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Building resilience with nickel: mining revenues and subnational spending in Indonesia

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Summary

Indonesia's downstream integration into global nickel supply chains has had significant economic benefits, strengthening the country's position in the global energy transition and increasing the Government's fiscal revenues. At the same time, nickel-producing regions face heightened exposure to climate-related and environmental risks, including flooding, ecosystem degradation and pollution. These dynamics make growing demands of subnational governments, which play a central role in disaster response and climate adaptation. Best practices from other commodity-driven economies offer some useful policy lessons for Indonesia, ranging from stakeholder coordination platforms to revenue stabilisation funds.

Finite resources and growing risks

Indonesia's nickel industry has experienced rapid growth in recent years. While bringing economic benefits, this has created social and environmental risks. Indonesia needs to confront the finite nature of its nickel reserves, the volatility of commodity markets and the challenge of translating temporary fiscal windfalls into long-term resilience and economic stability.

This is particularly evident in the major nickel-producing provinces of Southeast Sulawesi, Central Sulawesi and North Maluku, which have experienced an increasing number of hydrometeorological disasters during this period of economic growth. Climate change has driven an increase in frequency and intensity of extreme weather events, with the severity of impacts exacerbated by urbanisation and other land-use change. In particular, deforestation linked to the nickel industry has reduced the size of catchment areas that could absorb rainfall and help regulate flooding and water availability. Furthermore, sedimentation associated with mining and mineral processing can lead to adverse health outcomes and reduce the productivity of sectors that are reliant on well-functioning ecosystems, such as agriculture and fisheries. Therefore, climate risks and environmental pressures will persist after the country's nickel reserves have been depleted if no proactive measures are taken.

In response to heightened natural-disaster and climate risks, the Government of Indonesia has developed the Disaster Risk Financing and Insurance Strategy (2018) to improve the timeliness and availability of funding for emergency response and recovery. Yet this framework remains largely geared towards reactive disaster response rather than proactive adaptation measures. The private sector sometimes conducts voluntary corporate social responsibility projects. It is also required by law to provide reclamation and post-mining guarantees, and to pay into a community development and empowerment fund, but this does not necessarily support long-term climate resilience-building.

Fiscal challenges

Meanwhile, subnational governments still face significant fiscal constraints. Despite two decades of fiscal decentralisation, they are still largely reliant on transfers from the central government to support their budgets and provide emergency support in response to major disasters. Moreover, competing development priorities (including legal requirements to provide high-quality education and healthcare) restrict their capacity to fund projects in areas such as climate resilience.

Between 2016 and 2025, mining-related fiscal revenues became ever more important to the subnational public finance systems in Southeast Sulawesi, Central Sulawesi and North Maluku. The growth of the nickel industry led to a significant increase in subnational fiscal revenue in these provinces. The overall growth in these revenues in the three provinces was largely driven by the increase in transfers from the central government to municipal and provincial governments, and revenue-sharing from coal and minerals (via royalties and land rent from upstream nickel production). By 2025, coal and mineral revenue-sharing in Southeast Sulawesi and North Maluku was 26% and 14%, above the national average, respectively. The equivalent for Central Sulawesi was just 8%, due to the

province's greater reliance on nickel processing and refining – midstream stages of production that the revenue-sharing mechanism does not cover. However, even in Southeast Sulawesi and North Maluku, this revenue stream did not grow every year. In 2024, revenue-sharing suffered from a fall in global nickel prices linked to factors ranging from uncertainty in the composition of battery technologies to shifts in Chinese demand for steel. This emphasises the importance of planning revenue management and fiscal buffers. If subnational governments make expenditure commitments based only on high-revenue years, downturns in commodity prices could increase fiscal pressures.

Overall, subnational spending has increased substantially with the expansion of the nickel industry, but has not led to significantly higher funding for adaptation and resilience efforts. Spending on environmental protection, social protection and security-related services has been relatively stable as a share of total expenditure, generally accounting for less than 5% of spending. This could suggest that changes in mining-related revenues do not automatically translate into proportional adjustments in resilience-oriented spending at the subnational level. Yet, in Indonesia's political economy, spending on social protection comes primarily from the national government through, for example, cash transfers and food assistance to citizens, with subnational governments playing a complementary role.

Climate adaptation and resilience measures may be embedded in other, broader areas of government spending beyond the categories discussed above, such as housing, public facilities and economic affairs. As a consequence, Indonesia's total climate-relevant spending may be higher than indicated by social and environmental protection budgets alone. Nevertheless, as climate budget-tagging data show, overall adaptation expenditure grew only modestly between 2022 and 2024. This was despite such expenditure in areas ranging from healthcare, flood management, irrigation and coastal protection to aquaculture, agriculture and administration.

Policy lessons

The experiences of Chile, Colombia and Peru all provide valuable lessons in the management of mining revenues. Chile shows how stabilisation and savings arrangements can be used to smooth volatile commodity revenues and direct fiscal windfalls towards social, environmental and industrial investment. Colombia combines royalty earmarking with digital transparency tools that enable the public to track the location, cost and implementation of royalty-funded projects. Peru, meanwhile, offers examples of how to promote better planning and use of resources by visibly linking mining revenues to environmental projects and institutionalising coordination between the Government, companies, communities and other stakeholders.

Indonesia has valuable precedents of its own. Revenue-sharing systems for commodities such as palm oil, tobacco and timber already use forms of earmarking for infrastructure, environmental management, healthcare and social protection. Moreover, the Government has established a dedicated fund to manage palm oil revenues. While such mechanisms require further effectiveness assessments and may need to be applied differently in the nickel industry, they have provided the country with institutional experience in managing and directing commodity-related revenues.

Core recommendations

Reflecting on the current state of the nickel industry, climate risks, fiscal challenges and policy lessons from other countries, the Government of Indonesia should:

- **Promote data transparency for traceable spending.** The Government has piloted subnational climate budget tagging, but full disclosure of spending on climate adaptation and mitigation could enhance accountability. Furthermore, the harmonisation of adaptation projects with existing platforms, such as the Ministry of Environment's National Climate Change Registry System, could boost public participation in assessments of their effectiveness. This could also help improve the design of future projects.

- **Improve coordination on revenue management with and between different types of stakeholders in the private sector, academia and civil society**, with a view to encouraging a more effective use of resources. Strengthening local planning and project appraisal capacity

will help ensure that additional revenues translate into effective resilience investments rather than fragmented or short-term expenditure. Moreover, institutionalising the coordination process for long-term planning could help channel funds towards the most effective resilience building measures.

- **Explore the creation of revenue stabilisation funds** to help manage fiscal windfalls during commodity booms. A share of fiscal revenues from the mining sector could be allocated to long-term investments, including those that build resilience, rather than short-term expenditure. Such spending would expand on current funding for measures that address externalities from mining (such as the Community Development and Empowerment Fund and reclamation and post-mining guarantees). This would also help mitigate the fiscal risks of global commodity price shocks.

The combination of these three approaches could help create an environment that attracts climate adaptation funding and could improve Indonesia's resilience in the medium and longer term. A revenue stabilisation fund would help secure a steady stream of financing during economic downturns, when there is a decline in revenue from commodities such as nickel. Meanwhile, enhanced data transparency and coordination practices would promote effective fiscal planning and the efficient use of existing funds, both of which are crucial given Indonesia's fiscal constraints.

1. Introduction

As global nickel demand has increased, Indonesia's downstream integration into nickel supply chains has produced significant economic and fiscal gains. Yet these gains have come at a social and environmental cost. At the same time, changes in land use linked to extractive activities such as mining may have exacerbated climate risks in already vulnerable regions. In this report, we explore the effects of the fiscal windfall from the nickel industry's expansion, focusing on the ways in which it can support climate adaptation and resilience at the subnational level.

Nickel has become a cornerstone of the global energy transition, supporting the rapid expansion of low-carbon technologies such as electric vehicles (EVs) and energy storage technologies (alongside its traditional use in products such as stainless steel). The International Energy Agency (2022) projects that global demand for nickel may rise by as much as 41 times between 2020 and 2040. Home to one-third of global nickel reserves, Indonesia has become the world's largest nickel producer. The country's downstreaming policy[1] has often been touted as helping it move up the nickel value chain, accelerate export growth and generate greater fiscal revenues for the Government.

Indonesia's nickel boom has had mixed outcomes for local communities' wellbeing. While it has helped improve infrastructure and living standards, it has also had negative social and environmental outcomes, particularly in increasing deforestation and pollution. One study in Sulawesi, Indonesia's primary nickel-producing region, found that villages near mines experienced deforestation at almost double the rate of those outside mining areas between 2011 and 2018 (Lo et al., 2024). Land-use change associated with extractive industries could exacerbate climate hazards (Almeida et al., 2025), an area in which Indonesia has long been vulnerable (World Bank and Asian Development Bank, 2021). With the country's nickel-producing regions already among its most climate-vulnerable regions, land-use change from mining could accelerate environmental degradation and weaken their resilience against climate change. This could occur through, for example, the reduction of catchment areas that absorb rainwater, such as forests.

While Indonesian provinces have benefited economically from nickel production, it is important to ensure that the fiscal frameworks are in place to mitigate their increased exposure to climate change and nature degradation. Investing in resilience measures and strengthening environmental safeguards can help offset future damages in the event of a natural disaster or climate event. The November 2025 cyclone-induced floods in Sumatra underscore this point. A region that has historically been associated with palm oil production, gold mining and deforestation, Sumatra experienced floods that led to the displacement of around one million people and the deaths of more than 1,000 others (Washington, 2026). At the time, the event was not declared as a national disaster, which restricted the use of centrally administered emergency funds for logistical and medical assistance, as well as access to foreign aid and assistance (Centre for Regulation Policy and Governance, 2025).

Subnational governments face fiscal constraints in responding to natural disasters, often relying on transfers from the central government or international aid. Therefore, Indonesia needs to enhance its public finance framework to become resilient against the unfolding impacts of climate change, ranging from catastrophic floods to droughts. The efficient allocation of fiscal revenues is especially crucial given the country's low tax receipts; Indonesia's tax-to-GDP ratio stood at 9.1% in 2021 (World Bank, 2025), far below averages in the Asia-Pacific and the Organisation for Economic Co-operation and Development (OECD) of 19.6% and 33.9%, respectively (OECD, 2025a).

Indonesia has private and public sector frameworks for handling climate shocks, but they remain largely reactive. While private sector and state-owned mining companies are required to address

[1] As part of its downstreaming policy, the Indonesian government prohibited exports of raw materials to boost domestic refining and increase Indonesia's share of high-value production processes.

some environmental and social externalities through mechanisms such as environmental impact assessments (AMDAL), reclamation guarantees and community development funds, these instruments are primarily oriented towards remediation and compensation rather than long-term climate adaptation and resilience building. Moreover, while climate adaptation has received growing attention in recent years, existing public sector disaster financing mechanisms are largely centred on reactive disaster response.

This raises the issue of whether, following the higher spending on building adaptation and resilience associated with fiscal windfalls from nickel mining, Indonesia's subnational regions are now resilient enough to withstand climate and environmental impacts linked to mining. This report defines adaptation and resilience spending as the use of public funds to reduce vulnerability to climate-related risks and enhance the capacity of systems, communities and economies to anticipate, absorb and recover from climate shocks. We address not only disaster risk management (e.g. emergency response and recovery) but also proactive, forward-looking investments in areas such as climate-resilient infrastructure, water management, healthcare systems and support for climate-sensitive livelihoods (e.g. agriculture and fisheries).

We explore these themes by focusing on Southeast Sulawesi, Central Sulawesi and North Maluku. Holding the largest proven nickel reserves in Indonesia, these provinces are the country's primary nickel-producing regions (Ministry of Energy and Mineral Resources, 2025) and have experienced notable economic losses from natural disasters. We do not attempt to establish a causal relationship between nickel production and such disasters, but look at how spending patterns have evolved since mining-related fiscal revenues began to rise.

Box 1.1. Definitions of key terms

- **Adaptation and resilience spending:** public spending to reduce vulnerability to climate-related risks and strengthen the capacity of systems, communities and economies to anticipate, absorb and recover from climate shocks. Due to budget classification constraints, we proxy adaptation and resilience-related spending using selected categories of subnational expenditure, such as social protection, environmental protection, security services (including disaster risk management) and economic services (diversification away from the mining industry). This is separate from spending to address the externalities of mining, which comes from mechanisms such as AMDAL, reclamation guarantees and corporate social responsibility initiatives.

- **Mining revenues:** these refer to non-tax revenues the Government receives from extractive activities, specifically royalties and land rent. Royalties are variable and depend on mineral prices and production volumes, while land rent is fixed. These revenues are captured through the revenue-sharing mechanism, a component of the central government's transfers to the subnational government, and are primarily linked to upstream extraction activities.

