

Plastic Pollution Policy Country Profile: Indonesia

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Key Takeaways*

- Indonesia is the largest archipelago in the world, a country that has experienced rapid development and urbanization, and has a large informal waste picker sector, presenting a unique plastic pollution management challenge.
- Studies from between 2015 and 2019 attempted to estimate the volume of marine debris for Indonesia, producing annual estimated ranging from 0.27 to 1.29 million tonnes per year, representing up to 10.1% of plastic marine debris globally.
- National and subnational laws have been passed approaching solid waste management broadly, and some focus on plastic waste. These laws assign many agencies the responsibility of policy implementation and enforcement.
- As a response to increased medical waste from the COVID-19 pandemic, national waste management restrictions loosened up to allow healthcare facilities to dispose of medical waste in waste management facilities that were not licensed to receive medical-grade waste.
- There have not been studies demonstrating policy effectiveness to date, though literature on the topic does focus on policy recommendations.

* These are based on a review of literature published and policies enacted before December 2021



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INTRODUCTION

This document outlines: 1) the nature of the plastic pollution problem in Indonesia, 2) available information about the national, subnational, and to a smaller extent, international policy landscape guiding government approaches to the plastic pollution problem Indonesia, and 3) what, if any, information exists about the effectiveness of these policy approaches. This document is written using a basic literature review process and with support from the [Plastics Policy Inventory](#), as outlined in the Appendix (below), and is not exhaustive. It contains the most up-to-date information at time of publication, but this information may eventually be less relevant as the policy landscape continues to evolve. The authors were able to get expert review for this case study, to ensure the information gathered aligns closely with what experts and practitioners are observing and experiencing on the ground. If conducting research on the plastic pollution crisis in Indonesia, we recommend you use this document as one of many resources available to better understand the problem and its solutions.

PLASTIC POLLUTION IN INDONESIA

Located in Southeast Asia, the Republic of Indonesia is the largest archipelago in the world, comprising 3,977 miles between the Pacific and Indian Oceans, with a land and sea area of 5,180,053 km² (Jing and Sutikno 2020). The country consists of 17,508 islands (Jing and Sutikno 2020), 86,700 km² of coral reefs and 24,300 km² of mangrove forests (Sodik 2021). As the fourth most populous country, with more than 270.2 million people (Statistics Indonesia (BPS), 2020), Indonesia ranks among the top largest contributors of plastic waste into the coastal environment, along with the United States and China (Republic of Indonesia Ministry of Environment and Forestry (MoEF) 2020; Law et al. 2020). This is largely due to the rapid urbanization that Indonesia has experienced over the last two decades, with projections suggesting that 68% of the total population will live in urban areas by 2025 (World Bank 2019). As a result, there have been gaps between the fast-growing urban population and the provision of basic services and infrastructure, with inadequate solid waste management being one of the most prominent examples (World Bank 2019). Currently, the waste management sector is significantly underfunded in terms of investments and operations (World Bank 2018). Local government allocations are at \$5–6 per capita/per annum, a level much lower than the international benchmarks of \$15–20 per capita/per annum (World Bank 2018). Estimates suggest that only 60% of the 142 million urban residents have access to waste collection services, and only 55% of urban solid waste is handled at a transfer station or processing facility (World Bank 2019). Therefore, at the current urbanization and consumption growth rates, the increase of solid waste management infrastructure will not be able to keep up with the waste generation (MoEF 2020).

In 2020, Indonesia's solid waste generation reached 67.8 million tonnes (MoEF 2021).¹ This number is estimated to continuously grow for the near future. Plastic pollution is part of the country's broader challenge of solid waste management. Plastic waste from Indonesia, as the world's second-largest plastic waste producer, has become a central concern for environmentalists and researchers (Sari et al. 2020). Studies from between 2015 and 2019, attempted to estimate the volume of marine debris for Indonesia, producing annual estimated ranging from 0.27 to 1.29 million tonnes per year (Sari et al. 2020).² Likewise, Jambeck et al., concluded from their research in 2015 that Indonesia produces 3.22 million tonnes of mismanaged plastic³ waste a year, of which 0.48 to 1.29 million tonnes becomes ocean plastic (Jambeck et al. 2015) through illegal dumping, the production of plastic debris in coastal areas, and fishing and industrial activities (Li et al. 2016). This could represent up to

1. This statistic is according to Purnomo, C.W. 2021. *Solusi Pengelolaan Sampah Kota*. Sleman: Gadjah Mada University Press. Due to language limitation of the authors, this number could not be confirmed. Therefore, the veracity of this information is uncertain.

2. According to expert review, a 2018 baseline study conducted by the Indonesian Institute of Science (LIPI)—officially recognized by the Indonesian Government in 2020—found that plastic waste leakage into the Indonesian ocean reached between 0.27–0.59 million tons. Due to language limitation of the authors, this report could not be found. Therefore, the veracity of this information is uncertain.

