

# The Political Economy of Indonesia's Nickel Mining Industry

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## Introduction

This memo discusses the political economy of Indonesia's nickel industry. Indonesia has not only experienced unprecedented economic growth over the last decade, but it has also improved its industrial capacity in the nickel industry. Specifically, Indonesia has been able to increase exporting higher-value nickel goods. In 2013, the country's exports of high-value nickel exports were a modest US\$6 billion in 2013. By 2022, this figure had risen to nearly US\$ 30 billion,<sup>1</sup> fueled by the exports of higher value-added products such as stainless steel and battery materials. This industrial policy started with the 2009 Mining Law signed by former president Susilo Bambang Yudhoyono, which mandated banning raw nickel exports and domesticating the processing of all nickel mined in the country.<sup>2</sup> Despite widespread opposition from the mining sector, the ban was implemented partially in 2014 and a full version came into fruition in late 2019. As seen in figure 1, Indonesia's raw nickel exports decreased between 2012 and 2018.

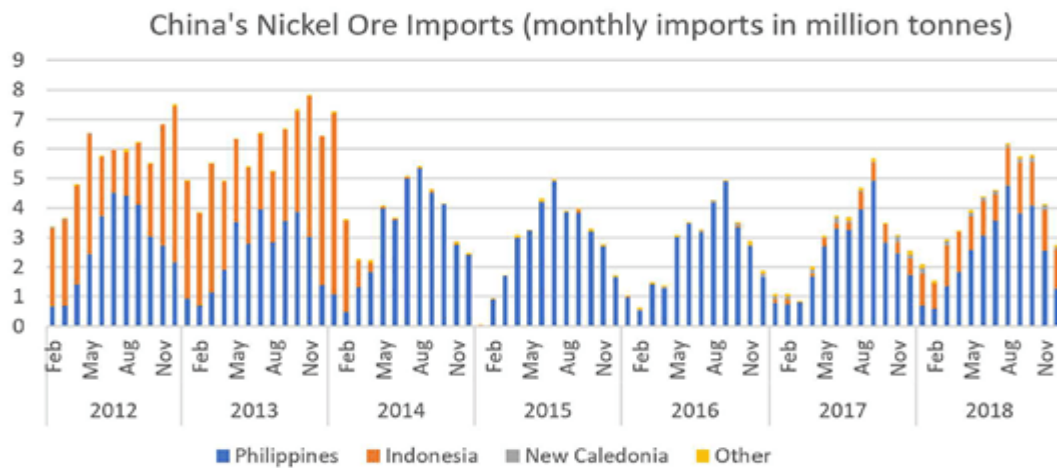


Figure 1: China's Nickel Ore Imports<sup>3</sup>

<sup>1</sup> The Economist (2023), "Indonesia embraces resource nationalism,"

<https://www.economist.com/asia/2023/01/26/indonesia-embraces-resource-nationalism>

<sup>2</sup> UNCTAD (2017), "Using trade policy to drive value addition: Lessons from Indonesia's ban on nickel exports," [https://unctad.org/system/files/non-official-document/suc2017d8\\_en.pdf](https://unctad.org/system/files/non-official-document/suc2017d8_en.pdf)

<sup>3</sup> See <https://www.mysteel.com/>, 晚餐：铁矿石到港量增加，焦炭首轮



Figure 2: Rolled Nickel Pig Iron in IMIP<sup>4</sup>

The results of Indonesia's export ban have been mixed. On the one hand, downstreaming has a success: hundreds of thousands of jobs have been created, higher-value skills have been transferred from Chinese workers to Indonesians, and more sophisticated technological and economic processes have been domesticated.<sup>5</sup> No longer exporting raw nickel ore, Indonesian firms have moved from exporting raw nickel ore to nickel pig iron (see figure 2), ferronickel, and other higher-value nickel-based goods. Given that the value of Indonesia's nickel exports has surged to five times the pre-ban rate, Western firms are seeking partnerships with Chinese companies in order to establish more smelting facilities. Inspired by the success of nickel, the Indonesian government is looking to ban the exports of copper and iron as well. In June 2023, the government passed a new ban on the export of raw bauxite.

