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From Fragmentation to Integration: The Challenges of Sustainable Peatland Governance

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ABSTRACT

Sustainable peatland management requires a governance framework that can address institutional fragmentation and cross-sectoral tensions, particularly in ecologically sensitive and economically strategic coastal peatlands. Riau Province, as one of the regions with the largest coastal peatlands in Indonesia, represents the complexity of such governance due to overlapping authorities, conflicting land use interests, and pressures from natural resource-based development. This article examines the challenges of Riau's coastal peatland governance through the lens of governance frameworks and institutional analysis, with the aim of conceptualizing a shift from sectoral management to an integrated governance model. The study adopts a qualitative approach based on policy and institutional analysis, utilizing the concepts of multi-level governance, institutional interplay, and policy coherence to assess how the configuration of actors, rules, and power relations shapes peat management practices at the national and regional levels. Analytical findings indicate that governance fragmentation—reflected in inconsistent regulations, overlapping institutional mandates, and weak vertical and horizontal coordination—is a major obstacle to the sustainability of Riau's coastal peat ecosystem. This article argues that the failure of peatland governance in Riau is not merely technical-ecological in nature, but rather rooted in institutional design and the political dynamics of policy.

INTRODUCTION

Peatlands are strategic ecosystems within the global sustainable development agenda due to their role as carbon sinks, hydrological regulators, and biodiversity and the livelihoods of local communities (Syahza., et.al, 2020). In Indonesia, the significance of peatlands is even more pronounced given that the country has one of the largest tropical peat areas in the world (Anda., et.al, 2021). However, high land-use intensity and extraction-based development pressures have made peatlands areas with high levels of ecological vulnerability and governance conflicts, particularly in coastal areas (Rus., et.al, 2025).

Riau Province is a representative example of this complexity. The region is dominated by coastal peat landscapes that are ecologically sensitive and economically strategic, particularly for the plantation sector and land-based industries. Over the past two decades, Riau has experienced significant peat degradation, characterized by recurrent land fires, reduced hydrological function, and increased carbon emissions (Choy & Onuma, 2025). This phenomenon has not only had local impacts but also national and regional impacts, making the management of Riau's coastal peatlands a cross-border and cross-stakeholder governance issue.

Various policies and programs have been implemented to address the peat crisis in Riau, including a permit moratorium, hydrological restoration, and strengthening regulations for peat ecosystem protection (Okamoto., et.al, 2023). However, the effectiveness of these policies remains questionable. Many interventions are fragmented and uncoordinated, failing to address the root causes of peat degradation (Meyer-Jürshof., et.al, 2025). This situation reflects the strong fragmentation of governance, manifested in overlapping authority between institutions, a lack of synchronization between central and regional policies, and weak integration between conservation agendas and local economic interests.

The literature on natural resource governance emphasizes that such issues cannot be understood solely as failures in policy implementation or limited technical capacity (Rahman., et.al, 2017). Rather, they are rooted in the institutional design and power relations that shape decision-making processes. In the context of Riau's coastal peatlands, various policy regimes—forestry, plantations, environmental, spatial planning, and regional autonomy—interact within a complex institutional arena. These interactions are often incoherent and competitive, creating legal uncertainty and opening up space for unsustainable land use practices (Van den Ende., et.al., 2023).

The governance framework approach provides a theoretical foundation for analyzing these dynamics by viewing peatland management as the result of multi-actor and multi-level interactions (Muñiz-Martínez, 2025). The concept of multi-level governance is relevant to explaining how peatland policy in Riau is shaped through the relationships between the central government, provincial and district governments, business actors, and local communities in coastal areas (Fatimah., et.al, 2025). At the same time, the institutional interplay perspective helps reveal how overlaps and disharmony between policy regimes weaken the effectiveness of peatland governance (Cashore., et.al., 2024).

Furthermore, the concept of policy coherence is key to understanding the failure of integrated peatland management policies in Riau's coastal areas. Efforts to protect peatland

ecosystems often clash with regional economic development agendas that rely on plantation expansion and land-based investment (Gearey., et.al., 2025). This tension demonstrates that peatland management is not only an environmental issue but also a political policy arena fraught with negotiation of interests and power asymmetries between actors.

