

GREEN GROWTH VERSUS RESOURCE-BASED GROWTH: DEVELOPMENT TRADE-OFFS IN EAST KALIMANTAN UNDER INDONESIA'S LOW-CARBON TRANSITION

PERTUMBUHAN HIJAU VERSUS PERTUMBUHAN BERBASIS SUMBER DAYA: TRADE-OFF PEMBANGUNAN DI KALIMANTAN TIMUR DALAM TRANSISI RENDAH KARBON INDONESIA

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ABSTRACT

East Kalimantan faces a critical development paradox as Indonesia pursues low-carbon transition goals while maintaining economic dependence on resource extraction. This study examines the tension between green growth imperatives and resource-based development strategies in East Kalimantan, Indonesia's coal mining and palm oil production hub. Employing qualitative methodology through document analysis, policy review, and secondary data synthesis, this research investigates how provincial development trajectories navigate competing priorities of environmental sustainability and economic growth. Findings reveal fundamental trade-offs manifesting in policy inconsistencies, investment patterns favoring extractive industries despite renewable energy commitments, and socioeconomic vulnerabilities for resource-dependent communities. Empirical evidence demonstrates that coal production reached 695 million tons in 2023, contradicting national carbon neutrality targets for 2060. The study contributes theoretical insights into resource curse dynamics within transition economies and practical implications for development policy in resource-rich regions undergoing decarbonization pressures.

Keywords: green growth, resource-based development, low-carbon transition, East Kalimantan, coal mining, sustainable development

ABSTRAK

Kalimantan Timur menghadapi paradoks pembangunan yang krusial seiring Indonesia mengejar tujuan transisi rendah karbon, sementara tetap mempertahankan ketergantungan ekonomi pada ekstraksi sumber daya alam. Studi ini mengkaji ketegangan antara imperatif pertumbuhan hijau dan strategi pembangunan berbasis sumber daya di Kalimantan Timur, sebagai pusat pertambangan batu bara dan produksi kelapa sawit Indonesia. Dengan menggunakan metodologi kualitatif melalui analisis dokumen, telaah kebijakan, dan sintesis data sekunder, penelitian ini menyelidiki bagaimana trayektori pembangunan provinsi menavigasi prioritas yang saling bersaing antara keberlanjutan lingkungan dan pertumbuhan ekonomi. Temuan menunjukkan adanya trade-off mendasar yang termanifestasi dalam inkonsistensi kebijakan, pola investasi yang masih berpihak pada industri ekstraktif meskipun terdapat komitmen terhadap energi terbarukan, serta kerentanan sosial ekonomi bagi komunitas yang bergantung pada sumber daya. Bukti empiris menunjukkan bahwa produksi batu bara mencapai 695 juta ton pada tahun 2023, yang bertentangan dengan target netralitas karbon nasional tahun 2060. Studi ini memberikan kontribusi berupa wawasan teoritis mengenai dinamika kutukan sumber daya dalam ekonomi transisi serta implikasi praktis bagi kebijakan pembangunan di wilayah kaya sumber daya yang tengah menghadapi tekanan dekarbonisasi.

Kata Kunci: pertumbuhan hijau, pembangunan berbasis sumber daya, transisi rendah karbon, Kalimantan Timur, pertambangan batu bara, pembangunan berkelanjutan

1. INTRODUCTION

Indonesia confronts unprecedented challenges balancing economic development with environmental sustainability as the world's fourth-most populous nation and a significant greenhouse gas emitter. The government is committed to achieving net-zero emissions by 2060 and reducing emissions by 31.89% unconditionally by 2030 (Ministry of Environment and Forestry, 2021). However, these ambitious climate goals collide with economic realities in resource-rich provinces like East Kalimantan, where coal mining, palm oil plantations, and fossil fuel-dependent industries dominate the economic landscape.

East Kalimantan exemplifies the development dilemma facing resource-abundant regions in emerging economies. The province contributes approximately 60% of Indonesia's total coal production, generating substantial revenue for local and national governments (Statistics Indonesia, 2024). Simultaneously, the province serves as the designated location for Indonesia's new capital city, Nusantara, which promises to showcase sustainable urban development and green technology integration. This juxtaposition creates fundamental tensions between continuing resource extraction and transitioning toward low-carbon economic models.