Nonetheless, there have been negative effects from the ban. The ban created a huge market with few buyers—an oligopsony, to largely benefit nickel smelting firms.<sup>6</sup> The largest ones are joint ventures between Chinese and Indonesian companies, which have established major industrial parks. Indonesian mining firms, as they earn less and less per tonnes of ore that they extract, have started cutting corners and costs: improper dumping of tail waste, contamination of fresh water and emits particulate matter, noise pollution, and many others.<sup>7</sup> These problems have become prominent in Sulawesi—home to the country's largest nickel reserves. With further export bans and industrial processing now on the agenda, health concerns are likely to spread to other islands.

This memo discusses six risks for the US government to source nickel in Indonesia: (1) the dominance of Chinese firms and their importance to the Indonesian economy; (2) the division between large-scale mining companies (LSM) and artisanal small-scale mining companies; (3) the

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<sup>4</sup> Field research, November 2019.

<sup>5</sup> Camba, A., Lim, G., & Gallagher, K. (2022). Leading sector and dual economy: how Indonesia and Malaysia mobilised Chinese capital in mineral processing. *Third World Quarterly*, 43(10), 2375-2395.

<sup>6</sup> Camba, A., Tritto, A., & Silaban, M. (2020). From the postwar era to intensified Chinese intervention: Variegated extractive regimes in the Philippines and Indonesia. *The Extractive Industries and Society*, 7(3), 1054-1065.

<sup>7</sup> Camba, A. (2021). The unintended consequences of national regulations: Large-scale-small-scale relations in Philippine and Indonesian nickel mining. *Resources Policy*, 74, 102213.

externalization of costs on communities; (4) environmental costs; and (5) an ideology of industrial policy and future export bans.

### 1. Dominance of Chinese firms and their importance to the Indonesian economy

The People's Republic of China's (PRC) emergence as a major global capital exporter has changed Indonesia (and the rest of the world). In 2018, China's foreign direct investment (FDI) stock totaled \$3.8 trillion,<sup>8</sup> and it spent around \$843 billion in concessionary and non-concessionary financing between 2000 and 2019.<sup>9</sup> Since the 1990s, the PRC has increasingly oriented its development finance towards soft infrastructure and low value sectors to prevent recipient countries from rising up in the production chain. Politically, China has allied with global South countries in resisting the Western bloc, positioning itself as a model to emulate through the construction of large-scale physical infrastructures.<sup>10</sup>

