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Nickel Down Streaming in Indonesia: Policy Implementation and Economic, Social, and Environmental Impacts

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Abstract

This paper investigates Indonesia's nickel downstreaming, focusing on policy implementation and its economic, social, and environmental impacts. Emphasizing the government's strategy to enhance the value of natural resources, the study traces the evolution of nickel downstreaming policies, analyzing changes over time. Applying Thomas R. Dye's policy framework, the research evaluates policy implementation through agenda setting and formulation. It identifies economic shifts, including industrial growth and increased employment. Social impacts, such as worker migration changes, and environmental effects, considering resource use and pollution, are assessed. This analysis, anchored in policy theory, provides insights for policy formulation and aids industry practitioners, offering valuable information on national resource downstreaming.

Keywords: *Nickel-based Industrialization, Public Policy, Economic Consequences, Environmental Implications, Indonesia.*

Introduction

Industrialization is the bedrock of sustainable, rapid economic growth. No country has achieved decades of more than 7% growth without it, except resource-rich outliers. Japan, South Korea, and Taiwan's 20th-century success stories hinged on manufacturing booms[5]. Industrialization offers diversification, innovation, and skilled jobs, making it the "cornerstone" of growth.[6] Uniquely, manufacturing fuels productivity growth even in countries with weak governance or human capital[7]. This "unconditional convergence" makes it a potent engine for development.

Due to the critical importance of manufacturing for overall growth, countries that have yet to fully industrialize will consequently suffer from sub-optimal economic development and that has been the case for Indonesia. Industrialization had not yet fully taken off in Indonesia when it already started declining, a phenomenon called premature deindustrialization.[8] Conventionally, countries do gradually deindustrialize after they have reached a certain level of prosperity. In the case of Indonesia, deindustrialization occurred earlier compared to developed

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[5] Dani Rodrik, "Unconditional Convergence in Manufacturing," *Quarterly Journal of Economics* 128, no. 1 (2013): 165–204, https://doi.org/10.1093/qje/qjs047.
[6] R. Kaplinsky, "Industrialization: New challenges and opportunities for developing countries," *Global Policy* 9, no. 3 (2018): 376-384.
[7] Dani Rodrik, "Unconditional Convergence".
[8] Dani Rodrik, "Premature Deindustrialization," *Journal of Economic Growth* 21, no. 1 (2016): 1–33, https://doi.org/10.1007/s10887-015-9122-3; Dani Rodrik, "The Past, Present, and Future of Economic Growth," *Challenge* 57, no. 3 (2014): 5–39, https://doi.org/10.2753/0577-5132570301.

countries in the past. As a comparison, Japan began to deindustrialize when its GDP per capita was already US$ 18,000, whereas Indonesia started to deindustrialize in 2002 when its GDP per capita was only US$ 2,000.

We can observe the declining share of manufacturing in Indonesia's GDP from the World Bank data as shown in the chart below.

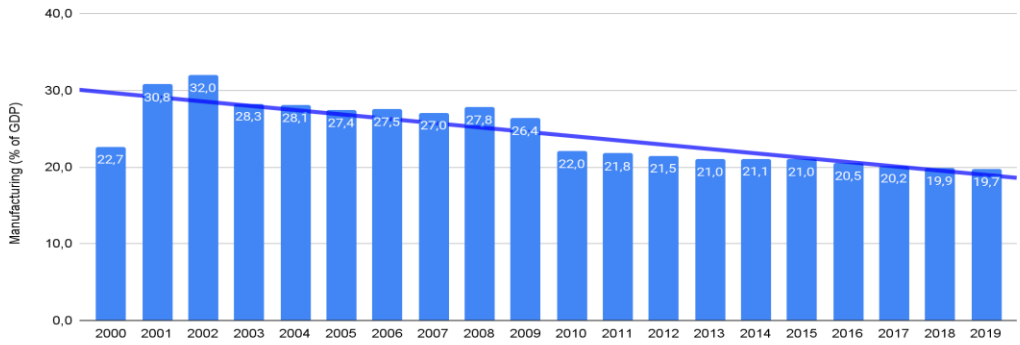


Figure 1 – Share of Manufacturing in Indonesia's GDP, 2000 – 2022.
Source: World Bank.

From the 1990s until 2002 the share of manufacturing in Indonesia's GDP continued to steadily increase with the exception of the 1998 Asian Financial Crisis. During this period, manufacturing served as the engine of growth for the economy as its growth far surpassed the overall GDP growth. However, since 2002, growth began to falter and it started to underperform compared to the rest of the economy. Indonesia's export basket, heavy with raw materials, reveals its incomplete industrialization. Unlike regional peers exporting manufactured goods, Indonesia's reliance on commodities fuels the "Dutch disease," choking non-resource sectors like manufacturing. This dependence fosters a boom-bust cycle driven by volatile prices, jeopardizing development. UN data paints a stark picture: 29 of 32 low-human-development countries are commodity-heavy, often entangled with weak governance, where "resource riches breed political instability, corruption, and plunder".[9]

Although the dependence has incrementally gone down, Indonesia remains relatively more reliant on commodities for its exports especially compared to other peer countries in the region as we can see from the chart below.

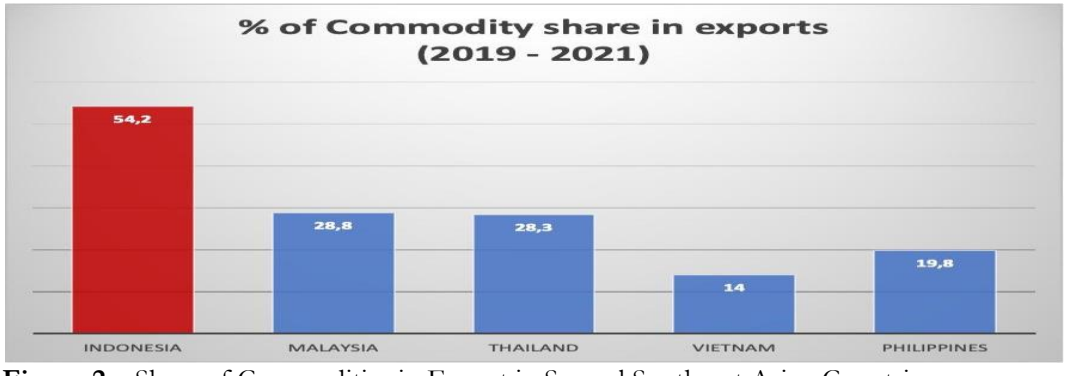


Figure 2 – Share of Commodities in Export in Several Southeast Asian Countries.

[9] Joseph E. Stiglitz, *Making Globalization Work* (New York: W.W. Norton & Co., 2006).

Source: UNCTAD, 2021.

With the advantages of manufacturing and pitfalls of raw commodities becoming evident, the crucial question is how to nurture sustainable industrialization in Indonesia. While free-market advocates persist, historical evidence and studies suggest government intervention is crucial due to numerous market failures plaguing industrialization in developing countries. "Coordination failures" and "information externalities".[10] lead entrepreneurs to favor resource extraction over the riskier, yet transformative, manufacturing sector.

Nearly all developed nations employed unorthodox policies, dubbed "industrial policy" (IMF, 2023), involving targeted government support to trigger economic transformation. Even the fervent free-trade champion, the United States, shielded its nascent manufacturing through hefty import tariffs in the 19th and early 20th centuries (see chart). Bairoch (1993) aptly dubs the U.S. the "mother country and bastion of modern protectionism."

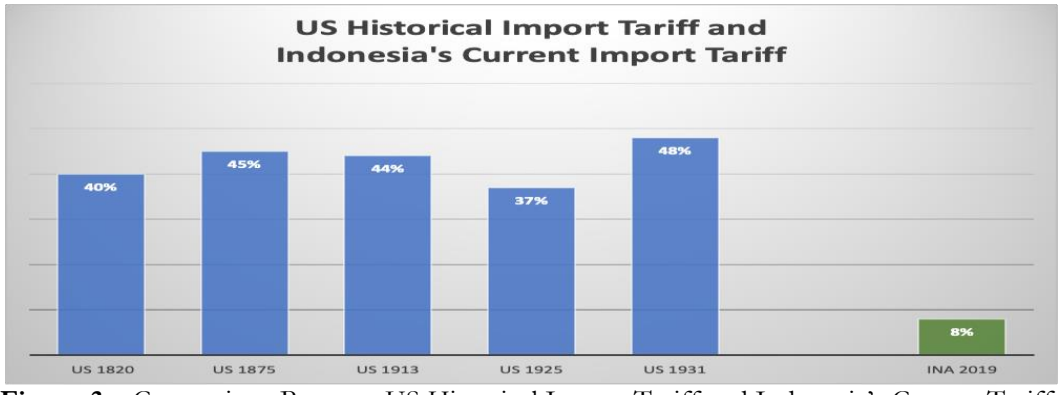
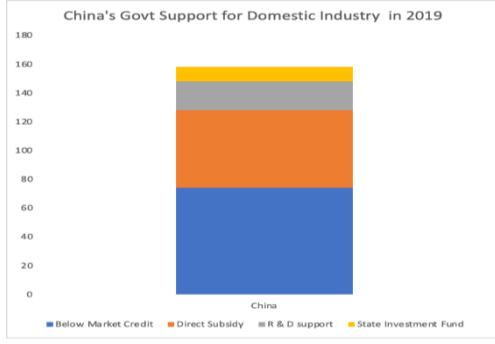
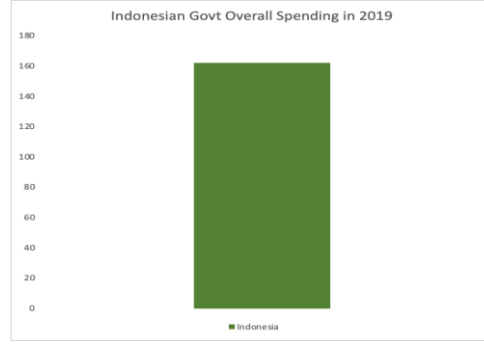


Figure 3 – Comparison Between US Historical Import Tariff and Indonesia's Current Tariff
Source: Bairoch (1993) and Chang (2020)

Aside from the US, all of the so-called East Asian economic miracles also witnessed vigorous government intervention throughout their rapid ascendance. Japan and South Korea utilized trade protection, generous subsidies, and concessional credit to support domestic champions in manufacturing with rigorous conditionalities (usually export performance). China started its industrial policy later and today the country remains an outlier in supporting its industry as CSIS reported (2022). In 2019, China spent more than US$ 160 billion to prop up its industry (CSIS, 2022), roughly the same as the Indonesian government's overall expenditure in the same year.



