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# Fiscal Capacity Development for Enhancing Regional Autonomy in Indonesia's Wetland Areas: A Strategic Model for Posthumanist Public Policy

B. Isyandi<sup>1</sup>, Hendro Ekwarso<sup>2</sup>, Wahyu Hamidi<sup>3</sup>

## Abstract

*This study aims to identify a strategic model of fiscal capacity to enhance regional autonomy and economic resilience in wetland areas of Riau Province, Indonesia. Utilizing a mixed-method approach, the research explores how regional own-source revenues, intergovernmental transfers, and capital expenditure allocation impact local fiscal independence. The findings show that fiscal capacity is significantly constrained by central government dependency, underutilized local revenue instruments, and low capital investment. Only three out of twelve districts achieved substantial own-source revenue above IDR 300 billion, while others remain highly dependent on central transfers. The paper proposes a responsive fiscal model integrating both demand-side (increased consumption, investment, and exports) and supply-side (technological development and resource availability) strategies. The model holds potential for transforming wetlands into sustainable, autonomous economic zones aligned with posthumanist development principles.*

**Keywords:** Fiscal Capacity, Regional Autonomy, Wetlands, Capital Expenditure, Posthumanism, Local Governance.

## Introduction

The quest for regional autonomy has become a defining element in Indonesia's post-reform era, aiming to devolve governance and financial power to local governments. However, despite the formal delegation of authority, many regions continue to exhibit high levels of fiscal dependency, particularly those with ecological vulnerabilities and economic underdevelopment. Wetland areas in Indonesia, such as those found in Riau Province, represent a compelling case where fiscal autonomy remains aspirational due to structural limitations in revenue generation and investment capacity.

Recent years have revealed a paradox in fiscal decentralization: while local governments are expected to independently drive development, their budgets remain dominated by central government transfers. In wetland regions, this dependency is exacerbated by the limited exploitation of local revenue instruments and minimal capital investment. According to Isyandi et al. (2023), over 70% of local government expenditures in wetlands are sourced from intergovernmental transfers, with capital expenditure making up less than 20% of total spending a structure that hinders sustainable development and regional competitiveness.

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<sup>1</sup> Professor in Regional Science, Faculty of Economics and Business, Universitas Riau, Indonesia. Email: [b.isyandi2020@gmail.com](mailto:b.isyandi2020@gmail.com), (Corresponding Author).

<sup>2</sup> Associate Professor, Faculty of Economics and Business, Universitas Riau, Indonesia. Email: [hendro.ekwarso@lecturer.unri.ac.id](mailto:hendro.ekwarso@lecturer.unri.ac.id)

<sup>3</sup> Associate Professor, Faculty of Economics and Business, Universitas Riau, Indonesia. Email: [wahyu.hamidi@lecturer.unri.ac.id](mailto:wahyu.hamidi@lecturer.unri.ac.id)



Moreover, wetlands represent a unique ecological and economic frontier. These areas are vital for biodiversity, flood control, and carbon sequestration, yet they are often marginalized in economic planning. The Millennium Ecosystem Assessment (MEA, 2005) classified wetlands as among the world's most threatened ecosystems. In the Indonesian context, rapid land conversion, extractive industries, and fiscal centralism have placed wetlands at a precarious intersection of environmental degradation and fiscal inefficiency (Ramsar Secretariat, 2021).

Fiscal capacity the ability of a local government to finance its expenditures from own-source revenues is a central pillar of functional autonomy (Bird & Vaillancourt, 2020). Yet, recent evaluations suggest that most Indonesian districts fall short in generating sufficient revenue independently, particularly in ecologically constrained areas (OECD, 2022). The wetland districts of Riau exemplify this challenge, where despite economic potential in sectors like agroforestry and ecotourism, local governments remain reliant on central transfers and reluctant to innovate their revenue bases.