3. Defined as “material that is either littered or inadequately disposed. Inadequately disposed waste is not formally managed and includes disposal in dumps or open, uncontrolled landfills, where it is not fully contained” (Jambeck et al. 2015).

10.1% of plastic marine debris globally (Lestari et al. 2019). A 2018 study by the Indonesian Institute of Science (LIPI) found that plastic waste leakage from Indonesia into the ocean reached between 0.27 to 0.59 million tonnes per year (Indonesian Institute of Science 2018, per personal communications). The resulting marine debris has caused serious negative impacts to marine life, livelihoods, and public health (Jing and Sutikno 2020).

Additionally, there are approximately 10 billion plastic bags (equivalent to ~85,000 tonnes of plastics) directly released into the country's local environment every year (MoEF 2020). Together, these unmanaged plastic wastes not only pollute marine environment, but also pose a threat to the country's river systems. For example, Brantas, Solo, Serayu, and Progo are four rivers in Indonesia that rank among the most polluted 20 rivers in the world (Lebreton 2017).

As solid waste management is increasingly being viewed as a critical part of the rapidly developing Indonesian economy, the government has been increasing its efforts in this sector and the amount of infrastructure spending (World Bank 2019). For solid waste management in general, some early attempts include the Solid Waste Management Act (NO.18/2008), which aims to improve the solid waste management in Indonesia by closing all the open-dumping sites by 2013 and requiring all large cities to send their waste exclusively to sanitary disposal facilities. However, this ambitious target was not achieved. In 2018, the Ministry of Environment and Forestry recorded that 167 open-dump waste disposal facilities were still operating (Sistem Informasi Pengelolaan Sampah Nasional (SIPSN); National Solid Waste Management Information System 2018).

Likewise, current estimates suggest that the Waste Banks in Indonesia (see policy section below for more detail) handles about 1–2% of the recyclable waste, a relatively smaller number compared to the 10–15% of recyclable waste handled by the informal sector (Ministry of Environment of Denmark 2017). These informal collectors are playing an important role in Indonesia's waste management economy (WEF 2021), and thus have been supported by many businesses and NGOs to improve their livelihoods and digital literacy, and to better contribute to the National Plastic Action Partnership (NPAP) Multi-stakeholder Action Plan goal of doubling Indonesia's waste collection and recycling capacity (WEF 2021). There is also increasing demand for government support to grant the informal waste collectors legal status and recognition (China Dialogue 2021).

POLICIES TO ADDRESS PLASTIC POLLUTION

Indonesia has been actively involved in several global efforts to address plastic pollution. For example, in 2017, Indonesia joined UN Environment's #CleanSeas campaign to eliminate major sources of marine litter by cutting plastic waste in 25 coastal cities and reducing marine litter by 70% by 2025 (UNEP 2017). Additionally, the Indonesian Coordinating Ministry for Maritime Affairs and Investments is a collaborating partner of OECD and a member of UNEP's Sustainable Blue Economy Finance Initiative (FI). In this role, Indonesia facilitates regional policy dialogues in Southeast Asia to enhance regional cooperation, policy coherence and sustainable policy dialogues regarding marine plastic pollution (UN 2021).

Domestically, since the Solid Waste Management Act (NO.18/2008), there have been many waste management laws and regulation rules introduced at national, regional, and city levels, with some addressing plastic pollution as part of the broader issue. Figure 1, below, shows a summary of national waste management regulations in Indonesia as of Aug 2019 by the Indonesian Ministry of Environment and Forestry (MoEF). Under the Waste Management Law No. 18/2008, various government regulations, presidential-level regulations, ministerial regulations, and regional regulations were developed to regulate plastic waste. Additional regulations include Regulation of the Minister of Industry Number 24/M-IND/PER/2/2010 concerning Food Grade Logo and Recycling Code on Plastic Food Containers (Ministerial Regulation); Governor Decree of Jakarta Special Region Number 142 2019 (Regional Regulation); and Peraturan Walikota (PERWALI) tentang Perubahan Atas Peraturan Wali Kota Bekasi Nomor 61 Tahun 2018 Tentang Pengurangan Penggunaan Kantong Plastik (Local Regulation). Figure 2 summarizes current waste management related regulations in Indonesia at all geographical levels with more details in local regulations. This section will introduce and discuss some of these efforts.