This report is structured as follows:

- **Section 2** focuses on the climate and fiscal risks faced by Southeast Sulawesi, Central Sulawesi and North Maluku, as well as the relationship between the nickel industry and those risks.
- **Section 3** provides an overview of the global nickel market, the design of Indonesia's nickel downstreaming policy, and the impact of nickel supply chains on subnational governments' fiscal revenues.
- **Section 4** explores the relationship between rising fiscal revenues at the provincial level and increased spending on social and environmental protection.
- **Section 5** discusses Indonesia's existing initiatives for building climate resilience.
- **Section 6** examines revenue management practices from other countries that have experienced commodity-driven fiscal windfalls.
- **Section 7** makes a series of recommendations for Indonesian policymakers.

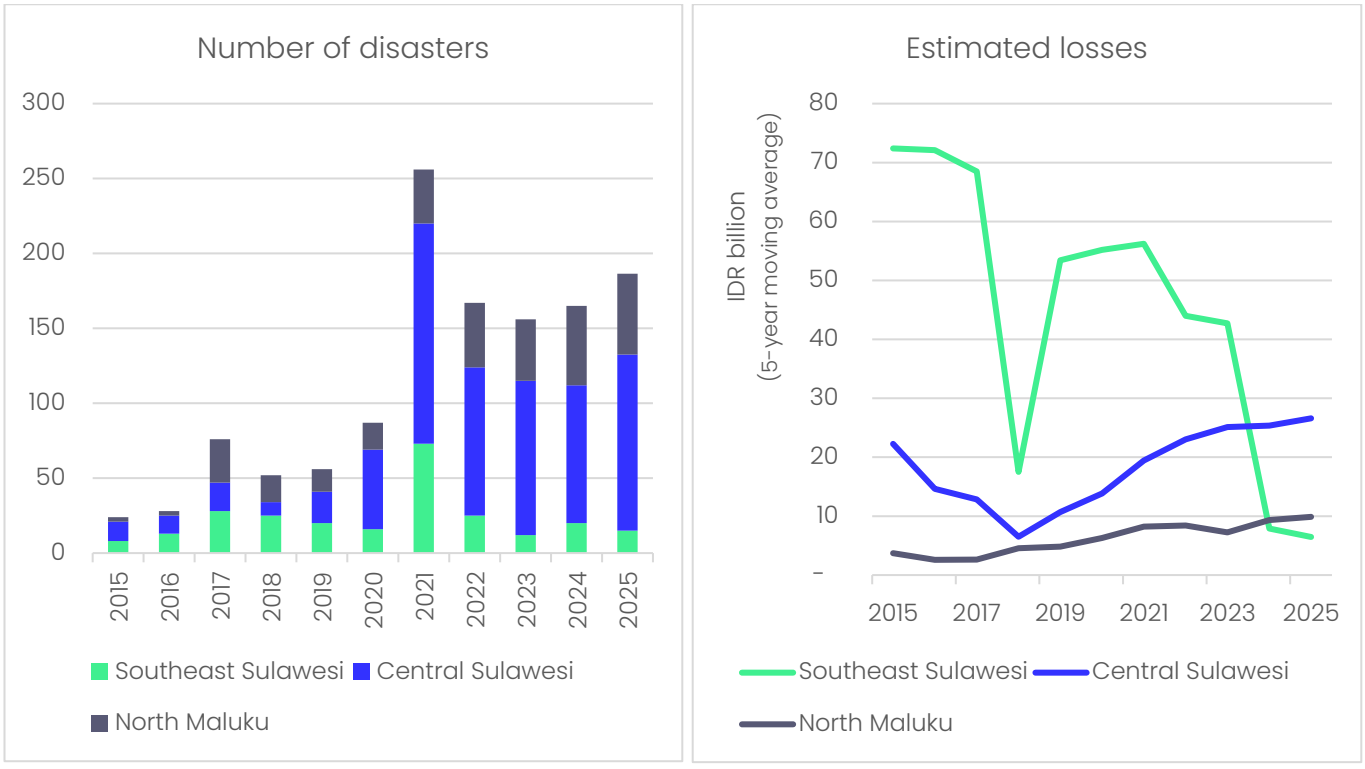
2. The relationship between the nickel supply chain and climate and fiscal risks

Indonesia faces escalating climate risks compounded by increased land-use change, with estimated losses from hydrometeorological disasters reaching approximately US$43.6 million between 2015 and 2024 in Southeast Sulawesi, Central Sulawesi and North Maluku. At the same time, an increase in climate-linked disasters threatens to reduce subnational governments' fiscal capacity. It will be vital to manage such risks and build long-term resilience, especially given the varied impacts of mining.

Growing climate risks

Southeast Sulawesi, Central Sulawesi and North Maluku are increasingly exposed to hydrometeorological disasters (see Figure 2.1). The rate of such disasters has been relatively stable in Southeast Sulawesi, but has trended upwards in Central Sulawesi and North Maluku, signalling an increase in exposure to climate change impacts. As one observer describes it, Central Sulawesi has become a "laboratory of natural disasters" (Hanif et al., 2024: 20). However, climate change is not the sole driver of this trend; land-use change and urbanisation also play a role in altering the landscape and reducing drainage capacity. Other drivers include mine development and the construction of smelters, roads and other supporting infrastructure.

Figure 2.1. Hydrometeorological disasters in Southeast Sulawesi, Central Sulawesi and North Maluku



Source: National Disaster Countermeasure Agency (2025). Natural disasters include floods, extreme weather, rogue waves and abrasion, forest and land fires, droughts and landslides.

The National Disaster Countermeasure Agency estimates that cumulative losses from hydrometeorological natural disasters reached IDR 764 billion (US$43.6 million) in the three provinces between 2015 and 2024. Floods account for most of the recorded incidents. These natural disasters have damaged physical infrastructure and reduced overall economic activity across the three provinces. Although Southeast Sulawesi initially experienced higher estimated losses than the other two provinces in the period, its losses tended downwards over time. Central Sulawesi and North Maluku experienced the opposite trend, with the largest share of the damage in the former province occurring between 2024 and 2025. Nevertheless, despite the extent of this damage, residents of Central Sulawesi still have a relatively limited understanding of climate change (Hanif et al., 2024).

Fiscal risks

In the long run, fiscal planning will become even more critical as the effects of climate change grow. The physical and transition risks from climate change will continue to create risk exposures across the economy and public sector, including in aspects of public finance such as government expenditure and revenue. The fiscal impact of climate change will be channelled through multiple routes and across different levels of government. Compounding this risk is the resource curse: as seen in commodity booms in other countries, nations rich in natural resources have relatively few incentives to diversify economically and often underperform in developmental outcomes, fiscal discipline and efficiency of spending (Sachs and Warner, 1995; Ross, 1999).

The macroeconomic impact of natural disasters includes heightened fiscal risk from reduced tax revenues and increased expenditure. Spending on social and environmental protection cushions the effects of such disasters and directly contributes to resilience by addressing critical vulnerabilities (OECD, 2019). On the fiscal side, public funding is needed for emergency response, social security payments and reconstruction of public infrastructure and private households. Governments need to respond quickly to disasters to relieve the societal burden. In the long run, public funds are required to build socioeconomic resilience in preparation for future disasters, such as by investing in an early warning system or public infrastructure that accounts for climate change risks. Therefore, budget credibility and flexibility are important to both act fast and develop long-term disaster resilience plans.

Many subnational governments often have limited funds for disaster response, making them reliant on aid or transfers from the central government to cover the damages (World Bank, 2022). The Indonesian Ministry of Finance's 2025 fiscal capacity mapping exercise shed light on subnational governments' ability to finance projects beyond paying their personnel, revealing that Southeast Sulawesi, Central Sulawesi and North Maluku had low capacity in this regard (Ministry of Finance, 2025a). Although Indonesia has engaged in fiscal decentralisation since 2001, subnational governments are still largely reliant on transfers from the central government. This is the case in the three provinces, despite the fact that they have experienced an increase in *Pajak Asli Daerah* (own-source tax revenues) in recent years (Lewis, 2023b).

The Ministry of Finance launched the Disaster Risk Financing and Insurance Strategy (DRFI) in 2018 (Ministry of Finance Indonesia, 2026). The DRFI strategy focuses on providing sufficient funds in a timely manner according to the phase of a disaster. Its financing strategy adopts a multi-layered approach to risk based on the disaster's frequency and severity. Expenditure under both state and subnational budgets accounts for different levels of risk. Under the DRFI strategy, the authorities' response to low-frequency, high-impact disasters can tap into contingent loans from multinational development banks to the Disaster Pooling Fund (PFB). The strategy is designed to gradually shift the burden of financial responsibility for disaster response away from public budgets and towards private financing through household, state-asset and catastrophe insurance. A key component of the DRFI, the PFB plays a crucial role in providing quick and efficient financing for disaster response without overburdening national and subnational budgets.

The PFB is an off-budget mechanism for disaster response that operates on an ex-post basis, leaving a gap for proactive climate adaptation. The PFB was formally initiated in Indonesia in 2021, managed by the Environmental Fund Management Agency (BPDLH), a special vehicle or public service agency under the Ministry of Finance. The PFB was created as an off-budget government fund to provide adequate, timely, targeted, planned and sustainable disaster relief support through fundraising, central and regional coordination, risk transfers through insurance schemes, and strategic

partnerships and governance. The PFB acts as the main government financing mechanism for disaster response and draws on various sources, including contributions by the national and subnational governments, as well as the private sector. The resulting funds are invested, with the return used to support preparation for disasters, emergency response and post-disaster recovery, including the implementation of a risk transfer mechanism (BPDLH, 2025). However, as an off-budget instrument that largely comes into effect following a disaster, the PFB is separate from proactive, on-budget fiscal commitments to climate adaptation at the subnational level, which are the primary focus of this analysis.

To overcome coordination challenges, it will be critical to define clear roles and responsibilities for national and subnational governments in mitigating the physical and transition risks of climate change. As it stands, subnational governments only make voluntary contributions to this process, even though have a deeper understanding of the characteristics and climate risk profiles of their local areas. This means that at times when they have limited fiscal space, most of the fiscal risk shifts to the national government.

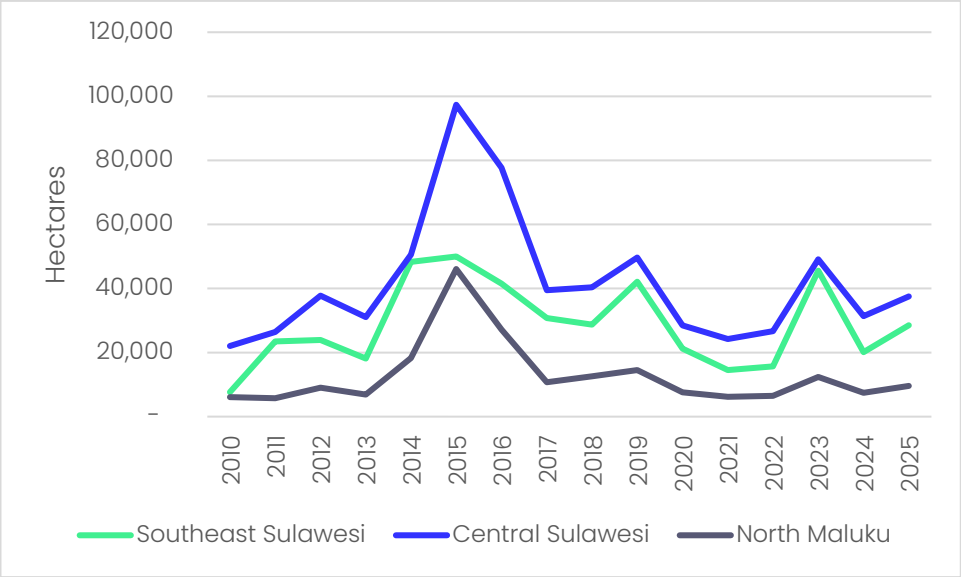
In the long run, it is vital to incentivise subnational governments to manage risk, build resilience against disasters and play a greater role in the broader effort of adaptation to climate change, especially when they experience fiscal windfalls. However, as previously discussed, the evidence suggests that there is a link between such windfalls and the unproductive spending that characterises the resource curse. In other words, fiscal windfalls can create pressure to spend rapidly and without sufficient planning, weaken the incentives for fiscal discipline and, in some cases, fail to translate into improvements in public welfare or public service delivery (Manzano and Gutierrez, 2019). Therefore, it is crucial to implement policy mechanisms that channel resource revenues into resilience-enhancing investments rather than short-term projects when the opportunity arises.

Interactions with the nickel supply chain

Although the nickel downstreaming policy has provided some economic benefits to Southeast Sulawesi, Central Sulawesi, and North Maluku, this has been accompanied by adverse social and environmental consequences. Overall, the policy has raised basic living standards, created employment opportunities and improved infrastructure through corporate and public investments (Lo et al., 2024). However, there have been trade-offs in increasing social tension, as communities used demonstrations and sometimes violence to obtain compensation for environmental damage and a loss of economic opportunities (Hudayana et al., 2021). The growth of the nickel industry has affected other forms of economic activity through, for instance, the buildup of debris from mining on cultivated land, which damages farmers' productivity, and of toxic pollutants near the captive coal plants that power nickel smelters, which correlates with a higher incidence of respiratory illnesses (Myllyvirta et al., 2024).