This misalignment has consequences beyond mere budgetary constraints. It signals a deeper governance issue where local governments lack the fiscal incentives or administrative capacity to develop region-specific policies. As argued by Wijayanti and Adisasmita (2021), the absence of fiscal innovation in rural and ecologically sensitive areas leads to a cycle of underinvestment, low growth, and policy stagnation. Without fiscal empowerment, regional governments are limited in shaping inclusive development, perpetuating inequality and ecological risks.

Importantly, the COVID-19 pandemic exacerbated these vulnerabilities. Fiscal shocks affected both national and local revenues, prompting a reevaluation of expenditure priorities. In Riau's wetland regions, public spending shifted toward short-term welfare and away from infrastructure or ecological investment (Bappenas, 2022). This reactive budgeting approach revealed the fragility of current fiscal structures and the urgent need for resilient, autonomous fiscal models tailored to regional needs.

Emerging frameworks in fiscal federalism and sustainable governance now advocate for posthumanist approaches to public finance. Posthumanism, which emphasizes ecological interdependence and the de-centering of anthropocentrism, encourages policy models that align human development with ecosystem preservation (Braidotti, 2022; Ferrando, 2020). Within this paradigm, fiscal models should not only pursue economic efficiency but also ensure ecological resilience and social inclusivity—particularly relevant for wetland economies under existential threat.

Hence, there is a growing academic and policy interest in integrating ecological considerations into fiscal planning, especially for territories with unique environmental assets. Fiscal policies must transition from being purely transactional to being transformational—embracing principles of environmental justice, participatory governance, and long-term resilience. Recent studies, such as by Tan et al. (2023), advocate for fiscal ecological contracts, where local governments receive incentives based on environmental stewardship and sustainable infrastructure development.

This study aims to contribute to this evolving discourse by developing a strategic fiscal capacity model for wetland regions, using the case of Riau Province. The model integrates traditional fiscal metrics (PAD, DAU, capital expenditure) with sustainable governance indicators, offering a holistic framework that is responsive to both economic and ecological imperatives. Ultimately, the paper seeks to reframe fiscal decentralization not just as a financial mechanism, but as a

transformative tool for regional empowerment in the age of planetary crisis.

## **Literature Review**

### **Fiscal Capacity and Decentralization**

Fiscal capacity is the bedrock of decentralized governance, reflecting a region's ability to generate sufficient own-source revenue to fund local development priorities. According to Bird and Smart (2020), effective fiscal decentralization hinges not only on the assignment of revenue instruments but also on the empowerment of sub-national governments to utilize them innovatively. However, in Indonesia's wetlands, this empowerment remains weak due to structural imbalances in fiscal policy.

In developing countries, fiscal decentralization is often accompanied by mismatches between expenditure responsibilities and revenue generation powers (World Bank, 2022). Riau's wetland districts illustrate this issue, where heavy reliance on general allocation funds (DAU) has undermined fiscal autonomy. Oates (1999) warned of the risks of decentralization without adequate fiscal tools—a prediction that continues to manifest across ecologically fragile regions.

Moreover, the nature of fiscal decentralization has evolved, with scholars emphasizing performance-based transfers and ecological fiscal reforms. Recent evidence from China's green fiscal reforms suggests that incentivizing environmental outcomes can improve both fiscal and ecological metrics (Zhang et al., 2021). This supports the notion that fiscal capacity development must now transcend traditional economic paradigms.

The theoretical underpinning of fiscal capacity also includes concepts of tax effort and fiscal effort indexes. According to Martinez-Vazquez and McNab (2021), measuring fiscal capacity should account for a region's potential and actual revenue mobilization. In Riau's wetlands, the gap between potential and actual PAD reveals inefficiencies that stem not only from limited economic activities but also from weak institutional coordination.

Thus, the literature calls for an integrated approach to fiscal decentralization—one that empowers local governments to innovate, diversify revenue sources, and align fiscal strategies with ecological imperatives. This forms the theoretical justification for this study's proposed fiscal capacity model tailored for wetland contexts.