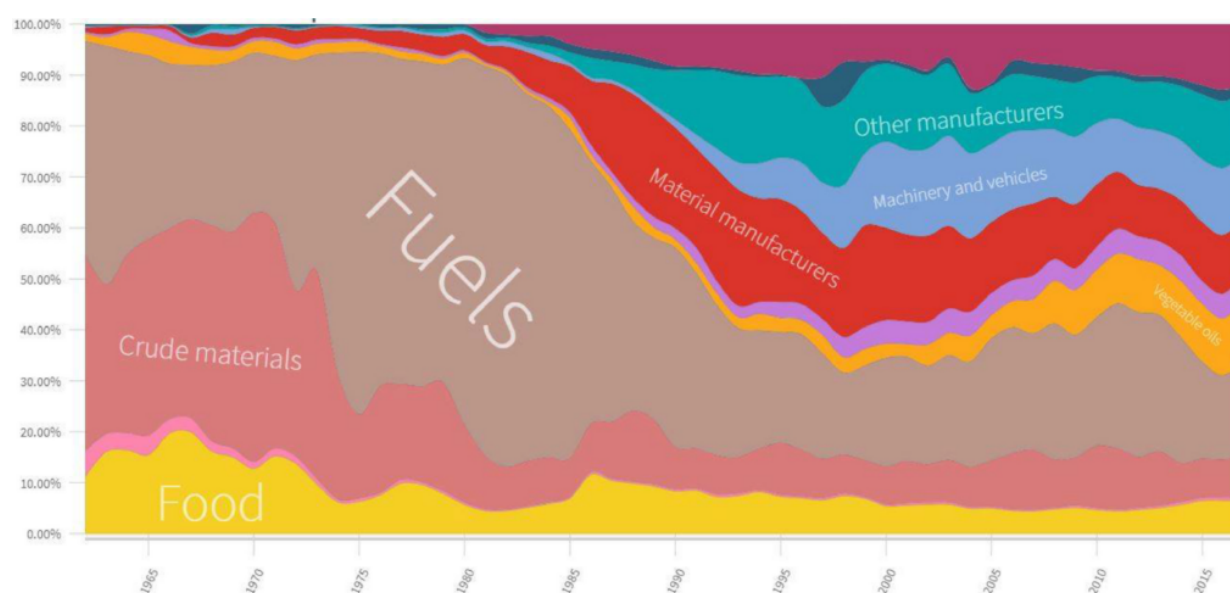


Figure 3: Composition of Indonesian Exports, 1965-2015.<sup>11</sup>

The Indonesian government has long tried to move away from raw commodity exports (see figure 3). In 2009, the Tsingshan Group from China's Zhejiang Province became a key partner to Indonesia's industrial policy. Tsingshan was the world's largest producer of ferro-nickel and the second-largest manufacturer of stainless steel.<sup>12</sup> The SBY government pushed Tsingshan to instead invest and develop an industrial park, moving the smelting activities from China to Indonesia. To

<sup>8</sup> UNCTAD. (2019). World Investment Report 2019. : United Nations Conference on Trade and Development. Retrieved May 4, 2020, from [https://unctad.org/en/PublicationsLibrary/wir2019\\_en.Pdf](https://unctad.org/en/PublicationsLibrary/wir2019_en.Pdf)

<sup>9</sup> Malik, A., Parks, B., Russell, B., Lin, J. J., Walsh, K., Solomon, K., ... & Goodman, S. (2021). Banking on the Belt and Road: Insights from a new global dataset of 13,427 Chinese development projects. Williamsburg, VA: AidData at William & Mary, 23-36.

<sup>10</sup> Ho, S. (2020). Infrastructure and Chinese power. *International Affairs*, 96(6), 1461-1485.

<sup>11</sup> The Atlas of Economic Complexity (2017), <http://www.atlas.cid.harvard.edu/>

<sup>12</sup> Tsingshan (ND), <https://www.tssgroup.com.cn/en/>

do this, Tsingshan worked with the Bintang Delapan Group, a long-term partner of the Chinese firm and one of the largest nickel mining companies in Sulawesi.<sup>13</sup> The new park was to be located at Morowali Regency in Central Sulawesi Province, covering 5472 square kilometers, which is estimated to hold 370.59 million tons of nickel reserves.<sup>14</sup>

Construction for the park began in 2014. While industrial parks and special economic zones exist throughout Indonesia, there has never been a park in the mining sector that links extraction-to-smelting so easily, and at such a large scale. Tsingshan group owns 66.25 percent of the park and Bintang Delapan holds a 33.75 percent share. Spanning 2,000 hectares of land, the park holds smelting facilities and a transportation network. It also boasts a five-star hotel for investors, barracks for thousands of workers, major roads, a port, and a small airport. By 2019, sixteen major firms—including from Australia, Japan, and Korea—were operating there in activities such as battery production and carbon steel development. Adjacent to Bintang Delapan’s mining concession, one of the largest in Sulawesi, the Morowali Industrial Park (IMIP) has succeeded by bringing together smelting and extraction in a single location.<sup>15</sup> Together, Tsingshan and Bintang Delapan established Sulawesi Mineral Investments, which has bolstered extraction by pouring capital investments into new mining technologies.