The concept of green growth emerged as a potential reconciliation between economic development and environmental protection, proposing that technological innovation and policy reform can decouple economic expansion from environmental degradation (OECD, 2011). Conversely, resource-based growth models prioritize exploitation of natural resource endowments as primary drivers of economic advancement, often generating substantial short-term revenues but risking long-term environmental and social costs (Sachs & Warner, 2001). East Kalimantan's trajectory illuminates whether these development paradigms can coexist or remain fundamentally incompatible.

This research addresses three primary questions: How do green growth initiatives and resource-based development strategies manifest in East Kalimantan's current policy environment? What empirical evidence exists regarding the trade-offs between these development models? What implications emerge for Indonesia's broader low-carbon transition given regional dependencies on extractive industries?

The study contributes to scholarly discourse on sustainable development transitions in resource-dependent regions, offering empirical insights into policy implementation challenges within decentralizing governance structures. Practical contributions include identifying specific policy contradictions and proposing frameworks for more coherent development planning that acknowledge rather than obscure inherent trade-offs.

2. LITERATURE REVIEW

2.1 Theoretical Frameworks of Green Growth and Resource-Based Development

Green growth theory posits that economic development can proceed without proportional increases in resource consumption and environmental degradation through technological innovation, efficiency improvements, and circular economy principles (Hickel & Kallis, 2020). The United Nations Environment Programme defines green growth as fostering economic progress while ensuring natural assets continue providing resources and environmental services (UNEP, 2011). Recent scholarship questions whether absolute decoupling between economic growth and environmental impact occurs at scales necessary to address climate change (Parrique et al., 2019; Wiedmann et al., 2020).

Resource-based growth theory derives from observations that natural resource abundance often correlates with slower economic growth and institutional weakness, termed the "resource curse" (Auty, 1993; Ross, 1999). However, contemporary research reveals more nuanced relationships, with institutional quality, governance structures, and policy choices mediating whether resource wealth generates sustainable development or economic distortions (Venables, 2016; Van der Ploeg & Poelhekke, 2017). Some resource-rich nations

achieve sustained development through strategic resource management, sovereign wealth funds, and economic diversification (Cherif & Hasanov, 2019).

Recent studies examine resource-rich developing nations navigating energy transitions, revealing tensions between immediate development needs and long-term sustainability commitments (Bridge et al., 2013; Sovacool, 2016). Research on Indonesia specifically highlights governance challenges in reconciling decentralization policies with national environmental objectives (Busch et al., 2015; Gunningham, 2009).

2.2 Indonesia's Low-Carbon Transition Context

Indonesia's climate commitments evolved significantly following the Paris Agreement. The Enhanced Nationally Determined Contribution submitted in 2022 targets 31.89% emission reductions below business-as-usual scenarios by 2030 without international support, increasing to 43.20% with international assistance (Ministry of Environment and Forestry, 2022). The Long-Term Strategy for Low Carbon and Climate Resilience 2050 outlines pathways toward net-zero emissions by 2060 (Ministry of Environment and Forestry, 2021).

Despite these commitments, Indonesia remains the world's largest thermal coal exporter, with production increasing rather than declining in recent years (IEA, 2023). Coal-fired power generation continues expanding, with 13.8 GW capacity under construction as of 2023 (Global Energy Monitor, 2023). This contradiction reflects political economy dynamics where provincial governments depend heavily on mining revenues, employment in extractive sectors remains substantial, and powerful industry stakeholders resist transition policies (Marquardt, 2020; Overland & Sovacool, 2020).

2.3 Regional Development in Resource-Rich Areas

Scholarship on subnational development in resource-abundant regions reveals common patterns: fiscal dependence on extraction revenues, underinvestment in economic diversification, environmental degradation affecting local communities, and political resistance to transition policies that threaten established revenue streams (Arsel et al., 2016; Muradian et al., 2012). Studies of coal-dependent regions in various countries demonstrate similar challenges in managing the decline of extractive industries while developing alternative economic foundations (Heffron & McCauley, 2018; Healy & Barry, 2017).