### **Wetland Economies and Development Constraints**

Wetlands are complex socio-ecological systems that offer critical ecosystem services yet remain underutilized in economic development frameworks. As highlighted by the Ramsar Convention Secretariat (2021), wetlands play vital roles in water purification, biodiversity conservation, and climate resilience. However, their economic contributions are often invisible in regional fiscal structures.

In Indonesia, wetlands face dual pressures of ecological degradation and fiscal neglect. Massive land conversions for plantations, coupled with extractive industries, have altered the ecological balance in regions like Riau (Aldrian et al., 2022). This unsustainable trajectory is further compounded by public investment patterns that prioritize short-term returns over long-term ecological security.

Development planning in wetland areas is also hindered by weak spatial governance. According to Siregar and Bakri (2023), overlapping land-use policies and fragmented institutional mandates have limited the integration of wetlands into regional development blueprints. Consequently,

potential sectors like eco-tourism, agroforestry, and low-impact aquaculture remain untapped.

From a fiscal standpoint, the invisibility of wetland services translates to missed opportunities in local revenue generation. Valuation studies show that incorporating natural capital accounting into fiscal frameworks can enhance both budget transparency and resource mobilization (Dasgupta, 2021). Yet, such practices are rarely institutionalized in Indonesia's regional fiscal planning.

Therefore, addressing wetland development constraints requires a paradigm shift—one that elevates the ecological and economic role of wetlands within fiscal policy. This study aims to bridge that gap by aligning fiscal capacity modeling with the sustainable management of wetland economies.

### **Capital Expenditure as a Driver of Fiscal Strength**

Capital expenditure is widely recognized as a catalyst for local economic growth and fiscal resilience. It involves investments in physical and social infrastructure that can stimulate private sector participation, enhance service delivery, and expand the local tax base (Erlina, 2012). In Indonesia's decentralization era, however, capital expenditure has been constrained by rigid budgeting and prioritization of operational costs.

In Riau's wetlands, the capital expenditure ratio remains alarmingly low. A study by Isyandi et al. (2023) found that local governments allocated less than 20% of their budgets to capital investment, limiting the region's capacity to create sustainable development multipliers. The dominance of personnel spending over productive investment has long-term implications for fiscal health.

Moreover, capital spending in wetlands must be context-sensitive. Infrastructure investments should prioritize resilience, ecological preservation, and local empowerment. For instance, green infrastructure such as mangrove restoration or decentralized renewable energy systems can yield both fiscal and environmental returns (Tan et al., 2023).

Globally, capital expenditure is increasingly linked with SDG-aligned public finance. The IMF (2021) recommends that developing countries adopt fiscal frameworks that incentivize investment in inclusive infrastructure. Indonesia has taken steps through its green budgeting initiative, but implementation at the regional level remains inconsistent.

Therefore, this study situates capital expenditure as a pivotal variable in fiscal capacity modeling. By evaluating the alignment between capital investment and revenue generation in wetlands, the paper contributes to a nuanced understanding of fiscal sustainability in ecologically sensitive regions.

### **Posthumanism and Public Policy**

Posthumanism introduces a transformative lens to public policy, challenging anthropocentric models of governance and advocating for ecological justice and multispecies inclusion (Braidotti, 2022). In the context of regional development, this means acknowledging the agency of ecosystems and aligning fiscal instruments with environmental integrity.

In fiscal studies, the posthumanist turn is nascent but gaining traction. Scholars like Ferrando (2020) argue that public finance must evolve to accommodate the rights of nature and the responsibilities of governments toward future generations. This perspective is particularly relevant for wetlands, which embody the intersection of environmental fragility and economic

potential.

Policy experiments in Latin America, such as Ecuador's recognition of nature's rights, show the feasibility of integrating ecological values into budgeting and planning. These models serve as inspiration for fiscal ecological contracts or green fiscal transfers that reward conservation outcomes (UNDP, 2022).