Figure 1. Summary of National waste management regulations in Indonesia (MoEF 2020)

	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 15px; height: 10px; background-color: #c8e6c9; border: 1px solid black;"></div> Ministry of Environmental and Forestry <div style="width: 15px; height: 10px; background-color: #bbdefb; border: 1px solid black;"></div> Ministry of Public Works <div style="width: 15px; height: 10px; background-color: #d7ccc8; border: 1px solid black;"></div> Ministry of Trade <div style="width: 15px; height: 10px; background-color: #ffe0b2; border: 1px solid black;"></div> Ministry of Industry </div>				
National Law	UU No. 18 / 2008 Law on Solid Waste Management		UU No. 32/2009 Law on Environmental Protection and Management		
Government Regulation	PP No. 81/2012 Government Regulation on Management of Household and Household-like Waste	PP No. 101/2014 Government Regulation on Hazardous Waste Management	DRAFT Government Regulation on Excise on Plastic	DRAFT Government Regulation on Specific Waste Management	
Presidential Regulation	Perpres No. 97/2017 Presidential Regulation on National Policy and Management Strategy of Household Waste and Household-like Waste	Perpres No. 83/2018 Presidential Regulation on Marine Debris Management	Perpres No. 18/2015 Presidential Regulation on Income Tax Facilities for Investment in Certain Business Fields and/or in Certain Regions	Perpres No. 15/2018 Presidential Regulation on Acceleration of Damage and Pollution Control on Citarum River Basin	Perpres No. 35/2018 Presidential Regulation on Acceleration of Development of Waste-to-Energy Installation using Environmentally-sound Technology
Presidential Decree	Keppres No. 61/1993 and No. 47/2005 Presidential Decree on Ratification of the Basel Convention on the Control of the Transboundary Movement of Hazardous Waste and Their Disposal				
Ministerial Regulation	Ministry of Trade Regulation No. 31/2016 on Non-Hazardous Waste Import	Ministry of Public Works Regulation No. 3/2013 on Implementation of Solid Waste Infrastructure and Facilities	Ministry of Environment and Forestry Regulation No. P.75/2019 on Roadmap to Waste Reduction by Producers	DRAFT Ministerial Regulation (MoEF) on Shopping Plastic Bag Reduction	
	Ministry of Trade Regulation No. 48/2015 on General Provisions in the Import Sector	Ministry of Trade Regulation No. 70/2015 on Importer Identification Number	Ministry of Industry Regulation No. 48/2015 on Requirements for Income Tax Facilities Implementation		
Regional/Local Regulation	Regional/Local Regulations on Single-use Plastics Ban: - Pergub Bali No. 97/2018	- Perwali Denpasar 36/2018 - Perwali Bogor 61/2018 - Perwali Banjarmasin 18/2016	- Perwali Balikpapan 8/2018 - Perwali Padang 36/2018 - Perda Purwakarta 37/2016		

(Source: SWI analysis, 2019)

Figure 2. Waste management related regulations in Indonesia (MoEF 2020)

Waste management related regulations in Indonesia					
National Law	Act No. 18/2008 on Solid waste management		Act No. 32/2009 on Environmental Protection and Management		
Government Regulation	PP No. 81/2012 Government Regulation on Management of Household and Household-like Waste	PP No. 101/2014 Government Regulation on Hazardous Waste Management	DRAFT Government Regulation on Excise on Plastic	DRAFT Government Regulation on Specific Waste Management	
Presidential Regulation	Perpres No. 97/2017 Presidential Regulation on National Policy and Management Strategy of Household Waste and Household-like Waste	Perpres No. 83/2018 Presidential Regulation on Marine Debris Management	Perpres No. 18/2015 Presidential Regulation on Income Tax Facilities for Investment in Certain Business Fields and/or in Certain Regions	Perpres No. 15/2018 Presidential Regulation on Acceleration of Damage and Pollution Control on Citarum River Basin	Perpres No. 35/2018 Presidential Regulation on Acceleration of Development of Waste-to-Energy Installation using Environmentally-sound Technology
Presidential Decree	Keppres No. 61/1993 and No. 47/2005 Presidential Decree on Ratification of the Basel Convention on the Control of the Transboundary Movement of Hazardous Waste and Their Disposal				
Ministerial Regulation	Ministry of Trade Regulation No. 31/2016 on Non-Hazardous Waste Import	Ministry of Public Works Regulation No. 3/2013 on Implementation of Solid Waste Infrastructure and Facilities	Ministry of Trade Regulation No. 48/2015 on General Provisions in the Import Sector	Ministry of Trade Regulation No. 70/2015 on Importer Identification Number	Ministry of Industry Regulation No. 48/2015 on Requirements for Income Tax Facilities Implementation
	Ministry of Environment and Forestry Regulation No. P.75/2019 on Roadmap to Waste Reduction by Producers		DRAFT Ministerial Regulation (MoEF) on Shopping Plastic Bag Reduction		
Local Regulation	Regional/Local Regulations on Single-use Plastic Bans; 3 provinces and 28 municipalities as of December 2019 (Provincial level) Pergub Bali No.97/2018, Pergub DKI Jakarta No.142/2019, Surat Edaran Yogyakarta No.490/1758 (Municipal level) Perbup Kabupaten Purwakarta No.37/2016, Peraturan Bupati Badung No.47/2018, Peraturan Bupati Hulu Sungai Utara No.8/2019, Peraturan Bupati Biak Numfor No.28/2019, Peraturan Bupati Bogor No.13/2019, Peraturan Bupati Nunukan No.32/2019, Peraturan Bupati Nunukan No.45/2019, Instruksi Bupati Tulungagung No.2/2019, Peraturan Bupati Pati No.33/2019, Peraturan Bupati Merauke No.23/2019, Peraturan Daerah Bandung No.17/2012, Perwali Bandung No.37/2019, Perwali Banjarmasin No. 18/2016, Peraturan Daerah Balikpapan No.1/2019, Perwali Balikpapan No.28/2019, Perwali Bogor No.61/2018, Perwali Jambi No.61/2018, Perwali Denpasar No.36/2018, Perwali Banjarbaru No.66/2016, Perwali Bukittinggi No.28/2018, Perwali Sam				

