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POLICY ANALYSIS OF RIVER BOUNDARY MANAGEMENT AS PART OF SUSTAINABLE DEVELOPMENT GOVERNANCE IN INDONESIA

Rian Sanjaya[1], Aal Lukmanul Hakim[2], R. Yuniar Anisa Ilyanawati[3]
e.2210728@unida.ac.id[1], aal.lukmanul.hakim@unida.ac.id[2], yuniar.anisa.fh@unida.ac.id[3]
Universitas Djuanda

ABSTRACT

Riverbank management is a strategic component in safeguarding water resource sustainability, reducing disaster risks, and ensuring the achievement of sustainable development goals in Indonesia. However, field practices reveal ongoing policy disharmony, overlapping institutional authorities, and weak law enforcement, all of which contribute to widespread land-use activities within riverbank zones that do not comply with regulatory provisions. This research aims to analyze the policy framework governing riverbank management in relation to sustainable development governance, particularly in the context of achieving SDG 6 (Clean Water and Sanitation) and SDG 11 (Sustainable Cities and Communities). The methodology employs a normative juridical approach through the examination of legislation, policy documents, and academic literature, combined with an empirical approach through case studies in several regions experiencing significant spatial pressure along riverbanks. The findings indicate that the suboptimal implementation of policies is driven by regulatory disharmony across land, environmental, and water resource sectors; weak interagency coordination; and the absence of adequate monitoring mechanisms grounded in sustainable governance principles. The implications highlight the need for policy reformulation that prioritizes river ecosystem protection within the broader framework of sustainable development. The limitations of this research lie in its reliance on localized case data that do not represent all river regions in Indonesia. The novelty of this research lies in its integration of riverbank policy analysis with sustainable development governance frameworksan approach rarely adopted in previous studies. This research contributes original value by providing a critical mapping of the relationship between riverbank management policies and the SDGs agenda as a basis for improving the national legal framework.

Keywords: *Sustainable Governance, Policy Harmonization, Normative Analysis, Environmental Regulation, SDGs Framework.*

INTRODUCTION

The management of riverbank buffer zones is a crucial aspect of natural resource governance in Indonesia, particularly amid increasing pressure on urban space, rapid land-use changes, and the growing intensity of hydrometeorological disasters.[1] Riverbank buffer zones play an essential ecological role as flow-regulating areas, water infiltration zones, and protective spaces for water quality and ecosystem stability.[2] However, realities in many regions show that these functions are increasingly threatened by residential development, economic activities, and environmental degradation along river corridor.[3] These conditions illustrate a persistent tension between development demands and ecological protection

[1] Chairul Umam, "Pemetaan Luas Bangunan Di Sempadan Kanal Mangetan Menggunakan Citra Sentinel-2A Dan Sitem Informasi Geogras," *Environmental Pollution Journal* 5 (2025): 239–49.

[2] Dina Hayati Putri and et al , Novita Arumsari, "Studi Kualitas Hutan Riparian Di Sungai Berambai, Samarinda: Pendekatan Indeks QBR Dan Naturalness," *Jurnal Ilmu Lingkungan Universitas Mulawarman* 1, no. 1 (2025): 1–9.

[3] Catur Bejo Santoso et al., "Engineering Mitigation of Flood Inundation and Riverbank Instability under Climate Variability in the Bomo Watershed , Indonesia" 2 (2025): 216.

obligations, signaling the need for more effective, measurable, and sustainability-oriented policies for riverbank management.

Although Indonesia possesses a relatively comprehensive regulatory framework including the Water Resources Law, Spatial Planning Law, and various regulations governing the environment and natural resources, the implementation of riverbank management policies continues to face multiple obstacles. In the field, many permanent buildings are found in areas that should serve as green open spaces, government oversight remains weak, and regulatory overlaps occur among institutions. These phenomena reveal a clear policy gap between legal norms and implementation practices, indicating the need for a comprehensive policy analysis of the current system for riverbank management.[4] This study employs a case study of the Cibalok River, where increasing spatial pressure along the riverbank has resulted from residential development and economic activities. Based on the identification of these regulatory and implementation gaps, this study formulates two central problems:

(1) how effective the current policy and regulatory framework is in managing riverbank buffer zones, and what forms of disharmony or governance weaknesses hinder its implementation;

(2) how the principle of the state's right to control natural resources can be actualized as a foundation for strengthening policy integration, monitoring, and law enforcement in riverbank management in alignment with sustainable development goals.