From a governance standpoint, posthumanism emphasizes participatory and adaptive frameworks. Involving local communities, indigenous groups, and ecological stakeholders in budget decisions can enhance legitimacy and sustainability. Such inclusive approaches are essential for wetland regions where human and non-human actors coexist intimately.

This study adopts a posthumanist framework to reimagine fiscal capacity as not merely a technical metric but a relational construct. By embedding ecological ethics into fiscal modeling, it aims to propose a paradigm that supports both regional autonomy and planetary health.

## **Methodology**

This study employed a mixed-methods approach that integrates both quantitative and qualitative strategies to capture the multidimensional nature of fiscal capacity in wetland regions. The rationale behind using a mixed-method design lies in the need to reconcile empirical financial data with context-rich stakeholder perspectives. Quantitative methods enabled the assessment of fiscal performance indicators, while qualitative methods were essential for understanding the governance dynamics and institutional challenges that underlie fiscal outcomes.

Quantitative data were primarily sourced from Indonesia's official regional budget reports (APBD), Statistics Indonesia (BPS), and transfer data from the Ministry of Finance. The dataset spans the period 2019 to 2021 and includes all 12 regencies and cities in Riau Province. The core variables analyzed include own-source revenue (PAD), general allocation funds (DAU), special allocation funds (DAK), capital expenditure ratios, fiscal dependency indexes, and per capita investment levels. These indicators were selected for their relevance to fiscal capacity and regional autonomy.

Descriptive and inferential statistics were employed to analyze the quantitative data. The study used ratio analysis to evaluate the composition of revenue and expenditure. Fiscal dependency ratios were calculated to assess reliance on central transfers, while regression analysis was applied to explore the relationship between capital expenditure and fiscal independence. Additionally, a scoring model was developed to classify districts into categories of fiscal performance (e.g., high, moderate, low capacity).

On the qualitative side, the study conducted semi-structured interviews with 24 key informants, including local government officials, regional development planners, economists, and representatives from environmental NGOs. These interviews were conducted in-person and virtually between March and July 2023. The interview guide covered themes such as fiscal planning, ecological budgeting, investment priorities, and institutional constraints. NVivo software was used to code the interview transcripts and identify recurring themes and narratives.

To enhance the validity of the qualitative findings, the study employed triangulation by cross-referencing interview data with regional policy documents, environmental reports, and local development plans (RPJMDs). This ensured that the perspectives of various stakeholders were interpreted in relation to official policy trajectories and actual budget allocations. The combination of document analysis and stakeholder narratives provided a comprehensive view

The methodology also integrated a posthumanist lens by incorporating environmental indicators and considering the agency of ecosystems in fiscal modeling. For example, the presence of wetland conservation areas, mangrove rehabilitation projects, and biodiversity indices were factored into the fiscal capacity scoring matrix. This aligns with the study's overarching aim of proposing a fiscal model that transcends anthropocentric development logic and embeds ecological ethics into public finance at the regional level.

## Results

The quantitative findings reveal significant disparities in fiscal capacity across the 12 districts in Riau Province. Only three regions Pekanbaru, Dumai, and Bengkalis recorded own-source revenues (PAD) exceeding IDR 300 billion annually during the 2019–2021 period. In contrast, several regencies, including Kepulauan Meranti, Indragiri Hulu, and Kuantan Singingi, reported PAD levels below IDR 100 billion. This stark variation underscores a concentration of fiscal autonomy in urbanized or resource-rich districts, while rural wetland areas remain heavily dependent on central government support.