Solid Waste Management Act (No.18/2008)

As previously introduced, the Solid Waste Management Act (No. 18/2008) law focuses mainly on municipal solid waste management. The law makes it illegal to operate open dump sites. The Act set a target to end all open dump waste disposal by 2013.⁴ However, this goal was not achieved as the Ministry of Environment and Forestry recorded 167 open-dump waste disposal facilities that are still in operation (SIPSN 2018). Although there were no specific regulations targeting plastic waste, the Act did order to give disincentives to “the producer using production material that is not easily processed by natural process, un-reuse, and/or un-recycle and not environmental[ly] friendly.”

4. According to expert review, the Act states that it is illegal to operate open dump waste disposal however it does not state to end all open dump waste disposal. However, according to Chapter XVI Article 44 of the Solid Waste Management Act, “Local government shall close the final waste processing site with open dumping system for a maximum 5 (five) years after the enactment of this Act.” The National Plastic Waste Reduction Strategic Actions for Indonesia published by MoEF also mentioned that “Solid Waste Management Act (No. 18/2008) was issued to bring about the improvement of solid waste management in Indonesia, including the cessation of all open dump waste disposal by 2013.” Therefore, the veracity of this information is uncertain.

Government Decree No. 81/2012 on Waste Management of Household Waste and Household-Like Waste

The Government Regulation No. 81 of 2012 focuses on the management of domestic waste. It includes both policy and a strategy for its implementation as well as enforcement of the Solid Waste Management Act (No.18/2008) but does not mention plastics explicitly. The regulation states that all individuals are obliged to reduce and manage their waste through reduction, recycling, and reuse (3Rs). Producers are also required to limit and recycle their production waste by establishing relevant programs or plans, producing products with easily degradable packaging, and collecting product packages for recycling.

MoEF Decree No.13/2012 on Guidelines for Implementation of Reduce, Reuse and Recycle through Waste Bank⁵

The Ministry of Environment Regulation No. 13 of 2012 defines the Waste Bank and states the requirements, mechanism, implementation, and implementation of the Waste Bank, which is the main government tool to increase recycling of household and similar waste. The Waste Bank allows residents to be paid a pre-set amount for selected valuable waste types through local reception stations.

Presidential Decree No.97/2017 on National Policy & Strategy on Management of Household Waste and Household-Like Waste (JAKSTRANAS)

President Regulation No. 97/2017 is a roadmap towards the 2025 Clean-from-Waste Indonesia (Indonesia Bersih Sampah 2025). It sets a target of 30% waste reduction and 70% waste handling by 2025 (Figure 3). Indicators for waste reduction include decreasing waste generation per capita, reducing waste at source (e.g., plastic bag restriction), and reducing waste leakage to the environment (Figure 4). For the “70% handling” target mentioned above, the indicators include increasing waste to be treated (recycling, composting, biogas, thermal recovery, etc.) and reducing waste to be landfilled (MoEF 2020). Through these targets, the Ministry of Environment and Forestry aims to reduce 70% marine plastic by 2025.

Figure 3. National Target on Household Waste Reduction and Handling 2018–2025 (in Million Tons and Percentage Change) (JAKSTRANAS 2017)⁶

National Targets on Solid Waste Reduction (201– 2025)
(In Million Tons and Percentage Change)

Indicator	2018	2019	2020	2021	2022	2023	2024	2025
Waste Generation	66.5	67.1	67.8	68.5	69.2	69.9	70.6	70.8
Waste Reduction Target	12 (18%)	13.4 (20%)	14 (22%)	16.4 (24%)	17.99 (26%)	18.9 (27%)	19.7 (28%)	20.9 (30%)
Waste Handling Target	48.5 (73%)	50.3 (75%)	50.8 (75%)	50.7 (74%)	50.5 (73%)	50.3 (72%)	50.1 (71%)	49.9 (70%)

Source: Presidential Regulation No. 97/2017 concerning National Policy and Strategy in Solid Waste Management (JAKSTRANAS)

5. Expert review suggested the inclusion of the MoEF decree No 14/2021 on Waste Management in Waste Banks in this document. However, it could not be located at the time of document writing. It is possible more information about this regulation will be available online after its publication.

6. According to expert review, there is a difference in the number stated in the waste handling target in 2019 from the paper (50.3%) to the actual Presidential Decree (53.7%). Therefore, the veracity of this information is uncertain.

