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Analysis of Natural Resource Curse Indications in Regional Development Using the NRDI, RSDI, and RRCI Indices in Regencies and Cities of East Kalimantan Province

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Abstract

Natural resources can stimulate regional economic growth, yet an excessive reliance on them may result in the Natural Resource Curse (NRC). Using a descriptive quantitative design, this study assesses NRC indications across ten regencies and cities in East Kalimantan Province for the 2018-2025 period. It draws on three composite indices: the Natural Resource Dependency Index (NRDI), the Regional Sustainable Development Index (RSDI), and the Regional Resource Curse Index (RRCI). The results show that 8 of the 10 regions have a high level of resource dependency, one region (Bontang) is moderate, and one (Balikpapan) is low. Sustainable development is low in eight regions and moderate only in Balikpapan and Bontang, while no region reaches the high category. East Kutai records the highest RRCI (1.71) and Balikpapan the lowest (1.00). These findings indicate that NRC indications differ across regions and arise from the combination of high resource dependency and low sustainable development, not from dependency alone. The indices describe structural vulnerability and should not be read as causal evidence of the NRC. Economic diversification and better management of resource-based regional revenue are therefore needed.

Keywords: Natural Resource Curse, NRDI, RSDI, RRCI, East Kalimantan.

INTRODUCTION

Indonesia possesses considerable mineral wealth, spanning oil and gas, coal, and numerous other minerals, which makes it a relevant case for examining the natural resource curse (NRC). The NRC describes a pattern in which resource-rich regions lag behind resource-poor ones in development outcomes. According to Sachs and Warner

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(1995), an overreliance on extractive sectors tends to generate unstable growth, limited economic diversification, and greater income inequality. A related explanation is the Dutch Disease model, in which, as Corden and Neary (1982) show, a resource boom undermines the competitiveness of non-resource sectors and distorts the overall structure of the economy.

Empirically, the NRC has been identified mainly in resource-abundant developing countries in Africa and Latin America, where large endowments have not raised living standards (Gregow and Hermele, 2011). Yet this outcome is not inevitable. Mehlum, Moene and Torvik (2006) and Van der Ploeg (2011) demonstrate that institutional quality and governance determine whether natural resources become a blessing or a curse.

For Indonesia, the evidence at the national level remains inconclusive. Fahriza and Hartono (2018) detect no signs of the NRC in the country as a whole, whereas Rosser (2004) notes that the benefits and costs of resource wealth are allocated unevenly between central and regional governments. Such disparities suggest that national aggregates may conceal important variation, which underscores the need for a regional-level analysis capable of capturing NRC dynamics that would otherwise go unnoticed.

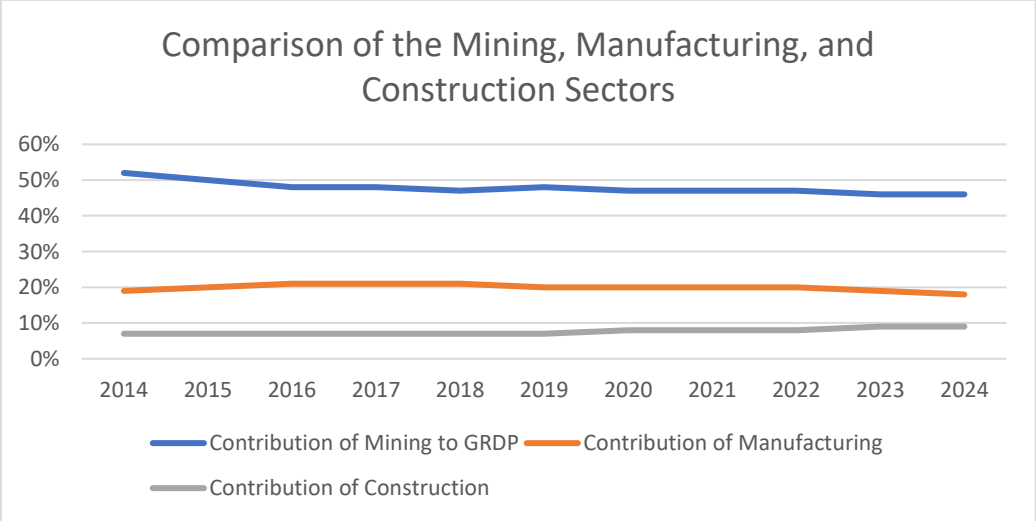


Figure 1.1. Average Contribution of the Mining Sector to Total GRDP of East Kalimantan Province, 2014-2024