Although Riau is often used as a locus for studies on peatland fires and degradation, most research still focuses on the biophysical and technical aspects, while the governance and institutional dimensions have not been explored in depth and systematically. These limitations hamper understanding why policies normatively designed to protect peatlands often fail to produce substantive changes at the implementation level. Therefore, an analytical approach is needed that can bridge empirical studies on Riau with theoretical frameworks of natural resource governance.

This article starts from the argument that the transformation of Riau's coastal peatland management requires a shift from fragmented governance to an integrated management model. Using governance frameworks and institutional analysis, this article aims to identify patterns of fragmented peatland governance in Riau, analyze the institutional and political roots of the policies behind them, and formulate a conceptual framework for integrated peatland governance contextualized for coastal areas. This article's theoretical contribution lies in linking the Riau case to broader debates on natural resource governance and sustainability, while also offering a conceptual basis for formulating more coherent, adaptive, and equitable peatland management policies.

The coastal region of Riau presents spatial and social characteristics that complicate peatland governance practices. The dynamics of coastal hydrology, tidal influences, and proximity to mangrove ecosystems create ecological linkages that demand landscape-based management approaches and integrated socio-ecological systems. Existing institutional designs still tend to separate peatland management from coastal areas and waters, thus ignoring these ecological connections. This situation strengthens the argument that governance fragmentation in Riau is not only sectoral but also spatial, where administrative boundaries and policy regimes fail to reflect the reality of interconnected coastal peatland ecosystems.

In this context, this article positions the case of Riau's coastal peatlands as a critical case study to examine the relevance and limitations of an integrated governance framework for natural resource management. By combining institutional analysis and a multi-level governance perspective, this study seeks to answer the key question of how integrated governance can be designed within a complex and asymmetrical political-policy context. Thus, this article not only contributes to the empirical literature on peatland management in Indonesia but also enriches the theoretical discourse on natural resource governance in coastal areas of developing countries, particularly in the context of vulnerable and strategically valuable ecosystems.

RESEARCH METHODS

This research uses a qualitative approach with a case study design to analyze the governance of coastal peatland management in Riau Province. Riau was chosen as a critical case study due to its significant coastal peatland area, high level of ecosystem degradation, and complex governance involving multiple actors and policy regimes. To capture variations in governance dynamics at the local level, this study adopted a comparative sub-case study of several coastal districts in Riau that represent different ecological characteristics and land use pressures. The analytical framework of this research is based on a governance framework and institutional analysis, integrating the concepts of multi-level governance, institutional interplay, and policy coherence (van Noort., et.al., 2023). This framework is used to identify forms of governance fragmentation, cross-sectoral and cross-level government coordination mechanisms, and their implications for the sustainability of coastal peatland management.

Data collection was conducted through three main techniques. First, an analysis of relevant policy and regulatory documents, including laws and regulations, spatial and development planning documents, and peatland management and restoration program reports. Second, a literature review of academic publications and institutional reports related to peatland management and natural resource governance was conducted. Third, semi-structured interviews were conducted with key informants from the central and regional governments, the private sector, civil society organizations, and representatives of local communities in the coastal areas of Riau. Informants were selected purposively based on their role and influence in the decision-making process related to peat-land management.

Data analysis was conducted in a phased and integrated manner. Policy network analysis was used to map the relationships, interaction patterns, and levels of connectivity among actors in the formulation and implementation of peatland management policies (Valujeva., et.al., 2023). Actor power mapping was applied to identify the distribution of power, interests, and influence of key actors on the direction of coastal peatland management policies and practices. Institutional analysis was conducted through institutional mapping to assess overlapping authority and coherence between policy regimes. Comparisons across sub-cases of coastal districts were used to identify general patterns and local variations in governance practices. Figure 1 explains the peatland governance analysis method.