The environmental trade-offs of nickel mining have affected Indonesia's ecosystems on land and in rivers and oceans. Between 2015 and 2025, tree cover in Southeast Sulawesi, Central Sulawesi and North Maluku significantly decreased (Figure 2.3). While mining is not the sole cause of deforestation in these provinces, one study found that villages in mining areas experienced 4% more deforestation than others during 2011–18 (Lo et al., 2024). This could lead to not only productivity losses but also greater fiscal pressure due to higher exposure to climate-driven extreme weather events, increasing the need for healthcare spending. For example, following the spread of mining waste around the industrial park in North Maluku, fishermen working nearby have reported reduced yields and heavy traces of toxins in fish they caught in the area (Aviram, 2025). With the nickel production having contributed to these vulnerabilities, it is important to use fiscal revenues from mining to address such issues by, for example, building climate-resilient health and infrastructure systems. This approach could help build longer-term resilience.

Figure 2.2. Annual tree cover loss



Source: Global Forest Watch (2025).

Companies are required to conduct AMDAL before they begin mining activities. This is mandated under Law No. 32 (2009) and Law No. 4 (2009), which has been amended four times since it was first introduced. AMDAL serves as an important forward-looking instrument to assess, mitigate and monitor the environmental risks associated with large-scale projects, including mining operations. However, many believe there has been a lack of sufficient public participation in the AMDAL process, as the procedure has become less stringent following government reforms (Romianingsih et al., 2023). The Government implemented these reforms through Regulation No. 22 (2021) on Environmental Protection, Organisation and Management as part of the Omnibus Law on Job Creation, intending to draw in further investment and improve the ease of doing business (Halimatussadiah et al., 2025).

Mining companies are obligated to contribute some of the proceeds of their operations to environmental and social causes, but the provisions have evolved over the years. Previously, under Government Regulation No. 78 (2010) on Reclamation and Post-Mining, the Ministry of Energy and Mineral Resources (2010) required holders of mining business permits to provide reclamation[2] and post-mining[3] guarantees. However, under Law No. 2 (2025), companies are now allowed to choose whether to provide both reclamation and post-mining guarantees or just one of the two (Audit Board of Indonesia, 2025). Furthermore, under the Law on Minerals and Coal/Ministry of Energy 41 (2016), companies must contribute to a Community Development and Empowerment Fund that supports economic welfare, education, social and cultural activities, and healthcare for communities near mining areas.

Private sector participants in the nickel industry engage in corporate social responsibility (CSR) activities, but concerns have been raised about their effectiveness. One criticism of such activities is that they are not distributed equitably and are often symbolic in nature (Palpacuer and Roussey, 2024). Furthermore, in some cases, while CSR budgets have been disclosed and may increase each year, the allocations under them are opaque, making it more difficult to assess the effectiveness of this spending (Muflih et al., 2025). Nevertheless, the private sector has collaborated with the Government and academia to carry out these efforts – as seen in, for example, mangrove and coral reef restoration projects in North Maluku (Fadilah, 2024; Saputra, 2023) and a biodiversity park in South Sulawesi (Vale, 2024). While these initiatives may provide important local benefits, they remain voluntary and project-based rather than systematic.

[2] Reclamation guarantees provide for the restoration of mining areas during or immediately after operations.

[3] Post-mining guarantees cover planned longer-term activities aimed at restoring pre-existing environmental and ecological conditions in local areas after mining has ceased.

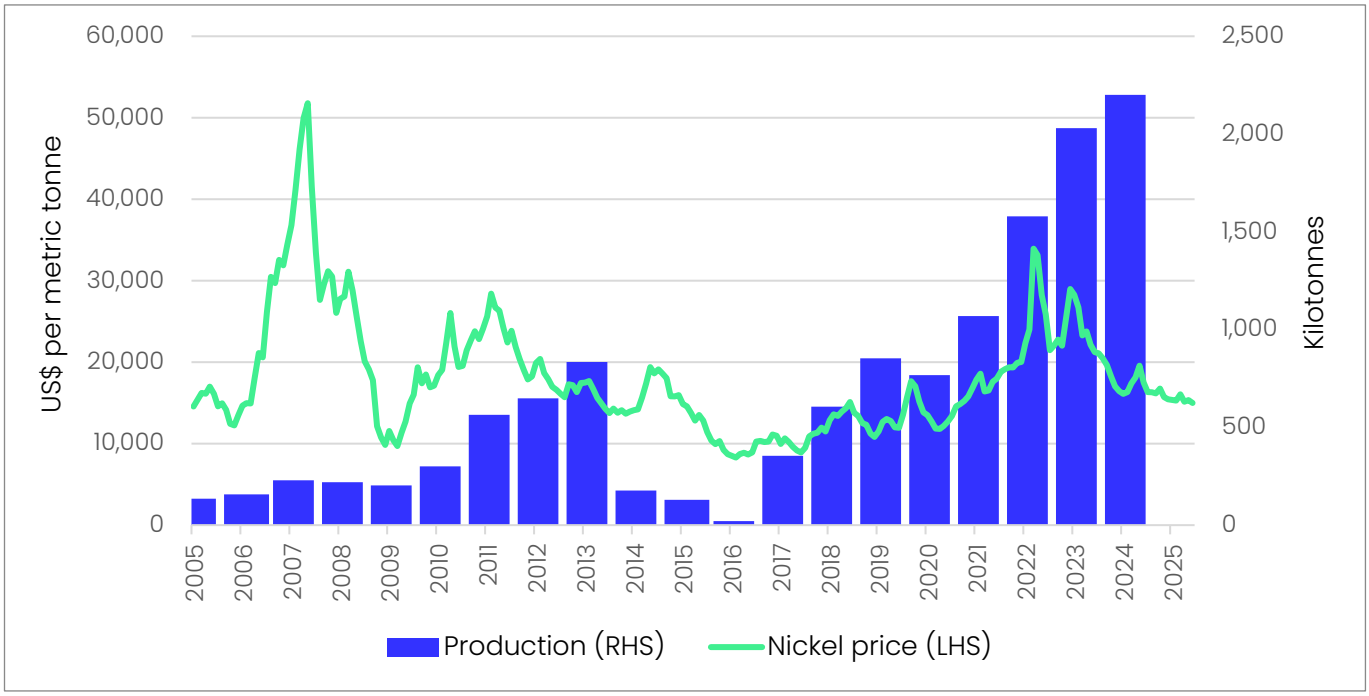
3. Nickel market dynamics and fiscal incentives

This section examines the evolution of the global nickel market and Indonesia's policy measures to support the development of domestic nickel supply chains. It highlights how these measures contributed to a rapid growth in nickel production and processing, while also creating trade-offs related to fiscal revenues and exposure to market volatility. We show how fluctuations in global nickel demand and prices affect the sustainability of fiscal windfalls and associated revenues in nickel-producing regions.

Nickel market dynamics

Global demand for nickel has grown considerably in the last two decades, with Indonesia's nickel production responding accordingly. In 2008, the expansion of China's stainless-steel industry began to drive the rise in demand for nickel, a key input. Indonesian nickel production helped fuel this growth, steadily increasing during 2009–13 (Figure 3.1). The Indonesian government implemented policies designed to capitalise on the growing nickel market, moving away from solely extracting nickel to integrate into later stages of the supply chain. This motivated the first nickel export ban in 2014, leading to a decline in production. That ban was lifted in 2017 to ease the pressures on domestic producers (Terauds, 2017).

Figure 3.1. Global nickel prices and Indonesia's nickel ore production



Source: *United States Geological Survey (2014; 2019; 2023; 2025) and International Monetary Fund (2025).*

In 2020, with the EV industry growing rapidly, the Indonesian government reinstated the export ban. It remains in place to this day. EV battery production, for which nickel is an important input, provides higher value add than stainless steel but requires more steps in production and a higher technical capacity. Indonesia's nickel production increased by around 164% between 2013 and 2024, as shown in Figure 3.1.

In 2024, having rapidly expanded its nickel smelters, Indonesia imported 10.4 million tonnes of nickel ore from the Philippines to meet demand, which was projected to grow further in 2025 (Decena, 2025). Indonesia is projected to have depleted its reserves of high-grade nickel by around 2036, and lower-grade nickel ore by around 2056 (Sunuhadi et al., 2024). In October 2025, the Government shortened production mining quotas from 3 years to 1 year, with the aim of controlling the output of commodities such as coal and nickel (Reuters, 2025). All these factors contribute to the underlying tension in the country's downstreaming policy.

The Government enacted several policies beyond the export ban that helped attract investment in the nickel supply chain at the expense of increased fiscal revenues. These provisions included a tax holiday, which entailed reductions in corporate income tax rates of 50–100% for 5–20 years depending on the amount a company invested, as well as customs duty exemptions for imports of machinery and other equipment used in nickel production. The Government also simplified regulations and expedited the permits process for participating companies (Ministry of Investment, 2022). While these efforts have contributed to an increase in the number of nickel companies operating in Indonesia, the tax provisions represent a potential lost opportunity to significantly boost government revenues.

Effective management of fiscal windfalls is especially crucial due to the volatility of nickel prices. Trends in recent years reflect this. Russia's full-scale invasion of Ukraine in 2022 triggered a spike in global nickel prices, as concerns mounted about the security of the nickel supply from Russia, another key producer (Guberman, 2024). In more recent years, nickel markets have experienced a slump as demand has shifted away from nickel-based nickel manganese cobalt (NMC) and towards lithium iron phosphate (LFP) (Christina, 2025). Moreover, China's economic slowdown contributed to a reduction in steel demand (Organisation for Economic Co-operation and Development [OECD], 2025b). According to data from the London Metals Exchange, nickel prices fell from a peak of approximately US$33,000 per tonne in April 2022 to around US$15,000 per tonne in 2025. Meanwhile, production continued to increase in the same period. To control prices, Indonesia's Ministry of Energy revised the quota for nickel production from 370 million tonnes to around 260–270 million tonnes in its 2026 work plan and budget (Hidayatullah, 2026). However, quota adjustment policies may be reactive in nature and may not fully address market volatilities. The divergence between high output and weakening demand lowers the potential revenues for producing regions and the associated fiscal revenues of governments there.

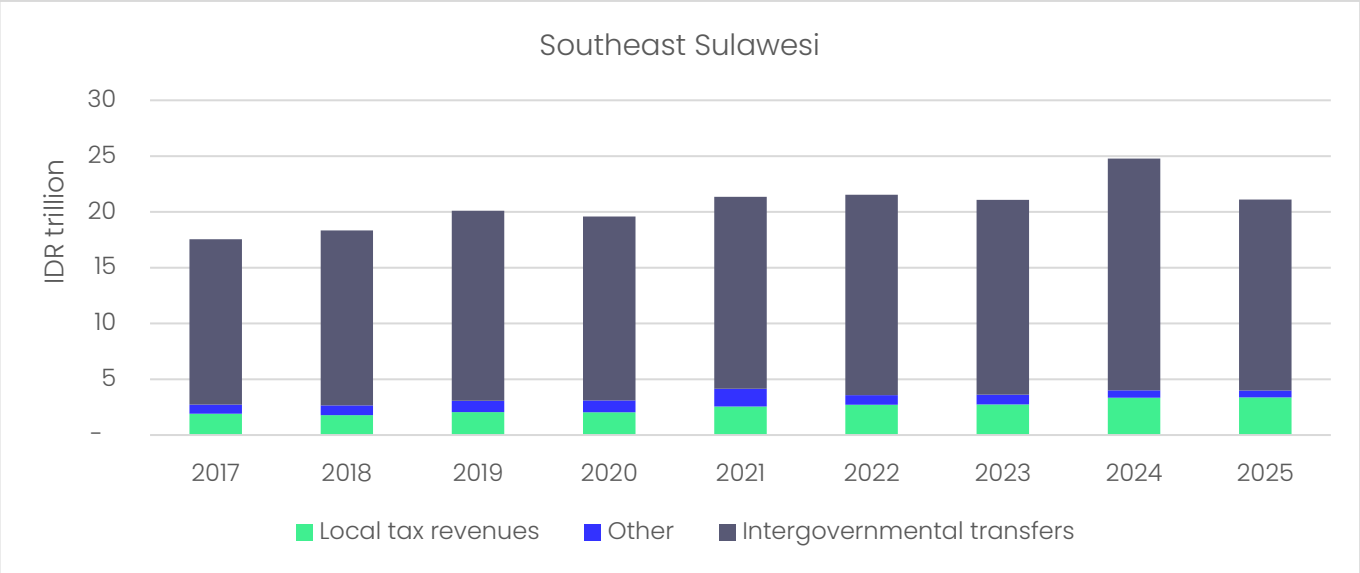
4. Nickel's impact on subnational fiscal revenues and spending

