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# 10 Meters to Disaster: The Challenges of Premature Application of Circular Economy Strategies in Jakarta's Waste Management Structure

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SIT Study Abroad Indonesia: Arts, Religion, and Social Change

Spring 2024

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## Abstract

Jakarta's complex issue of waste management encompasses a multitude of challenges that include inefficiencies in infrastructure, a lack of public awareness of the consequences of an inadequate waste system, socioeconomic disparities, and a deficiency in intersectoral collaboration. The urgency for holistic and sustainable solutions that prioritize proactive waste collection is underscored by the complexities of these dynamics. This field study paper argues that the attention that is being drawn towards trending waste management innovations, which are reactive strategies, could bring the waste crisis in Jakarta to an even more critical state. The sections will critically examine current waste management efforts and argue for concerted action to implement systematic solutions that can effectively tackle Jakarta's mounting waste management challenges. By redirecting attention towards proactive strategies that address underlying issues and develop community engagement, the paper advocates for a transformative shift in current waste management paradigms.

## Acknowledgments

In writing this paper, I would like to acknowledge that although I am Indonesian by blood, I have done this independent fieldwork through the lens of an American having been raised and gone through education in America. I could never write from the perspective of one experiencing the waste management crisis first-hand, nor do justice to the experts in the field that I have interviewed during this ISP period because I translated as best as I could without using a professional translator. I would like to thank Yayasan Perisai and me, especially Ibu Nina Nazar, Bapak Indria, and my advisor Ibu Sri Bebasari for connecting me with the waste management community at Dinas Lingkungan Hidup DKI Jakarta and for giving such valuable information and advice in preparing me for my fieldwork. I would like to thank Ibu Mulyorini, Bapak Agung, Bapak Roy, and Ibu Sri Kasi for providing insights on DLH's role in Jakarta's waste management efforts. Each time I interviewed someone in the waste management scene, I was thanked for being interested in this topic and I want to thank InSWA and DHL members for being so open in sharing their passionate opinions and insights.

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## Introduction

Indonesia's capital city, Jakarta, is home to over 11 million residents. The city generates over 7 thousand tons of municipal solid waste daily, making the lack of an efficient waste management system one of the biggest inhibitors of a clean environment for Jakarta. This consequently causes numerous health, social, and ecological issues. Historically, Indonesia, along with other developing countries in the global south has served as dumping grounds for Western developed countries utilizing international waste trade. From systemic inefficiencies in infrastructure to an unmanageable dearth of public awareness regarding the consequences of a shortage of ineffective waste management, the city is already in a state of environmental emergency.

Currently, the only proper landfill, Bantargebang in Bekasi, has nearly exceeded its design capacity. Present waste management systems, such as Waste Banks, RDF, and Waste-to-Energy plants promote waste as a resource, creating numerous challenges in compensating those who collect waste. For a circular economy model to be effective in Jakarta for all sectors, the city must address these challenges and implement policies that prioritize 100% waste collection and other proactive measures that delve deeper into the root causes of Jakarta's waste management dilemma.

In examining existing references on strategies to combat Jakarta's waste management issue, it is relevant that the majority of popular research papers are written by Western economists who consistently recommend circular economy models, waste-to-energy infrastructure, and more collaboration between the government, private sector, and community-based waste management initiatives. Missing from the most accessible resources were financial breakdowns of operations, which I later found in physical resources written in Bahasa Indonesia, and investigations of current progress in the waste management field and how these efforts affect Jakarta's environment and society in the present day.

While most existing studies encourage countries like Indonesia which are already in the ICU phases of waste management disaster to shift to a circular economy, this shift to a circular model may not be feasible yet for Jakarta. Frameworks like these are more complicated in the context of a developing country that has not yet set the foundations for waste

management as a service, and it is crucial to consider the unique challenges and opportunities that Jakarta faces in implementing a sustainable waste management system.

## Methodology

To attempt to understand the severity of Indonesia's waste management issues and investigate the center of waste management initiatives with time and resource constraints, I conducted a month-long field study in Indonesia's most populated city, Jakarta. Due to the additional time constraints because of the affected site and interviewee availability during the Eid Al Fitr holiday, I centered my examination of existing methods of managing waste in Jakarta on private sector initiatives, specifically waste banks and start-ups that reduce the amount of waste from reaching Jakarta's dumping facility, Bantargebang.

I sought out those who are directly involved with the management of waste in Indonesia. The people who care the most about the situation dedicate themselves to remedying the social and environmental impacts of the leakage of waste into urban and natural communities because opportunities for leadership in this sector appear at every level and are non-competitive roles. Through my advisor, a specialist in waste management, I was connected to one of the founders of TPST Bantargebang and its current head of operations. I reached out to other members of my advisor's organization; InSWA, Indonesia Solid Waste Association, and Yayasan Perisai, an NGO that supports waste management research in Indonesia; to learn from the perspectives of those who volunteer their time to waste management efforts. I was recruited by my advisor to be a part of her newest project; a waste management start-up with her organization that has gained its funding through a cement corporation's CSR and was given access to plans for waste collection and sorting operations through a social enterprise lens in Plumpang, Jakarta.

Every initial interviewee suggested other participants, characterizing most of my data collection as being through the snowball method. Over four weeks, I conducted ten formal interviews, meeting a few interviewees more than once for further discussion and being accompanied to TPST Bantargebang and other waste management sites in Jakarta. I spoke with residents of Jakarta from different neighborhoods informally to gain insights on effective incentives to participate in waste



management programs or to comply with waste management regulations. These people were friends, students from Universitas Indonesia, family members, people that I spoke to in hospital and apartment lobbies, and drivers who provided transport to and from interview meeting places and dumping site visits.