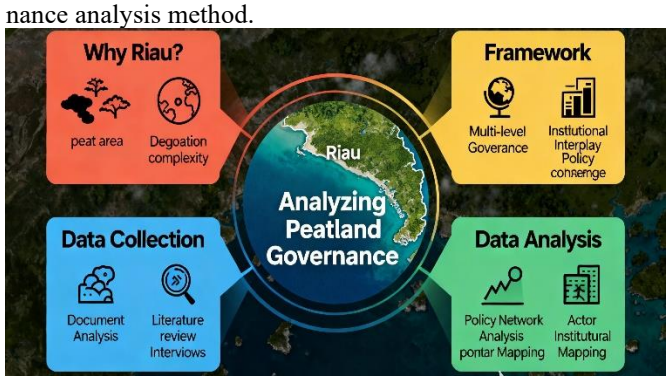

Figure 1. Analyzing Peatland Governance

RESULT AND DISCUSSION

This section presents and discusses the empirical findings of the study by situating them within the conceptual framework outlined earlier. The analysis is structured around key governance dimensions—namely institutional arrangements, multi-level coordination processes, and actor networks—to examine how these elements interact in shaping coastal peatland management in Riau Province. Rather than treating governance outcomes as linear policy effects, the discussion highlights the dynamic and context-dependent nature of governance practices, drawing on comparative evidence from selected coastal districts. By integrating empirical observa-

tions with governance and institutional theory, this section aims to explain both the persistence of fragmentation and the conditions under which more integrated governance arrangements emerge.

Fragmentation of Coastal Peatland Governance

The results of policy and institutional analysis indicate that coastal peatland governance in Riau Province is still characterized by structural and functional fragmentation. This fragmentation is particularly evident in the overlapping authority between government institutions governing forestry, plantations, the environment, spatial planning, and regional government (Windey, 2020). Although the national regulatory framework recognizes the importance of peat ecosystem protection, its implementation at the coastal level in Riau shows significant inconsistencies, both in regulatory interpretation and in land management practices.

This fragmentation is reflected in the weak synchronization between sectoral planning documents and coastal spatial planning (Hansen, Steffansen, & Howells., 2025). Several policies oriented toward peat protection run parallel with regional economic development policies that encourage land use expansion. This situation reinforces findings in the institutional interplay literature that incoherent interactions between policy regimes have the potential to produce policy outcomes that are counterproductive to sustainability goals.

This fragmentation of governance is also reflected in weak horizontal coordination mechanisms between regional agencies and vertical coordination mechanisms between the central, provincial, and coastal district/city governments (Chen, Yang, & Liu, 2024). Existing cross-sectoral coordination forums tend to be ad hoc and administrative in nature, failing to function as deliberative spaces for aligning interests and policy objectives. As a result, decision-making related to coastal peatland management often occurs separately, with each institution operating under its own sectoral mandate. This situation reinforces siloed governance, hindering policy integration and reducing the effectiveness of peat ecosystem protection.

The fragmentation of governance in Riau's coastal peatland areas is also influenced by regional political-economic dynamics, particularly the dependence of local governments on land-use-based revenues. Pressures to encourage economic growth and investment often lead to peat protection policies being positioned as obstacles to development, rather than as an integral part of sustainable development strategies. From a governance framework perspective, this situation demonstrates that fragmentation is not simply a technical institutional issue, but rather the result of the interaction between institutional design, power relations, and competing policy preferences (Larsson, 2019). Efforts to address fragmentation in coastal peatland governance in Riau require an approach that emphasizes not only regulatory harmonization but also a transformation of development paradigms and the strengthening of more collaborative and adaptive governance mechanisms.

Dynamics of Multi-Level Governance

A multi-level governance analysis reveals a gap in vertical coordination between the central government, provincial governments, and coastal district governments. The central government plays a dominant role in establishing peat protection norms and standards, while local governments play a key role in implementation and oversight on the ground. Asynchronous development priorities and limited institutional capacity at the regional level mean that peat protection policies are not fully internalized in coastal area management practices.

At the district level, differences in administrative capacity and economic pressures result in significant variation in policy implementation. Districts with a high dependence on land-based sectors tend to face a dilemma between compliance with environmental regulations and the need to increase regional revenue. These findings confirm that coastal peat governance cannot be understood as a linear process from the central government to the regions, but rather as a complex arena for negotiating interests across levels.