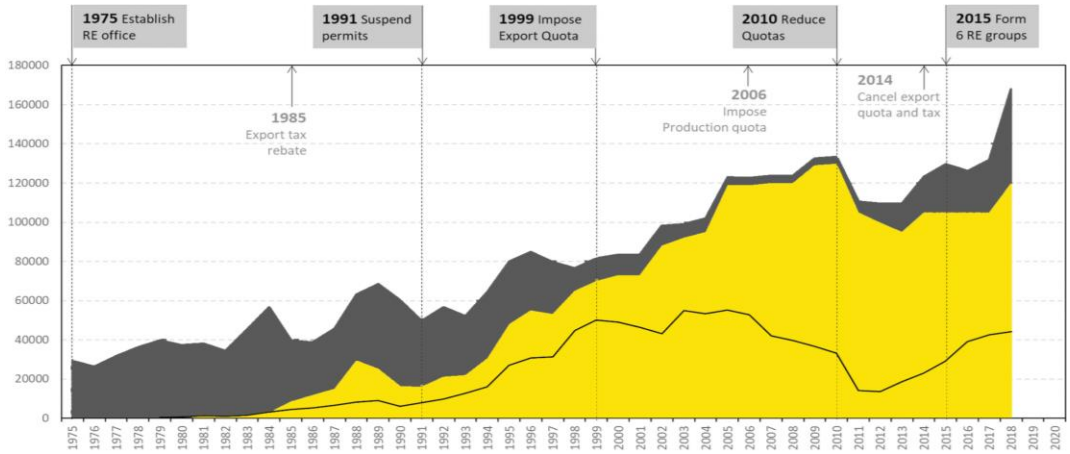


[10] Rodrik, "Unconditional Convergence in Manufacturing"; Dani Rodrik et al., "Industrial policy for the twenty-first century," http://www.ksg.harvard.edu/rodrik/ (2004).

Figure 4 – China's Spending to Support Domestic Industry.
Source: CSIS (2022).

In addition to providing substantial subsidy, the Chinese Government also restricted the export of critical natural resources to promote industrialization at home. For instance, China imposed export quota for rare earth minerals in 1999 to encourage rare earth minerals processing industry domestically. As the result, China's export of rare earth declined and the processing of the minerals increased.

China's Rare Earth Minerals Export and Production



(**Source:** Shen et al 2020).

Indonesia's industrial policy history is checkered. Despite sporadic attempts since Soeharto's era, lacking "serious efforts" and "export discipline" limited impact.[11] Even revived efforts, like Soeharto's late-regime aircraft venture, faltered during the Asian Crisis. Later, IMF pressure and a commodity boom further stalled industrial goals.

The 2009 Mining Law's planned ore export ban, later diluted by investor resistance, marked another false start. However, 2020's strict enforcement reflects a renewed commitment to industrialization, with nickel downstreaming as a flagship initiative. This resource-based strategy, while sensible given the limited value of raw exports, sparks debate. Sachs and Warner (2001) warn of resource-driven growth risks, making Indonesia's unconventional path intriguing but potentially perilous. Downstreaming faces additional criticism for exacerbating inequality, demanding careful navigation.

Against the aforementioned backdrop, through this study the author seeks to analyze the impact of the downstreaming policy in various dimensions including economic (e.g. GDP, investment, export), social (e.g. employment, consumption, poverty) and environmental (e.g. air and water quality). The author will focus on Morowali which constitute a major destination for nickel downstream investment.

This study delivers several significant contributions:

1. Policy Guidance: By dissecting the multifaceted implications of Indonesia's nickel downstreaming program, this research offers valuable insights for policymakers. We provide a roadmap for the effective execution of similar policies and highlight potential

[11] J. Studwell, *How Asia Works: Success and Failure in the World's Most Dynamic Region* (London: Profile Books Ltd, 2013).

pitfalls to avoid. This serves as a blueprint for promoting downstreaming not just in nickel, but across other strategic commodities, fostering broader economic diversification.

2. Bridging Knowledge Gaps: Existing literature on industrialization often overlooks the potential of resource-based approaches. This study fills this gap by demonstrating the viability and potential merits of leveraging resource abundance for value-added manufacturing. We provide empirical evidence and nuanced analysis, enriching the scholarly understanding of resource-based industrialization strategies.
3. Global Lessons: For other nations with abundant natural resources, our findings offer valuable lessons. Countries contemplating downstreaming policies or seeking to refine existing ones can benefit from our analysis, drawing inspiration and adapting our insights to their own contexts. This research contributes to a broader global dialogue on sustainable resource utilization and responsible development practices.

Overview of Public Policy

Public policy encompasses any government action or inaction, aimed at influencing societal conditions. Crafting effective policy requires careful consideration of both intended and unintended benefits and harms across all groups. As Dye states, "public policy is whatever the government chooses to do or not to do".[12] This underscores that beyond pronouncements, policy manifests in concrete actions and even deliberate non-intervention. This implies government responsibility to implement policy through tangible efforts, balancing diverse interests while pursuing clear goals and objectives. Analyzing public policy involves understanding its content, environmental influences, institutional and political determinants, and its overall impact on the political system and society.

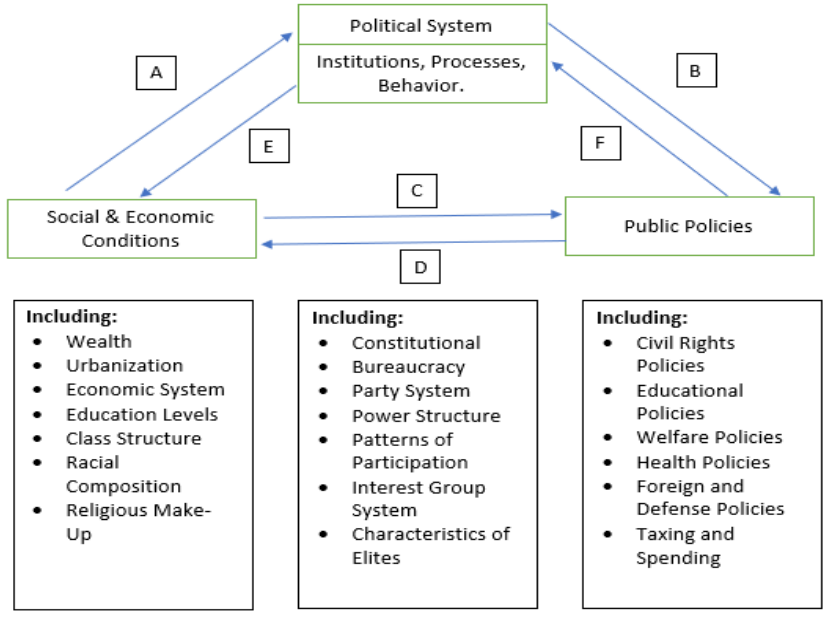


Image 1: The Impact of Public Policy and Society.

A = the impact of societal forces and environmental conditions on political and governance institutions, political processes and political behavior.

[12] Thomas R. Dye, *Understanding Public Policy* (2005).

B = the impact of political and government institutions, political processes and political behavior on government policy.
C = the impact of forces and conditions of society's environment on government policy.
D = the impact of government policies on socio-economic conditions.
E = the impact of political institutions, government institutions, political processes and political behavior on social / economic forces / conditions.
F = the impact of government policies on government institutions, political processes and political behavior.

Subsequently, Dye illustrates the impact of policies on target and non-target groups:

1. Target Group:

a. Agenda Setting: Dye emphasizes that the target group plays a crucial role in the agenda-setting process. Those with significant interests in the policy are likely to be an active target group influencing policy agenda formation.
b. Policy Formulation: The target group strives to ensure that formulated policies meet their needs and interests. They can participate in the policy formulation process through advocacy and lobbying.
c. Policy Implementation: The target group may directly experience the impacts of policy implementation. Their well-being and interests often take center stage during the implementation phase.

2. Non-Target Group:

a. Side Effects: Dye highlights that policies directed at one group may have side effects on another. Non-target groups may experience unintended consequences or changes in their environment due to the implemented policies.
b. Distributive Effects: Non-target groups may undergo changes in resource distribution, both positive and negative, as a result of applied policies. Understanding distributive effects helps predict the policy impact on these groups.

In accordance with Thomas R. Dye's theory, the target group concerning the nickel downstreaming policy in Indonesia, particularly in the Morowali region as a hub for nickel downstreaming industries, may encompass those directly involved in the downstreaming process. The target group may include producers and actors in the nickel downstreaming industry, local government officials, as well as workers engaged in the production chain.

Meanwhile, the non-target group may comprise the local community, who might not be directly involved in the nickel downstreaming process but could experience environmental and social impacts due to the policy. For instance, the local residents living around the nickel downstreaming industrial area may undergo changes in lifestyle, environment, and access to resources.

Nickel Down streaming Policy Implementation

Indonesia's nickel story began in the late 19th century with Dutch pioneers like NV Billiton Maatschappij. This era saw sophisticated nickel production at Obi Island, North Maluku, and the birth of state-owned giant Antam in 1954. Nationalization in the 1960s, driven by sovereignty aspirations, brought Dutch assets under control. Notably, PT Inco emerged in 1968, a landmark partnership with Canada's INCO, showcasing Indonesia's global nickel clout.

From 1970-1990, Indonesia saw a nickel boom. Inco's 1977 Sorowako mine propelled Sulawesi and Indonesia onto the global stage. The next two decades loosened foreign ownership

restrictions, paving the way for further expansion. By 2010-2019, a renewed focus on downstreaming emerged. The 2009 Mineral and Coal Mining Law, aiming to ban raw mineral exports, marked a paradigm shift: from exporting unprocessed resources to adding value through downstream processing.