From these research problems, the study establishes several guiding questions, namely: to what extent current riverbank management policies ensure ecological protection and the sustainability of water resources; what forms of regulatory disharmony, policy gaps, and institutional constraints affect policy implementation; and how the principle of the state's right to control natural resources can be utilized to strengthen governance of riverbank management within a sustainable development framework. Accordingly, the specific objectives of this research are:

(1) to analyze the effectiveness of the legal and policy framework governing riverbank buffer zones;

(2) to assess the role of the state's right to control natural resources in enhancing policy integration, monitoring effectiveness, and law enforcement, while formulating policy recommendations aligned with sustainable development agendas.

This study advances the thesis that riverbank management cannot rely solely on substantive regulations but must be supported by integrative and cross-sectoral governance, including regulatory harmonization and the strengthening of the state's role as the holder of the mandate to control natural resources. Sustainable riverbank management can only be achieved when the legal framework operates in harmony with the principles of sustainable development governance, such as accountability, institutional coordination, public participation, and legal certainty.[5]

The specific focus of this research is directed toward evaluating the policy framework, particularly how regulations, authority, and institutional arrangements interact in the implementation of riverbank management. This study does not discuss technical aspects such as hydrology, river engineering, or detailed geospatial analysis. Another focus is examining how the principle of the state's right to control natural resources functions as a

[4] Setiadi Setiadi et al., "The Flood Management Policy in Bandung City : Challenges and Potential Strategies The Flood Management Policy in Bandung City : Challenges and Potential Strategies," *Cogent Social Sciences* 9, no. 2 (2023), https://doi.org/10.1080/23311886.2023.2282434.

[5] Nurul Huda, "Community Program for Managing Wetland Environment : Case Study of Banjarmasin Riverbank," *Jurnal Civics : Media Kajian Kewarganegaraan* 22 (2025): 346–53.

normative foundation in regulating water resources and protecting riverbank buffer zones.[6]

The scope of this research includes normative and policy analysis related to riverbank management at both the national and relevant regional levels. The study is limited to reviewing regulatory documents, literature studies, and conceptual policy analysis, without conducting physical field measurements or quantitative surveys. Furthermore, the research is focused on riverbank buffer zones as an integral component of sustainable development governance, rather than the broader management of entire watershed areas.[7]

In terms of novelty, this study offers an integrative approach combining policy analysis, natural resource law, and sustainable development governance. Another contribution lies in emphasizing the actualization of the state's right to control natural resources as an analytical perspective to strengthen riverbank management a perspective rarely employed in previous studies. The study also provides policy recommendations oriented toward regulatory harmonization and institutional capacity building in the context of achieving the Sustainable Development Goals (SDGs).[8]

Systematically, this article is organized into several sections. The first outlines the conceptual background on riverbank buffer zones, the state's right to control natural resources, and sustainable development governance. The second elaborates on the national regulatory and policy framework related to riverbank management. The third presents an analysis of regulatory disharmony, institutional weaknesses, and policy implementation barriers. The fourth proposes policy recommendations based on sustainable development principles to strengthen the governance of riverbank management. The final section contains the conclusion, emphasizing the contributions and implications of the research.

METHODS

The empirical component of this study was conducted in the riverbank buffer zone of the Cibalok River, which was selected as a case study due to significant spatial pressure from residential development and economic activities along its banks. The study employs a qualitative socio-legal approach that combines normative analysis of water, spatial planning, and environmental laws with empirical examination of monitoring practices, land-use activities, and institutional interactions. This integrated design enables the identification of gaps between formal legal norms and their actual implementation in riverbank buffer zone governance.[9]

Primary data were collected through purposive interviews with key officials and community members, supported by field observations of riverbank conditions and land-use activities. Secondary data were obtained from legal documents, spatial planning records, institutional reports, and peer-reviewed literature.[10]

Data were coded and organized into key themes such as regulatory fragmentation, institutional coordination, and monitoring effectiveness, following the Miles, Huberman,

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[6] Latifah Amir, Arrie Budhiartie, and Eko Nuriyatman, "The Right to Manage Emergent Land on the Riverbank," *Fiat Justitia Jurnal Ilmu Hukum* 18, no. 1 (2024): 85–94, https://doi.org/10.25041/fiatjustisia.v18no1.3356.