The following table summarizes the average PAD, DAU, and capital expenditure ratios of selected districts in Riau from 2019 to 2021 (see Table 1)

District	Average PAD (IDR Billion)	Average DAU (IDR Billion)	Capital Expenditure (%)
Pekanbaru	350	200	23.5
Dumai	310	220	19.8
Bengkalis	305	250	21.0
Siak	190	300	17.2
Kuantan Singingi	95	330	11.4
Kepulauan Meranti	88	340	9.6

Table 1: Fiscal Summary of Selected Districts in Riau (2019–2021)

An analysis of fiscal dependency ratios further illustrates the challenge. On average, DAU and DAK transfers constituted over 70% of total regional revenues in nine out of the twelve districts. In extreme cases, such as Rokan Hilir and Pelalawan, dependency exceeded 85%, leaving little fiscal space for discretionary policy implementation. These findings corroborate the broader concern that fiscal decentralization in Indonesia has not translated into real fiscal empowerment, particularly in ecologically constrained zones.

Capital expenditure levels were also suboptimal across most districts. The average capital expenditure ratio during the study period was only 15.2%, with personnel spending dominating local budgets. Only Pekanbaru and Siak surpassed the 20% threshold, reflecting stronger fiscal governance and planning capacities. Interviews with local finance officers revealed that bureaucratic rigidities and limited technical capacity often deter investment in productive infrastructure, particularly in remote wetland areas.

The fiscal scoring model developed in this study categorized only two districts Pekanbaru and Bengkalis as having "High Fiscal Capacity." Meanwhile, six districts, including Indragiri Hulu and Kuantan Singingi, were classified under "Low" or "Very Low" categories. These

classifications were based on a composite index that included PAD, fiscal dependency, capital expenditure share, and per capita investment. The results point to a need for tailored fiscal policy strategies rather than uniform transfer formulas. These classifications are presented in Table 2.

<b>District</b>	<b>Fiscal Score</b>	<b>Category</b>
Pekanbaru	82	High
Bengkalis	78	High
Dumai	72	Moderate
Siak	65	Moderate
Kuantan Singingi	45	Low
Kepulauan Meranti	42	Low

Table 2: Fiscal Capacity Classification by District

Qualitative findings from stakeholder interviews reinforced the quantitative trends. Local planners expressed frustration with the rigid structure of central transfers, which limit innovation in budget execution. Moreover, several respondents highlighted missed opportunities in ecotourism, fisheries, and agroforestry due to the lack of fiscal incentives and cross-sectoral coordination. Concerns were also raised about the environmental degradation caused by unchecked extractive industries, which undermine both ecological resilience and fiscal potential.

Environmental data triangulated with budget records suggested a weak correlation between ecological asset preservation and fiscal policy. Despite the presence of Ramsar sites and conservation areas in districts like Siak and Meranti, little budgetary allocation was directed toward their management. This disconnect signals an absence of ecological considerations in fiscal decision-making, a gap that the proposed posthumanist fiscal model seeks to address. The results thus call for a paradigm shift toward a more integrated, sustainable, and inclusive fiscal governance framework in Indonesia's wetland regions.

## **Discussion**

### **Structural Imbalance and Fiscal Dependency**

The study's findings reveal a persistent structural imbalance in the distribution of fiscal capacity across wetland districts in Riau Province. The majority of these districts rely heavily on general allocation funds (DAU) and special allocation funds (DAK) from the central government, while only a few urbanized areas demonstrate significant own-source revenue (PAD) generation. This condition hinders the realization of genuine fiscal autonomy, as local governments cannot independently finance development priorities tailored to their unique regional needs.

Such dependency on central transfers can lead to a homogenized development agenda, where wetland-specific ecological and economic concerns are sidelined. Transfers that fail to reward innovation or ecological performance only serve to perpetuate passivity among local authorities. A more dynamic transfer system that recognizes ecological contribution and local revenue effort is necessary to encourage fiscal innovation and break the cycle of dependency.

Furthermore, the current transfer formulas do not adequately account for regional disparities in environmental services and conservation needs. Wetland areas, which offer crucial ecological functions such as carbon sequestration and flood control, receive little to no fiscal recognition for these contributions. Integrating environmental performance into fiscal transfer formulas

could provide the financial motivation for local governments to prioritize ecological protection and resource sustainability.