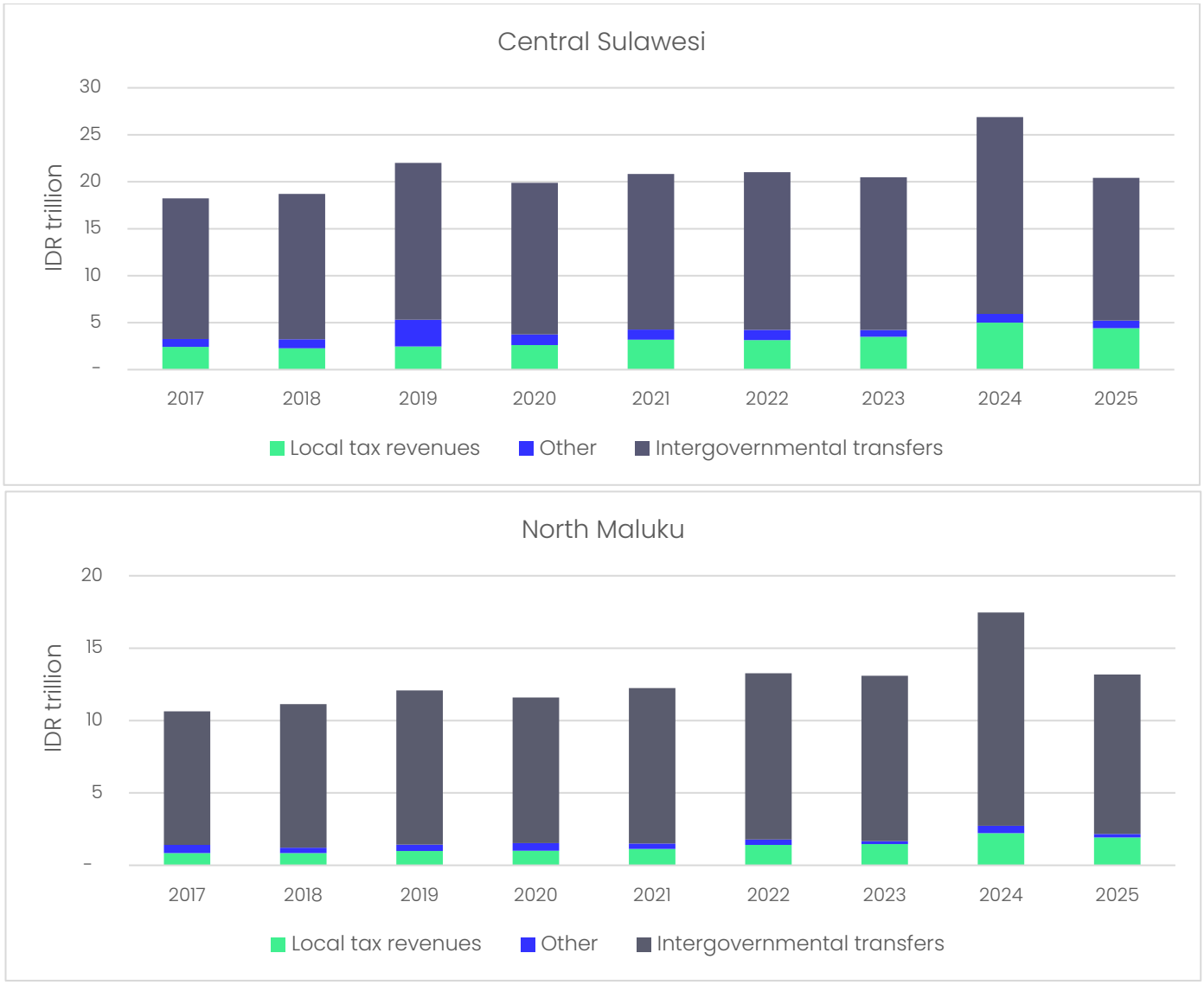
This section analyses the effects of Indonesia's nickel downstreaming policy on subnational government budgets at the provincial and district levels between 2015 and 2025. Fiscal revenues increased in this period, particularly due to revenue-sharing from mining. Subnational and national expenditure also grew, with spending on economic services rising faster than that on security, social services and environmental protection. The allocation of that expenditure will determine the extent to which it contributes to long-term economic diversification.

Revenue

The growth of the nickel industry led to a significant increase in total subnational fiscal revenues in Southeast Sulawesi, Central Sulawesi and North Maluku between 2017 and 2025 (see Figure 4.1). However, this was a fluctuating trend: in all three provinces, total revenues declined by between 1.3% and 2.6% in 2023, coinciding with the fall of global nickel prices. There is a need to use these revenues more effectively and to adopt a forward-looking approach that builds both fiscal and climate resilience (Halimatussadiah et al., 2025). For instance, subnational governments will face fiscal shocks if their commitments to expenditure based on high revenue assumptions encounter declines in revenue of the kind that occurred in 2020 and 2023.

Figure 4.1. Subnational tax revenues



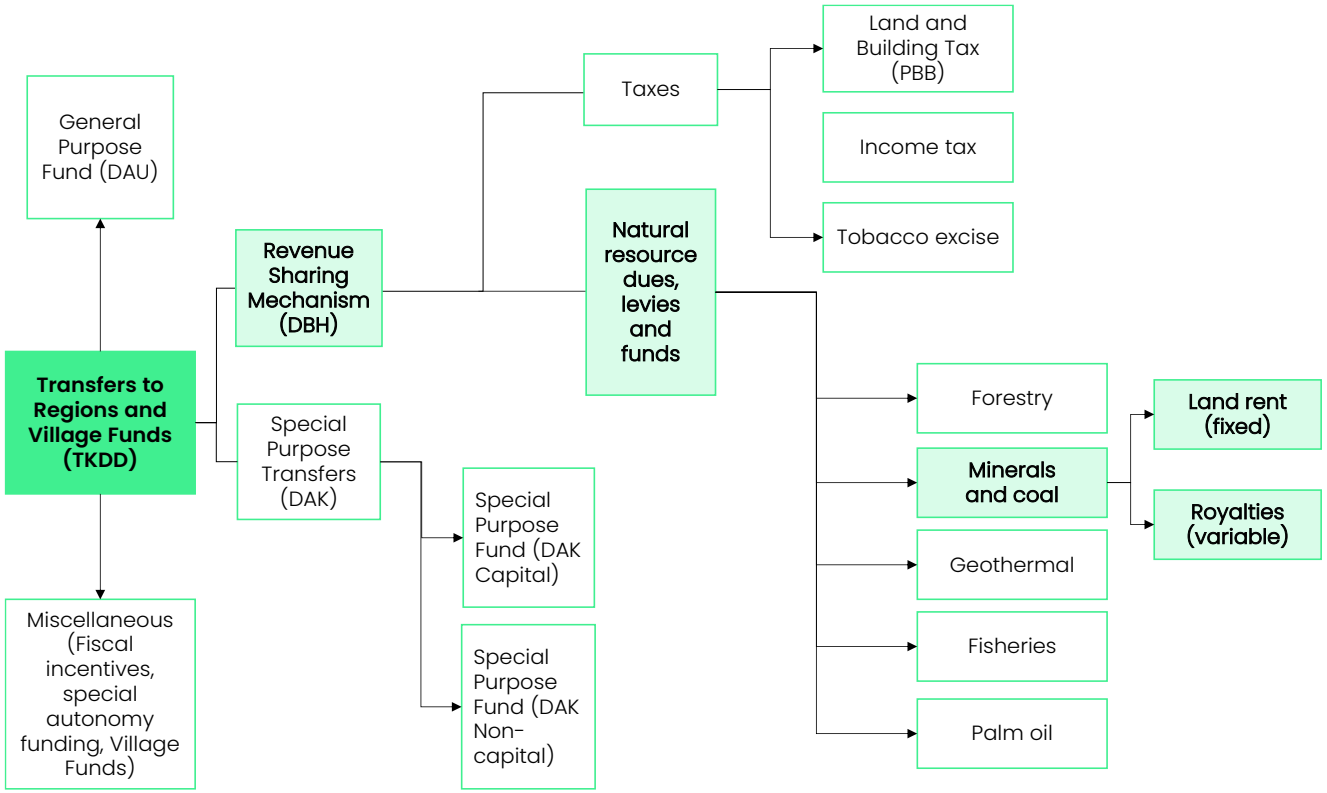


Source: Ministry of Finance (n.d.-a). Notes: this figure shows aggregate revenues of each provincial government and their respective municipalities. A visualisation of government revenues alone can be found in the Appendix.

Subnational governments' own-source revenues have generally increased, but transfers from the central government still make up most of their total revenues. In Southeast Sulawesi, own-source revenues increased by 75% during 2017–24, from IDR 1.9 trillion to IDR 3.3 trillion. Those in Central Sulawesi increased from IDR 2.4 trillion to IDR 5 trillion in that period, or by 105%. Meanwhile, own-source revenues in North Maluku increased from IDR 597 billion to IDR 2.2 trillion, or by 271%.

There are various mechanisms for transferring fiscal revenues from the central government to subnational governments. The central government's Transfers to Subnational Governments (TKDD) system consists of a General Purpose Fund (DAU), a Special Purpose Transfer Fund (DAK) and a Revenue Sharing Fund (DBH), among other instruments (Figure 4.2). One subset of the DBH focuses on coal and minerals, drawing on royalties and fixed contributions from land and rent. These transfers do not include corporate income tax receipts, which the central government oversees, and exclusively cover the upstream or extraction stage of production. The DAK includes the component *DAK Fisik*, which finances the construction of local infrastructure and, accordingly, could partly contribute to climate adaptation measures (Ministry of Finance, 2024a).

Figure 4.2. The central government's transfers to subnational governments



Source: Authors' analysis.

Law No. 1 (2022) on Fiscal Decentralisation between Central and Local Governments mandates that 80% of revenue-sharing from coal and minerals should be allocated to subnational governments, with the producing municipality receiving more of this amount (Halimatussadiah et al., 2025; see Table 4.1). The revenue-sharing mechanism is designed to fund local government projects and to compensate for negative externalities arising from natural resource exploitation (Nurfatriani et al., 2024). While the mechanism for sharing revenue from coal and minerals involves more than just nickel, it can serve as a proxy for how nickel production has affected subnational fiscal revenues. The government has refined these revenue-sharing funds over the years, replacing the flat rate with a progressive rate in which subnational governments receive more funding when market prices are high (Fitch Ratings, 2025).

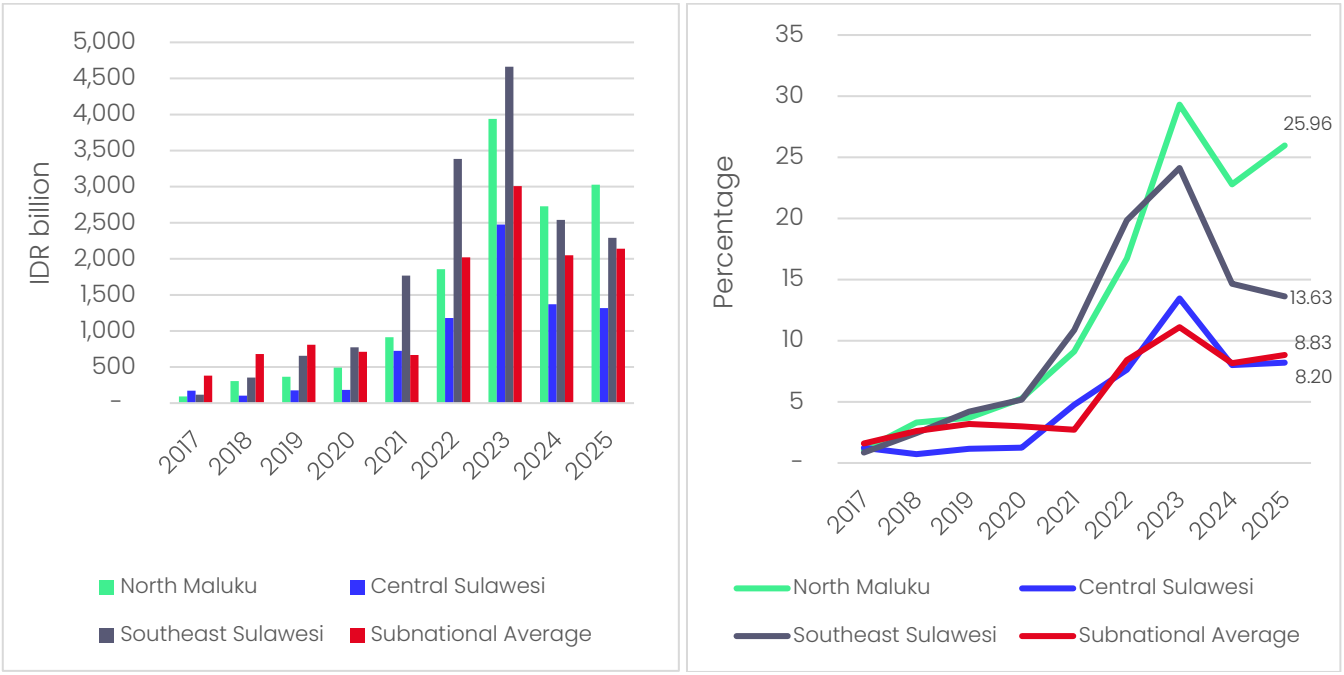
Table 4.1. Distribution of mining non-tax revenues

Type	Central	Originating province	Originating district	Bordering district	Processing districts	Other Municipalities (in the same province)
Land rent	20%	30%	50%			
Land rent (sea-bordering region)	20%	80%				
Royalty	20%	16%	32%	12%	8%	12%
Royalty (sea-bordering region)	20%	26%			8%	46%

Source: adapted from Lewis (2023b). Notes: See the Appendix for a comparison between mechanisms for revenue-sharing from mining and other sources.