This gap in vertical coordination is further exacerbated by the limited availability of effective incentive and sanction mechanisms to encourage local government compliance with peat protection policies. In many cases, standards and targets set at the national level are not supported by adequate fiscal, technical, and institutional support at the regional level. As a result, coastal district governments often find themselves in a dilemma, where the demands for environmental policy implementation are disproportionate to their available resources and policy space. This situation reflects one of the main weaknesses in multi-level governance practices: the imbalance between authority, responsibility, and capacity across levels of government.

The dynamics of multi-level governance in Riau's coastal peatlands are also influenced by power relations and informal political processes that transcend formal institutional structures (Firdasari, 2022). Negotiations between central and regional actors, as well as between regional governments and business actors, often result in policy compromises that are not fully reflected in official regulatory documents. These practices demonstrate that peat protection policy implementation takes place within a hybrid governance framework, where formal rules interact with local economic and political interests. From a theoretical perspective, these findings confirm that the effectiveness of multi-level governance is determined not only by the clarity of the division of authority but also by the governance system's ability to manage conflicts of interest and build alignment of goals across levels of government.

Policy Network Analysis: Interaction Patterns Between Actors

The results of the policy network analysis indicate that the coastal peatland management policy network in Riau is asymmetrical, with uneven levels of connectivity between actors. Government institutions and business actors occupy central positions in the decision-making network, while civil society organizations and local communities occupy peripheral positions with limited influence. This pattern indicates that the policy formulation and implementation process is still dominated by actors with stronger political and economic resources.

The limited space for local actor participation has resulted in low policy legitimacy at the grassroots level. In several coastal district sub-cases, peatland management policies are perceived as top-down administrative instruments, thus not fully aligning with local practices and knowledge. This finding aligns with criticisms of technocratic governance approaches that ignore the social dimension of natural resource management.

The results of the policy network analysis further reveal that governance arrangements for coastal peatland mana-

gement in Riau are structurally asymmetric, characterized by uneven levels of connectivity and influence among policy actors. Government agencies and private sector actors—particularly those linked to plantation development and infrastructure investment—occupy central and brokerage positions within the decision-making network. Their dominance is reflected in higher degree centrality and control over key policy nodes, enabling them to shape agenda-setting, resource allocation, and implementation priorities. In contrast, civil society organizations, customary institutions, and local coastal communities remain largely peripheral, with limited access to formal decision-making channels and weak relational ties to core actors. This configuration indicates that peatland governance continues to be driven primarily by actors endo-wed with superior political authority, financial resources, and technical expertise, reinforcing hierarchical institutional logics rather than collaborative governance norms.

The marginal positioning of local actors has direct implications for policy legitimacy and effectiveness at the site level (Mulder, 2023). Evidence from comparative sub-cases across selected coastal districts in Riau suggests that peatland management policies are frequently perceived as administrative and compliance-oriented instruments imposed through top-down mechanisms. As a result, policy objectives are often misaligned with local land-use practices, livelihood strategies, and community-based ecological knowledge that have historically shaped peatland utilization in coastal settings. This disconnect corroborates broader critiques of technocratic governance approaches that prioritize regulatory control and biophysical indicators while underestimating the social and institutional dimensions of natural resource management. Without meaningful integration of local actors into policy networks, governance interventions risk generating symbolic compliance rather than substantive sustainability outcomes, ultimately constraining the adaptive capacity and long-term resilience of coastal peatland systems (Flood, Wilson, & Renou-Wilson, 2025).

Actor Power Mapping and Power Relations

Actor power mapping analysis reveals that power relations play a central role in shaping the direction of coastal peatland governance. State and private sector actors possess significant influence through control over regulations, permits, and access to economic resources. Conversely, local communities and vulnerable groups in coastal areas have a relatively weak bargaining position, even though they are most impacted by peat degradation and land management policies (Yeny., et.al., 2022).

This power asymmetry reinforces governance fragmentation because strategic decisions tend to reflect the interests of dominant actors. In the context of the governance framework, this situation demonstrates that the failure of policy integration is not merely a matter of administrative coordination but also a reflection of the unequal distribution of power within the policy network. Therefore, governance integration requires mechanisms that are not only technical but also political and deliberative.

The concentration of power among state and private sector actors is also reflected in the process of setting policy agendas and determining priorities for coastal peatland management (Zulkarnaini., et.al., 2024) Actors with access to political and economic resources tend to have greater ability to influence policy narratives, including in defining problems, solutions, and indicators of governance success. In some cases, peatland management approaches emphasize administrative compliance and investment stability over ecosystem protection and strengthening local community capacity. This finding aligns with critical governance literature, which highlights how power relations shape environmental policy bias.