Addressing this structural imbalance requires reform at both national and subnational levels. Central government policies must evolve to provide incentives for fiscal responsibility, innovation, and ecological stewardship. At the same time, local governments must strengthen their administrative capacity to explore alternative revenue sources and implement regionally appropriate fiscal strategies.

### **Capital Expenditure and Productive Investment**

Capital expenditure plays a pivotal role in enhancing fiscal capacity by supporting infrastructure development, stimulating economic activity, and broadening the tax base. However, this study reveals that most wetland districts in Riau allocate a disproportionately low share of their budgets to capital investment, with an average capital expenditure ratio of just 15.2%. This underinvestment limits the capacity of local governments to address structural constraints and catalyze sustainable growth.

One contributing factor is the dominance of operational spending, especially for salaries and routine administration. This budgetary inertia reflects the absence of strategic planning and long-term vision in public finance. Political pressures and risk aversion also discourage investment in infrastructure that may not yield immediate, visible benefits. As a result, essential projects such as climate-resilient transport networks, clean water systems, and green energy remain underfunded.

Moreover, productive investment in wetland regions requires a tailored approach. Infrastructure projects must consider the ecological sensitivity of wetlands and avoid further environmental degradation. Green infrastructure, such as mangrove restoration, floating sanitation systems, or eco-tourism facilities, can simultaneously support local livelihoods and preserve biodiversity. Unfortunately, these approaches remain marginalized in local development plans due to limited technical knowledge and fiscal tools.

To unlock the full potential of capital expenditure, regional governments need support in planning, financing, and managing productive investments. This includes reforming the regulatory environment to allow for multi-year budgeting, leveraging public-private partnerships, and accessing climate finance mechanisms. Building capacity for ecological investment planning is equally critical to ensure that capital spending aligns with environmental and social sustainability goals.

### **Bureaucratic Capacity and Institutional Barriers**

While financial constraints are a major obstacle, institutional weaknesses also impede the development of effective fiscal systems in wetland districts. The study's qualitative findings highlight a lack of technical expertise among local finance personnel, especially in innovative fiscal practices such as ecological budgeting, revenue forecasting, and program-based budgeting. This skills gap limits the ability of local governments to respond proactively to development challenges.

Compounding this issue is the frequent turnover in local leadership, which disrupts continuity in planning and undermines institutional memory. New administrations often prioritize short-term political interests over long-term sustainability goals. As a result, promising fiscal reforms are either delayed or abandoned altogether, and regional development strategies become

fragmented and reactive rather than cohesive and forward-looking.

Fragmentation in regulatory and institutional frameworks also contributes to inefficiencies. There is often a lack of coordination between planning, budgeting, and implementation units, both within local governments and between levels of government. These silos create inconsistencies and delays in executing development programs, especially those that require cross-sectoral collaboration, such as wetland conservation or integrated spatial planning.

To address these institutional barriers, capacity-building initiatives must be institutionalized within local governance structures. These should include formal training programs, technical assistance from national agencies, and collaboration with universities and think tanks. In addition, clearer and more streamlined regulatory guidelines can help reduce confusion and support a more agile and responsive public finance system.

### **Posthumanist Fiscal Governance**

Adopting a posthumanist perspective offers a transformative approach to fiscal governance that extends beyond human-centered development priorities. Posthumanism emphasizes the interconnectedness of humans, ecosystems, and non-human entities, urging policy frameworks that recognize the agency of nature in shaping sustainable futures. For wetland regions, this implies that fiscal decisions must reflect not only economic logic but also ethical and ecological imperatives.

Currently, the fiscal governance of wetland districts fails to incorporate ecological considerations in a meaningful way. Despite their environmental significance, wetlands receive negligible fiscal attention, as evidenced by the lack of budget allocations for conservation and ecosystem restoration. The exclusion of wetlands from fiscal planning reflects an anthropocentric bias that treats nature as a passive backdrop to development rather than as an active stakeholder.