[7] Arum Sekar Kedhaton and Andika Krismondo, "Monitoring Penataan Permukiman Tepian Sungai Mahakam Di Kota Samarinda: Studi Kasus Daerah Sempadan Sungai Kecamatan Loa Janan Ilir, Palaran Dan Samarinda Seberang," *Jurnal Riset Inossa : Media Hasil Riset Pemerintahan, Ekonomi Dan Sumber Daya Alam* 5, no. 02 (2024): 39–51, https://doi.org/10.54902/jri.v5i02.141.

[8] Chay Asdak et al., "A NATIONAL POLICY ON INDONESIA ' S INTEGRATED," *Indonesian Journal of Forestry Research* 10, no. 2 (2023): 151–62, https://doi.org/10.59465/ijfr.2023.10.2.151-162.

[9] Sidi Ahyar Wiraguna, "Metode Normatif Dan Empiris Dalam Penelitian Hukum : Studi Eksploratif Di Indonesia," *Jurnal Sosial Politik, Pemerintahan Dan Hukum* 3, no. 3 (2024), https://doi.org/10.59818/jps.v3i3.1390.

[10] Aristo Pangaribuan, "Metode Wawancara Dalam Penelitian Hukum Doktrinal Dan Sosio-Legal," *Undang: Jurnal Hukum* 6, no. 2 (2023): 351–83, https://doi.org/10.22437/ujh.6.2.351-383.

and Saldaña framework.[11] Normative data were analyzed through legal interpretation and regulatory synchronization, while empirical data were examined using thematic analysis. The integration of both provides a comprehensive basis for assessing the coherence, effectiveness, and institutional performance in riverbank buffer zone governance.

RESULTS AND DISCUSSION

The findings indicate that land use within riverbank buffer zones remains largely non-compliant with existing regulations. Field observations reveal the presence of permanent structures, informal economic activities, and uncontrolled land use along riverbanks.[12] These conditions have reduced the ecological functions of riverbank areas, including water infiltration capacity, natural flood flow space, and the sustainability of riparian vegetation.

Table 1. Violations of River Boundary Utilization (2019–2024)

Year	Number of Violation Findings
2019	52 case
2020	57 case
2021	61 case
2022	74 case
2023	89 case
2024	103 case

(Source, Field data and institutional documents, processed by the author (2025))[13]

The data show a consistent increase in the number of violations of riverbank land use over the past five years. Monitoring reports from BBWS also record a similar upward trend in spatial utilization violations within riverbank areas during the same period.[14] Regulatory document analysis indicates the existence of inconsistencies among water resource regulations, land administration policies, and spatial planning instruments. These inconsistencies result in ambiguity in determining riverbank boundaries and contribute to variations in monitoring and enforcement practices across institutions.[15]

Table 2. Institutional Issues in Riverbank Management

Institutional Aspects	Findings	Impact
PUPR-Regional Government Coordination	Don't have a shared SOP	The enforcement actions are not uniform
BBWS vs. Local Government	Differences in interpretation of boundary boundaries	Overlapping authority

[11] Muhammad Alfaruq Nirwana, "REGULATORY APPROACHES AND STRATEGIES FOR HOUSEHOLD WASTE POLLUTION MANAGEMENT IN THE EAST RIVER FLOOD CANAL OF SEMARANG CITY," *Walisongo Law Review (Walrev)* 5, no. 1 (2023), https://doi.org/10.21580/walrev/2023.5.1.14770.

[12] Rezky Khrisrachmansyah, Paul Brindley, and Nicola Dempsey, "Tracking Land-Use and Land-Cover Change Through Fragmentation Dynamics in the Ciliwung River Watershed , Indonesia : A Remote-Sensing and GIS Approach," *Land*, 2025, 1–29.