The initiation of the implementation of the Mineral and Coal Mining Law of 2009 began in 2014 with the Government Regulation No. 1 of 2014. Due to various factors affecting the implementation of the export ban policy, on January 12, 2017, Government Regulation No. 1 of 2017 was issued, marking the fourth amendment to Presidential Regulation No. 23 of 2010. This regulation provided leniency or relaxation of permits for the export of raw minerals for all types of minerals for up to 5 (five) years. The primary reason the government granted conditional export relaxation was for national revenue considerations, thereby allowing for adjustments to the export ban[13].

The continuity of the relaxation measures implemented by the government was determined in 2018. The Ministry of Energy and Mineral Resources issued Ministerial Regulation No. 25/2018 on Mineral and Coal Mining Operations (Ministerial Regulation ESDM 25/2018), which imposed a ban on the export of nickel with a content below 1.7%, starting from January 11, 2022. One year later, through Ministerial Regulation ESDM No. 11 of 2019, the government accelerated the ban on nickel ore exports, effective from January 1, 2020.

Indonesia's ambitious 2009 raw mineral export ban faced several hurdles in its initial five years. The entrenched reliance on revenue from raw exports, lack of developed processing infrastructure, complex regulatory changes, and resistance from vested interests, particularly mining companies, all conspired to complicate implementation.

Condensed and impactful version of the Law No. 3 of 2020 introduction:

Recognizing the need for enhanced governance and sustainability, Indonesia revamped its mining regulations with Law No. 3 of 2020. Replacing 2009's Law No. 4, this new law prioritizes downstreaming – boosting local processing before exports – through eight key changes:

1. Streamlined licensing
2. Mandatory smelter utilization
3. Downstreaming focus with raw material export ban
4. Simplified mining taxation
5. Strengthened environmental protections
6. Efficient dispute resolution mechanisms
7. Improved local community welfare
8. Restructured organizational framework

This revamped framework aims to improve efficiency, unlock greater economic value, and ensure sustainable development in the mining sector.

In 2020, the Indonesian government exhibited a more resolute stance in enforcing the ban on nickel ore exports and promoting nickel downstream processing due to several compelling factors and policies that propelled this transformation. The underpinning elements fortifying this shift are among others as follows:

1. President Widodo's second term saw a pivotal shift. Downstreaming became a top priority,

[13] Suhartono dan Izzati. "Kebijakan Percepatan Larangan Ekspor Ore Nikel Dan Upaya Hilirisasi Nikel." *Jurnal Info Singkat* 11 (2019).

enshrined in the 2020-2024 development plan and annual working plan. This clear endorsement from the highest office provided crucial momentum for the policy's success.

2. The 2020 Minerba Law tightened its grip on downstreaming. Six mandatory value-adding activities were outlined for mining permit holders, spanning metallic and non-metallic mineral processing, rock processing, coal processing, and utilization. Alongside incentives for compliance, the law introduced tougher penalties for violations, signaling a zero-tolerance approach to non-compliance.
3. Once foes, now allies. Years of friction with the private sector melted away as downstreaming revealed lucrative opportunities. Nickel investment skyrocketed from a meager US$502 million pre-ban to a staggering US$10.9 billion post-2020, proving the industry's embrace of the new paradigm.

With the above factors, in comparison to the export ban of 2014, the 2020 export ban proved to be significantly more successful. This success is substantiated by the growth in the mineral production sector and the proliferation of smelter construction in various regions of Indonesia. Unlike the 2014 ban, which encountered significant opposition and challenges, the 2020 ban showcased improved implementation and alignment with national objectives.

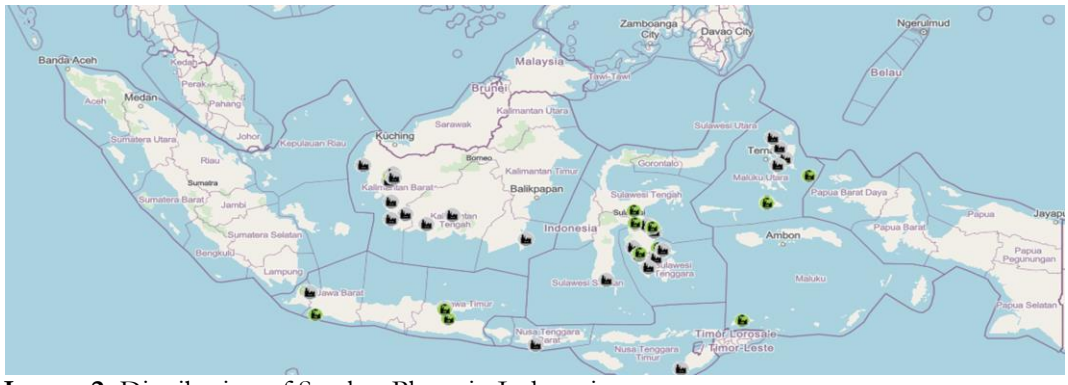


Image 2: Distribution of Smelter Plants in Indonesia.
Source: Ministry of Energy and Mineral Resources.

As the production of mineral mining goods increases, the construction of smelter plants is also increasing in Indonesia. Currently, there are 41 smelter plants in Indonesia both under construction and already running consisting of 4 smelter plants in Java, 2 smelter plants in Nusa Tenggara, 12 smelter plants in Kalimantan, 16 smelter plants in Sulawesi, 7 smelter plants in Maluku and North Maluku. Indonesia also already has 3 HPAL facilities which produce MHP and 1 nickel sulfate production facility.

Going forward, the Indonesian government is continuing to push downstreaming so that it extends into the EV battery ecosystem which is increasingly pivotal for global energy transition and SDGs attainment. To that end, it is worth noting that downstreaming policy in Indonesia is not just aimed at economic prosperity but also environmental sustainability in accordance to the goals of SDGs.

Scope of Analysis

This section will describe the scope of analysis under consideration in this study. Morowali, Indonesia's nickel downstreaming epicenter, serves as our lab to analyze the policy's impact. With an influx of USD15.56 billion investment and 11 smelters since 2014, compared to less intensive downstreaming regions in Central Sulawesi, Morowali offers a compelling case study. By examining its environmental, social, and economic outcomes, we'll shed light on the true

potential of downstreaming, considering the well-established positive link between good ESG performance and economic success (Diaye, 2021).

1. Economic: Economic indicators measure the economic performance of a region for a given year. One of the main measures is production, which in macroeconomics is equivalent to output and income. Viewed from the expenditure approach, output can be broken down into spending components such as aggregate consumption (household and government consumption), investment, and net export.[14] The economic indicators analyzed in this study are:

a. Gross Regional Domestic Product (GRDP): GRDP is a regional measure equivalent to GDP, which is the total final market value of goods and services produced in an economy within a year. According to BPS, GRDP can be measured with two approaches: the production and the expenditure approach.
b. Investment: Investment refers to the Gross Fixed Capital Formation (GFCF), measuring the procurement, manufacture, and purchase of capital goods .
c. Export: Exports consist of transactions of goods and services from residents to non-residents . Its counterpart, imports, are transactions of goods and services consisting of non-residents to residents.
d. Fiscal Revenue: Fiscal revenue consists of tax and non-tax revenue. The government of Indonesia classifies several tax revenue components, based on its source, such as: income tax, value added tax, land and building tax, excise tax, tariff, and export tax. On the other hand, non-tax revenues consist of revenue from natural resources, revenue from state assets, and grants.
e. Employment: Number of employed people in the population measures the extent of job creation in the economy .

2. Social: Social indicators measure the extent to which social change development occurs in a region. It is intended to measure the quality of life, and measures vary from qualitative to quantitative indicators.[15] This paper focuses on several social indicators to reflect social changes such as:

a. Welfare: Welfare is associated with well-being, quality of life, and overall state of prosperity and contentment of individuals, communities, or society as a whole. This paper uses tangible measures of welfare, by using consumption from micro data. Consumption reflects the goods and services that people actually utilize to meet their daily needs and desires and it also encompasses non-monetary benefits like access to healthcare and education.[16]
b. Poverty: Poverty is a condition characterized by a lack of the essential resources and opportunities needed for a decent standard of living, typically defined by an insufficient income or access to basic necessities, such as food, clean water, shelter, healthcare, and education. This paper uses the percentage of population in poverty to measure to what extent does the downstreaming policy and its economic consequences can lift people up from poverty.[17]
c. Inequality: Inequality refers to the unequal distribution of resources, opportunities, and outcomes among individuals or groups within a society or community. It is often characterized by differences in income, wealth, education, access to healthcare, and various

[14] G.H. Moore, "The Analysis of Economic Indicators," *Scientific American* 232, no. 1 (1975): 17–23, http://www.jstor.org/stable/24949702.
[15] A. L. Ferriss, "The Uses of Social Indicators," *Social Forces* 66, no. 3 (1988): 601–17, https://doi.org/10.1093/sf/66.3.601.
[16] M. Pradhan, "Welfare Analysis with a Proxy Consumption Measure: Evidence from a Repeated Experiment in Indonesia," *Fiscal Studies* 30, no. 3–4 (2009): 391–417, https://doi.org/10.1111/j.1475-5890.2009.00101.x; Dale W. Jorgenson, "Production and Welfare: Progress in Economic Measurement," *Journal of Economic Literature* 56, no. 3 (2018): 867–919, https://doi.org/10.1257/jel.20171358.
[17] D.V. Ferazagia, "Analisis Tingkat Kemiskinan Di Indonesia," *Jurnal Sosial Humaniora Terapan* 1, no. 1 (2018).

other socio-economic factors. Inequality is typically measured using the Gini index.[18]

d. Education: Education is a fundamental right and plays a crucial role in promoting sustainable development and social inclusion. In the context of the provided sources, education is highlighted as a key component of the SDGs to generate social impact.[19] This study will dissect the school participation rate of the local community in Morowali as well as the level of educational attainment of the population.
e. Health: Health is a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity. It encompasses various aspects of an individual's well-being, including their physical, mental, and social dimensions. Health is influenced by a range of factors, including genetics, lifestyle choices, environmental conditions, and access to healthcare services. It is important to consider health in the context of social impact.[20] This study will attempt to examine the prevalence of the local community in reporting diseases particularly respiratory illness as well as the incidence of stunting among toddlers.
f. Crime: this study will seek to unveil the crime rate as reported by the local law enforcement agency and supported by the community views on social conflict.[21]

3. Environment: Environmental indicators measure the development of harmful emission and waste, examine the environmental damage created by human activities.[22] This paper focuses on several environmental indicators such as the result of water and air quality test. On the other hand, the discharge of sewage into the sea has caused adverse impacts on the health and economy of the community such as the reddening of the face of the waters, mass mortality of fish, increased heavy metal content, and the discovery of arsenic bacteria that had never been found before (Jatam, 2020).