This analysis demonstrates that efforts to integrate governance without redistributing power risk pro-ducing what can be described as formal integration but sub-stantive fragmentation. Cross-sectoral and cross-level coordi-nation mechanisms that are not accompanied by expanded participation and strengthened local actors tend to be symbolic and ineffective at the grassroots level. A sustainable coastal peatland governance framework needs to incorporate the dimension of transforming power relations, through the institutionalization of deliberative forums, transparency in decision-making, and recognition of local community know-ledge and rights as an integral part of the governance process.

Sub-Case Comparison of Coastal Districts

A comparative sub-case approach across several coastal districts in Riau reveals varying governance patterns influenced by a combination of institutional, economic, and socio-ecological factors. Districts with collaborative initiatives involving local governments, communities, and non-state actors demonstrate relatively better policy compliance and peatland management effectiveness. Conversely, districts that rely on sectoral and administrative approaches tend to experience higher levels of land use conflicts and ecosystem degradation.

This comparison confirms that governance integration is not universal but rather contextual. Local institutional capacity, policy leadership, and the existence of cross-sectoral coordination forums are key factors in determining the success of coastal peatland management (Iacobuţă, 2021). These findings enrich the discourse on multi-level governance by demonstrating the importance of local dynamics in shaping environmental policy outcomes.

The comparative sub-case approach across selected coastal districts in Riau reveals distinct variations in governance performance shaped by interacting institutional, economic, and social–ecological factors. Districts that have adopted collaborative governance arrangements—bringing together local government authorities, community groups, and non-state actors—demonstrate relatively higher levels of policy compliance and more effective peatland management outcomes. These settings tend to exhibit clearer role differentiation, more stable coordination mechanisms, and greater alignment between formal regulations and local land-use practices. Districts relying predominantly on sectoral, command-and-control, and administratively driven approaches are more prone to land-use conflicts, fragmented implementation, and accelerated ecosystem degradation, particularly in peat-dominated coastal landscapes where hydrological interdependencies are high.

This comparison underscores that integrated governance is not a universal or uniform model but a context-dependent process contingent upon local institutional capacity and political dynamics (Shi, 2025). Policy leadership at the district level, the presence of cross-sectoral coordination forums, and the ability to mediate competing economic and environmental interests emerge as decisive factors shaping governance effectiveness. These findings contribute to the broader multi-level governance literature by demonstrating how subnational

institutional configurations condition environmental policy outcomes, even within a shared national regulatory framework. By foregrounding local governance dynamics, the study highlights the need to move beyond standardized policy prescriptions toward more adaptive and territorially embedded approaches to coastal peatland management (Wellens, 2024).