Figure 4. National Policy and Strategy on Solid Waste Reduction (JAKSTRANAS 2017)⁷

30% REDUCTION BY 2025	<p>Indicators:</p> <ol style="list-style-type: none"> 1. Decreasing waste generation per capita 2. Reducing waste at the source (community based 3R) 3. Reducing waste leakage into environment 	Leads to 70% Reduced Marine Plastic by 2025
70% HANDLING BY 2025	<p>Indicators:</p> <ol style="list-style-type: none"> 1. Increasing treated waste (recycling, composting, biogas, thermal recovery, RDF, etc.) 2. Reducing landfilled waste 3. Reducing waste leakage into environment 	

Source: Presidential Regulation No. 97/2017

Presidential Regulation No. 83/2018 on Marine Debris Management (National Plan of Action on Marine Plastic Debris)

In Presidential Regulation No.83/2018, the Government of Indonesia declared a National Plan of Action to combat marine debris from 2018 to 2025. The Regulation involves 18 ministries, local governments, private sectors, and NGOs with a planned budget of US\$1 billion (KKP 2018). Through the Regulation, the 18 ministries form the National Coordination Team for Marine Debris Handling, coordinated by the Secretariat for National Coordination Team (operationalization and funding are supported by UNDP). The 2018–2025 action plan pledges to reduce plastic and other marine waste by 70% by 2025, which is strongly linked to overall 100% urban collection targets on land. There are close to 60 actions⁸ to combat marine debris, including raising stakeholder awareness, managing waste generated on land, managing coastal and ocean waste, strengthening monitoring and law enforcement, and research and development, etc. (ERIA 2019; TKN PSL 2021). Together, they have already achieved a 15.3% reduction (TKN PSL 2021).

7. According to expert review, indicator number 3 under “30% reduction by 2025” says reducing waste leakage to the environment, whereas the actual Presidential Decree stated reducing waste of goods and packaging. Because of language limitations of the authors of this brief, this could not be verified. Therefore, the veracity of this information is uncertain.

8. According to the most recent information, there are 59 actions involving 18 ministries, and this information can be privately accessed with a username and password at <https://laporan.sampahlaut.id/auth/login>. However, the authors of this report could not access this information and the most recent publications indicate 16 ministries involved. Therefore, the veracity of this information is uncertain.

Figure 5. Number of activities by ministry under 2018–2025 Indonesian Action Plan (Kojima et al. 2019)

Strategies	Ministry of Industry	Ministry of Maritime Affairs and Fisheries	Ministry of Environment and Forestry	Ministry of Transportation	Ministry of Public Works and Housing	Others
Enhancement of stakeholder awareness	4	1	4	-		3
Land-based waste sources	10	1	2		3	1
Costal and ocean waste		6		5	1	4
Funding, monitoring, enforcement, etc.	1	-	-	1		5
Research and development	2	1	-	-		3
Total	17	9	6	6	4	16

M. Kojima and F. Iwasaki, based on the action plan in Presidential Decree No. 83/2018 on Marine Debris Management.

MoEF Decree No. P.75/2019 on Roadmap to Waste Reduction by Producers

The regulation No. P.75/2019 on Extended Producer Responsibility (EPR) is designed to guide and facilitate the producers (brand owners, manufacturers, importers, retailers, and the food and beverage service industry, etc.) to implement their EPR on reducing the waste generated from their goods, packaging, and services in plastics, paper, aluminum cans, and glass (MoEF 2020). The regulation contains three components (direct translation from IGES 2021):

- (1) To prevent and limit the potential of waste generation as much as possible by implementing design for sustainability in the form of redesigned products and packaging, by phasing out single-use plastics, eliminating unnecessary and excessive packaging, making packaging more recyclable and reusable, creating packaging out of more recycled content, and producing more durable, returnable, rechargeable, and refillable goods;
- (2) To take back post-consumer products and packaging for reuse; and
- (3) To take back post-consumer products and packaging for recycling.

Legislative Responses to Plastic Waste Due to the COVID-19 Pandemic

Since the onset of the COVID-19 pandemic, the total medical waste generated in Indonesia has increased by 30%, from 293.87 tons per day before the pandemic to 382.03 tons per day (World Bank 2021). Due to uneven

numbers of licensed medical waste facilities in Indonesia (World Bank 2021), there is additional pressure on the country to manage plastic waste from COVID-19 and to meet its plastic waste reduction goals. To manage waste generated from COVID-19, MoEF issued circular letter No. SE.2/MENLHK/PSLB3/PLB.3/3/2020 on infectious (hazardous) and domestic waste management from COVID-19 response. The guidance allowed healthcare facilities to dispose of medical waste using treatment facilities such as incinerators or autoclaves, in burial pits, or using third-party waste handlers, even if these waste management facilities are not licensed to receive medical-grade waste by the MoEF.