From 2017 to 2025, revenue-sharing from coal and minerals rose by an average of 63%, 57% and 70% each year in Southeast Sulawesi, Central Sulawesi and North Maluku, respectively. Coinciding with the growth of the nickel industry, revenues from mining accounted for a growing share of the central government's transfers to subnational governments until 2023, rising from around 1% in 2017 to 8–26% by 2025 (see Figure 4.3). While these fiscal windfalls bolstered subnational governments' budgets, they also highlighted the need to anticipate volatility that may arise from shifts in global market conditions and the future depletion of nickel reserves.

Figure 4.3. Revenue from coal and minerals transferred to subnational governments through revenue-sharing funds, in IDR billion (left) and as a share of all transfers (right)



Source: Authors' analysis of Ministry of Finance (n.d.-a) data. Mining revenues consist of royalties and fixed contributions from land rent. This data aggregates coal and mineral revenue-sharing at both the provincial and municipal levels.

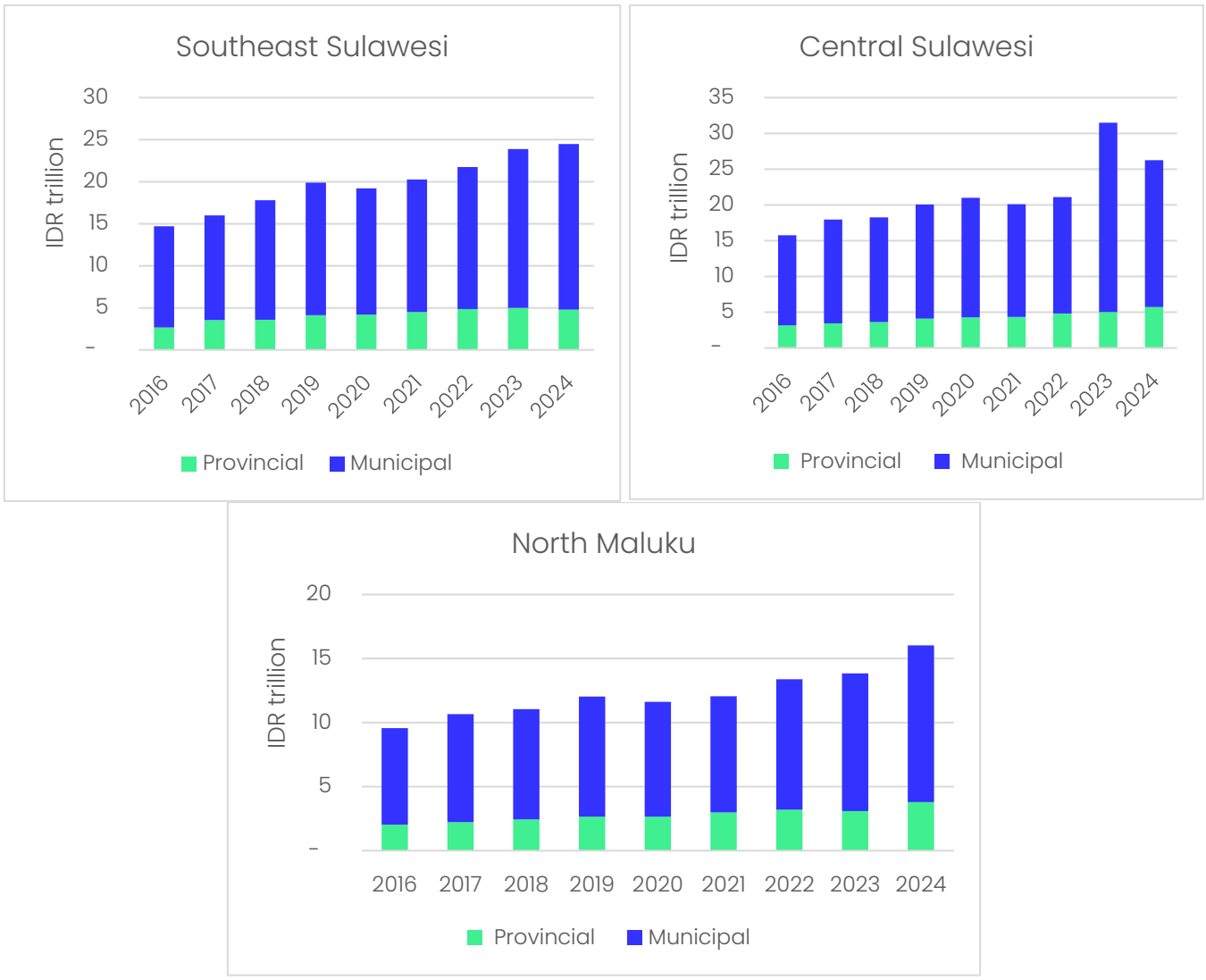
From 2018 to 2025, Southeast Sulawesi and North Maluku tended to receive an above-average proportion of revenue from coal and minerals in transfers through revenue-sharing funds. Since 2023, transfers to the two provinces have also exceeded the subnational average in absolute terms. Meanwhile, transfers to Central Sulawesi have been closer to the subnational average. One explanation for this could be that Central Sulawesi primarily focuses on nickel refining, while the more productive mines are in the other two provinces. This speaks to criticism of the revenue-sharing mechanism as overly focused on upstream production or mineral extraction, to the detriment of the midstream or refinery stage, the segment of the value chain with greater potential to generate fiscal revenues (Ruslan, 2026).

Spending

Spending on adaptation and resilience building goes beyond disaster response to include environmental protection, social protection and security-related expenditure. Although spending on economic development can play a similar role where it results in long-term economic diversification, it can also involve activities that do not necessarily do so, such as mining, energy and transportation.

Overall, the provincial and municipal governments in Southeast Sulawesi, Central Sulawesi and North Maluku subnational government have substantially increased their spending in recent years (see Figure 4.4). Most of this spending has occurred at the municipal or district levels.

Figure 4.4. Total subnational government spending, 2016–24

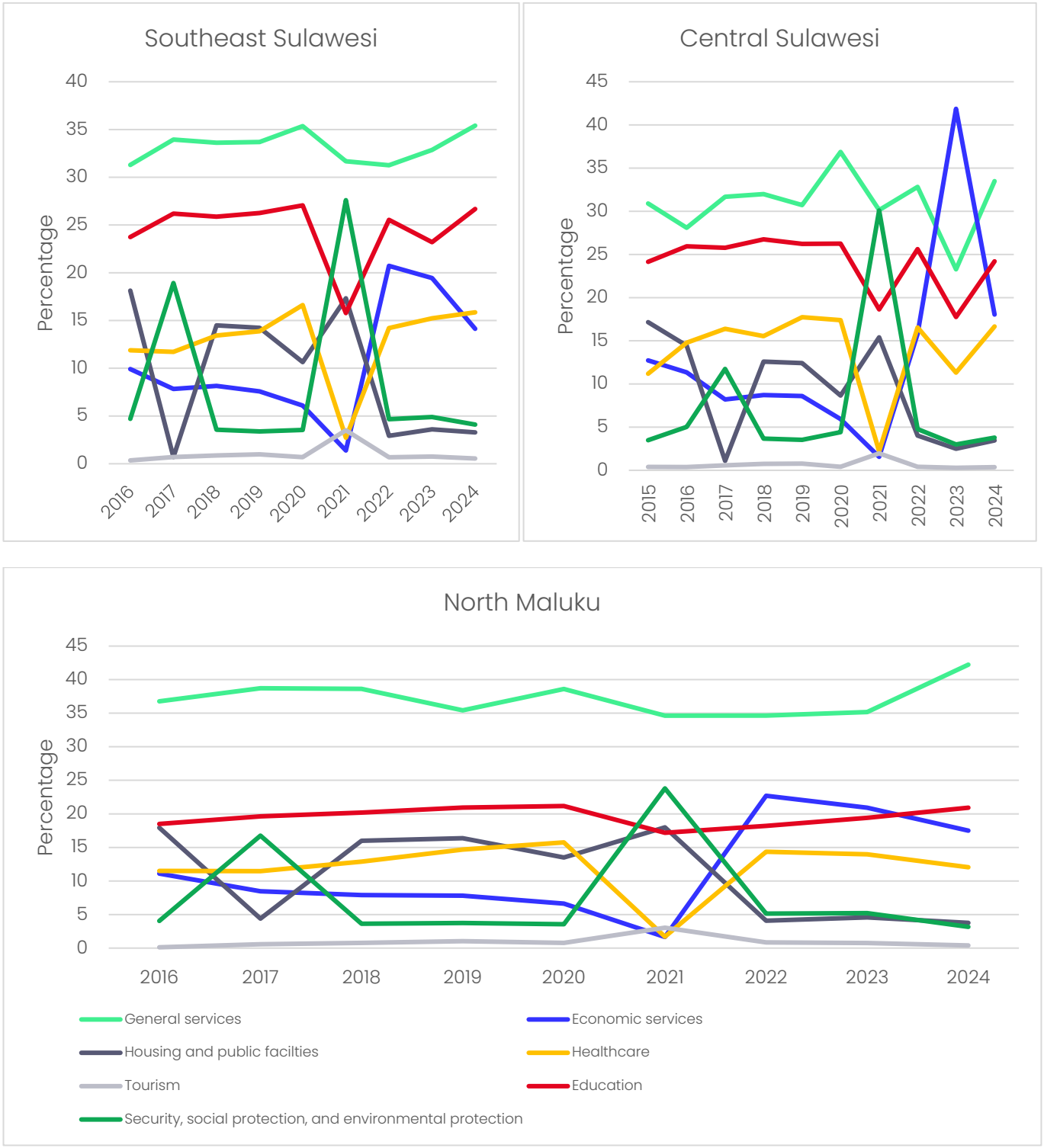


Source: Authors' analysis of Ministry of Finance (2025c) data. Notes: This data covers both provincial and municipal spending. Data for security, social protection and environmental protection were aggregated for legibility.

Generally, the three provinces spend a significant share of their budgets on areas such as general services, healthcare, economic affairs and education. However, the composition of this spending has changed over the years. Across the three provinces, spending on housing and public facilities decreased from around 17–21% of subnational spending in 2015 to around 3–4% in 2024. This has been replaced with increased spending on economic development and general services. Strikingly, in Indonesia, around one-third of spending at the district level is on general services – far more than, for example, 13% in Tanzania, 8% in Norway and 3% in the US and the UK (Sjahrir et al., 2014). Given that administrative costs have significantly increased in Southeast Sulawesi, Central Sulawesi and North Maluku due to rapid economic growth, it is important to examine the effectiveness of this spending.

The three provinces increased their spending on economic affairs from around 10% of their budgets in 2016 to around 15–20% in 2024 (see Figure 4.5). This budget category covers spending on fuel and energy, mining, transportation, communication, agriculture and fisheries. As discussed, such spending could have contributed to long-term economic diversification depending on how it was allocated, even if it did not directly build climate resilience. Meanwhile, spending on social services, environmental protection and security has largely remained under 5% of the budget. Security spending increased in 2021, likely due to the COVID-19 pandemic, while environmental spending ticked upwards in 2017. In line with Ministry of Home Affairs Regulation No. 90 (2019), this security spending includes disaster risk management (Audit Board of Indonesia, 2019).

Figure 4.5. Distribution of subnational government spending, 2016–24 (%)



Source: Authors' analysis of Ministry of Finance (2025c) data. This data combines provincial and municipal data. The budget classification follows the standardised framework created by the United Nations Statistics Division (see the Appendix). Data for security, social protection and environmental protection were aggregated for legibility.