Figure 4: IMIP’s Vocational School<sup>16</sup>

Since the facilities at IMIP are offshoots of existing ones in China, Chinese workers were recruited to take up supervisory, technical, and managerial roles. With the Indonesian government’s encouragement, however, IMIP soon began investment in nearby vocational schools with the goal of upskilling Morowalians, in turn providing jobs to locals and supplying IMIP a relatively cheaper

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<sup>13</sup> Tritto, A. (2022). How Indonesia Used Chinese Industrial Investments to Turn Nickel into the New Gold. Carnegie Endowment for International Peace.

<sup>14</sup> The Jakarta Post (2017), “Morowali: A tale of China’s grip on rich region .”  
<https://www.thejakartapost.com/news/2017/11/15/morowali-a-tale-china-s-grip-rich-region.html>

<sup>15</sup> Ibid.

<sup>16</sup> Field research, November 2019.

supply of workers than what they would have contracted from China (see figure 4). In total, the company has thus far employed— directly and indirectly—80,000 Indonesians, the majority of whom come from Sulawesi or neighboring islands.<sup>17</sup> In addition to schools, the IMIP constructed mosques and established health clinics.

With the success of IMIP, more firms are looking to invest in Indonesian nickel. The Weda Industrial Park (IWIP), built on the same model as IMIP, has become the largest nickel smelter in Weda, North Maluku. The Brazilian firm Vale, one of the largest nickel mining companies in Indonesia, has signed partnerships with Chinese firms Taiyuan Iron & Steel Co. Ltd. (Tisco) and Shangdong Xinhai Technology Co. (Xinhai) to build new smelters.<sup>18</sup> Tsingshan played a major investor role, inspiring both imitation and competition from other Chinese and foreign mining companies. Indonesian smelting firms are worried that the scale of mining-smelting activities will result in decreased supply. IMIP and other smelting firms have started importing ore from the Philippines, the second largest nickel ore exporter in the world.<sup>19</sup>

The export ban has created the nickel mining oligopsony, privileging the buyers of nickel minerals over sellers.<sup>20</sup> Since Indonesian mining firms cannot sell extracted low- or high-value nickel to the overseas market, they are left with no choice but to sell on the far smaller domestic market, giving power to the select number of buyers. Among the buyers, two Chinese nickel smelting firms and their domestic Indonesian counterparts comprise 80 percent of the domestic market; only they have the productive capacity, thanks to Chinese financial support.<sup>21</sup> IWIP will likely take a bigger share of the domestic nickel market in the future.<sup>22</sup> Contained to this oligopsony, the price of nickel has been kept low, hovering between 15 and 30 percent of global market price.<sup>23</sup>

## 2. Divisions between the Large-Scale and Small-Scale Mining Sectors

Conflict between large-scale mining firms (LSM) and artisanal small-scale (ASM) groups have been common. This makes the source prone to conflict driven by the ban. Although the Indonesian Ministry of Energy and Mineral Resources set a domestic price, Chinese and other smelting consortiums rarely comply with the official rate. The government's rate is already lower than the

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<sup>17</sup> Camba, A., Lim, G., & Gallagher, K. (2022). Leading sector and dual economy: how Indonesia and Malaysia mobilised Chinese capital in mineral processing. *Third World Quarterly*, 43(10), 2375-2395.

<sup>18</sup> Mining.com (2020). "Vale signs agreements with Chinese companies to reinforce strategic agenda in Asia," <https://www.mining.com/vale-signs-agreements-with-chinese-companies-to-reinforce-strategic-agenda-in-asia/>

<sup>19</sup> Seasi (2023) "Smelters in Indonesia turn to Philippine nickel," <https://www.seasi.org/details/23764?type=news-rooms#:~:text=The%20Financial%20Times%20reported%20on,hosts%20Tsingshan's%20nickel%20smelting%20complex.>

<sup>20</sup> Camba, A. (2021). The unintended consequences of national regulations: Large-scale-small-scale relations in Philippine and Indonesian nickel mining. *Resources Policy*, 74, 102213.