Theoretical and Policy Implications

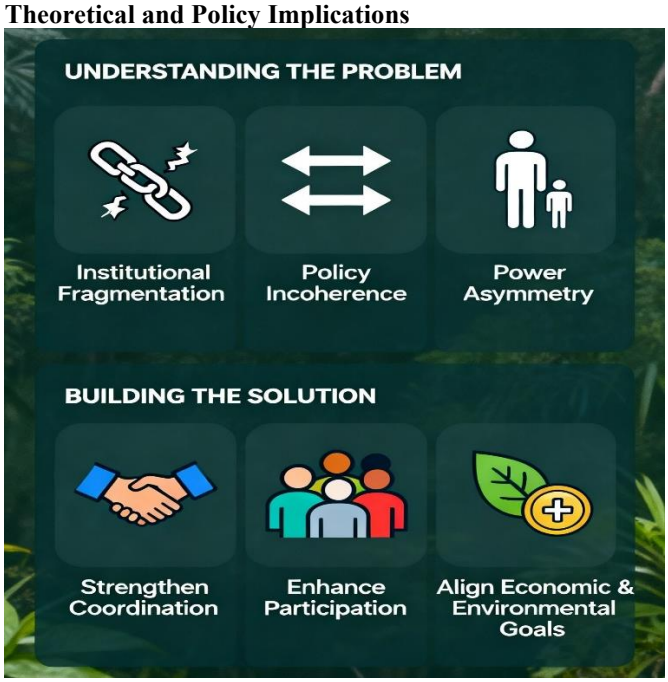

Figure 2. Integrated Governance for Coastal Peatland

Based on figure 2, the findings of this study strengthen the argument that coastal peatland management is a complex and multi-layered governance issue. Institutional fragmentation, policy incoherence, and power asymmetries interact to shape peatland management practices. By integrating multi-level governance, institutional interplay, and policy coherence, this article offers a more comprehensive understanding of the mechanisms of failure and opportunities for integrated governance.

From a policy perspective, the research findings emphasize the need for a shift from a sectoral approach to more integrative and collaborative coastal peatland governance. Strengthening cross-sectoral coordination, mechanisms for local actor participation, and alignment of economic and environmental goals are key prerequisites for sustainable peatland management in Riau. Thus, the case of coastal Riau is not only empirically relevant but also provides conceptual lessons for peatland ecosystem management in coastal areas of other developing countries.

CONCLUSION

This study demonstrates that coastal peatland governance in Riau Province remains deeply constrained by structural fragmentation, asymmetric policy networks, and uneven multi-level coordination. Despite the presence of a comprehensive national regulatory framework for peatland protection, implementation at the coastal and district levels is shaped by overlapping institutional mandates, competing development priorities, and unequal distributions of power among actors. The findings confirm that peatland governance cannot be understood as a linear process of policy transmission from the central government to local authorities, but rather as a complex arena of negotiation where political–economic interests, institutional capacity, and ecological vulnerability intersect.

By integrating multi-level governance analysis, policy network analysis, and comparative sub-case assessment, this article advances the understanding of how governance outcomes are produced through relational and contextual dynamics. The dominance of state agencies and private sector actors within policy networks marginalizes local communities and civil society, undermining policy legitimacy and adaptive capacity at the site level. At the same time, the comparative analysis across coastal districts reveals that governance performance is not predetermined by regulatory design alone. Districts that foster collaborative arrangements, cross-sectoral coordination, and locally grounded leadership demonstrate more coherent implementation and relatively better peatland management outcomes, even under similar regulatory constraints.

REFERENCES

Anda, M., Ritung, S., Suryani, E., Hikmat, M., Yatno, E., Mulyani, A., & Subandiono, R. E. (2021). Revisiting tropical peatlands in Indonesia: Semi-detailed mapping, extent and depth distribution assessment. *Geoderma*, *402*, 115235.

Cashore, B., Mukherjee, I., Virani, A., & Wijedasa, L. S. (2024). Policy design for biodiversity: How problem conception drift undermines "fit-for-purpose" Peatland conservation. *Policy and Society*, *43*(3), 351-380.

Chen, X., Yang, W., & Liu, Y. (2024). Recent developments in China's coastal zone management legislation: an appraisal. *Coastal Management*, *52*(6), 315-339.

Choy, Y. K., & Onuma, A. (2025). The tropical peatlands in Indonesia and global environmental change: A multi-dimensional system-based analysis and policy implications. *Regional Science and Environmental Economics*, *2*(3), 17.

Fatimah, Y. A., Prasojo, Z. H., Smith, S. W., Rahman, N. E. B., Wardle, D. A., Chong, K. Y., ... & Lee, J. S. (2023). Multi-level actor-network: Case of Peatland programs in a Riau Village, Indonesia (1974–2020). *Geoforum*, *145*, 103829.

Firdasari, M. F. (2022). *Multi-level governance in practice: investigating mangrove forest governance in Indonesia* (Doctoral dissertation, University of Birmingham).

Flood, K., Wilson, D., & Renou-Wilson, F. (2025). Evidence Synthesis and Knowledge Integration for Sustainable Peatland Management. *Land*, *14*(7), 1397.

Gearey, R., Reed, M. S., Kopansky, D., Harris, L. I., Kumar, R., Lång, K., ... & Scheel, P. (2025). Policy options in peatland conservation and restoration: A review of the UNEP Global Peatlands Assessment and future strategy for global governance.