Methodology

In this study, the author employed mixed methods research, also known as methodological eclecticism or methodological pluralism, involving the integration of both quantitative and qualitative research techniques within a single study, where multiple quantitative and/or qualitative methods are employed simultaneously.[23] Researchers commonly employ qualitative methods when studying topics with limited existing research or when seeking a deeper exploration.[24] Conversely, they tend to utilize quantitative methods for hypothesis testing and generalization.

To gauge the impact of nickel downstreaming, a two-pronged research approach was adopted. The quantitative arm, analyzing pre-existing data on GDP, growth, and employment, shed light on the broader economic picture. Conversely, qualitative in-depth interviews with community members illuminated local perceptions and concerns surrounding a proposed smelter, capturing intangible aspects often missed by numbers alone.

1. In-depth interviews with community members (village chiefs, residents) and stakeholders

[18] Tri Wahyuningsih, Mohammad Bugis, and Saidna Zulfiqar Bin Tahir, "Analysis of the Inequality on Inter-Regional and Inter-Time Income Distribution in Indonesia," *The Journal of Social Sciences Research*, no. 51 (January 2019), https://doi.org/10.32861/jssr.51.1.8.
[19] Belén López, "Social Impact through the SDGs: Case Studies in Higher Education," 2023, https://doi.org/10.5772/intechopen.109811.
[20] L. Den Broeder and F. Vanclay, "Health in social impact assessment," in *Health in Impact Assessments: Opportunities Not To Be Missed*, eds. R. Fehr, F. Viliani, J. Nowacki, and M. Martuzzi (World Health Organisation Regional Office for Europe, 2014), 69-88, http://www.euro.who.int/health-in-IA.
[21] Kai Kaiser et al., "World Bank Policy Research Working Paper 3384," http://econ.worldbank.org. *WorldBank*.
[22] X. Olsthoorn et al., "Environmental Indicators for Business: A Review of the Literature and Standardisation Methods," *Journal of Cleaner Production* 9, no. 5 (2001): 453–63, https://doi.org/10.1016/S0959-6526(01)00005-1.
[23] J. Creswell and J. Creswell, *Mixed methods research: Developments, debates, and dilemmas*, in *Research in Organizations: Foundations for Methods of Inquiry*, eds. R. Swanson and E. Holton III (CA: Berrett-Koehler, San Francisco, 2005), 315–326.
[24] L.A. Palinkas et al., "Mixed-Methods Designs in Mental Health Services Research: A Review," *Psychiatric Services* 62, no. 3 (2011): 255–63, https://doi.org/10.1176/ps.62.3.pss6203_0255.

(government officials) in Morowali, Indonesia's nickel downstreaming epicenter, delved into the multifaceted impacts of the industry. These interviews covered:

2. Employment prospects: Examining labor inclusion, job opportunities, and barriers based on age, gender, education, and income.
3. Economic benefits: Exploring perceived improvements in income through business ventures like stalls and shops.
4. Social cohesion: Assessing whether local collaboration helps mitigate potential conflicts from migrant workers.
5. Social jealousy: Investigating internal conflicts within communities and their resolution mechanisms.
6. Environmental concerns: Focusing on firsthand experiences of environmental repercussions due to smelter construction.
7. By capturing these diverse perspectives, the research provides a holistic understanding of the intricate social dynamics surrounding nickel downstreaming in Indonesia.

Although this is a mixed method, this paper will integrate quantitative and qualitative data, to present the results of the impact from objective data (quantitative) and in-depth interviews (qualitative). The process of assessing and classifying the rationales provided by the informants into ten distinct categories entails a three-step methodology:

1. Scrutinizing the field study notes and reviewing the recorded interviews.
2. Analyzing the field study report and perusing the logbook entries authored by the local research assistants.
3. Conducting an internal focus group discussion to deliberate upon the findings.

Result and Analysis of Social, Economic, and Environmental Impacts

This section dives deep into the economic, social, and environmental implications of Indonesia's "downstreaming" program, implemented through the 2020 nickel ore export ban. Using a two-pronged approach, we'll delve into both macro-level impacts through data analysis and micro-level perspectives through in-depth community interviews. Our focus lies on Central Sulawesi, particularly Morowali, the epicenter of nickel downstreaming.

Nationally, the policy's most striking impact is evident in a dramatic shift in export performance. As Figure 5 reveals, exports of nickel downstream products skyrocketed from pre-ban levels to a staggering US$33 billion in 2022. This surge signifies progress in diversifying and upgrading Indonesia's nickel exports into higher-value products, moving up the global value chain.

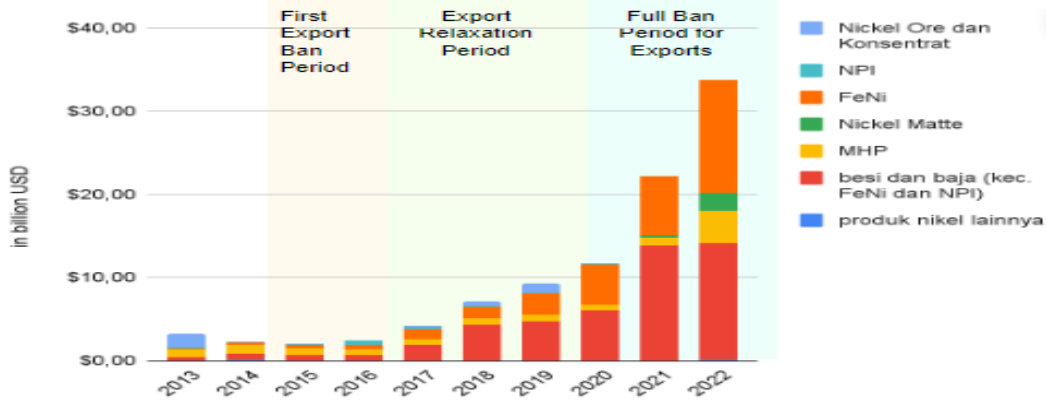


Figure 5 – Export Value of Nickel Industries in Indonesia.
Source: Trademap.

Though national export figures showcase the success of downstreaming, lingering concerns persist about its impact on local communities. Particularly in Morowali, a heartland of nickel production with over 100 mining permits, the experiences of residents deserve close scrutiny. This section dives deep into the local effects of downstreaming in Morowali and Central Sulawesi, utilizing interviews, surveys, and data analysis to assess its economic, social, and environmental implications for impacted communities.

Economic Impact of Downstreaming

Driven by Indonesia's ambitious nickel downstreaming program and the subsequent ban on raw ore exports, Central Sulawesi has witnessed a remarkable economic transformation. This section dissects the multi-faceted impacts of this policy, focusing on Morowali, the epicenter of downstreaming investments.

According to data from the Ministry of Investment, the number of projects in Morowali has exhibited a remarkable uptrend, from 30 projects in 2014 to 181 projects by the year 2023 (as of 3rd quarter). Furthermore, the value of these investments has seen a substantial uptick, with an annual growth rate of 36.43%, resulting in a total investment value of almost 8 billion USD in 2022. Significantly, this contribution accounts for 87% of the total FDI in Central Sulawesi, as illustrated in Figure 6.

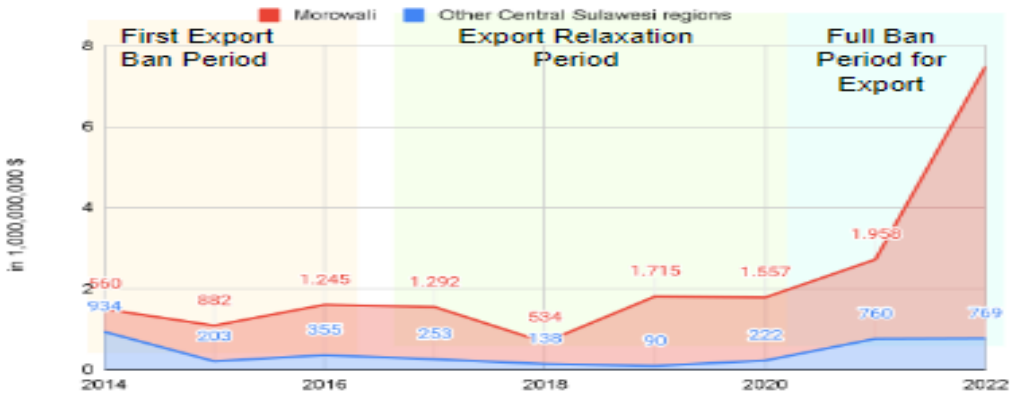


Figure 6 – Value of FDI in Morowali and Central Sulawesi.
Source: Ministry of Investment/BKPM.

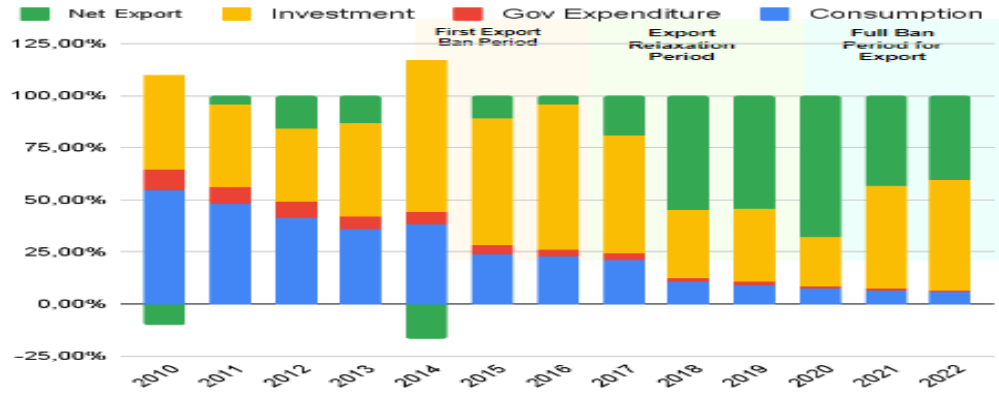


Figure 7 – Composition of Real GRDP in Morowali.
Source: Statistics Indonesia.