<sup>21</sup> Tritto, A. (2022). How Indonesia Used Chinese Industrial Investments to Turn Nickel into the New Gold. Carnegie Endowment for International Peace.

<sup>22</sup> Yannisto, Y., & Wibowo, T. (2020, November). Perancangan dan implementi. In *Conference on Business, Social Sciences and Innovation Technology* (Vol. 1, No. 1, pp. 362-369).

<sup>23</sup> Interviews with members of the Indonesian nickel mining association, January 2020 & November 2023.

international price dictated by Shanghai Metal Mineral and aims to satisfy both mining companies and the smelting consortiums. However, the government wanted to reward the smelting consortiums and encourage them to invest further. In 2019, according to large-scale mining firms and ASM groups, smelting consortiums insist on a \$30/WMT (per wet metric ton) price, which is cheaper than the government's rate of \$40/WMT.<sup>24</sup>

Large-scale mining firms sought to allay the situation by disproportionately disadvantaging their ASM groups.<sup>25</sup> These firms imposed more pressure on the ASM miners working in their concessions, lowering the purchasing prices of their extracted nickel. Before the nickel export ban, one metric ton of nickel was worth \$10 for ASM miners working in one domestic Indonesian large-scale mining firm near IMIP.<sup>26</sup> After the export ban, prices were reduced to \$5-7 per metric ton to compensate for the price set by IMIP. For large-scale-small-scale agreements that do not work on a per ton basis, large-scale mining firms started depending on ASM miners through casual labor and curtailed hourly rates. Large-scale mining firms also began moving the ASM miners to the less promising parts of the concession, renegeing from their previous cohabitation arrangement.<sup>27</sup> Some ASM miners have little choice but to work for measly wages and take up manual labor for large-scale mining firms.

A considerable number of ASM miners began fighting back by refusing to work, protesting, or moving to another large-scale mining firm to look for better conditions.<sup>28</sup> Some ASM miners decided to work with financiers, in particular with local elites and Chinese investors with no ties to the smelting consortiums. ASM groups began to encroach on the unexplored lands of other large-scale mining firms. In Central Sulawesi, Vale, a large-scale mining firm with a huge concession, experienced a surge of ASM miners from certain of Sulawesi. ASM miners, financed by Chinese financiers, began operating in areas sealed off by Vale for future operations or preserved for reclamation activities.<sup>29</sup> Vale, which has good relations with the local community through their social development programs, began hiring guards from this community to ward off the ASM groups. Conflict ensued multiple times until the regent intervened to keep the ASM groups out. At times, ASM groups would still come and attempt to dig out nickel from Vale's vast concessions.

### **3. The Externalization of Costs on Communities**

The nickel mining oligopsony externalizes cost onto communities. Sourcing nickel in a place where social and environmental justice concerns are ignored creates sustainable development and social justice issues. The original agreement between a large-scale mining firm and IMIP pegged the price at \$26 per metric ton. However, since the nickel ore export ban, the agreement between IMIP and the nickel mining firms – large-scale and ASM - has lowered the price to \$16.5 per metric ton, a difference of \$9.5 USD or Rp 135,327.5. The new agreement also stated that ore with

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<sup>24</sup> Ibid.

<sup>25</sup> Field research in December 2023.

<sup>26</sup> Camba, A. (2021). The unintended consequences of national regulations: Large-scale-small-scale relations in Philippine and Indonesian nickel mining. *Resources Policy*, 74, 102213.

<sup>27</sup> Field research in December 2023.