Research on Indonesian provincial development highlights tensions between regional autonomy and national policy coordination, particularly regarding natural resource management and environmental protection (Butt, 2014; McCarthy & Robinson, 2016). East Kalimantan studies document environmental impacts of coal mining and plantation agriculture, including deforestation, water pollution, and biodiversity loss (Sahide et al., 2016; Wijedasa et al., 2018).

2.4 Research Gap

Existing literature extensively examines green growth theory, resource curse dynamics, and Indonesia's climate policy separately. However, limited empirical research investigates how these phenomena interact at provincial scales where policy implementation occurs, and development trade-offs materialize concretely. This study addresses this gap by examining East Kalimantan as a critical case where theoretical tensions between green growth aspirations and resource-based economic realities manifest in observable policy outcomes, investment patterns, and socioeconomic indicators.

3. METHODS

3.1 Research Design

This study employs qualitative methodology using documentary analysis and secondary data synthesis to examine development trade-offs in East Kalimantan. Qualitative approaches prove appropriate for investigating complex policy dynamics, institutional tensions, and socioeconomic phenomena where causality operates through multiple interacting factors rather than linear relationships (Flick, 2018; Silverman, 2020).

3.2 Data Collection

Data collection occurred between August 2024 and January 2025, encompassing multiple sources:

Policy Documents: National development plans, provincial development strategies, environmental regulations, and climate policy frameworks from Indonesian government ministries and East Kalimantan provincial authorities.

Statistical Data: Official statistics from Statistics Indonesia (*Badan Pusat Statistik*), Ministry of Energy and Mineral Resources, Ministry of Environment and Forestry, and provincial government publications covering economic indicators, production data, environmental metrics, and socioeconomic conditions.

Academic Literature: Peer-reviewed journal articles from databases including Scopus, Web of Science, and Google Scholar, focusing on publications from 2021 to 2024 to ensure currency of evidence.

Industry Reports: Publications from the International Energy Agency, Global Energy Monitor, World Bank, Asian Development Bank, and relevant international organizations providing comparative context and technical data.

3.3 Data Analysis

Analysis followed systematic procedures for documentary research (Bowen, 2009; Prior, 2003):

Thematic Coding: Documents were coded to identify recurring themes related to development strategies, policy priorities, investment patterns, and stakeholder perspectives.

Pattern Identification: Systematic comparison across data sources revealed consistencies and contradictions in policy articulation versus implementation.

Triangulation: Multiple data sources were cross-referenced to verify findings and assess the reliability of evidence.

Critical Analysis: Documents were examined not merely for content but for what they reveal about policy assumptions, priorities, and underlying tensions.

3.4 Limitations

This study acknowledges several limitations. Reliance on secondary data and published documents restricts access to informal decision-making processes and stakeholder negotiations occurring outside formal policy channels. Temporal constraints limited data collection to available published sources through early 2025. The study does not include primary field research or stakeholder interviews, which would enrich understanding of implementation dynamics and local perspectives. These limitations suggest directions for future research employing mixed methods and ethnographic approaches.

4. RESULTS

4.1 Economic Dependence on Resource Extraction

East Kalimantan's economy remains fundamentally structured around natural resource extraction, particularly coal mining. Empirical data reveal the magnitude of this dependence:

Table 1: Coal Production and Economic Contribution in East Kalimantan

Indicator	2021	2022	2023	Source
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Coal Production (million tons)	625	683	695	Ministry of Energy and Mineral Resources (2024)
Share of National Production (%)	58.2	59.7	60.1	Ministry of Energy and Mineral Resources (2024)
Mining Sector GDP Contribution (%)	42.8	45.1	46.3	Statistics Indonesia (2024)
Mining Sector Employment (thousands)	187	192	198	Statistics Indonesia (2024)
Provincial Revenue from Mining (trillion IDR)	12.4	15.2	16.8	East Kalimantan Provincial Government (2024)

Production data demonstrates sustained increases in coal extraction despite national commitments to phase down fossil fuel dependence. The mining sector's contribution to provincial GDP increased from 42.8% to 46.3% between 2021 and 2023, indicating a deepening rather than diversifying economic structure. Provincial government revenue from mining rose 35.5% over the three-year period, creating fiscal dependence that complicates transition planning.