The relative lack of spending on social protection reflects subnational governments' role within Indonesia's broader social welfare system. Under Minister of Home Affairs Regulation No. 13 (2018), subnational spending on social protection covers targeted, non-continuous social assistance transfers to individuals, households and groups facing social risks. These transfers are temporary, discretionary and contingent on fiscal capacity; they are only allocated after mandatory and priority expenditures

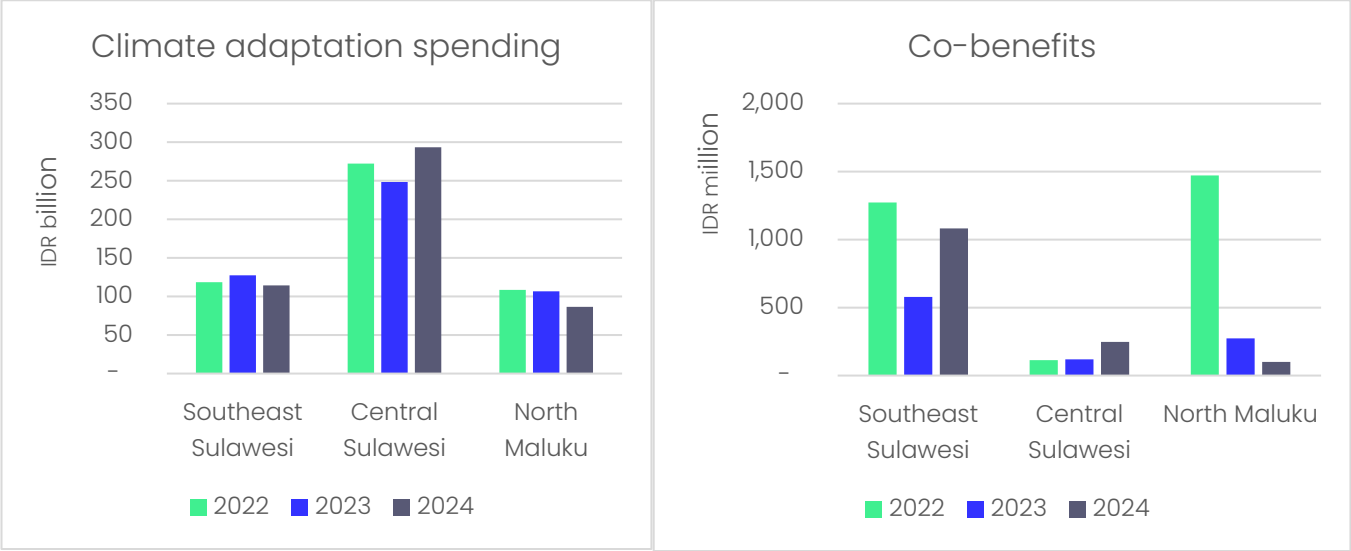
have been made (Audit Board of Indonesia, 2018). In this context, subnational governments' spending in this area acts as a complementary rather than core part of Indonesia's social protection system, which is largely designed and financed at the national level (OECD, 2019).

In all three provinces, spending on environmental protection peaked in 2017, before declining substantially. At the subnational level, such spending covers pollution and environmental damage management, environmental information systems, and enforcement. While there are no commonly attributed reasons for the spike in spending, it coincided with an increasing number of natural disasters (see Figure 2.1). From 2021 onwards, environmental spending increased to almost IDR 200 billion. Meanwhile, spending on social protection was volatile during 2016–24, with the three provinces following broadly similar trends. The Ministry of Finance's data indicate that their spending on environmental protection reflected a nationwide trend.

Climate adaptation data disclosed by the Ministry of Finance illustrate the cross-sectoral nature of adaptation spending, adding to the picture created by overall budget data (see Figure 4.6). Activities classified as climate adaptation include the construction of healthcare facilities; flood management; the provision of water reservoir buildings; coastal protective structures and vegetation; the protection of aquaculture production facilities; maritime safety infrastructure; irrigation networks; adaptive agricultural facilities; a fishing information system; and supporting activities, which include those related to coordination and administration.

During 2022–24, the Ministry of Finance's climate adaptation spending data remained relatively stable amid fluctuations in revenue-sharing from coal and minerals. Co-benefit spending, which the Ministry of Finance (2023) defines as addressing both mitigation and adaptation, decreased in Southeast Sulawesi and North Maluku but increased slightly in Central Sulawesi. Central Sulawesi remained the clear regional leader in climate adaptation spending. Nevertheless, one should be cautious in interpreting these findings: the short time horizon makes it hard to assess long-term trends, while this climate adaptation data does not show the relevant revenue streams.

Figure 4.6. Distribution of subnational government spending, 2016–24



Source: Authors' analysis of Ministry of Finance data.

Overall, while mining-related revenues increased substantially across the three provinces, this did not correlate with a proportional increase in resilience-oriented expenditure over time. Spending on environmental protection, social protection and security remained relatively stable as a share of total expenditure. The rise in spending on economic affairs could suggest efforts at diversification, but one should be cautious in interpreting such expenditure in this way, given that it covers government spending on mining. Indeed, the Ministry of Finance's climate budget tagging data on adaptation spending between 2022 and 2024 suggests that the levels of funding it disbursed remained largely stable across the three provinces.

Limitations

This analysis in this section is subject to the following limitations:

- **Data constraints.** Due to a lack of data, we do not trace specific revenue streams from mining to individual categories of expenditure. Consequently, we do not establish a direct causal relationship between mining revenues and adaptation spending but instead examine the broader patterns in the composition of expenditure in resource-rich regions. Furthermore, while it is possible to compare budget allocation data with corresponding data on climate adaptation spending, more granular data on climate adaptation is only available for 2022–24. This makes it challenging to see how subnational spending on adaptation has evolved in the longer term.

- **Scope.** While we aggregate payments to the provincial and municipal governments, it would be valuable to examine the differing dynamics between the two levels of government. For example, in 2024, mining company Vale paid around US$68,000 to the Southeast Sulawesi provincial government and around US$1.5 million to Morowali, a municipality within the province. In South Sulawesi, by contrast, the company paid the provincial government US$17.1 million and the relevant municipality US$14.9 million (Vale, 2024).

- **Assessment of effectiveness.** Increases in social and environmental spending do not always improve climate resilience. For instance, we do not explore the causal relationship between such spending and economic losses from climate-related disasters.

- **Revenue attribution.** As discussed, we use aggregate mining-related revenue-sharing (consisting of royalties and land rent) as a proxy for nickel-related fiscal flows. Data on mining in Southeast Sulawesi, Central Sulawesi and North Maluku covers the extraction of gold and other minerals, which limits the precision with which we can attribute the data to the nickel industry (Ministry of Energy and Mineral Resources, 2025).

5. Financing mechanisms and programmes to build climate resilience

This section covers a range of public and private programmes designed to build resilience against the impacts of climate change in Indonesia. We distinguish between two policy dimensions: the management of environmental and social externalities arising from mining activities, and the financing of climate adaptation and resilience. The former primarily involves regulatory frameworks such as AMDAL, reclamation obligations and corporate responsibility initiatives. We focus on how the generation and allocation of mining-related fiscal revenues can support long-term investment in resilience.

Government support

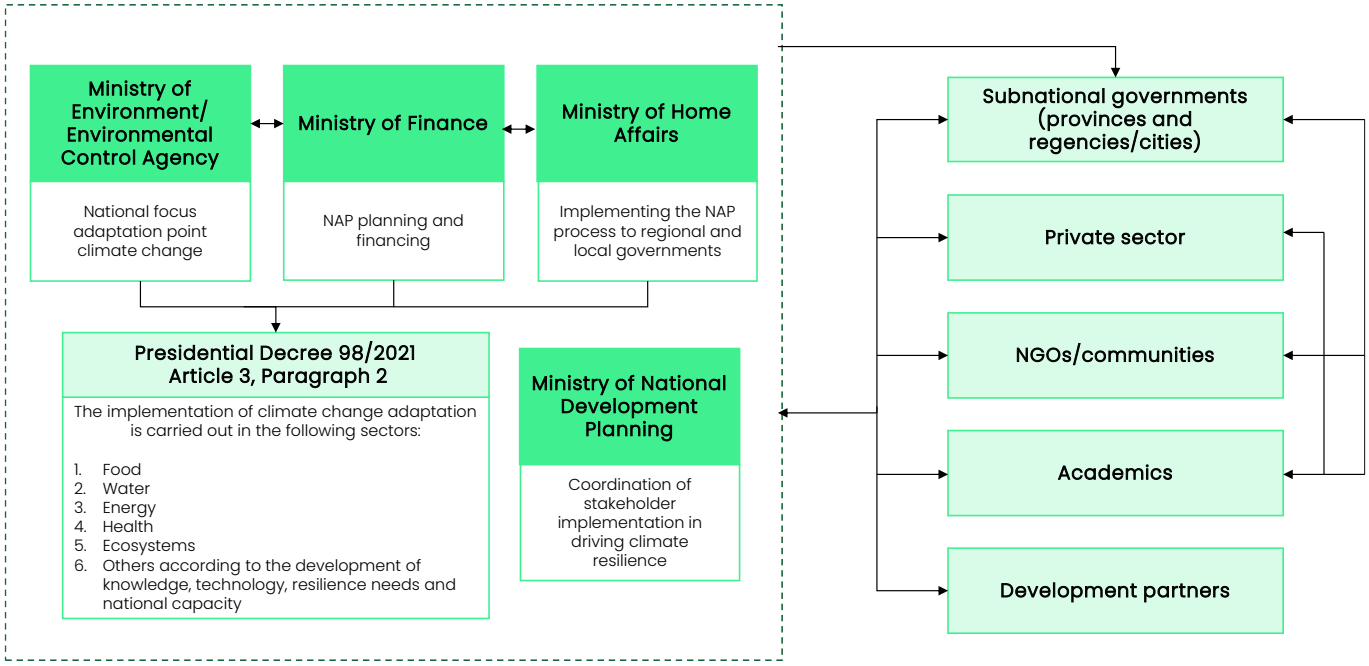
Indonesia's national government formally recognises the role of subnational governments in climate adaptation. This is reflected in the country's Nationally Determined Contributions (Sulistiawati and Rembeth, 2025) and operationalised through regulations such as Ministry of Environment and Forestry Regulation No. 12 (2024), which requires provinces and districts to formulate and implement their own Subnational Adaptation Action Plans (Government of Indonesia, 2025). The Ministry of Environment acknowledges that climate resilience is "inseparable from economic growth, social protection, and biodiversity conservation" (Ministry of Environment, 2025: vi).

The Government has prioritised climate adaptation in several of its national plans, including the 2025 National Adaptation Plan (Government of Indonesia, 2025). Climate resilience is also highlighted in the 2020–45 National Action Plan on Climate Change Adaptation and Climate Resilience Development Policy. The 2014 National Action Plan for Climate Change Adaptation specifies that financing for climate adaptation should come from both national and subnational government budgets, international bilateral and multilateral sources, private investment, and CSR initiatives.

The central government maintains a monitoring and coordination role in climate adaptation, while subnational governments are responsible for tailoring adaptation efforts to local hazards. Climate adaptation should be locally led because, unlike mitigation, it needs to cater to local challenges, which the latter tend to understand in greater depth (Mutiara et al., 2021). This is especially crucial given the wide variation in climate conditions within a country (de Mello and Ter-Minassian, 2024).

The implementation of Indonesia's national adaptation plan involves several government agencies. At the national level, the Ministry of Environment acts as the focal point of the steering committee, the Ministry of Finance plans and finances adaptation, and the Ministry of Home Affairs focuses on overseeing regional and local governments' implementation of adaptation plans. The Ministry of Environment also discloses and collates information on climate adaptation and mitigation plans at the project level on its online platform, the National Climate Change Registry System. Other relevant ministries include the Ministry of Villages, Development of Disadvantaged Regions and Transmigration; the Ministry of Public Works; the Ministry of Transportation; and the Ministry of Agriculture. Subnational governments are responsible for conducting Strategic Environmental Assessments under Law No. 32 (2009) to ensure that sustainability is embedded in regional development and policymaking (Umam, 2021).

Figure 5.1. Climate adaptation in Indonesia



Source: Adapted from Government of Indonesia (2025).

Financing

The Indonesian government has created several vehicles to provide climate financing, complementing funds allocated in regional budgets. These transmission mechanisms include, but are not limited to:

- The BPDLH: operating under the Ministry of Finance, the agency allocates international funding from institutions such as the Green Climate Fund, the Adaptation Fund and the Global Environment Facility. In 2025, the BPDLH managed US$1.72 billion in its portfolio through grants, loans and endowments (Haryanto, 2025).
- The PFB: a mechanism for both central and regional governments under the Indonesian Environment Fund. The fund, which focuses on accelerated disbursements during natural disasters, involves transferring risk from public assets (e.g. schools and hospitals) to reduce the burden on government budgets. Some of the funds are also allocated to build long-term resilience and mitigation. They have stated that it is open to CSR contributions, and they have engaged with local government institutions in operationalising and developing the PFB, such as Southeast Sulawesi's Regional Disaster Management Agency (Environmental Fund Management Agency, 2024).
- Indonesia Climate Change Trust Fund (ICCTF): widely regarded as the first national climate fund in Indonesia, the ICCTF is managed by the Ministry of Development Planning. It combines funding from the Government's annual budget with that from international sources. Adaptation and resilience form one of the four thematic areas that ICCTF funding covers. During 2015–23, the ICCTF received approximately US$31.2 million in funding, with US$5.7 million from the state budget and the remainder from international donors (ICCTF, 2023).
- SDG Indonesia One: a blended finance platform by PT Sarana Multi Infrastruktur (SMI), this special mission vehicle under the Ministry of Finance focuses on the development of sustainable infrastructure in areas ranging from clean water and sanitation to renewable energy and transportation. The platform provides financing, technical expertise and knowledge transfers from international partners. By March 2025, SDG Indonesia One had secured US$3.13 billion in commitments from 38 partners (Investor Relations Unit, 2025).