<sup>28</sup> Ibid

<sup>29</sup> Ibid.



less than 1.80% nickel concentrate will be rejected by IMIP. The Indonesian government denies pushing the prices down. However, this assessment has been negated by third party observers.<sup>30</sup>

The same set of issues happened in the Konawe regency. Large-scale mining firms needed to decrease their selling price just to adjust to demands of Virtue Dragon Nickel, the dominant Chinese smelter in southern Sulawesi. VDNI reneged on its previous commitments to purchase nickel from another LSM firm, pushing the price further down to “\$15.5 per metric ton” and initiating a race to the bottom among large-scale mining firms.<sup>31</sup> When both large-scale mining firms decided to band together and demand the previous price, VDNI refused to buy nickel from both companies, creating a stalemate in price negotiations.<sup>32</sup> VDNI was able to stall because Indonesian large-scale mining firms were desperate to sell their nickel. In addition, these conditions led to a situation in which low-grade nickel ore does not get properly dispensed, dumping these resources nearby the roads, rivers, and other areas.<sup>33</sup> Large-scale mining firms and ASM groups began blaming each other, leading to tense conflict in which the village head is unable to mediate the relations once again.

The aggressive drive of the smelting consortiums drove ASM groups to expand their mineral operations, creating social conflicts with communities. For instance, the village of Tangkeno, an island in Southern Sulawesi, is facing the pressure of PT Bakti Bumi Sulawesi,<sup>34</sup> a domestic Indonesian firm with Chinese investments. The local head of Tangkeno applied for a tourist permit, registering their village and some of the adjacent areas – land, water bodies, and forest – in the license. This tourist permit prohibits mining or other industries from exploring or working in those areas. While the district office gave Tangkeno the license, PT Bakti Bumi has a competing provincial mining license that covers some of the areas registered in the Tangkeno tourist permit, creating a legal dispute between the village and the mining firm.

Nonetheless, PT Bakti Bumi decided to “cookie cut” and incorporate the adjacent areas surrounding the Tangkeno license.<sup>35</sup> This move allowed the firm to legally use those extended areas for mining exploration, prospecting, and other activities. Since the lands are relatively disconnected from the main provincial mining license, the firm decided to hire ASM miners to begin nickel exploration in the extended area. Some ASM miners due to dwindling wages and lack of a better alternative decided to participate in these quasi-legal ventures.<sup>36</sup> The sheer power of large-scale mining firms over some ASM groups enabled these abuses. By implication, these

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<sup>30</sup> Sianipar, J. R. (2020). Analisis Penerapan Akuntansi pada Usaha Perlengkapan Jahitan di Pekanbaru.

<sup>31</sup> Interview, Indonesian LSM firm, November 2019.

<sup>32</sup> Ibid.

<sup>33</sup> Interview, Kampung head, Konawe Regency, November 2019.

<sup>34</sup> Morse, Ian, 2019. In Indonesia, a tourism village holds off a nickel mine — for now. Mongabay, December 8. <https://news.mongabay.com/2019/12/in-indonesia-a-tourism-village-holds-off-a-nickel-mine-for-now/>.

<sup>35</sup> Yunus, A. (2019), “Tangkeno, A Show About Struggle in Bombana,”

<https://www.kompas.id/baca/utama/2019/10/17/tangkeno-a-show-about-struggle-in-bombana>

<sup>36</sup> Jong, H. (2024) “Indonesian nickel project harms environment and human rights, report says,” <https://news.mongabay.com/2024/02/indonesian-nickel-project-harms-environment-and-human-rights-report-says/>

activities would harm the Tangkeno village since mining operations will occur in the surrounding land, forest, and license.



Figure 5: Tailing deposit on the road, Konawe (author's field research 2019)

Across Sulawesi, large-scale mining and ASM have resorted to a process called strip-mining, which directly bypasses the rainforest to get to the nickel ore deposits right away.<sup>37</sup> The leftover dirt and nickel are taken elsewhere, deposited in certain areas that have been designated for dumping unused nickel (see figure 5). In these areas, large-scale-small-scale relations worsened as the price of nickel continued to go down. ASM groups have been designated to pick up dirt, sand, or low-grade nickel ore to be deposited elsewhere. When heavy rain takes place, the limited vegetation and scattered location of the deposits will wash the unused low-grade nickel into the ocean, vastly polluting the coral reefs and other sea life elsewhere.<sup>38</sup> As a result, fishing communities are finding it harder to endure their livelihood.