[13] Aldri Frinaldi Fajar Agung Mulia, Rembrandt, and Dasman Lanin, "INKONSISTENSI PEMANFAATAN RUANG PADA SEMPADAN SUNGAI KOTA PADANG," *E-Journal_Jurnal Rekayasa Teknik Sipil Dan Lingkungan* 5, no. 2 (2024): 50–58.

[14] Fatin Nur Izzati Jufry Nikmatul Adha Nordin, Yong Adilah Shamsul Harumain, Keiko Yoshida, "URBAN COMMUNITY FARMING: LESSONS FROM JAPAN'S CHOKUBAI MODEL FOR BUILDING SOCIAL ENTERPRISES," *Journal of the Malaysian Institute of Planners* 23, no. 2 (2025): 1–13.

[15] Mirnanda Cambodia Arlina Phelia, "Integrated Water Resources Management in the Seputih Sekampung River Basin, Indonesia: Challenges Strategies and Institutional Synergy," *Journal of Engineering Innovation and Management Science* 1, no. 1 (2025): 50–62.

Institutional Aspects	Findings	Impact
BPN	Land data is not synchronized with the RTRW	Building placement errors
Environmental Service	Minimal involvement in monitoring	Ecological functions are not prioritized
Public	Minimal socialization	High violations of spatial utilization

(Source, Interview data and institutional analysis, processed by the author (2025))[16]

Interviews with officials from PUPR/BBWS, the National Land Agency (BPN), local governments, and community representatives reveal weak cross-sectoral coordination in riverbank management. Informants reported the absence of a unified standard operating procedure (SOP) for riverbank monitoring and enforcement, resulting in ad hoc coordination and delayed control measures.[17] Communities were found to utilize riverbank areas primarily due to limited awareness of regulations, economic pressures, and unclear land tenure status.

Discussion

The discussion begins by examining the significance of the empirical findings, which reveal that land use within riverbank buffer zones remains far from compliant with existing normative provisions.[18] Field observations identify the presence of permanent structures, informal economic activities, and land use practices carried out without adequate supervision. Such forms of utilization not only violate legally established riverbank boundary regulations but also directly threaten the ecological functions that define these areas. Riverbank buffer zones, which are intended to serve as water infiltration areas, natural flood flow corridors, and ecological habitats for riparian vegetation, are experiencing increasing pressure due to uncontrolled spatial conversion.[19] These findings reflect a clear gap between legal norms and social realities, indicating that the mere existence of regulatory frameworks is insufficient to regulate land use in the absence of strong oversight, effective institutional coordination, and comprehensive regulatory socialization.

In the context of institutional implementation, interviews with officials from the Ministry of Public Works and Housing/River Basin Organizations (PUPR/BBWS), the National Land Agency (BPN), and local governments provide a clear depiction of weak cross-sectoral coordination as a major obstacle to effective riverbank buffer zone management.[20] Informants emphasized that, to date, there is no integrated and binding Standard Operating Procedure (SOP) governing the roles and responsibilities of all relevant institutions. In the absence of such an SOP, coordination mechanisms operate in an ad hoc

[16] Andi Setyo Pambudi, "Strategi Optimalisasi Pengelolaan DAS Terpadu Di Indonesia Melalui Kolaborasi Pembangunan Pusat Dan Daerah," *Jurnal Pembangunan Nagari* 8, no. 2 (2023): 170–85, https://doi.org/10.30559/jpn.v8i2.418.

[17] Andi Setyo PAMBUDI, "POLICY AND REGULATORY IMPLEMENTATION IN WATER RESOURCES CONSERVATION DEVELOPMENT IN INDONESIA: A CRITICAL ANALYSIS," *Protection: Journal Of Land And Environmental Law* 3 (2025): 103–30.

[18] Wildan Siregara and Maret Priyantac , Ida Nurlindab, "KEBIJAKAN PENEGAKAN HUKUM LINGKUNGAN ATAS PELANGGARAN ADMINISTRASI TATA RUANG DAN ALIH FUNGSI LAHAN SEMPADAN SUNGAI DALAM RANGKA TERWUJUDNYA TATA RUANG YANG BERKELANJUTAN," *JURNAL POROS HUKUM PADJADJARAN*, no. 42 (2021): 130–49.