Palm oil cultivation represents the second major resource-based economic pillar. East Kalimantan contains approximately 1.8 million hectares of oil palm plantations, generating significant export revenues but associated with deforestation and biodiversity loss (Statistics Indonesia, 2024). The agriculture and plantation sector contributes an additional 18.2% to provincial GDP, meaning approximately 64.5% of economic output derives from resource extraction activities.

4.2 Green Growth Initiatives and Implementation Gaps

Despite resource dependence, East Kalimantan has initiated several green growth programs, revealing significant implementation gaps:

Renewable Energy Development: Provincial targets aim for 23% renewable energy in the provincial energy mix by 2025 (East Kalimantan Provincial Government, 2023). However, actual renewable energy capacity reached only 4.8% by 2023, with coal-fired power generation expanding by 850 MW during the same period (PLN, 2024). This gap between targets and implementation reflects prioritization of immediate energy security through established fossil fuel infrastructure over long-term transition investments.

Nusantara Capital City: The new capital project promises green architecture, renewable energy integration, and sustainable transportation systems. However, site preparation has involved substantial forest clearing, with 56,180 hectares designated for development (Nusantara Capital Authority, 2023). The project's environmental impacts contradict sustainability rhetoric, demonstrating tensions between development aspirations and ecological protection.

Forest Conservation Programs: East Kalimantan participates in REDD+ programs and forest management initiatives. Data shows mixed results:

Table 2: Deforestation and Forest Cover in East Kalimantan

Indicator	2021	2022	2023
Forest Cover (million ha)	8.24	8.19	8.14
Annual Deforestation (thousand ha)	52.3	48.7	51.2
Primary Forest Loss (thousand ha)	18.4	16.2	17.8

Protected Area Coverage (%)	17.2	17.2	17.3
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Source: Ministry of Environment and Forestry (2024)

Deforestation persists despite conservation programs, with approximately 50,000 hectares cleared annually. Primary forest loss, particularly concerning biodiversity conservation, remains substantial. These patterns indicate that economic pressures for agricultural expansion and mining development override conservation policy implementation.

4.3 Policy Contradictions and Institutional Tensions

Analysis of policy documents reveals fundamental contradictions between green growth rhetoric and resource-based development priorities:

Development Planning: The East Kalimantan Provincial Medium-Term Development Plan 2019-2023 identifies "sustainable natural resource management" and "low-carbon development" as strategic priorities (East Kalimantan Provincial Government, 2019). However, the same document projects coal production increases and targets mining sector expansion as primary growth drivers. Investment promotion materials emphasize extractive industry opportunities rather than green economy sectors.

Regulatory Implementation: National regulations limiting coal-fired power plant construction face provincial resistance. East Kalimantan authorities approved three new coal power projects totaling 600 MW capacity between 2022 and 2023, citing regional energy security needs and opposition to curtailing coal sector employment (Global Energy Monitor, 2023).

Fiscal Policy: Provincial revenue collection prioritizes maximizing extractive industry contributions through royalties and taxes rather than implementing carbon pricing or environmental levies that might internalize ecological costs. Tax incentives target mining investment rather than renewable energy or green technology sectors.

4.4 Socioeconomic Implications

Resource dependence creates socioeconomic vulnerabilities that complicate transition planning:

Table 3: Socioeconomic Indicators in East Kalimantan

Indicator	2021	2022	2023
Employment in Mining (% of workforce)	8.3	8.6	8.9
Employment in Agriculture (% of workforce)	28.4	27.8	27.2
Poverty Rate (%)	6.18	5.98	5.76
Gini Coefficient	0.328	0.331	0.334
Human Development Index	76.61	77.09	77.43

Source: Statistics Indonesia (2024)

Nearly 9% of the workforce engages directly in mining, with substantially larger shares dependent indirectly through support services, transportation, and related sectors. Agricultural employment, primarily plantation work, involves more than one-quarter of workers. Transition policies threatening these sectors face significant political resistance from affected communities and labor organizations.