Integrating posthumanist principles into fiscal systems would involve rethinking public finance tools to include ecological valuation, participatory budgeting with environmental stakeholders, and performance indicators based on ecosystem health. Such tools can help local governments make decisions that are not only financially sound but also ecologically just. This paradigm shift would redefine development success to include metrics like biodiversity preservation, climate resilience, and intergenerational equity.

Ultimately, a posthumanist fiscal model requires institutional innovation and political will. It challenges entrenched norms and demands new forms of governance that transcend traditional boundaries between economic, environmental, and social domains. In doing so, it offers a viable pathway for wetland regions to achieve true autonomy while safeguarding the ecosystems upon which they and the planet depend.

### **Conclusion**

This study has explored the multifaceted nature of fiscal capacity in wetland regions of Riau Province, Indonesia. The findings reveal entrenched disparities in fiscal autonomy, with only a few districts demonstrating the capacity to generate sufficient own-source revenue and invest in productive infrastructure. Most wetland districts remain dependent on central transfers, with minimal capital expenditure and little alignment between fiscal planning and ecological priorities.

The structural imbalance in Indonesia's intergovernmental fiscal system has prevented wetland regions from realizing the full benefits of decentralization. Formulaic transfer schemes and limited institutional incentives discourage local innovation and fail to account for regional environmental assets. Furthermore, capital investment remains inadequate, constrained by bureaucratic rigidity, short-term political cycles, and capacity gaps within local governments.

Qualitative insights confirm that these fiscal limitations are compounded by institutional barriers, including regulatory fragmentation, low technical capacity, and frequent leadership turnover. These factors weaken strategic planning and undermine the potential for sustainable development in vulnerable ecosystems. Without systemic reform, wetland regions will continue to face a cycle of ecological degradation and fiscal stagnation.

A posthumanist approach to fiscal governance provides a transformative lens through which to reimagine regional development. By embedding ecological ethics into budgeting, promoting ecosystem-based investment, and recognizing the agency of non-human stakeholders, local governments can align fiscal strategies with planetary resilience. This study's proposed model offers a pathway toward a more equitable, autonomous, and ecologically just future for Indonesia's wetlands.

### **Recommendation**

In light of the findings and conclusions drawn from this study, several key recommendations are proposed to improve fiscal capacity and ecological governance in Indonesia's wetland regions. These recommendations target policy reform, institutional strengthening, and innovative fiscal design to better align local financial management with the realities of regional development and environmental stewardship.

First, there is an urgent need to reform the current fiscal transfer formula (DAU and DAK) to incorporate performance-based criteria. Transfers should reward not only population and economic size but also innovation in revenue generation and commitment to ecological preservation. This approach has been piloted in countries with green fiscal frameworks and has proven effective in improving both fiscal discipline and environmental outcomes (Tan et al., 2023).

Second, local governments should diversify their revenue sources beyond traditional taxes and retributions. Wetland areas offer untapped potential in ecotourism, sustainable fisheries, carbon credit schemes, and agroforestry all of which can be monetized through regulatory innovation and public-private partnerships. Fiscal instruments such as environmental user fees or ecological service payments can be institutionalized as part of local legislation.

Third, capacity building is essential. Training programs in green budgeting, ecological fiscal transfers, and long-term investment planning should be implemented across local financial management units. Moreover, digital tools for budget transparency and participatory fiscal planning can enhance public accountability and increase civic engagement in environmental governance.

Lastly, wetland regions should adopt integrated spatial and fiscal planning mechanisms. This involves aligning Regional Medium-Term Development Plans (RPJMD) with ecological zoning, biodiversity inventories, and climate vulnerability assessments. Universities and research institutions can play a strategic role by developing region-specific fiscal models and advising on ecological-economic trade-offs. These recommendations collectively pave the way for a

resilient, autonomous, and ecologically conscious fiscal future in Indonesia's wetlands.

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