[19] Anak Agung Sagung Alit W dan Moch. Shofwan Slamet Budiono, "PEMANFAATAN LAHAN SEMPADAN SUNGAI BERBASIS SIG (SISTEM INFORMASI GEOGRAFIS)," *Jurnal Teknik UNIPA* 15 (2017): 1.

[20] Evelyn Lukat et al., "Governance towards Coordination for Water Resources Management: The Effect of Governance Modes," *Environmental Science & Policy* 141 (2023): 50–60, https://doi.org/https://doi.org/10.1016/j.envsci.2022.12.016.

manner, lacking clear command structures and task delineation. When violations occur or enforcement actions are initiated, obstacles frequently arise due to differing interpretations of institutional authority.[21] BBWS, as a representative of the central government, asserts technical authority over riverbank areas, while local governments consider spatial planning authority to fall within their jurisdiction.[22] These tensions and overlapping mandates result in delayed responses in the field, ultimately rendering land-use control and enforcement efforts ineffective.

From a societal perspective, community-based findings offer a different yet complementary dimension to the institutional analysis.[23] Many residents and individuals engaged in activities within riverbank buffer zones reported that they have not received adequate information regarding buffer boundaries, land-use regulations, or applicable restrictions.[24] Limited regulatory socialization has resulted in insufficient public awareness to recognize that their activities constitute violations of protected areas. Moreover, pressing economic needs compel many community members to utilize riverbank areas as spaces for survival.[25] Similar conditions were observed among communities occupying land with unclear legal status, such as state land or newly emerged land that has not been formally registered. This legal uncertainty fosters a perception that compliance with regulations is not obligatory, while simultaneously limiting access to alternative spaces that offer greater legal security.

These findings are consistent with the existing literature, which characterizes riverbank buffer zone management as a multisectoral issue situated at the intersection of agrarian law, spatial planning, environmental protection, and water resource governance.[26] Numerous prior studies have identified regulatory disharmony namely, the lack of synchronization between sectoral legislation and its implementation as a key factor contributing to the ineffectiveness of water resource policies. This regulatory fragmentation is further exacerbated by weak institutional coordination, both vertically between central and local governments and horizontally among agencies operating at the same administrative level. Sustainable governance theory emphasizes that effective environmental management must be grounded in coordination, transparency, and institutional synergy. In this context, the findings of this study indicate that these principles have not yet been adequately implemented in the governance of riverbank buffer zones.[27]

The application of the State's Right to Control (right to control the country, HMN) in the management of riverbank buffer zones also constitutes a central focus of this study's discussion. As stipulated in Article 33 paragraph (3) of the 1945 Constitution of the Republic of Indonesia, HMN mandates that the state exercises control over natural

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[21] Annisa Triyanti et al., *Environmental Governance in Indonesia*, 2023.

[22] Noor Aida Saad Yusof, Zuriyati, "CHALLENGES TO EFFECTIVE INTEGRATED WATER RESOURCES MANAGEMENT: A REVIEW," *International Journal of Civil Engineering and Technology (IJCIET)* 11, no. 9 (2020): 54–61.

[23] Yuliarti Nurul Kusumawardani, Prabawa Eka Soesanta, and A. Hadian Pratama Hamzah, "Permukiman Tepi Sungai Ilegal: Dampak Kondisi Sosial-Ekonomi, Ketidakstabilan Ekonomi, Ketidakadilan Spasial Perkotaan Dan Kebijakan Pemerintah," *SENTRI: Jurnal Riset Ilmiah* 4, no. 9 (2025): 2068–80.

[24] Biro Komunikasi Publik Kementerian Pekerjaan Umum, "MASYARAKAT TERLIBAT DALAM PENGELOLAAN SEMPADAN SUNGAI," Kementrian Pekerjaan Umum, 2007, https://pu.go.id/berita/masyarakat-terlibat-dalam-pengelolaan-sempadan-sungai?utm_source=chatgpt.com.

