have read and agreed to the published version of the manuscript.

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Data and Software Availability Statements

The data supporting the findings of this study are derived from publicly available government reports and secondary sources. The primary data source is the 2023 Regional Environmental Management Performance Information Document (DIKPLHD), published by the Riau Provincial Environment and Forestry Service (Dinas Lingkungan Hidup dan Kehutanan Provinsi Riau) otherwise state: available upon request from the corresponding author]. Secondary data, including reports from the Riau Province Central Statistics Agency (BPS) and relevant academic literature, are fully cited in the References section. No new experimental datasets were generated. This study employed qualitative content and policy analysis; therefore, no specific proprietary software or custom code was developed or utilized for data generation or analysis.

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