Investment has been one of the two strongest drivers of growth in Morowali, alongside exports. The contribution of investment and exports continues to dominate GRDP in Morowali, making the region less reliant on consumption (Figure 7). In 2022, more than 90% of Morowali's economy was driven by investment and export, much higher than the national figure at 37%.

In 2022 alone, GRDP grew by 28.21%, to which investment contributed 19.32%. However, the quality of investment in generating short-term growth is on the decline. During the early stages of the downstreaming policy, from 2013 to 2014, GFCF experienced 4.98% and 9.29% growth, while GRDP surged by 21.69% and 22.18%. Moving to 2022, GFCF grew by 39,04% but the GRDP only by 28,21%. Both investments, coming from foreign and domestic business, exhibit the same feature.

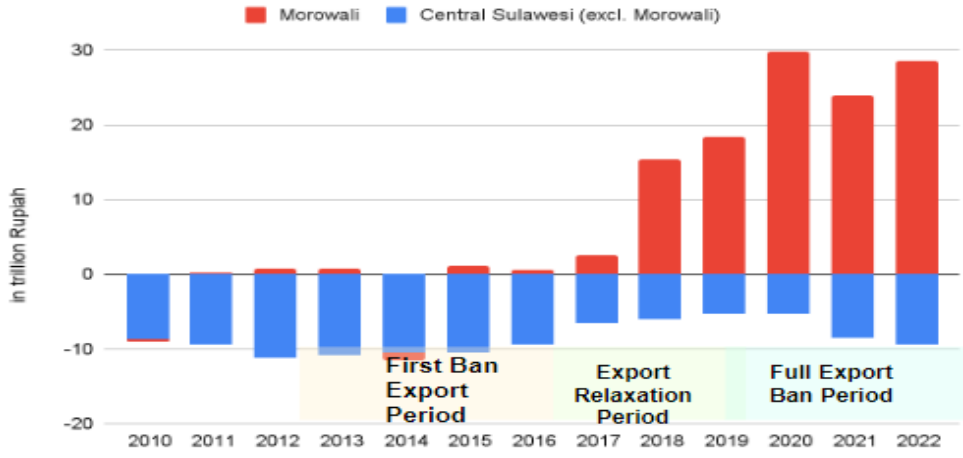


Figure 8 – Net Export of Morowali and Central Sulawesi.
Source: Statistics Indonesia.

The soaring investment also enabled another driver of Morowali's economic growth: export. Morowali has contributed a significant amount of net export to Central Sulawesi, as shown in Figure 8 even as the net export of the rest of Central Sulawesi was in the negative territory.

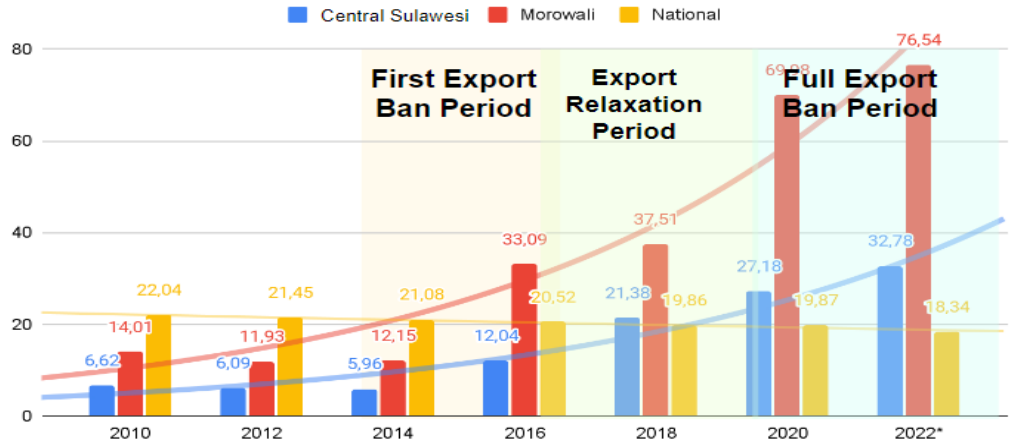


Figure 9 – Contribution of Manufacturing Sector to GDP.
Source: Statistics Indonesia, Ministry of Finance.

Despite Indonesia's premature deindustrialization, Morowali has successfully reindustrialized through its downstreaming policy. Structural transformation is taking place at a rapid pace, as reflected by the share of manufacturing output that consistently outpaced Central Sulawesi. The share of manufacturing in Morowali's GDP in 2022 stood at 76.54%,, double the figure for Central Sulawesi and more than three times higher than the national average (Figure 9). If Morowali can keep this record, it could reap the benefit from long-term output growth, further strengthening its significance in the province and emerge as a national growth source. Currently, it contributed to 40,73% of the total real output in Central Sulawesi and 10,73% of growth in the province (Figure 10).

The significance of manufacturing in Central Sulawesi can also be observed in the sector's high multiplier effect on the rest of the economy. In fact, manufacturing in Central Sulawesi has the highest forward linkage compared to other sectors at 2.24. In other words, investment that generate US$ 1 million output will yield 2.24 million US$ higher output in the rest of the economy.

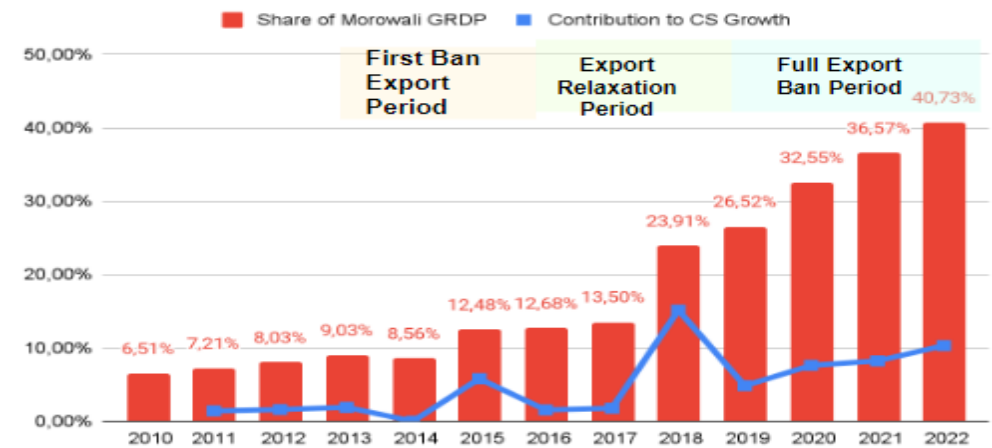


Figure 10 – Real GRDP of Morowali: Level, Growth, and Contribution to Central Sulawesi.
Source: Statistics Indonesia.

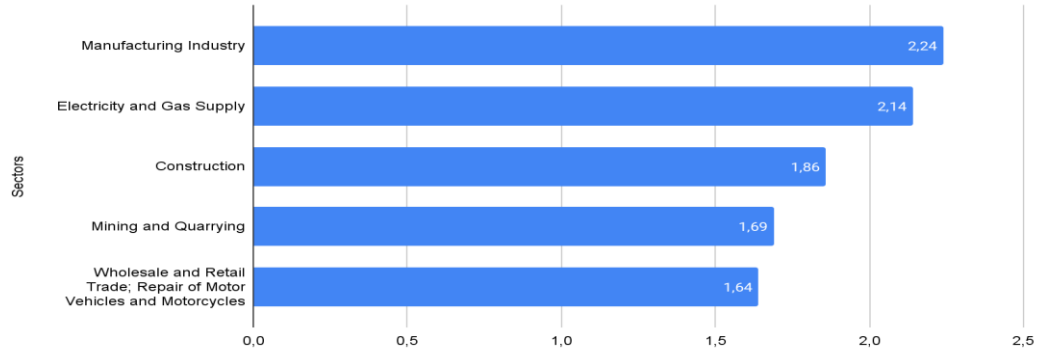


Figure 11 – Sectors with the highest forward linkage in Central Sulawesi, 2016.
Source: Statistics Indonesia.

Morowali's economic rise under nickel downstreaming becomes crystal clear when we look at individual incomes. From 2010 to 2022, its real Gross Regional Domestic Product (GRDP) per capita skyrocketed at a staggering 26.43% annual rate, dwarfing the 5.24% growth of other Central Sulawesi regions. This disparity translated into a remarkable 17-fold increase in Morowali's per capita income, propelling it far ahead of the national average.

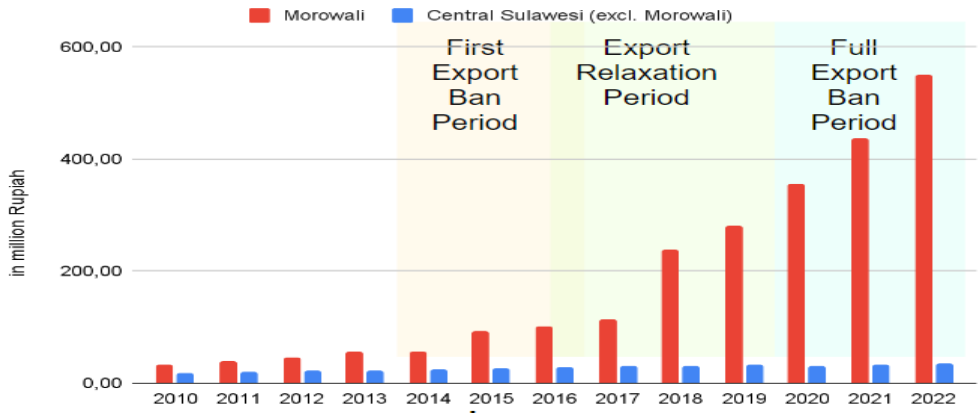


Figure 12 – Real GRDP per Capita of Central Sulawesi and Morowali.
Source: Statistics Indonesia.