[25] and Ibrahimu Chikira Mjemah Janeth Mwile Mwasenga, "Socio-Economic Feasibility for Implementation of Environmental Legislation along the Riparian Buffer Zones in Urban Rivers of Northern Tanzania," *Urban Science*, 2023.

[26] Muhammad Zacky Ardhyan Lely Masthura, Budi S Wignyosukarto, Nina Fahriana, "Keterpaduan Lintas Sektoral Dalam Pengembangan Kebijakan Integrated Water Resources Management (IWRM) Pada Wilayah Sungai Aceh Meureudu Provinsi Aceh," *Jurnal Daur Lingkungan* 6, no. 1 (2023): 40–47.

[27] Ella L. Wargadinata Zulhadi, Andi Pitono, "Collaborative Governance Dalam Pengelolaan Kawasan Citarum Harum Di Kabupaten Bandung," *Jurnal Pendidikan Dan Konseling* 5 (2023): 1244–55.

resources for the greatest benefit of the people.[28] In the context of riverbank management, this mandate should be operationalized through regulation, administration, management, supervision, and control of land use to safeguard the ecological functions of river systems.[29] However, this study finds that although HMN provides a strong normative foundation, its implementation in practice remains partial and insufficiently operational. The extensive authority vested in the state has not been accompanied by institutional strengthening, regulatory harmonization, or effective oversight mechanisms capable of ensuring that ecological protection objectives are fully realized.

The research question concerning the effectiveness of riverbank buffer zone management policies can be addressed by assessing the extent to which these policies generate tangible impacts on the protection of designated conservation areas. Based on the findings, it can be concluded that policy effectiveness remains low. Existing regulations have not succeeded in curbing the rate of land-use violations, despite the relatively clear provisions governing riverbank boundaries set out in Government Regulation No. 38/2011 and Minister of Public Works and Housing Regulation No. 28/2015.[30] Moreover, the absence of an integrated monitoring and evaluation mechanism has resulted in the lack of accurate spatial land-use data, rendering policy decision-making insufficiently responsive to on-the-ground dynamics. The implementation of the State's Right to Control (HMN) has likewise been suboptimal, as the state has been unable to effectively exercise its supervisory function due to limited institutional capacity and budgetary support.

From the perspective of spatial planning theory, this study demonstrates that riverbank buffer zones are often treated as residual spaces rather than as integral components of urban or regional ecological structures.[31] However, spatial planning literature emphasizes that riverbank areas constitute a critical part of ecological buffer systems. When these zones are converted into residential areas or centers of informal economic activity, the landscape's capacity to manage disaster risks such as flooding and erosion is significantly reduced. This study shows that weak control over land-use practices reflects not only institutional failure but also a fundamental misunderstanding of spatial planning principles that recognize riverbank buffer zones as strategic areas requiring protection. These findings reinforce critiques of spatial planning approaches that prioritize physical development while neglecting the principles of urban ecology.

This study also makes a significant contribution to the development of sustainable governance theory.[32] The empirical findings underscore that environmental sustainability is not determined solely by the quality of legislative formulation, but also by the extent to which responsible institutions possess the coordination capacity required to enforce regulatory provisions. When coordination mechanisms are weak, ecological sustainability is placed at risk. Effective coordination requires clear delineation of authority, mutually agreed standard operating procedures, and collaborative mechanisms that enable regular

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[28] Wincent Hungstan Angkasa Christine S T Kansi, "Analisis Hak Menguasai Negara Dalam Pengelolaan Sumber Daya Perikanan: Implikasi Terhadap Kesejahteraan Nelayan Dan Perlindungan Ekosistem Laut Di Indonesia," *Journal of Accounting Law Communication and Technology* 2, no. 1 (2025): 289–96.

[29] Syaiful Bahari, Muhammad Panca, and Prana Mustaqim, "REKONSTRUKSI PEMAKNAAN HAK MENGUASAI NEGARA MENURUT PASAL 33 AYAT (3) UUD 1945," *Journal Science and Theory of Law* 2, no. 1 (2025).

[30] Aditi Majumdar and Kirti Avishek, "Mitigating Riparian Buffer Zone Degradation through Policy Interventions and Learnings from Best Practices," *Discover Environment*, 2025.