Among Indonesian provinces, East Kalimantan stands out for its abundant natural resources. According to BPS (2025), mining and quarrying generate roughly 46% of provincial GRDP, with manufacturing and construction contributing about 18% and 9%, respectively. When oil and gas are excluded, GRDP per capita in 2024 drops from

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approximately IDR 212.18 million to IDR 114.6 million, implying that oil and gas make up about 46.4% of it. The province also obtains substantial profit-sharing funds (Dana Bagi Hasil, DBH) from mining, amounting to IDR 5.26 trillion in 2025 and well exceeding the allocations to Papua Barat, Jambi, Aceh, and Riau. Nevertheless, the open unemployment rate reached 5.14% in 2024, the highest among the Kalimantan provinces, while a Gini ratio of 0.321 indicates moderate inequality. Taken together, these figures suggest that large resource output and revenue do not by themselves produce broad-based development.

Most earlier regional studies focus on the link between resource abundance and growth, and therefore reveal little about how strongly the NRC is present in individual regions. Rahma et al. (2021) address this gap by constructing composite indices that combine resource dependency with sustainable development, concluding that provinces with larger mining endowments are more prone to the resource curse. Applying a similar index approach to Sumatran provinces, Amalia and Emalia (2022) find that DBH from mining and oil and gas raises growth, although the RRCI shows that mining-rich provinces such as Jambi remain more vulnerable to the curse. To the best of our knowledge, this approach has not yet been applied to regencies and cities in East Kalimantan, a province marked by a wide gap between resource-producing regencies and service-based cities.more exposed to the curse. To our knowledge, the index approach has not been applied at the regency and city level in East Kalimantan, where the gap between resource-producing regencies and service-based cities is large.

Objectives

This study has three aims: to gauge the degree of resource dependency in East Kalimantan's regencies and cities using the NRDI, to assess their sustainable development using the RSDI, and to estimate the extent of NRC indications using the RRCI. The findings are intended to offer local governments an indicative map of where resource dependency overlaps with weak development, and to contribute to the regional NRC literature in Indonesia.

LITERATURE REVIEW

Natural Resource Curse

Auty (1994) first formulated the NRC thesis, and Sachs and Warner (1995) later tested it empirically, finding that resource-abundant economies grow more slowly. The mechanisms proposed in the literature include Dutch Disease (Corden and Neary, 1982), weak institutions and rent-seeking (Mehlum, Moene and Torvik, 2006), and insufficient investment in education and human capital (Gylfason, 2001).

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Natural Resource Dependency Index (NRDI)

Several variables can capture resource dependency, including the ratio of primary exports to GDP, the share of resource output in GDP, resource GDP per capita, and mineral revenue per capita. Following Rahma et al. (2021), this study relies on two indicators: mining GRDP per capita and resource revenue per capita, the latter proxied by DBH from mining and oil and gas. Reserve volumes are not used to measure abundance because reserves are not yet revenue and therefore cannot generate development outcomes.

Regional Sustainable Development Index (RSDI)

The RSDI summarizes regional development performance along three dimensions: economic (growth and open unemployment), social (poverty, human development, and income inequality), and environmental (environmental quality). The indicators are aggregated through a geometric mean, in line with OECD practice for composite indicators.