While downstreaming boasts impressive export figures and an expanding manufacturing sector in Morowali, the picture appears less rosy when viewed through the lens of employment. Despite these economic indicators, the labor force participation rate in Morowali has remained stagnant over the past five years, averaging a modest 62.28%. This contrasts starkly with the regional average of 68.81% in Central Sulawesi. Delving deeper, data from Statistics Indonesia reveals that between 2017 and 2022, the number of manufacturing workers in Morowali grew by a mere 948 individuals, reaching a total of 3,916 in 2022. This translates to a sluggish annual growth rate of just 2.07% for overall employment in the area.

Additionally, even when considering the proportion of manufacturing workers as delineated in Figure 13, it becomes evident that manufacturing employment only reached its peak in 2018, comprising 10,7% of the total employment in Morowali. Agricultural laborers continue to predominate, constituting 39,31% of the labor force in 2022, signifying that the region has yet to undergo substantial industrialization with respect to employment.

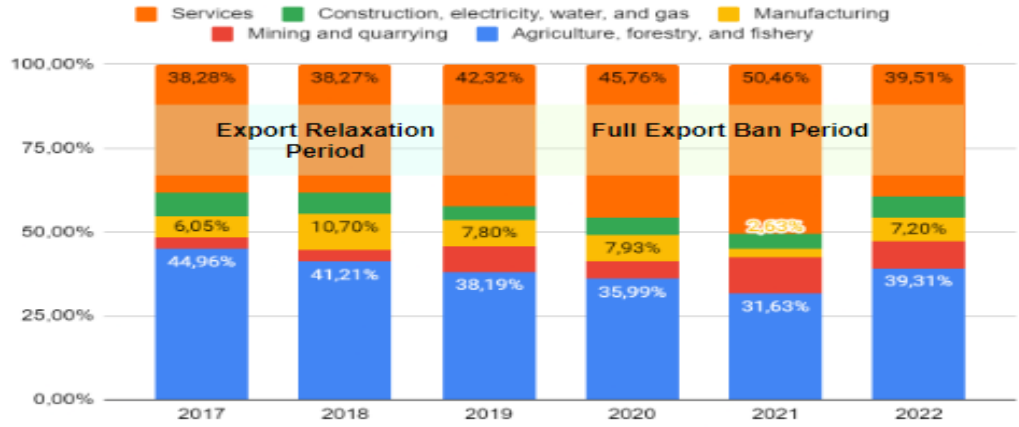


Figure 13 – Share of Sectoral Employment in Morowali (%), 2017 – 2022.
Source: Statistics Indonesia.

While farming and fishing jobs dipped in Morowali, the expected surge towards high-productivity manufacturing hasn't fully materialized. Instead, mining and services witnessed employment gains (Figure 13). This raises questions about skills mismatch and whether downstreaming is creating enough skilled jobs for local communities. Still, the average income of workers in Morowali is rising rapidly even when including self-employed workers who did not earn regular pay. The rise of income also happens at a rate much faster than Central Sulawesi as a whole, widening the gap between the two regions (Figure 14).

The Head of Fatufia Village paints a vivid picture of downstreaming's impact on their community. While diversification has driven a rise in overall income, disparities in skill levels limit equal access to this prosperity. For those possessing the necessary skills, IMIP offers substantial salaries, with skilled workers earning around 5-6 million IDR per month, a significant leap from the prior range of 100,000-200,000 IDR for fishing or farming. However, only a minority qualify for these high-paying roles. This gap has spurred entrepreneurial endeavors, with many residents, like those in Fatufia, setting up businesses capitalizing on the influx of workers. Accommodation services, such as renting houses and boarding rooms, have seen a boom, offering alternative income streams for the community.

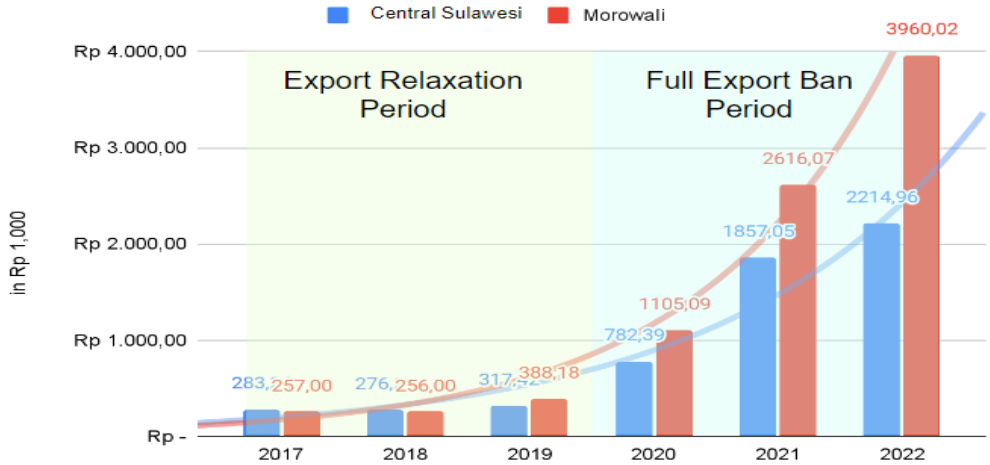


Figure 14 – Average Income in Central Sulawesi and Morowali.

Source: Statistics Indonesia.

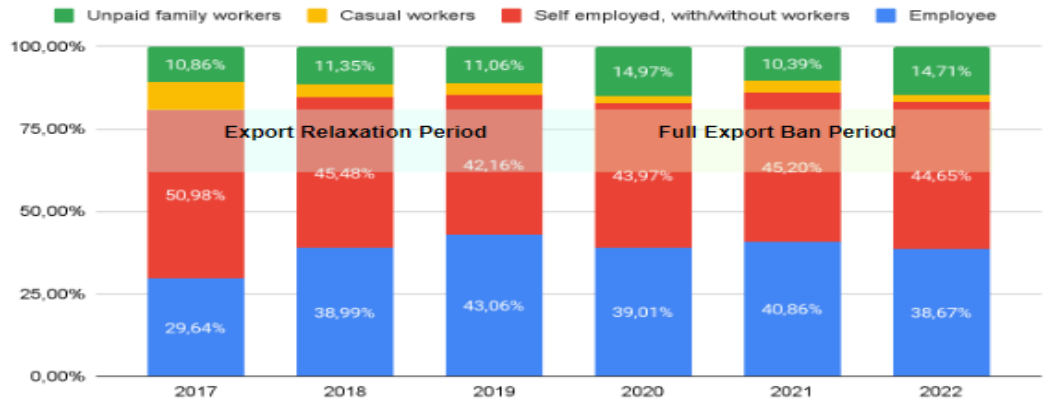


Figure 15 – Employment Share by Working Status in Morowali (%), 2017 – 2022.
Source: Statistics Indonesia.

While a rising tide of formality seems to be lifting boats in Morowali, closer inspection reveals nuanced trends. Self-employment and casual work are gradually declining, suggesting a shift towards formal jobs, but the pace has slowed post-pandemic. Meanwhile, the number of unpaid family workers, often hidden within households, has surprisingly increased (Figure 15).

However, it did not entail that every Morowali resident was able to access better, formal jobs. Unemployment rate steadily declined in Morowali from 2008 until 2015, reaching its lowest at only 2,29% in tandem with the trend in Central Sulawesi. Progress has stalled since then. Even before COVID-19, the rate of unemployment rose, converging with that of Central Sulawesi, even doubling during COVID-19 until 5,21% in 2020 (Figure 16). Rising investment in Morowali and Central Sulawesi in 2022 enabled a quick reduction of the unemployment rate to 3,2% .

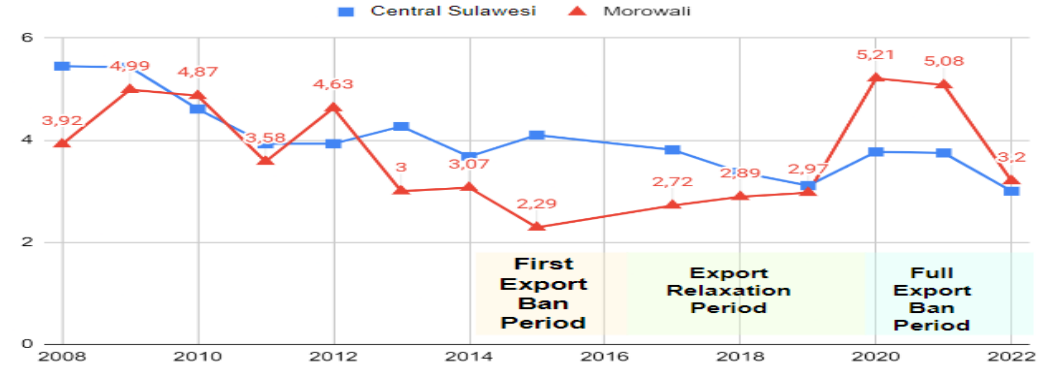


Figure 16 – Open Unemployment Rate, Morowali and Central Sulawesi.
Source: Statistics Indonesia.

One reason for the stagnating unemployment rate and low manufacturing labor absorption in Morowali can be found from primary data collected by IMIP. The industrial park recorded that only 17.3 thousands of its workers are Morowali residents, whereas the other 61.3 thousands of its workers hailed from other Indonesian regions. Not to mention that a sizable number of their workers are coming from foreign countries, mainly from China. Other than the skill gap

that the region experiences which attracted migrant workers, the striking gap between previous secondary figures and this primary data is because the latter did not differentiate the kind of economic activities (sectors) that the workers are doing and the limitation of sample-based data that Statistics Indonesia provides.

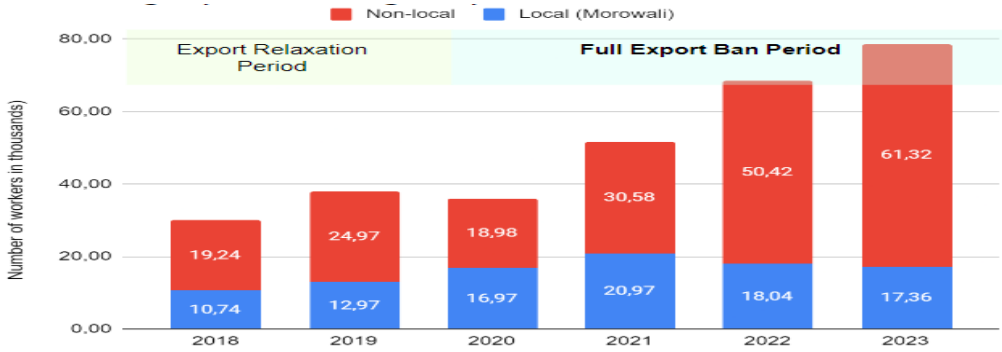


Figure 17 – IMIP Indonesian Workers by Origin.
Source: IMIP.