Regulations and Programs at Local Level

To enhance solid waste management, many programs and regulations have also been introduced at local level. Efforts to achieve this goal include discouraging the use of plastic bags by applying additional charges, encouraging more source separation, and promoting circular economy through waste sorting management (Gerakan Pilah Sampah in 2019 by MoEF), implementing recyclables collection models (e.g., PET bottle, cartons, etc.), and carrying out ocean plastic waste observation (MoEF 2021).

At the local level, examples of regulations and programs include Regent Regulation No.13/2019 concerning Plastic Styrofoam Usage Reduction issued by Bogor. The ADIPURA Program (a clean city program) has also been implemented as an incentive for any municipality that excels in environmental management and city cleanliness (MoEF 2020). Figure 6 below shows a summary of the implementation of national waste management programs at local level (this is non-exhaustive). Specifically, for the local/regional regulations, there are 35 agencies, 35 cities, and 2 provinces implementing the single-use plastic ban. In addition to the cities in Figure 6, Bekasi (City) also implemented a regulation on no free plastic bag, titled “Peraturan Walikota (PERWALI) tentang PERUBAHAN ATAS PERATURAN WALI KOTA BEKASI NOMOR 61 TAHUN 2018 TENTANG PENGURANGAN PENGGUNAAN KANTONG PLASTIK.”

Figure 6. National waste management programs at local level (SWI analysis 2019)



POLICY EFFECTIVENESS

Governed by the Solid Waste Management Act (No. 18/2008), current waste management in Indonesia mainly focuses on the 3Rs paradigm. To implement this paradigm, the central and regional governments in the country are given the authority to establish waste management policies and strategies (Hasan 2021). However, despite the introduction of various solid waste management policies and regulations over the years in Indonesia, experts indicate that the enforcements need to be significantly strengthened (World Bank 2018). According to a World Bank report in 2018, currently there is virtually no or minimum enforcement of solid waste laws and standards from city-level violations to individual polluters (World Bank 2018). Multiple studies have pointed out that the root cause to be the “absence of effective method for managing plastic waste” (Hidayat 2019). For example, as part of the No.18/2008 law, the government applied a plastic bag levy policy in 23 regions in 2016. The levy requires supermarket customers to pay Rp 200 (about US\$0.015) per piece of plastic used, including Value Added Tax (PPN). The revenue collected was to be managed by the retail stores as CSR (Sobaya et al. 2018). However, the policy was revoked in less than eight months due to the country’s “weak legal basis” (Hasan 2021). Moreover, recycling remains an informal sector activity with the informal waste collectors not regulated and their welfare not guaranteed, and formal recycling systems capturing less than 5% of the waste generated in the country. As mentioned, if the informal sector can be properly recognized and well compensated, they can largely contribute to the waste collection, recycling capacity and the overall policy execution.

CONCLUSION

Indonesia is both a large generator of plastic waste and has marine debris from foreign countries. According to available information, both its formal and informal solid waste and plastic waste management have limited institutional and infrastructural capacity to support the volume of plastic waste generated in and entering the area, and there is limited information about effective or successful plastics policy implementation. Likewise, the informal waste picker sector remains to be recognized or appropriately compensated, which is both a plastic waste and environmental justice issue.

REFERENCES

- Agustina Hidayat, Y., S. Kiranamahsa, and M. Arya Zamal. 2019. “A Study of Plastic Waste Management Effectiveness in Indonesia Industries.” *AIMS Energy* 7(3): 350–370. <https://doi.org/10.3934/energy.2019.3.350>.
- DIREKTORAT JENDERAL PERIKANAN TANGKAP. 2018. Marine Pollution. Retrieved October 2021, from https://kkp.go.id/an-component/media/upload-gambar-pendukung/kkp/DATA%20KKP/Dokumen%20Komitmen%20OOC%202018/Marpol_Commitments_web_rev.pdf.
- Hasan, D. 2021. Indonesia: Paid Plastic Bag Policy: Its Concept and Relevance to Pollution-Levy Principles. *Environmental Policy and Law* 50(4–5): 415–422. <https://doi.org/10.3233/epl-200244>.
- Hoorweg, D., and P. Bhada-Tata. 2012. What a Waste: A Global Review of Solid Waste Management. The World Bank. Retrieved October 2021, from <https://openknowledge.worldbank.org/handle/10986/17388>.
- Institute for Global Environmental Strategies. 2021. Indonesia Actions and Progress on Marine Plastic Litter. Towards Osaka Blue Ocean Vision - G20 Implementation Framework for Actions on Marine Plastic Litter. Retrieved October 2021, from <https://g20mpl.org/partners/indonesia>.
- Indonesian Institute of Science (LIPI). 2018, 2019, 2020. The authors of this report could not find these resources due to language constraints.
- Jambeck, J.R., R. Geyer, C. Wilcox, T.R. Siegler, M. Perryman, A. Andrady, et al. 2015. Plastic Waste Inputs from Land into the Ocean. *Science* 347(6223): 768–771. <https://doi.org/10.1126/science.1260352>.
- Jing, Z., and S. Sutikno. 2020. “Legal Issues on Indonesian Marine Plastic Debris Pollution.” *Indonesia Law Review* 10(1): 87–110. <https://doi.org/10.15742/ilrev.v10n1.592>.
- Kojima, M., and F. Iwasaki. 2019. Tackling Marine Plastic Pollution. Regional Knowledge Centre for Marine Plastic Debris. Retrieved October 7, 2021
- Law, K.L., N. Starr, T.R. Siegler, J.R. Jambeck, N.J. Mallos, and G.H. Leonard. 2020. “The United States’ Contribution of Plastic Waste to Land and Ocean.” *Science Advances* 6(44): eabd0288.