Regional Resource Curse Index (RRCI)

The RRCI combines the NRDI and the RSDI to indicate the degree of NRC in a region. Its interpretation is opposite to that of its components: a higher NRDI and RSDI are read as positive, while a higher RRCI indicates a more severe curse. The combination reflects the idea that high dependency is not necessarily harmful when it is accompanied by good development performance, and that low dependency does not guarantee freedom from NRC risk (Rahma et al., 2021).

METHODOLOGY

Research Location

The study covers East Kalimantan Province, which comprises seven regencies and three cities: Paser, West Kutai, Kutai Kartanegara, East Kutai, Berau, Penajam Paser Utara, Mahakam Ulu, Balikpapan, Samarinda, and Bontang. The province was chosen as a relevant NRC case because its economy is dominated by mining, chiefly coal and oil and gas.

Data Sources and Data Types

This descriptive quantitative study uses annual secondary panel data covering 10 regencies and cities from 2018 to 2025. The data come from Statistics Indonesia (BPS), the Ministry of Energy and Mineral Resources, the Audit Board of the Republic of Indonesia (BPK), and the Ministry of Finance.

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Data Analysis

The analysis computes three indices following Rahma et al. (2021).

1. **NRDI.**
   Mining GRDP per capita (PDRBT) and mining and oil and gas DBH per capita (DBHT) are converted into indices with min-max normalization:

$$IPDRBTi = \frac{(PDRBit - PDRBmin)}{(PDRBTmax - PDRBTmin)} x\ 100 \quad (1)$$

$$IDBHTi = \frac{(DBHit - DBHiTmin)}{(DBHITmax - DBHITmin)} x\ 100 \quad (2)$$

$$NRDIi = \frac{IPDRBTi - IDBHTi}{2} \quad (3)$$

2. **RSDI.**
   Six indicators capture the three dimensions: economic growth (EG), open unemployment (UNP), poverty (POV), the Human Development Index (HDI), the Gini ratio (GI), and the Environmental Quality Index (EQI). Before aggregation, EG, UNP, and POV are min-max normalized, and the RSDI is then calculated as the geometric mean of the six indicators:

$$RSDI = \sqrt[6]{IEG\ x\ HDI\ x\ EQI\ x\ (1 - IPOV)\ x\ (1 - GI)\ x\ (1 - IUNP)} \quad (4)$$

3. **RRCI**
   The RRCI is computed with the Geometric Mean of Conditional Weighted Product Method (CWPM):

$$Xit = \left(\frac{NRDIit}{NRDIt_min}\right) W1$$

$$Yit = \left(\frac{RSDIt_max}{RSDIit}\right) W2$$

$$RRCIit = \sqrt{Xit.Yit}$$

   where NRDI_t,min is the lowest NRDI and RSDI_t,max the highest RSDI among all regions in period t.

   Classification. The NRDI and RSDI are classified as low (< 30), moderate (30 to < 60), and high (≥ 60). For the RRCI, the cut-offs of Rahma et al. (2021) are < 0.3 (low), 0.3 to 0.6 (moderate), and ≥ 0.6 (high).

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RESEARCH RESULTS AND DISCUSSION

Natural Resource Dependency Index (NRDI)

Table 1 indicates that most of East Kalimantan is highly dependent on resources.

Table 1. NRDI, RSDI, and RRCI Values for the Regencies and Cities of East

Regency / City	NRDI	Dependency Level	RSDI	Development Level	RRCI
Berau	73.07	High	18.44	Low	1.52
Kutai Kartanegara	76.75	High	20.34	Low	1.50
West Kutai	76.76	High	22.51	Low	1.46
East Kutai	72.16	High	11.25	Low	1.71
Paser	77.87	High	17.44	Low	1.39
Balikpapan	20.63	Low	41.44	Moderate	1.00
Bontang	55.78	Moderate	37.73	Moderate	1.46
Samarinda	81.93	High	14.45	Low	1.66
Penajem Paser Utara	85.66	High	14.51	Low	1.67
Mahakam Ulu	61.08	High	15.19	Low	1.49