The results from secondary data, mainly the employment shift from agriculture to service instead of manufacturing and low local labor absorption, are confirmed by our field survey. The Bahodopi community claims that there is significant difference in their area following the nickel downstream program. Before the program, the community's main mode of livelihoods were farmers and fishermen. Since the nickel downstreaming program started, the community lost their livelihoods as farmers and fishermen because the availability of marine natural resources and agricultural gradually depleted.

After downstreaming took hold, many accommodation service providers such as boarding house owners or renters, self-employment by selling such as restaurants or small stalls, sprang up. Some of the local population do work in mining companies, however, they confirmed that there is more non-local labor compared to local labor (Morowali District) that work in PT IMIP. North Luwu has the highest number of non-local labor with 3.526 people in 2023. Low level of education and skill mismatch of the local community has attracted workers from outside of Morowali to work in IMIP. Based on the education level data (discussed further in the social impact), most people in Morowali only finished elementary school.

Collaboration between local entrepreneurs and corporations is another notable aspect identified in our interviews with the locals. Such collaboration arises from the corporation's demand for goods and services provided by local companies. However, our investigation discovered that the majority of these local entrepreneurs do not originate from the Morowali region as reported by the Fatufia village head.

In conclusion, downstreaming's economic impact in Morowali is a tapestry woven with both gold and grit. While macroeconomic indicators celebrate success, the lived experiences of communities like Bahodopi whisper a cautionary tale. Structural transformation in the labor market remains elusive, and resource depletion jeopardizes traditional livelihoods with few alternatives offered. This disconnect underscores the vital need to delve beyond gleaming indicators and prioritize policies that truly uplift the communities at the heart of development, ensuring that downstreaming becomes a tide that lifts all boats, not just a select few.

Social Impact of Downstreaming

The nickel downstreaming has yielded favorable implications for societal well-being, notably within the regions of Morowali. Looking at Figure 19, Morowali Regency has higher consumption compared to Central Sulawesi Province indicating the higher accessibility and ability of people in Morowali Regency to purchase goods and services they need.

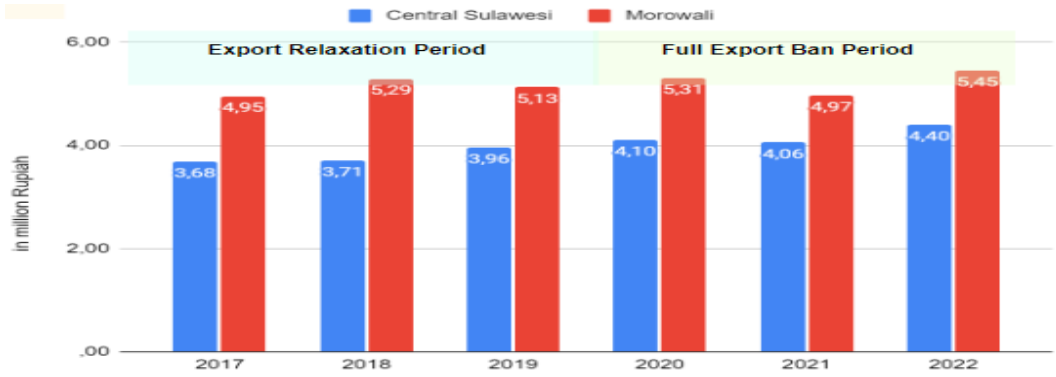


Figure 19 – Individual Nominal Monthly Consumption in Central Sulawesi and Morowali.
Source: Statistics Indonesia.

Not only that, the percentage of population in poverty also declined in the last decade (Figure 20). Even though Morowali has a slightly higher rate of poverty than Central Sulawesi as a whole, the rate of decline is parallel and Morowali has been able to converge with other regions. The first attempt of export restriction in 2014 coincided with rising poverty rate, as it is common for trade policy to affect the distribution of winners and losers. The declining trend continues in 2017 until 2022, but downstreaming policy in both regions can't bring down the poverty rate faster as they're still in the double-digit poverty rate zone.

The inequality figure complements the story of distribution in Morowali. First of all, in general, Gini indices of both regions are in a declining trend. This time, Morowali is more progressive in its equality improvement starting in 2015 (Figure 21). Slow-growing average income in Figure 14, combined with falling poverty rate in Figure 20 means that in later years of downstreaming policy, income growth occurs more on the lower-income group of the population. Nevertheless, it is worth noting that the decline of inequality post 2020 is more incremental compared to the 2014 - 2019 period.

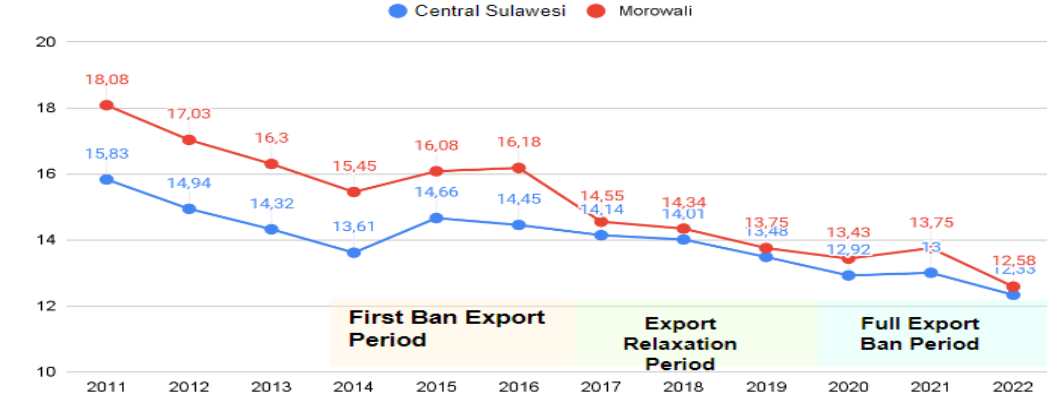


Figure 20– Prevalence and Severity of Poverty in Central Sulawesi and Morowali
Source: Statistics Indonesia

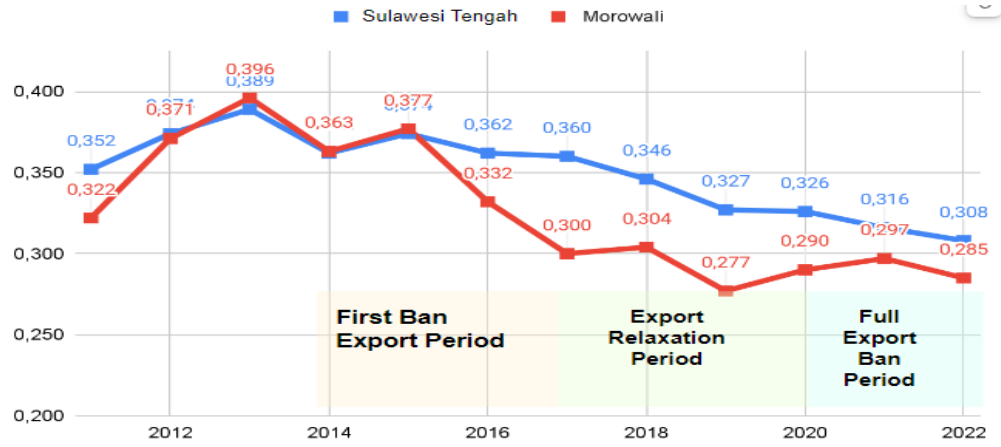


Figure 21 – Expenditure Gini Index in Central Sulawesi and Morowali.
Source: Statistics Indonesia.

Based on their highest educational level, most people in Morowali only finished elementary school. However, the share of people with elementary school education incrementally declined as the share of junior high school graduates was on the rise along with the increase of people with tertiary education albeit at a smaller scale. The data was in congruence with the Fatufia Village head who stated that elementary school graduates dominated the population in his village. The relatively low educational attainment rendered it difficult for the local workforce to access employment opportunities offered by IMIP.

"Individuals without necessary skills who have completed only elementary schooling, previously working as fishermen and farmers, have been deprived of their means of living. Additionally, the firm implements stringent regulations, whereas the local populace has limited comprehension." - Statement from the Head of Fatufia Village

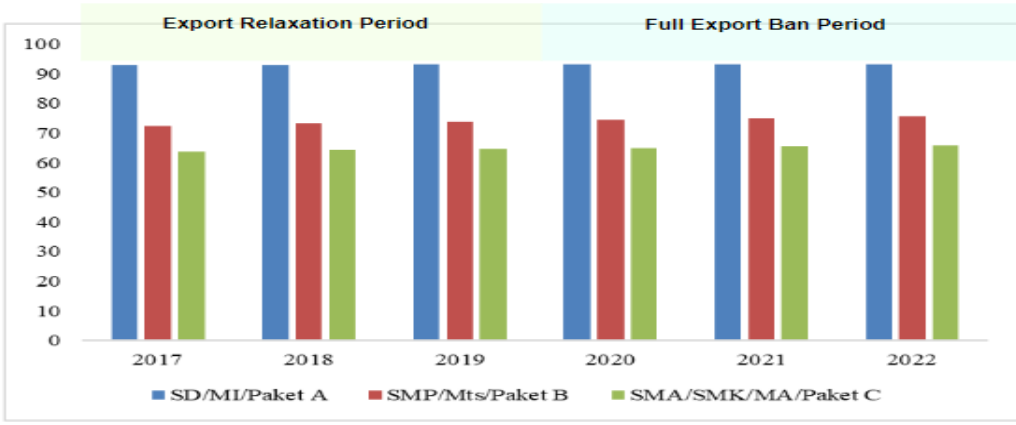


Figure 22 – Net Enrollment Ratio (NER) in Central Sulawesi.
Source: Statistics Indonesia.