- Lebreton, L.C., van der Zwet, J., Damsteeg, J.-W., Slat, B., Andrady, A., & Reisser, J. 2017. "River Plastic Emissions to the World's Oceans." *Nature Communications* 8(1). <https://doi.org/10.1038/ncomms15611>.
- Lestari, P., and Trihadiningrum, Y. 2019. "The Impact of Improper Solid Waste Management to Plastic Pollution in Indonesian Coast and Marine Environment." *Marine Pollution Bulletin* 149, 110505. <https://doi.org/10.1016/j.marpolbul.2019.110505>.
- Li, W.C., H.F. Tse, and L. Fok. 2016. "Plastic Waste in the Marine Environment: A Review of Sources, Occurrence and Effects." *Science of the Total Environment* 566–567, 333–349. <https://doi.org/10.1016/j.scitotenv.2016.05.084>.
- Maimaiti, G. 2021. 12 Innovators Improving the Lives – and Livelihoods – of Indonesia's Informal Sector Workers. World Economic Forum. Retrieved October 14, 2021, from <https://www.weforum.org/agenda/2021/06/innovators-indonesia-waste-informal-sector/>.
- Ministry of Environment and Forestry, Republic of Indonesia. 2020. Indonesian Policy on Combating Plastic Pollution: Avoiding and Reducing Single-Use Plastic and Developing Circular Economy. Retrieved October 2021, from https://ec.europa.eu/environment/international_issues/pdf/01-02%20-%20Novrizal%20Tahar.pdf.
- Ministry of Environment and Forestry, Republic of Indonesia. 2020. National Plastic Waste Reduction Strategic Actions for Indonesia. Retrieved October 2021, from <https://www.unep.org/ietc/resources/policy-and-strategy/national-plastic-waste-reduction-strategic-actions-indonesia>.
- Ministry of Environment of Denmark. 2018. Strategic Sector Cooperation on Sustainable Island Initiative (SII) between Denmark and Indonesia. Retrieved October 2021, from <https://eng.mst.dk/media/221219/partnership-document-ssc-indonesia.pdf>.
- Nurbaiti, A. 2021. The Apps Helping Indonesia's Waste Collectors. China Dialogue. Retrieved October 14, 2021, from <https://chinadialogue.net/en/cities/the-apps-helping-indonesias-waste-collectors/>.
- Office of Assistant to Deputy Cabinet Secretary of State Documents & Translation. 2021. Statistics Indonesia Releases 2020 Census Results Cabinet Secretariat of the Republic of Indonesia. Retrieved December 28, 2021, from <https://www.census.gov/2020results>.
- Patton, E., and H. Li. 2021. Turning the Tide: How Can Indonesia Close the Loop on Plastic Waste? The Wilson Center. Retrieved October 2021, from https://www.wilsoncenter.org/sites/default/files/media/uploads/documents/Insight%20Out_April2021_FINALr4.pdf.
- Sari, D.A., Suryanto, A.S. Sudarwanto, S. Nugraha, and R. Utomowati. 2021. "Reduce Marine Debris Policy in Indonesia." *IOP Conference Series: Earth and Environmental Science* 724(1): 012118. <https://doi.org/10.1088/1755-1315/724/1/012118>.
- Shuker, I.G., and C.A. Cadman. 2018. The Marine Debris Hotspot Rapid Assessment for Indonesia. The World Bank. Retrieved October 2021, from <https://documents1.worldbank.org/curated/en/983771527663689822/pdf/Indonesia-Marine-debris-hotspot-rapid-assessment-synthesis-report.pdf>.
- Sistem Informasi pengelolaan sampah Nasional. SIPSN. n.d. Retrieved October 2021, from <https://sipsn.menlhk.go.id/sipsn/>.
- Sobaya, S., R.A. Fahmi, and I. Nurrosida. 2018. "Consumer Responses to the Plastic Bag Levy in Special Region of Yogyakarta, Indonesia." *International Journal of Business Economics and Management Studies* 6(1): 10.
- Sodik, D.M. 2020. "Marine Pollution in Indonesia and the Regulatory Framework." *The International Journal of Marine and Coastal Law* 36(1): 114–135. <https://doi.org/10.1163/15718085-bja10038>.
- The World Bank. 2021. Indonesia Emergency Response to COVID-19 Additional Financing (P175759) Program for Results. The World Bank. Retrieved January 8, 2022, from <https://documents1.worldbank.org/curated/en/556521622161339564/pdf/Draft-Addendum-to-Environmental-and-Social-Systems-Assessment-ESSA-Indonesia-Emergency-Response-to-COVID-19-Additional-Financing-P175759.pdf>.
- The World Bank. 2019. Improvement of Solid Waste Management to Support Regional and Metropolitan Cities. Retrieved October 2021, from <https://documents1.worldbank.org/curated/en/608321575860426737/pdf/Indonesia-Improvement-of-Solid-Waste-Management-to-Support-Regional-and-Metropolitan-Cities-Project.pdf>.
- TKN PSL. 2021. Reporting System. Retrieved November 2021, from <https://laporan.sampahlaut.id/auth/login>.
- United Nations Environment Program. 2017. Indonesia Joins UN in a Bid to Eradicate Ocean Plastic. UNEP. Retrieved January 8, 2022, from <https://www.unep.org/news-and-stories/story/indonesia-joins-un-bid-eradicate-ocean-plastic>.
- United Nations Environment Management Group (EMG). 2021. An Overview of UN Activities and Initiatives Related to Marine Litter and Microplastics. United Nations. Retrieved January 8, 2022, from https://unemg.org/wp-content/uploads/2021/09/EMGSOM.27_INF_2_FINAL_Draft_Marine-Litter-Report.pdf.