Kalimantan *Source: BPS, data processed.*

Penajam Paser Utara has the highest NRDI (85.66), followed by Samarinda (81.93), Paser (77.87), West Kutai (76.76), Kutai Kartanegara (76.75), Berau (73.07), East Kutai (72.16), and Mahakam Ulu (61.08). In these eight regions, economic activity and fiscal capacity remain strongly tied to mining, both through the mining share of GRDP and through DBH revenue. Bontang (55.78) is in the moderate class, which suggests a somewhat more diversified economic structure. Balikpapan (20.63) is the only region with low dependency. Its economy is driven by trade, services, manufacturing, and transportation, so it is far less exposed to commodity price swings than the producing regencies.

Regional Sustainable Development Index (RSDI)

Sustainable development is rated low in eight of the ten regions: Berau, Kutai Kartanegara, West Kutai, East Kutai, Paser, Samarinda, Penajam Paser Utara, and Mahakam Ulu. Only Balikpapan (41.44) and Bontang (37.73) reach the moderate category, and none attains the high category. East Kutai records the lowest RSDI at 11.25. Balikpapan's position reflects its high HDI, comparatively low poverty, and better-developed urban infrastructure, whereas Bontang does reasonably well on social and economic indicators but remains under environmental pressure from industrial activity. Overall, the low RSDI values show that sustainable development is uneven and that mining revenue has not yet been translated into balanced economic, social, and environmental outcomes.

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Regional Resources Curse Index (RRCI)

East Kutai records the highest RRCI (1.71), followed by Penajam Paser Utara (1.67), Samarinda (1.66), Berau (1.52), Kutai Kartanegara (1.50), Mahakam Ulu (1.49), West Kutai and Bontang (1.46 each), and Paser (1.39). Balikpapan has the lowest value (1.00). Under the thresholds of Rahma et al. (2021), all ten regions fall into the high category (RRCI ≥ 0.60). Because the RRCI is normalized against the region with the lowest NRDI and the highest RSDI in each period, its minimum attainable value is 1.00, which is exactly Balikpapan's score. Absolute thresholds therefore discriminate poorly in this setting, and the RRCI is better used as a relative ranking than as a binary classification. On this reading, East Kutai, Penajam Paser Utara, and Samarinda show the strongest NRC indications, while Balikpapan shows the weakest.

Relationship Between NRDI, RSDI, And RRCI

The three indices should be interpreted jointly. East Kutai pairs a high NRDI (72.16) with the lowest RSDI (11.25), which yields the highest RRCI. Penajam Paser Utara (NRDI 85.66, RSDI 14.51) and Samarinda (NRDI 81.93, RSDI 14.45) follow the same pattern of very high dependency and low development. Paser, West Kutai, Kutai Kartanegara, and Berau are similarly dependent but have slightly higher RSDI, so their RRCI values are somewhat lower. Bontang and West Kutai share an RRCI of 1.46 through different combinations: Bontang has moderate dependency and moderate development, whereas West Kutai has high dependency and low development. This shows that identical composite values can arise from different structures, so NRC indications cannot be judged from dependency alone. Balikpapan combines the highest RSDI with the lowest NRDI, which explains its lowest RRCI and illustrates how diversification supports better development outcomes.

These results agree with Rahma et al. (2021), who found that resource-rich areas tend to face a stronger resource curse, and with Amalia and Emalia (2022), whose RRCI results indicated that mining-rich provinces in Sumatra remain more exposed even when resource revenue supports growth. They are also consistent with the Dutch Disease argument of Corden and Neary (1982): the region with the least dependence on mining is the one with the more diversified economy and the better development outcomes. The framework of Mehlum, Moene and Torvik (2006) and Van der Ploeg (2011) suggests that the weak development in the highly dependent regencies may reflect how resource revenue is managed, not the resources themselves, although this study does not test that mechanism.