- **Green Sukuk**: a sharia-compliant bond Indonesia uses to finance sustainable projects. In 2024, the Government raised US$600 million through the Global Sovereign Green Sukuk, IDR 9.92 trillion through domestic retail and IDR 8.95 trillion through domestic wholesale. Some of this was allocated to resilience building projects in nickel-producing provinces that focused on issues ranging from drought management to water management in agriculture (Ministry of Finance, 2025b).

Programmes

Indonesia has implemented several programmes focused on climate adaptation across the country. As summarised in Indonesia's Nationally Determined Contribution, the Government is organising "climate literacy, local capacity strengthening, improved knowledge management, convergent policy on climate change adaptation and disaster risks reduction, and the application of adaptive technology" (Government of Indonesia, 2025: 14). The Government's flagship adaptation programmes include:

- **Community Based Climate Action (ProKlim).** A programme that identifies priorities for climate adaptation, monitors the implementation of adaptation solutions, and assesses the effectiveness of those adaptation initiatives at the village level. Villages that successfully complete the programme can obtain a certification of 'climate village' from the government (Government of Indonesia, 2025).

- **Climate Disaster Resilient Village (Destana).** A programme that the National Disaster Countermeasure Agency has run since 2012 to help villages prepare for natural disasters and act independently when they occur. The programme's agenda ranges from creating institutional capacity (such as village-level regulations and policies) to establishing active teams or volunteer groups to coordinate disaster management, to mapping and assessing potential threats (Lessy et al., 2025).
- **Disaster Safe Education Unit**. A comprehensive safe school programme that the Ministry of Education and Culture runs to help schools prepare for natural disasters (Government of Indonesia, 2025).

The programmes have met with a mixed response. Participants say that programmes such as ProKlim are conceptually sound, have led to the creation of more early warning systems, and have helped educate the public about the need for sanitation and hygiene. However, the programmes have had only a limited impact due to "poor coordination and insufficient resources" (Sulistiadi et al., 2024: 7).

Mining revenues should not be viewed as the primary source of adaptation finance but as one component of a broader financing framework that includes national budgets, dedicated climate funds and sources such as intergovernmental transfers. However, given that mining regions need to contend with both heightened environmental pressures and volatile revenue streams, allocating a portion of mining revenues to investment in resilience building could help reduce fiscal risks. This is particularly important in the absence of formal commodity-linked stabilisation mechanisms, such as those implemented in Chile and other countries.

6. Revenue management practices in other countries

This section explores mechanisms for managing fiscal windfalls from various commodities in Chile, Peru and Colombia. While these mechanisms have distinct characteristics and may not be fully replicable, they offer lessons for the design of Indonesia's own system.

Chile, Colombia and Peru all have substantial mining sectors. Their experiences provide insights into practices such as earmarking mining revenues, tagging spending from these revenues, creating savings funds, and establishing multi-stakeholder institutions to promote long-term planning and coordination.

Policy lessons

Revenue earmarking

Chile provides a prominent example of contract-based revenue earmarking at the subnational level. In 2018, the Production Development Corporation (CORFO), a governmental organisation dedicated to promoting economic growth, renegotiated lithium extraction contracts with two private lithium mining companies, SQM and Albemarle. Under the new agreement, SQM contributes 1.7% of its annual lithium sales to local communities until 2030. The firm makes these payments directly to regional governments (CORFO, 2018). Beyond the annual contributions, SQM has also contributed US$14 million to sustainable development in Salar de Atacama and a further US$10.8 million to research and development at the Institute of Clean Technologies in Antofagasta (SQM, n.d.).

Colombia combines a centrally managed royalty system with explicit earmarking for certain sectors. The central government collects royalties from natural resources through the General System of Royalties, which pools revenues at the national level and redistributes them across both producing and non-producing regions. Within this framework, Colombia has earmarked at least 75% of its natural resource royalties for sustainability initiatives spanning education, health, drinking water and sanitation until specific objectives are met.[4] These objectives include access to clean drinking water for at least 91.5% of the population and access to sewage systems for at least 85.5%. Regional governments have discretion in how they disburse royalties within those areas (Martínez, 2025).

Spending tagging and transparency

A distinctive feature of Colombia's royalty system is its digital transparency infrastructure, particularly the Mapa de Regalías platform. This online tool allows citizens to track various aspects of royalty-funded projects, including their locations, budgets, contractors and implementation status. The platform forms part of a broader open data ecosystem that includes national planning, procurement and auditing systems (International Finance Corporation, 2020). One study of the tool found that following its launch, the efficiency of royalty-funded public investment projects increased by an average of nearly 8%.

Colombia's experience with transparency initiatives holds important lessons for Indonesia. First, royalty data is dispersed across multiple government platforms that are not fully interoperable, making it difficult for users to link company payments to specific local projects. Second, many local governments lack the requisite staff and skills to analyse the data and translate it into high-quality,

[4] The system differs for local tax revenues: subnational governments can choose how to spend these revenues, after setting aside 15–25% of them for the regional environmental agency.

bankable public investment projects. As a result, approved funds are often underutilised. Third, although large volumes of data have been disclosed, communities report that they often receive information in a manner that is not timely, accessible or relevant to their needs (Lauletta et al., 2019).

Peru offers a simpler but potentially impactful, complementary approach to spending tagging. One example of this can be found in Cajamarca, where mineral revenue-sharing is linked to the construction of a regional laboratory for water monitoring. This type of tagging provides a relatively low-cost way to visibly connect mining revenues to environmental outcomes, demonstrate accountability to local communities and strengthen the social contract, even where state capacity may be relatively limited (Garaycochea and Ali, 2024).

Stabilisation and savings fund

Recognising the volatility of lithium production as a revenue stream, the Chilean government has emphasised the need for fiscal stabilisation. In its National Lithium Strategy, the government laid out its plan to transfer revenues exceeding a certain threshold to a dedicated savings fund, earmarking them for use in "social, scientific-technological, and industrial investments" (Government of Chile, 2023: 15). This builds on Chile's long-standing system for stabilising copper revenues, the Economic and Social Stabilization Fund. In place since 1987, the fund has been used as a source of financing during economic shocks (Solimano and Guajardo, 2017). At the same time, Chile's experience offers a warning about the importance of absorptive capacity. The influx of revenue into the fund has not always been matched by sufficient planning and implementation capacity at the subnational level (Bonilla, 2024), showing that such approaches need to be complemented by improvements in institutional capacity.

Institutional coordination platforms

Peru created a non-profit, multi-stakeholder dialogue platform called Moquegua Crece to channel mining revenues back into the community more effectively. Established around the Quellaveco copper project in southern Peru, this programme was jointly launched in 2021 by the regional government of Moquegua, Anglo American, Mitsubishi Corporation and the International Finance Corporation, whereby they coordinate on regional development plans (Sabatini and Binetti, 2024). Unlike voluntary CSR initiatives, Moquegua Crece forms part of the 2032 Concerted Regional Development Plan (Moquegua Regional Government, 2022). This formal status provides it with continuity beyond individual mining CSR projects.

Peru's experience holds several cautionary tales for Indonesia. Protests in 2019 demonstrated that such dialogue mechanisms require continuous action and do not eliminate the risk of social conflict. Moreover, while international institutions promoted Quellaveco as a model of good governance, critics note that the platform shifts territorial planning power toward mining firms and prioritises investment continuity over the long-term redistribution of resource rents to public social and environmental protection (Rey-Coquais, 2021).

In 2008, Peru also created a Works for Taxes programme, in which companies could finance public investment projects in exchange for offsetting future tax payments, up to a ceiling of 50% of their previous year's tax liability. Used across the national and subnational levels, the programme has supported projects such as roads, schools and health facilities. However, the programme's limitations include its uneven geographical distribution, officials' limited understanding of its purpose (which could skew their priorities towards corporate interests rather than broader regional needs) and its focus on capital expenditure rather than long-term operations and maintenance (Korinek, 2015; OECD, 2025d).

Lessons for Indonesia

Taken together, these cases suggest that the main lesson for Indonesia lies in selectively adapting design features that suit the domestic context, especially in relation to fiscal and legal frameworks. Indonesia already has some of the institutional architecture required to implement similar initiatives:

- **Monitoring.** Like Colombia's tracking system, the Indonesian Ministry of Environment's National Climate Change Registry System maps adaptation, mitigation and joint programmes nationwide, including information on sources of funding – be it the central government budget, regional governments' budgets or bilateral or multilateral grants or loans. However, as it stands, there is no publicly available data on how nickel revenues are spent on social and environmental protection in Indonesia.

- **Coordination.** As discussed, the Indonesian government is already coordinating with multiple stakeholders, such as universities and private companies, on environmental programmes such as coral reef restoration. Following Peru's example, it could be beneficial to enhance and formalise this coordination to ensure more efficient use of the budget. There is precedent for this: the Indonesian Palm Oil Plantation Fund Management Agency, a unit under the Ministry of Finance, manages export levies on crude palm oil (CIFOR, 2022). As a relatively new body, this institution is worthy of closer study – to see what lessons the minerals sector could draw from its experience.

- **Revenue stabilisation.** The nickel market is volatile: there is significant uncertainty about its prospects, given its use in clean technologies such as EV batteries, and the sharp decline in nickel prices that has occurred since they spiked in 2022. This underscores the importance of long-term planning for fiscal windfalls from nickel production.

Table 6.1. Earmarking mechanisms in revenue-sharing funds

Commodity	Approach
Palm oil	• At least 80% of revenue allocated to road transport infrastructure. • Companies should push for more sustainable management of palm oil resources, including by rehabilitating land and forests. • Each jurisdiction has a minimum spend.
Tobacco	• Used to fund healthcare, justice for communities, law enforcement and support for workers in the tobacco and clove industries. • Allocation is flexible.
Forestry	• Used to support integrated area development. • Helps funds management of forests and rivers. • Provides social protection for forestry workers in vulnerable categories. • Helps support the FOLU (Forestry and Other Land Use) Net Sink 2030 programme, which is Indonesia's policy to achieve net zero emissions in the forestry sector.

Source: Adapted from Ministry of Finance (2024b).

- **Incentives for midstream producers.** Indonesia's existing system could be adapted to unlock more financing for resilience building, given that its reclamation and post-mining guarantees, and its National Programme for Community Empowerment, target upstream rather than midstream producers. This adaptation could draw on Peru's Works for Taxes programme and its focus on capital expenditures to, for example, finance the construction of flood protection measures. As midstream mining companies have an environmental impact and operate in the natural resources sector, they need to follow AMDAL and other requirements, and to engage in CSR initiatives (Nurmansyah et al., 2026). However, given negative public perceptions of companies' compliance with AMDAL, CSR and community empowerment programmes, such mechanisms need to be accompanied by more stringent governance of revenue flows.

- **Earmarking.** Indonesia's subnational governments have earmarked funds in the revenue-sharing mechanisms for commodities such as wood, tobacco and palm oil (see Table 6.1) (Ministry of Finance, 2024b). However, they have not done so for coal and mineral revenue-sharing funds. This is likely due to the mandates of special-purpose transfer funds, which earmark revenue for infrastructure and for distribution to specific areas, and require the private companies to contribute to the National Programme for Community Empowerment and reclamation or post-mining guarantees. These mandates could make it challenging to expand earmarking for social and environmental spending. This is particularly true of, for example, the central and subnational governments' requirement to spend 20% of the total budget on education (Lewis, 2023a).

7. Conclusion and policy recommendations

Indonesia could adapt the design of certain policies based on practices in other countries, while accounting for its own context. This approach could shape efforts to enhance data transparency, tag benefits from mining revenues, coordinate between different stakeholders, create a stabilisation fund, and earmark revenues for social and environmental projects.

It is crucial to support long-term adaptation and resilience building in Indonesia. This is especially vital in the country's nickel-producing regions, given their vulnerability to climate shocks and reliance on finite natural resources. Data from the National Disaster Countermeasure Agency show that these regions have faced a growing number of hydrometeorological disasters in recent decades. Enhancing social, health and environmental spending now could help dampen the impact of a decline in revenue from dwindling nickel reserves. At the same time, fiscal revenues are exposed to the instability of global market dynamics. Accounting for these developments is essential to prevent Indonesia from replicating other countries' experiences of the resource curse, in which commodity booms lead to subpar fiscal planning and weaken incentives for economic diversification.