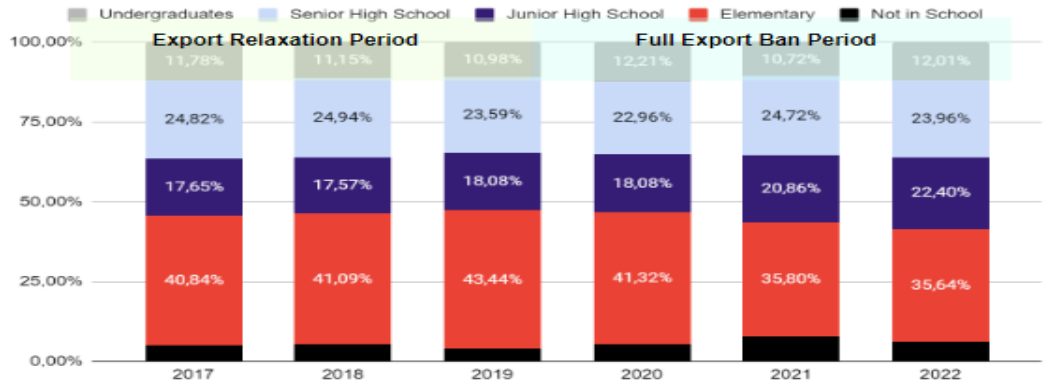


Figure 23 – Educational Level of Morowali Residents.
Source: Statistics Indonesia.

The number of elementary school pupils in Morowali continued to increase from 2018 to 2023. This was confirmed by Fatufia Village Head who added that such increase was not matched by construction of the needed school infrastructure.

"Due to rapid population growth and an influx of individuals from other regions, there is now a lack of study space in the Bahodopi sub-district area. Specifically, there is currently a deficit of 90 learning rooms for elementary school students, resulting in the implementation of a shift school system." - Statement from the Head of Fatufia Village

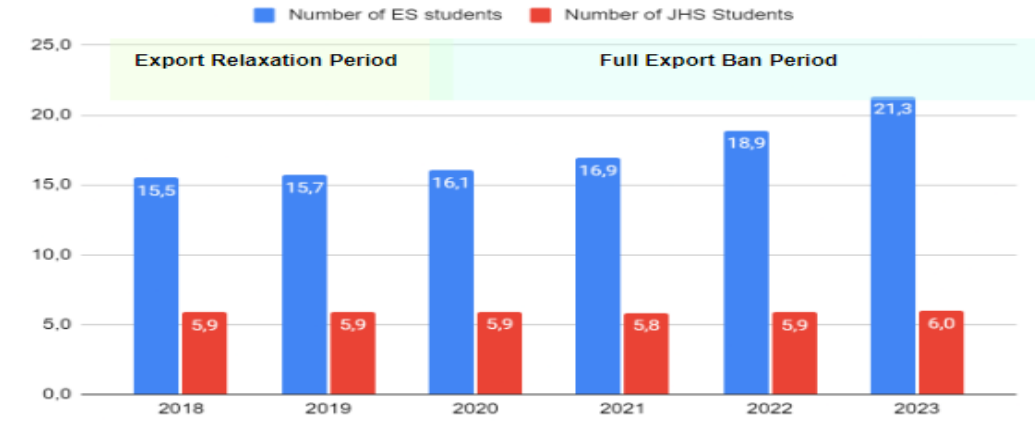


Figure 24 - Number of Elementary and Junior High School Students in Morowali
Source: Dinas Pendidikan Kabupaten Morowali

The prevalence of health problems which include heat, cough, cold, diarrhea, headache and chronic diseases in Morowali and Central Sulawesi showed gradual improvement particularly after 2020. The improvement in Morowali was more pronounced as the incidence of health problems more than halved between 2017 and 2022.

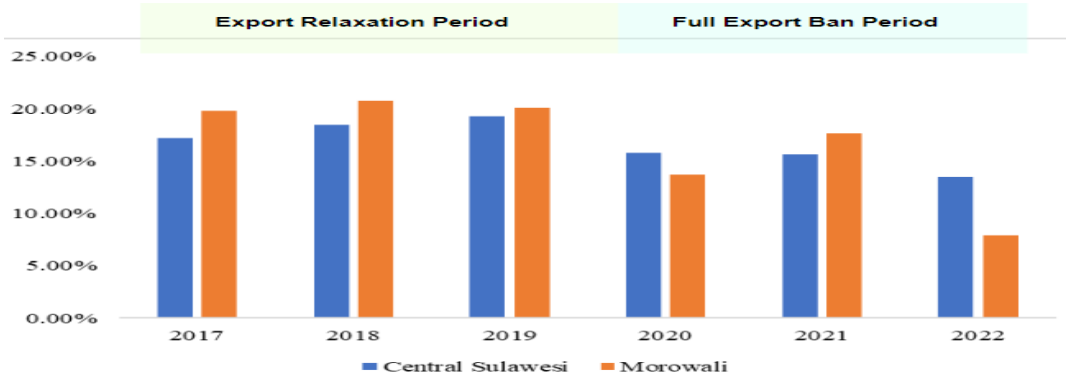


Figure 25 - Health Problems (Heat, Cough, Cold, Diare, Headache, Chronic Diseases, etc) in Central Sulawesi and Morowali.
Source: Statistics Indonesia.

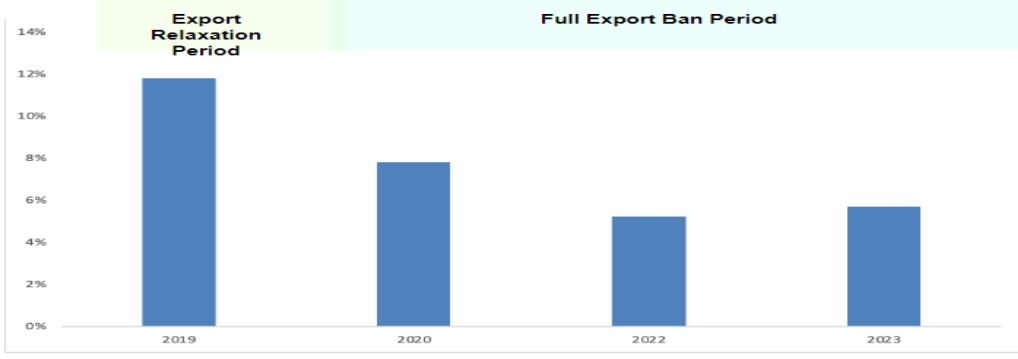


Figure 26 – Stunting rate among infants in Morowali.
Source: Statistics Indonesia.

Similar significant improvement is observed in terms of stunting among infants in Morowali. The rate of stunting fell substantially from 12% in 2019 to less than 6% in 2023.

Data on health standards progress above was also confirmed by the Fatufia Village Head who through in - depth interview revealed that he observed improving awareness for infants' nutrition as well as basic healthcare service for infants through *Posyandu* (local infants healthcare center) in his village.

"Although stunting still occurs, the implementation of posyandu in a coordinated manner can reduce the stunting rate. Health workers have assessed that stunting is infrequent here. "Alhamdulillah, as the posyandu is routine and we also budget in the APBDes for additional food." - Statement from the Head of Fatufia Village.

Environmental Impact

One of the discernible consequences arising from the implementation of nickel downstream policies is environmental degradation. Based on information conveyed by the village head, the community has often complained about the factory's activities, even staging demonstrations several times.

"Recently, protests have erupted over the issue of coal dust pollution. What are the potential solutions to mitigate coal dust exposure? A notable concern is the amount of black particulate matter that enters people's homes. This is especially problematic during the summer and windy seasons when dust loads are more prevalent during

transportation activities. "In the past, there were frequent demonstrations due to environmental issues, and more recently, demonstrations have occurred again due to coal dust." - Statement from the Head of Fatufia Village.

Based on interviews with the local community, environmental impact is among the most significant due to downstreaming. They alleged that there has been declining natural resource availability. Agricultural land and plantations previously owned by farmers have been converted. Fishing areas are increasingly polluted due to waste of both nickel processing and local community activities. The river that was previously used by the community for bathing and washing can no longer be used because the water quality has been compromised.

"Rubbish is a major issue within this village. Only Fatufia Village has TPS3R, overseen by the Bumdes, although it is yet to be fully optimised. This is due to the requirement for workers at the waste unit and an additional fleet, while the Bumdes funds are currently insufficient." - Statement from the Head of Fatufia Village.

In addition, the Bahodopi sub-district does not yet have a landfill for garbage. This has led to a large amount of garbage along the road and in front of residential areas. The local government recognizes that the problem of environmental pollution has not been well taken into account. Companies that process nickel have exceeded the threshold value (Nilai Ambang Batas - NAB) of pollution levels from the supposed standard in some regions.

"The Onlimo river water test outcomes from last year reveal high levels of TSS (Total Dissolved Suspension). The naked eye indicates the water is polluted. Lab results indicate that various components have surpassed the Threshold Value. Consequently, once it surpasses NAB, how can the situation be addressed? The technology listed in the document cannot address the ill effects." -Statement from Local Government

Image 3 – Garbage Dumping in Fatufia Village.

Conclusion

With regard to the economy, nickel downstreaming in Morowali and Central Sulawesi has resulted in increased investment, gross regional domestic product (PDRB), exports, and workforce income. Most importantly, downstream development has successfully driven structural transformation, where investment and industry have become the main driving forces in Morowali and Central Sulawesi today. However, the impact of downstream development on job creation and the empowerment of local entrepreneurs has not been significant.

From a social perspective, the nickel downstream industry in Morowali has resulted in a decrease in poverty, inequality trends, and improvements in health indicators. Nevertheless, the education indicators have not shown significant changes following. From an environmental point of view, the nickel downstream industry is marked by increased air pollution and poorly managed domestic waste.

Overall, the lives of the people in Morowali and Central Sulawesi have relatively improved after downstream development compared to before. However, this downstream development ihas not been entirely equitable and just, especially when viewed from the aspects of employment, the empowerment of local entrepreneurs, education, and the environment. In the future, the

government needs to further refine downstream development policies particularly on the issues of local community employment and environment to achieve more just, sustainable, and equitable development.

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