[31] Ayuni Farah and Ivan Muzaki, "Pendekatan Tata Ruang Dalam Pengendalian Daerah Sempadan Sungai Sebagai Area Resapan Banjir Di Desa Beleka , Lombok Tengah," *Journal of Community Development and Empowerment* 1, no. 5 (2025): 125–30.

[32] Chong-Wen Chen, "Corrigendum to 'Incorporating Artistic Thinking into Sustainability' [J. Clean. Prod. 198 (2018) 1007–1012]," *Journal of Cleaner Production* 341 (2022): 130873, https://doi.org/https://doi.org/10.1016/j.jclepro.2022.130873.

and systematic information exchange among central government, local authorities, and communities.[33] Accordingly, this study broadens the understanding of sustainable governance by demonstrating that inter-institutional relationships constitute a key indicator of success in environmental management.

In addition to its theoretical contributions, this study has several limitations that should be acknowledged. First, the limited geographical scope of the research requires that the generalization of the findings be approached with caution, as riverbank conditions in other regions of Indonesia may exhibit different social, institutional, and ecological characteristics. Second, the relatively small number of informants and the uneven representation of stakeholder groups may mean that certain aspects of policy implementation were not fully captured. Third, this study did not incorporate quantitative data, such as spatial analysis or river hydromorphological measurements, which could have strengthened the empirical observations.[34] Furthermore, access to official institutional documents particularly internal records was restricted, limiting the extent to which regulatory analysis could encompass all procedural dimensions.

Nevertheless, this study makes a significant contribution to the socio-legal literature on riverbank buffer zone management and water resource governance.[35] The findings not only document patterns of land-use practices that contravene regulatory provisions, but also illuminate the social and institutional dynamics that underlie the weak ecological protection of riparian areas.[36] By integrating normative and empirical perspectives, this study demonstrates that effective riverbank management requires a cross-sectoral approach encompassing regulatory harmonization, strengthened institutional coordination, and community empowerment, ensuring that policy interventions are aligned with local socio-economic realities rather than imposed in contradiction to them.

CONCLUSION

This study concludes that the management of riverbank buffer zones in Indonesia has not yet achieved its intended objectives, despite the presence of a relatively comprehensive regulatory framework. The findings indicate that policy effectiveness remains low due to regulatory disharmony across water resources, land, spatial planning, and environmental sectors, compounded by overlapping institutional authority and weak coordination mechanisms. As a result, the ecological functions of riverbank areas continue to be degraded by non-compliant land use. Although the principle of the state's right to control natural resources provides a strong constitutional foundation for riverbank governance, its implementation remains largely normative and fragmented, limiting the state's ability to ensure effective protection and sustainable management of riparian ecosystems.

From a practical perspective, this research highlights the need for integrated governance reforms that prioritize regulatory harmonization, the establishment of unified inter-agency standard operating procedures, and the strengthening of monitoring and enforcement mechanisms. Policy implementation must also be supported by improved institutional capacity and enhanced public engagement to address socio-economic drivers of riverbank utilization. Future research is recommended to expand the empirical scope

[33] Jenny Fairbrass and Andrew Jordan, "Multi-Level Governance and Environmental Policy," *Multi-Level Governance*, 2004, 147–64.

[34] Richard Kwame et al., "Integrating the Perspectives of Youth , Women , and Marginalised Communities in Addressing Global Environmental Management Challenges," *Environmental Management*, 2025, 3261–82, https://doi.org/10.1007/s00267-025-02254-7.

[35] Minhaz Farid Ahmed et al., "Integrated River Basin Management for Sustainable Development: Time for Stronger Action," *Water* 15, no. 3 (2023): 2497.

[36] Lauri Ahopelto et al., "Water Governance for Water Security : Analysing Institutional Strengths and Challenges in Finland," *International Journal of Water Resources Development* 40, no. 2 (2024): 153–73, https://doi.org/10.1080/07900627.2023.2266733.

across diverse river systems and to incorporate quantitative spatial and environmental analyses, enabling a more comprehensive evaluation of riverbank governance effectiveness within the broader framework of sustainable development.

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