Indonesia's nickel downstreaming policy has significantly boosted fiscal revenues in the provinces of Southeast Sulawesi, Central Sulawesi and North Maluku. Fiscal revenues derived from nickel mining in the three provinces now make up a notable share of transfers from the central government to subnational governments. However, these revenue flows have been volatile in recent years, as have fiscal revenues from mining more broadly.

Increases in mining-related revenues have not consistently translated into proportional rises in spending on security, environmental or social protection initiatives at the subnational level. Instead, the pattern of expenditure in these areas has remained relatively stable. For social protection, this partly reflects subnational governments' role within Indonesia's broader system, whereby this spending largely complements nationally designed and financed programmes. The increased share of spending on economic affairs may partly support broad economic development and diversification. However, as discussed, it is important to be cautious in interpreting such spending in this way, as it also covers mining- and energy-related activities. Similarly, more granular data from the Ministry of Finance indicates that adaptation-related spending has occurred across sectors but has grown modestly overall. Nonetheless, subnational governments' binding expenditure mandates, competing development priorities and limited space for discretionary spending may constrain their ability to allocate additional revenues to sectors such as environmental protection or resilience against disasters.

Efforts to strengthen resilience require preparation for a post-extractive transition. Nickel downstreaming may not generate sufficient long-term employment or stable fiscal revenues to sustain regional development indefinitely. Nickel-producing regions could, therefore, benefit from diversifying their economic base, supporting affected sectors such as agriculture and fisheries, and investing in workforce development and reskilling. The creation of fiscal buffers during periods when commodity prices are high could also help smooth adjustments and reduce vulnerability to future shocks.

Policy recommendations

Given the makeup of subnational governments' recent revenues from mining and expenditure on environmental and social initiatives, Indonesia could draw on best practice in other countries to develop its economic and environmental policy in the following ways:

1. **Enhance data transparency.** The Ministry of Finance could enhance data transparency on environmental and social protection spending via the disclosure of climate budget tagging data and information on climate adaptation projects:
    - The ministry has piloted subnational climate budget tagging at the municipal and provincial levels in some regions. Full disclosure would enhance transparency, allow for public participation and invite constructive feedback on the supply of projects in areas such as infrastructure construction and community welfare, as well as on the effectiveness of current spending on climate change adaptation.
    - Data on climate adaptation spending could be harmonised with the Ministry of Environment's National Registry System, which is easily accessible online. At the time of writing, the system does not cover recent adaptation programmes in Southeast Sulawesi, Central Sulawesi or North Maluku.
    - Beyond climate budget tagging, governments could also tag projects that have received funds from revenue-sharing from coal and minerals.
    - Following Peru's example, tagging funds from coal and mineral revenue-sharing could improve communication with local communities on the use of fiscal revenues to strengthen economic and climate resilience (if these communities continued to take an interest in the relevant projects). Moreover, in addition to providing feedback on potential projects, members of these communities could evaluate the material benefits of both ongoing and finished projects. This will help ensure that future initiatives are built on recognised best practice.
2. **Improve coordination on revenue management between different types of stakeholders.** Strengthening local planning and project appraisal capacity will help ensure that additional revenues translate into effective resilience investments rather than fragmented or short-term expenditure:
    - Some companies operating in Indonesia have engaged in CSR projects that involve stakeholders from governments or universities, alongside the mandatory guarantees for environmental restoration and the Community Development and Empowerment Fund.
    - Peru provides one model for institutionalising such coordination and more effectively managing funds in long-term planning. Operating with limited fiscal space, this could help channel funds towards the most effective resilience building projects.
    - Mechanisms such as Peru's Works for Taxes could be adapted to encourage midstream producers such as nickel smelters to engage in resilience building, thereby using tax breaks to unlock greater capital expenditure.
    - Funds could be allocated to existing mechanisms such as the Disaster Pooling Fund, which has publicly indicated that it is open to CSR funding. This approach should account for the type of challenges that Chile encountered with respect to absorptive capacity.
3. **Explore the creation of a revenue stabilisation fund.** Given the volatility of nickel-related revenues and the finite nature of Indonesia's mineral reserves, a stabilisation fund could help convert temporary fiscal windfalls into a more predictable source of financing for long-term resilience building and development priorities as mining operations depleted these resources:
    - Indonesia could explore stabilisation mechanisms to smooth revenue fluctuations over time, drawing inspiration from initiatives in other resource-rich countries, such as Chile's copper stabilisation fund and new lithium fund.
    - A portion of the windfall revenues could be saved to prioritise long-term investments over increases in short-term expenditure. Using these funds for long-term expenditure and resilience building could complement funding that has already been allocated to address externalities from mining, such as that under the Community Development and Empowerment Fund, and reclamation or post-mining guarantees.
    - This could help cushion fiscal risks stemming from downturns in commodity prices related to factors such as a decline in global demand for nickel.

The combination of these three approaches could help create an environment that attracts climate adaptation funding and could improve Indonesia's resilience in the medium and longer term. A revenue stabilisation fund would help secure a steady stream of financing during economic downturns, when there is a decline in revenue from commodities such as nickel. Meanwhile, enhanced data transparency and coordination practices would promote effective fiscal planning and the efficient use of existing funds, both of which are crucial given Indonesia's fiscal constraints.

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Appendix

Classifications of the functions of government

Table A1. Purpose of different budget categories	
General public services	• Executive and legislative organs, financial and fiscal affairs, external affairs • Foreign economic aid • General services • Basic research • R&D: general public services • General public services NEC (not elsewhere classified) • Public debt transactions • Transfers of a general character between different levels of government
Defence	• Military defence • Civil defence • Foreign military aid • R&D: defence • Defence NEC
Public order and safety	• Police services • Fire-protection services • Law courts • Prisons • R&D: public order and safety • Public order and safety NEC
Economic affairs	• General economic, commercial and labour affairs • Agriculture, forestry, fishing and hunting • Fuel and energy • Mining, manufacturing and construction • Transport • Communication • Other industries • R&D: economic affairs • Economic affairs NEC
Environmental protection	• Waste management • Waste water management • Pollution abatement • Protection of biodiversity and landscape

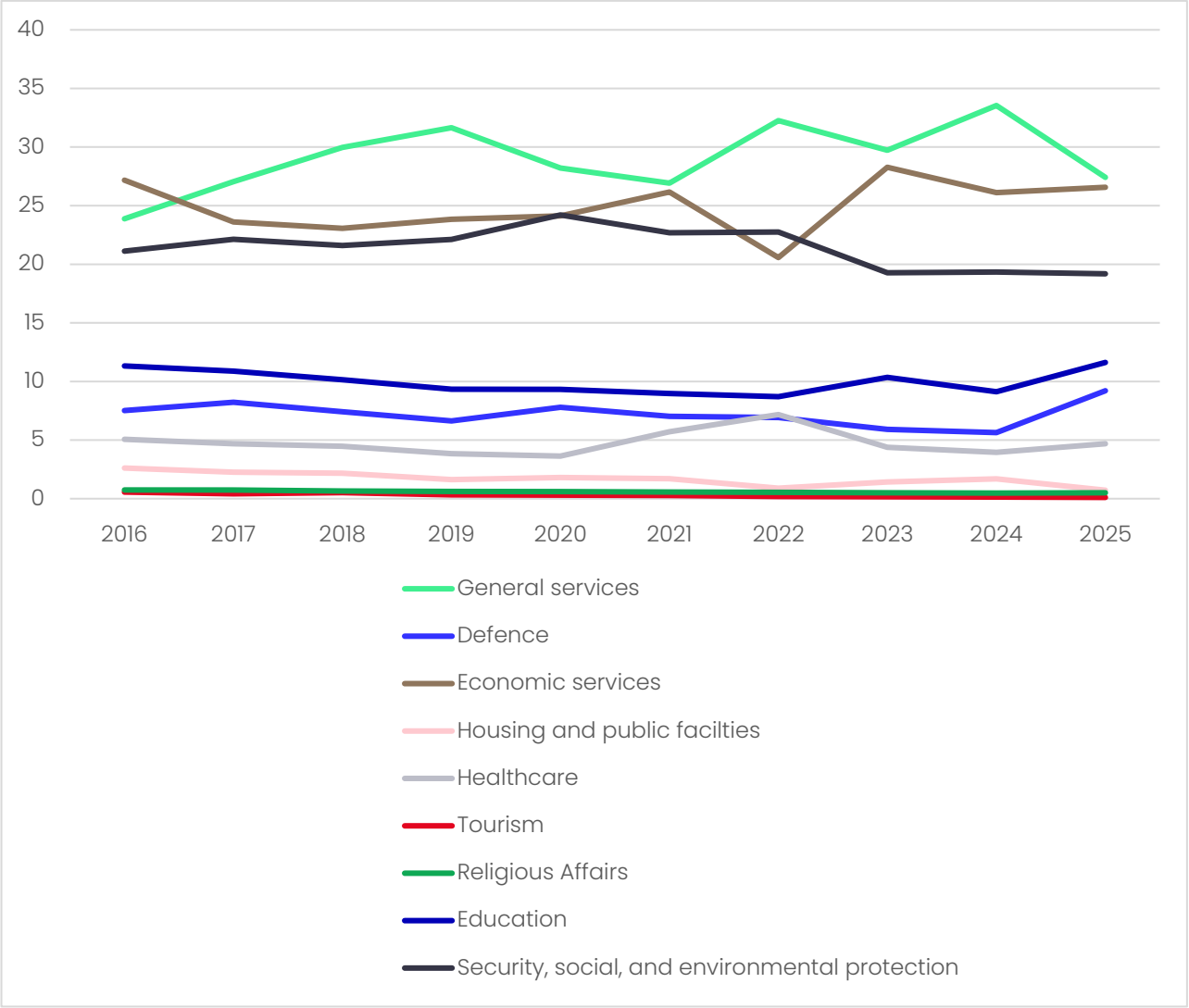
	• R&D: environmental protection • Environmental protection NEC
Housing and community amenities	• Housing development • Community development • Water supply • Street lighting • R&D: housing and community amenities • Housing and community amenities NEC
Health	• Medical products, appliances and equipment • Outpatient services • Hospital services • Public health services • R&D: health • Health NEC
Recreation, culture and religion	• Recreational and sporting services • Cultural services • Broadcasting and publishing services • Religious and other community services • R&D: recreation, culture and religion • Recreation, culture and religion NEC
Education	• Pre-primary and primary education • Secondary education • Post-secondary non-tertiary education • Tertiary education • Education not definable by level • Subsidiary services to education • R&D: education • Education NEC
Social protection	• Sickness and disability • Old age • Survivors • Family and children • Unemployment • Housing • Social exclusion NEC • R&D: social protection • Social protection NEC

Source: Adapted from OECD (2025c).

Figure A1. Provincial government fiscal revenues, 2015–25

Source: Ministry of Finance (2025c).

Figure A2. National budget allocation distribution, 2016–25



Source: Ministry of Finance (n.d.-b).

Distribution of revenue-sharing mechanism as of Law 1/2022

Table A2. Tax and non-tax revenue-sharing distribution

Type	Central	Originating province	Originating district	Bordering district	Processing districts	Other Municipalities (in the same province)
	TAX REVENUES					
Income Tax	80%	7.5%	8.9%			3.6%
Land and Buildings Tax		16.2%	73.8%			10%
Tobacco Excise	97%	0.8%	1.2%			1%
	NON-TAX REVENUES					
Forestry licence	20%	32%	48%			
Forestry royalty	20%	16%	32%	16%		16%
Reforestation	60%	40%				
Mining						

Land rent	20%	30%	50%			
Land rent (sea-bordering region)	20%	80%				
Royalty	20%	16%	32%	12%	8%	12%
Royalty (sea-bordering region)	20%	26%			8%	46%
Geothermal mining	20%	16%	32%	12%	8%	12%
Fisheries	20%					80%*
Oil	84.5%	2%	6.5%	3%	1%	3.0%
Oil (sea-bordering region)	84.5%	5%			1%	9.5%
Gas	69.5%	4%	13.5%	6%	1%	6%
Gas (sea-bordering region)	69.5%	10%			1%	19.5%

*Source: Adapted from Lewis (2023b). Note: *Distributed to all districts. Shaded boxes indicate that the data are not applicable.*

Table A3. Purpose of budget categories

Type	Breakdown
General purpose fund	• General purpose fund without earmarked usage • General purpose fund with earmarked usage • Salaries for government contract employees • Urban village (Kelurahan) funding • Education • Health • Public works
Special Allocation Fund (Physical)	• Education • Health • Connectivity • Drinking water • Sanitation • Housing • Irrigation • Agricultural food • Aquatic food • MSMEs • Trade • Protection for women and children