Hansen, C. J., Steffansen, R. N., & Howells, M. (2025). Between fragmentation and integration: the transformation of Danish coastal and maritime governance and planning. In *Planning for Urban Sustainability* (pp. 111-126). Edward Elgar Publishing.

Iacobuţă, G. I. (2021). *Enablers of ambitious climate action: Challenges and opportunities to combine climate change and sustainable development* (Doctoral dissertation, Wageningen University and Research).

Meyer-Jürshof, M., Theilen, G. S., & Lakner, S. (2025). Digging into Complexity: The Wicked Problem of Peatland Protection. *Advanced Sustainable Systems*, *9*(1), 2400380.

Mulder, F. (2023). The paradox of externally driven localisation: a case study on how local actors manage the contradictory legitimacy requirements of top-down bottom-up aid. *Journal of International Humanitarian Action*, *8*(1), 7.

Muñiz-Martínez, N. (2025). Extending actor engagement: Human–environmental engagement in multilevel socioecological systems. *Journal of Service Theory and Practice*, *35*(2), 220-244.

Okamoto, M., Osawa, T., Prasetyawan, W., & Binawan, A. (2023). *Local Governance of Peatland Restoration in Riau, Indonesia: A Transdisciplinary Analysis* (p. 335). Springer Nature.

Rahman, H. T., Saint Ville, A. S., Song, A. M., Po, J. Y., Berthet, E., Brammer, J. R., ... & Hickey, G. M. (2017). A framework for analyzing institutional gaps in natural resource governance. *International Journal of the Commons*, *11*(2).

Rus, M. I., Munteanu, I., Vaidianu, N., & Aivaz, K. A. (2025). Research Trends Concerning the Danube Delta: A Specific Social-Ecological System Facing Climate Uncertainty. *Earth*, *6*(1), 7.

Shi, C. (2025). Institutional Diversity and Comparative Analysis: State, Market, and Self-Organized. In *Institutional Diversity in Transferring Land Development Rights in China: Government, Market, and Self-organization* (pp. 103-137). Singapore: Springer Nature Singapore.

Syahza, A., Suswondo, Bakce, D., Nasrul, B., Wawan, & Irianti, M. (2020, October). Peatland policy and management strategy to support sustainable development in Indonesia. In *Journal of Physics: Conference Series* (Vol. 1655, No. 1, p. 012151). IOP Publishing.

Valujeva, K., Freed, E. K., Nipers, A., Jauhiainen, J., & Schulte, R. P. (2023). Pathways for governance opportunities: Social network analysis to create targeted and effective policies for agricultural and environmental development. *Journal of Environmental Management*, *325*, 116563.

Van den Ende, M. A., Hegger, D. L., Mees, H. L., & Driessen, P. P. (2023). Wicked problems and creeping crises: A framework for analyzing governance challenges to addressing environmental land-use problems. *Environmental Science & Policy*, *141*, 168-177.

van Noort, C., van Leeuwen, J., Toonen, H., van Tatenhove, J., Haapasaari, P., Flannery, W., ... & Varjopuro, R. (2025). A Multi-Layered Collaborative Marine Governance Model: Evaluating Change and Innovation of Marine Governance Arrangements. *Environmental Policy and Governance*.

Wellens, J. (2024). *For Peat's Sake: The Power of Imagination in Expanding the Solution Space for Sustainable Peatland Governance* (Doctoral dissertation, Utrecht University).

Windey, C. (2020). Abstracting Congolese forests: mappings, representational narratives, and the production of the plantation space under REDD+. *Discussion paper/University of Antwerp. Institute of Development Policy and Management; Université d'Anvers. Institut de politique et de gestion du développement.-Antwerp, 2002, currens*.

Yeny, I., Garsetiasih, R., Suharti, S., Gunawan, H., Sawitri, R., Karlina, E., ... & Takandjandji, M. (2022). Examining the socio-economic and natural resource risks of food estate development on peatlands: A strategy for economic recovery and natural resource sustainability. *Sustainability*, *14*(7), 3961.

Zulkarnaini, Z., Rusli, Z., Nasution, M. S., Rinto, R., Mayarni, M., & Mashur, D. (2024). Policy Design For Peatland Management Based On Public-Private Partnership. *Sosiohumaniora*, *26*(1), 97-105.