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<sup>37</sup> Spiegel, S. J. (2012). Governance institutions, resource rights regimes, and the informal mining sector: Regulatory complexities in Indonesia. *World development*, 40(1), 189-205.

<sup>38</sup> Surya, B., Hamsina, H., Ridwan, R., Baharuddin, B., Menne, F., Fitriyah, A. T., & Rasyidi, E. S. (2020). The complexity of space utilization and environmental pollution control in the main corridor of Makassar City, South Sulawesi, Indonesia. *Sustainability*, 12(21), 9244.



## 4. Environmental Costs

TREE COVER LOSS IN SULAWESI SELATAN, INDONESIA



From **2001** to **2022**, **Sulawesi Selatan** lost **344 kha** of tree cover, equivalent to a **11%** decrease in tree cover since **2000**, and **219 Mt** of CO<sub>2</sub>e emissions.

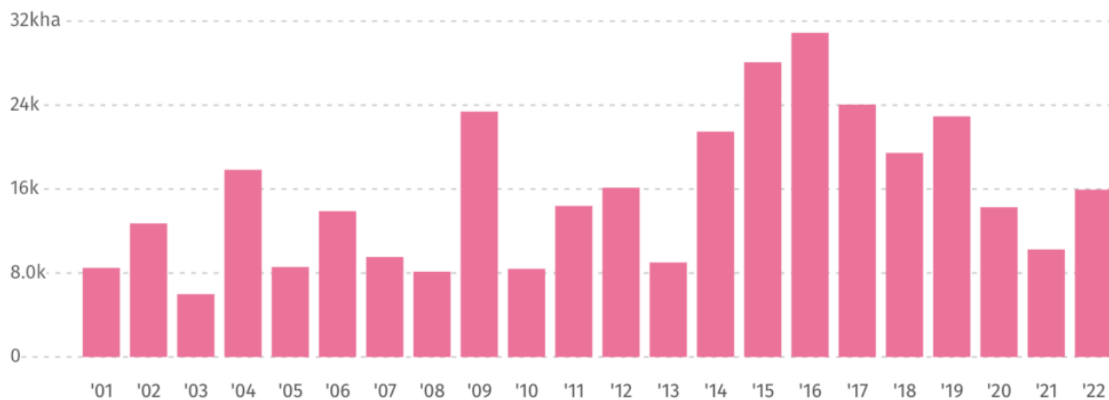


Figure 6: Forest cover loss in Sulawesi, 2001-2022<sup>39</sup>

Nickel extraction has been significantly scaled up in an effort to compensate for dwindling prices—resulting in increased levels of deforestation to clear the way for new open-pit and deep-pit mines. Mass deforestation contributed to intensifying Sulawesi’s periodic rains (see figure 6). In 2022, twenty-one floods and mudslides were recorded in Sulawesi. This stands in contrast to climatological data before the export ban; between 2005 and 2008, the island flooded only two to three times a year.<sup>40</sup> Furthermore, metal pollution in Sulawesi is twenty times more than anticipated, while cancer rates have surged in the last ten years.<sup>41</sup>

Apart from environmental effects, increased level of nickel production has meant more wage suppression across related sectors. Local Sulawesi fishers, who depend on fishing stocks in the surrounding oceans, have been negatively affected by illicit tailings deposit.<sup>42</sup> Fishing stocks have declined in the last decades. Other Indonesians who live in Sulawesi, such as those in farming and tourism, have less access to land to do their business.<sup>43</sup> Many of these families have transitioned into the mining sector, migrating to Morowali and Kendari to find jobs. Furthermore, pressure to find newer sources of nickel has pushed companies to purchase land from nearby communities and kampungs. Without ample sources of income, many families sell and move out elsewhere. These transactions receive little-to-no protection from the national or local authorities.

<sup>39</sup> <https://www.globalforestwatch.org/dashboards/country/IDN/26/>

<sup>40</sup> Baraputri, V. (2023). “The rush for nickel: ‘They are destroying our future,’” BBC.