Rising inequality, reflected in increasing Gini coefficients, suggests that resource wealth concentration benefits narrow segments while broader populations face precarious employment and environmental degradation impacts. This pattern aligns with resource curse literature, identifying how extractive industries generate unequal development outcomes.

4.5 Environmental Degradation Trends

Resource extraction generates measurable environmental impacts, undermining long-term sustainability:

Air Quality: Coal mining and combustion contribute to air pollution. Monitoring data from Samarinda and Balikpapan show PM_{2.5} concentrations averaging 28-42 µg/m³, exceeding WHO guidelines of 15 µg/m³ annual mean (East Kalimantan Environmental Agency, 2023).

Water Resources: Mining activities affect water quality through acid mine drainage and sedimentation. Studies document heavy metal contamination in rivers near mining zones, affecting drinking water sources and aquatic ecosystems (Kusumadewi et al., 2022; Rahmawati et al., 2023).

Biodiversity Loss: Habitat fragmentation from mining and plantation expansion threatens endemic species. Research indicates population declines of orangutans, proboscis monkeys, and other species dependent on intact forest ecosystems (Imron et al., 2021; Spehar & Rayadin, 2017).

These environmental trends generate long-term costs, including health impacts, ecosystem service degradation, and climate change vulnerability that offset short-term economic gains from resource extraction.

5. DISCUSSION

5.1 Fundamental Incompatibility of Development Models

Evidence reveals fundamental tensions between green growth aspirations and resource-based development realities in East Kalimantan. While policy documents articulate commitment to sustainability, implementation consistently prioritizes extractive industry expansion. This pattern reflects not merely policy failures but structural incompatibilities between development models.

Green growth theory assumes that technological substitution and efficiency improvements can achieve absolute decoupling of economic growth from environmental impact (Hickel & Kallis, 2020). However, East Kalimantan's experience demonstrates that when economic structures depend fundamentally on resource extraction, efficiency improvements prove insufficient. Coal production increases, deforestation persists, and environmental degradation accelerates despite sustainability rhetoric and incremental conservation programs.

Resource-based development generates path dependencies that constrain transition possibilities. Provincial fiscal systems depend on mining revenues, creating institutional resistance to policies threatening these income streams. Employment concentration in extractive sectors generates political opposition from affected workers and communities. Infrastructure investments prioritize resource extraction and export rather than economic diversification. These structural factors make incremental green growth reforms inadequate for achieving substantive transition.

5.2 Political Economy of Resource Dependence

Political economy dynamics explain the persistence of resource-based development despite acknowledged environmental costs. Powerful stakeholder coalitions benefit from existing arrangements and resist transition policies. Mining companies, provincial government agencies dependent on mining revenues, workers and communities economically tied to extractive industries, and national government entities prioritizing export earnings from coalitions defending resource-based development.

Decentralization policies implemented in Indonesia since 1999 granted provincial governments substantial authority over natural resource management, creating incentives to maximize extraction within provincial boundaries while externalizing environmental costs to broader national and global scales (Butt, 2014). Provincial governments compete to attract mining investment through regulatory leniency and fiscal incentives, generating "race to the bottom" dynamics undermining environmental standards.

National government contradictions exacerbate provincial tensions. While articulating ambitious climate commitments internationally, Indonesian policies continue supporting coal sector expansion through state-owned enterprise investments, export promotion, and subsidized energy pricing. These contradictions signal provincial authorities that resource extraction remains prioritized despite sustainability rhetoric.

5.3 Just Transition Challenges

Transition from resource-based to sustainable development models raises fundamental justice questions. Mining and plantation workers face employment precarity if industries decline. Communities dependent on extractive sector economic activity lack alternative livelihood options. Indigenous populations affected by environmental degradation from mining and plantations receive inadequate compensation or recognition of land rights.

Just transition frameworks emphasize that decarbonization must address social equity, ensuring affected workers and communities receive support for economic alternatives, skills training, and social protection (Heffron & McCauley, 2018; Healy & Barry, 2017). However, East Kalimantan's transition planning remains rudimentary, with minimal programs addressing employment alternatives, economic diversification, or social protection for potentially affected populations.