APPENDIX – METHODS

To begin the search for policy documents, researchers referenced the Nicholas Institute's Plastics Policy Inventory for any relevant national or subnational policies in Indonesia. At the time this case study was initially drafted, there were two policies from Indonesia in the Inventory.

Researchers then searched for academic and grey literature relating to plastic pollution and relevant policies in Indonesia. This search was mostly done through Google Scholar. Search terms included, but were not limited to, "Indonesia plastic," "Indonesia plastic pollution," "Indonesia plastic pollution policies," "Indonesia plastic bag ban," "Indonesia single-use plastic," and "Indonesia plastic use." In addition, Google Scholar search strings outlined in the "methods" section of the 20 Years of Government Responses to the Global Plastic Pollution Problem The Plastics Policy Inventory report were adapted, as follows:

("Marine debris" OR "Marine litter" OR Microplastic OR Microfiber OR Plastic NOT Surge* NOT elast*) AND (Policy OR Govern* OR Institution OR Law OR Regulat* OR Legal OR Intervention OR Infrastructure OR Coastal city OR Mega-city OR Municip* OR Subsidy OR subsidize OR Subsidies OR Ban OR bans OR banned OR Tax OR taxes OR taxed OR Fee OR Fees) AND (Indonesia);

("Marine debris" OR "Marine litter" OR Microplastic OR Microfiber OR Plastic NOT Surge* NOT elast*) AND (Policy OR Govern* OR Institution OR Law OR Regulat* OR Legal OR Intervention OR Infrastructure OR Coastal city OR Mega-city OR Municip* OR Subsidy OR subsidize OR Subsidies OR Ban OR bans OR banned OR Tax OR taxes OR taxed OR Fee OR Fees) AND (Indonesia OR Sumatra OR Java OR Sulawesi OR Borneo OR New Guinea);

(Nylon OR "Shopping bag" OR Styrofoam OR "Synthetic disposable" OR Tire OR Tyre OR "Cigarette waste" OR "Beach clean-up" OR "Coast* clean-up" OR "River clean-up") AND (Policy OR Govern* OR Institution OR Law OR Regulat* OR Legal OR Intervention OR Infrastructure OR Coastal city OR Mega-city OR Municip* OR Subsidy OR subsidize OR Subsidies OR Ban OR bans OR banned OR Tax OR taxes OR taxed OR Fee OR Fees); and (Indonesia).

Twenty-two total articles were found, and all were screened for inclusion. The inclusion criteria were that the articles described the plastic pollution problem in Indonesia, described relevant policies in Indonesia, or they described the effectiveness of relevant policies. They were then read through and relevant information that could aid this case study was extracted. When citations referenced additional literature that seemed relevant, those papers were subsequently screened for inclusion as well. This is the primary method in which the background information was collected.

Much of this scholarly literature referenced specific national policies, and in some cases included data on effectiveness as well. To find the policy documents that were not originally in the Plastics Policy Inventory, the policy names found in the literature were either entered in a Google. This is how the specific language of the policy documents was discovered and analyzed, though most policy documents were in Dhivehi and could not be analyzed beyond how the secondary literature described them. The policies which demonstrated an intent on behalf of policy makers to address plastic pollution were then entered into the Plastics Policy Inventory.

Finally, to check if any new policies had been agreed upon or enacted since the publication of the literature referenced above, the same search strings that were used to find the literature were applied in a normal Google search. Here, researchers were looking for recent news articles referencing policies that may have been implemented and not yet included in any literature.