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Limitations

The indices identify structural vulnerability and relative position among regions. They do not show that the NRC has occurred causally, since no relationship between resource variables and growth is tested here. The RRCI is also relative to the sample, so values cannot be compared directly with other provinces or studies without recalculating. Future studies can combine the indices with econometric tests and add institutional quality variables.

CONCLUSIONS AND RECOMENDATIONS

The indices show that NRC indications in East Kalimantan vary across regencies and cities. Resource dependency (NRDI) is high in eight regions, moderate in Bontang, and low in Balikpapan. Sustainable development (RSDI) is low in eight regions, moderate in Balikpapan and Bontang, and high in none. The RRCI is highest in East Kutai (1.71) and lowest in Balikpapan (1.00). Indications are strongest where high dependency coincides with low sustainable development, and the RRCI should be understood as an indicator of structural vulnerability rather than proof that the NRC has occurred.

In practical terms, regional governments are encouraged to diversify their economies and revenue sources toward manufacturing, trade, services, and tourism, and to channel mining-based revenue such as DBH into human development, poverty reduction, and environmental quality. Priority should be given to East Kutai, Penajam Paser Utara, and Samarinda. Future research should extend the observation period and regional coverage and combine the index analysis with panel regression and institutional variables.

REFERENCES

Amalia, F., & Emalia, Z. (2022). Fenomena kelimpahan sumber daya alam dan natural resource curse dalam perspektif ekonomi di Pulau Sumatera [The phenomenon of natural resource abundance and the natural resource curse from an economic perspective in Sumatra]. *BULLET: Jurnal Multidisiplin Ilmu, 1*(5), 1–14.

Amalia, F., & Emalia, Z. (2022). Fenomena kelimpahan sumber daya alam dan natural resource curse dalam perspektif ekonomi di Pulau Sumatera [The phenomenon of natural resource abundance and the natural resource curse from an economic perspective in Sumatra]. *BULLET: Jurnal Multidisiplin Ilmu, 1*(5), 1–14.

Auty, R. M. (1994). *Industrial policy reform in six large newly industrializing countries: The resource curse thesis*. University of Lancaster.

BPS. (2025). *[Complete publication title]*. Badan Pusat Statistik. [URL]

Corden, W. M., & Neary, J. P. (1982). Booming sector and de-industrialisation in a small open economy. *The Economic Journal, 92*(368).

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Fahriza, A., & Hartono, D. (2018). Pengaruh minyak dan gas terhadap kinerja pertumbuhan ekonomi regional: Sebuah kutukan atau anugerah? [The effect of oil and gas on regional economic growth performance: A curse or a blessing?]. *EKUITAS (Jurnal Ekonomi dan Keuangan), 2*(2), 184–202. https://doi.org/10.24034/j25485024.y2018.v2.i2.3940

Gregow, K., & Hermele, K. (2011). *From curse to blessing*. Forum Syd.

Gylfason, T. (2001). Natural resources, education, and economic development. *European Economic Review, 45*, 1–13.

Humphreys, M. (2007). *Escaping the resource curse*. Columbia University Press.

Mehlum, H., Moene, K., & Torvik, R. (2006). Cursed by resources or institutions? *The World Economy, 29*, 1117–1131. https://doi.org/10.1111/j.1467-9701.2006.00808.x

Rahma, H., Fauzi, A., Juanda, B., & Widjojanto, B. (2021). Fenomena natural resource curse dalam pembangunan wilayah di Indonesia [The natural resource curse phenomenon in regional development in Indonesia]. *Jurnal Ekonomi dan Pembangunan Indonesia, 21*(2), 1–17. https://doi.org/10.21002/jepi.2021.10

Rosser, A. (2004). *Why did Indonesia overcome the resource curse?* Institute of Development Studies.

Sachs, J. D., & Warner, A. M. (1995). *Natural resource abundance and economic growth*.

Van der Ploeg, F. (2011). Natural resources: Curse or blessing? *Journal of Economic Literature, 49*(2), 366–420. https://doi.org/10.1257/jel.49.2.366

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