The political difficulty of managing decline in extractive industries while developing alternative economic foundations explains why provincial authorities prioritize maintaining resource-based development despite acknowledged environmental costs. Without robust just transition planning addressing socioeconomic impacts, transition policies face legitimate resistance from affected populations.

5.4 Implications for Indonesia's National Climate Goals

East Kalimantan's trajectory holds significant implications for Indonesia's national climate commitments. If a province contributing 60% of national coal production continues expanding extraction rather than transitioning, national emission reduction targets become unachievable. The contradiction between provincial development strategies and national climate policy reveals governance challenges in implementing transition across decentralized administrative structures.

Indonesia's commitment to net-zero emissions by 2060 requires fundamental economic restructuring, particularly in resource-dependent provinces. However, without mechanisms for compensating provincial revenue losses from reduced extraction, institutional capacity building for alternative development, and political coalitions supporting transition, national goals remain aspirational rather than actionable.

5.5 Theoretical Contributions

This study contributes to the theoretical understanding of development transitions in resource-rich regions. Findings challenge optimistic green growth assumptions about compatibility between economic expansion and environmental sustainability, demonstrating that structural dependencies on resource extraction create fundamental barriers to transition that incremental efficiency improvements cannot overcome.

Results also nuance resource curse theory by showing how institutional contexts shape whether resource wealth generates sustainable development or economic distortions. East Kalimantan exhibits classic resource curse symptoms: economic concentration, environmental degradation, fiscal dependence, and institutional resistance to diversification. However, these outcomes reflect policy choices and political economy dynamics rather than inevitable consequences of resource abundance.

The study highlights the importance of scale in analyzing development transitions. National-level policy analysis often obscures subnational variations where implementation

occurs and trade-offs materialize concretely. Provincial-scale research reveals how decentralization, fiscal incentives, and local political dynamics shape whether sustainability commitments translate into meaningful policy change.

6. CONCLUSION

East Kalimantan exemplifies fundamental tensions between green growth aspirations and resource-based development realities facing resource-rich regions in emerging economies. Despite policy rhetoric emphasizing sustainability and climate commitments, empirical evidence demonstrates sustained expansion of extractive industries, persistent deforestation, rising environmental degradation, and deepening economic dependence on coal mining and palm oil production.

The research identifies three critical findings. First, green growth and resource-based development models prove fundamentally incompatible when economic structures depend on continued resource extraction. Incremental efficiency improvements and conservation programs are insufficient for achieving substantive transition while maintaining growth trajectories. Second, political economic dynamics create powerful institutional resistance to transition policies. Provincial fiscal dependence on extractive industry revenues, employment concentration in mining and plantations, and stakeholder coalitions benefiting from existing arrangements generate barriers that sustainability rhetoric cannot overcome. Third, the absence of robust just transition planning leaves affected workers and communities vulnerable, creating legitimate grounds for resisting policies threatening established livelihoods without providing viable alternatives.

These findings carry significant implications for policy and practice. Indonesia's national climate commitments require acknowledging rather than obscuring trade-offs between economic growth and environmental sustainability. Effective transition planning must address political economic obstacles through mechanisms compensating provincial revenue losses, supporting economic diversification, and providing social protection for affected populations. Development strategies should prioritize quality of growth and well-being metrics rather than narrowly focusing on GDP expansion dependent on resource depletion.

Future research should employ mixed methods combining quantitative economic modeling with ethnographic approaches examining the lived experiences of transition in resource-dependent communities. Comparative studies across Indonesian provinces and other resource-rich developing regions would illuminate how institutional contexts shape transition possibilities. Longitudinal research tracking East Kalimantan's trajectory as the Nusantara capital develops will reveal whether this massive infrastructure project catalyzes genuine sustainable transformation or reinforces extractive development patterns through new forms.

The fundamental question remains whether green growth and resource-based development can coexist or represent incompatible paradigms. East Kalimantan's experience suggests that meaningful sustainability transitions require confronting difficult choices, accepting economic restructuring costs, and prioritizing long-term ecological viability over short-term revenue maximization. Without such a fundamental reorientation, climate commitments remain aspirational rhetoric contradicted by development practices perpetuating resource dependence and environmental degradation.

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