<https://www.bbc.com/news/world-asia-66131451>

<sup>41</sup> Kulasekaran, C. D. Zeroing In’on ‘Zero Emissions.

<sup>42</sup> Interviews, Fisher folk, November 2023.

<sup>43</sup> Interview, Kampung villagers in tourism industry, December 2023.

## 5. Industrial Policy and Future Bans

Indonesian political elites and political parties are keen on increasing industrial capacity. This creates questions on the ability of US firms to offer these benefits to these elites. Since the Cold War, Indonesian political and policy elites are cognizant of Indonesia's reliance on exporting primary commodities, such as coal, base and precious metals, and palm oil. These elites have created numerous initiatives to encourage domestic industrial capacity by providing incentives, limiting imports, and banning some form of natural resource exports. Like many countries in the global south, Indonesia has followed a policy of establishing special economic zones (SEZ) and their various iterations to encourage foreign transfer of skills and technology.<sup>44</sup> However, SEZs, conventionally from Western firms, have been criticized as perpetuating the two-tier economy; one comprising the foreign funder firms and their high-value industries, and the other lower-tier host country economy that provides cheap labor and other primary inputs to the firms.

Nickel represents a case where the Indonesian government has long attempted to domesticate higher-level activities. Indeed, the Indonesian government has long encouraged the onshore smelting of nickel, but the policy took decades to come to fruition. In the late 1990s, the Suharto government extended smelting licenses to domestic firms. However, these proved to be costly to both the firms and the government. Enormous amounts of capital were needed to purchase the technology needed to begin operations and then scale them up to profitability. Approximately 5 percent of mining firms in Indonesia took advantage of the policy. Most firms capitalized on the business model of exporting nickel, utilizing foreign and domestic investments to increase their operations. Among Indonesia's political elites, the situation meant the country needed drastic measures to increase industrial policy and increase downstream activities.

Despite owners and investors of nickel mining firms lobbying against the ban,<sup>45</sup> the Jokowi government has withstood the pressures because the Indonesian oligarchy has no major investments in the nickel mining sector.<sup>46</sup> While externalities continue to pose problems, the government insists that these are the inevitable costs of pursuing higher-value industrial activities. The Indonesian government has signaled that its future policy will focus on the forward linkages of nickel smelting. Minister of Investment Bahlil Lahadalia said that the government will likely prioritize firms who plan to put Indonesian nickel in the service of domestic electric vehicle battery production, as well as smelters that rely on green energy. Government officials recognize that the country's high-grade nickel reserves will run out within the next two decades, further underscoring the need to develop industry beyond smelting.

Nonetheless, the government's success in the nickel sector has inspired confidence in similar strategies for bauxite. Indonesia is the sixth-largest producer of bauxite in the world, and there are currently four domestic bauxite and aluminum smelters, which produce 14 million tonnes of refined bauxite annually. In June 2023, the Indonesian Bauxite and Iron Ore Companies

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<sup>44</sup> Wijaya, T., & Camba, A. (2023). The politics of public-private partnerships: state-capital relations and spatial fixes in Indonesia and the Philippines. *Territory, Politics, Governance*, 11(8), 1669-1688.

<sup>45</sup> Reuters (2023), "Indonesia details plans to limit development of nickel smelters -report," <https://www.reuters.com/markets/commodities/indonesia-details-plans-limit-development-nickel-smelters-report-2023-01-13/>

<sup>46</sup> Author's calculation on the analysis of Indonesian BKPM investment records.

Association, which represents twenty-eight bauxite mining companies,<sup>47</sup> voiced their protest of the ban. But replicating nickel's success will be challenging: a bauxite processing or smelting facility costs \$1.3 billion, which is three times more than a nickel smelter.

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<sup>47</sup> ASEAN Briefing (2023), "Indonesia to Ban Bauxite Export from June 2023: An Explainer," <https://www.aseanbriefing.com/doing-business-guide/indonesia/sector-insights/indonesia-to-ban-bauxite-export-from-june-2023-an-explainer>