Each semi-structured interview was customized according to the background of the interviewee and question guidelines were created based on my preliminary research in Indonesian documents on waste management by Indonesian experts and by Western researchers. Information about Bantargebang included personal observations, and insights from Bapak Roy Sihombing, head of staff at Bantargebang; and Bapak Agung Pujo Winkarno, S.Si, M. Si, Head of TPST Bantargebang and head of waste management connections. Information about both private sector and public sector operations in waste management was provided by Bapak Agung Pujo Winkarno and Ibu Sri Mulyorini, founder of TPST Bantargebang and current head of wastewater management and local water contamination at Bantargebang.

Regarding public opinion, I asked each interviewee's opinion but was able to hear more from freshmen at the University of Indonesia, family members, friends, and strangers who were able to provide short opinions about their attitudes toward the waste crisis in Jakarta. I was able to gain a better understanding of the logistics of private partnerships and collaborations between sectors towards waste management with the help of Ibu Sri Kasi, Head of PSMDI (Data and Information Society on Partnerships and Collaborations) at Dinas Lingkungan Hidup. Each interviewee contributed to the discussion of the application of circular economy models in Jakarta, which led to the heart of my findings.

Because of time restraints, I was not able to conduct short interviews or surveys of community members who live in municipalities with recorded waste banks to see the direct impact of waste banks on the livelihoods and behaviors of communities. I was also unable to reach owners of RDF businesses to learn more about their partnerships with waste collection, processing, and management operations. If given more time, I would have conducted interviews differently since my topic changed a bit after beginning the interviewing process. I would also have looked more into different sub-topics, such as gender inequality reinforcement by gendered division of labor in waste management practices and the social and environmental impacts of Islamic organizations that are making their way into the waste management awareness scene.

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## Abbreviation

NGO, Non-Governmental Organization

TPS, *Tempat Penampungan Sementara* | Temporary Waste Site

TPST, *Tempat Pengolahan Sampah Terpadu* | Integrated Waste Processing Site

TPS3R, *Tempat Pengolahan Sampah Reduce Reuse Recycle* | Reduce Reuse Recycle Waste Processing Site

TPA, *Tempat Pemrosesan Akhir* | Final Processing Place

BSU, *Bank Sampah Unit*

BSI, *Bank Sampah Induk*

RDF, Refuse Derived Fuel

CSR, Corporate Social Responsibility

EPR, Extended Producer Responsibility

APBD, *Anggaran Pendapatan Belanja Daerah* | Local Budget

PPP, Public-Private Partnerships

DLH, *Dinas Lingkungan Hidup* | Department of Environmental Service

RW, *Rukun Warga* | Community Unit

RT, *Rukun Tetangga* | Neighborhood Unit

KSBB, *Kolaborasi Sosial Berskala Besar* | Large-Scale Social Collaboration

DKI Jakarta, *Daerah Khusus Ibukota* Jakarta | referring to Jakarta as the capital of Indonesia

B3, hazardous waste (electronic waste, batteries, lamps, oil, chemicals, ink, etc.)

ITF, intermediate treatment facility (waste-to-energy)

## Bantargebang

From central Jakarta, it takes 30 kilometers to reach Jakarta's landfill in Bekasi. Because of this distance, a Jakarta citizen could go their whole lifetime without seeing the most probable resting place for their waste and what the amount of waste Jakarta produces has manifested into over the past four decades. Even from the inside of a car, one could catch the scent of the landfill before exiting the inter-city freeway. Approaching the facility, slums, schools, offices, a few parks, power plants, and street markets surround the area. A line of garbage trucks are weighed and inspected one by one at the security gate, where hundreds of flies and the peaks of the mountains of garbage are already visible. The garbage mountain currently summits 60 meters high and with a 70-meter capacity, Bantargebang is in an emergency state trying to find ways to divert waste from its dumping zones.

TPST Bantargebang is a waste management facility operated by DLH DKI Jakarta, DKI Jakarta's Department of Environmental Services. With an area of 132.5 hectares and over 800 employees, its operational units include a landfill, RDF plant, incinerator, leachate treatment facilities, a powerhouse that generates electricity from landfill gas, and a truck washing station. Bantargebang employs residents of surrounding communities, providing job stability and the ability for the surrounding neighborhoods to economically benefit from TPST operations. More than 13,000 trucks enter the facility daily, totaling approximately 7,000 tons of waste each day with an average waste composition of 49.87% organic waste, 22.95% plastic, 17.24% paper, and 3.18% wood. The government took over TPST Bantargebang's operations in 2016 and has since undergone various changes and established partnerships with waste banks, Jakarta Recycle Center, and NGOs that promote the reduction of single-use plastic waste. Interestingly, though nearly half of Bantargebang's waste composition is organic waste, Bantargebang's composting facility has not been active since the recent leadership change in Jakarta's government. However, several businesses take organic waste from landfills to bring to maggot houses, fertilizer processing, or farms.

The facility implements certain measures to mitigate environmental disasters. Specific efforts include covering the landfill with "coversoil" and a geomembrane to create layers between waste that mitigate the growth of the disease, reduce the risk of landslides and fires, reduce odor, optimize the process of decomposition of organic waste, capture waste water and

waste gas such as methane to be diverted to other on-site facilities, and to prevent rainwater infiltration. Bantargebang's efforts to offset waste from the landfill divert a total of 2,100 tons of waste from the TPA each day.

Yet, Bantargebang faces daily health and safety risks for the environment, the employees, and surrounding communities. In 2023, 38 dumping sites caught fire within four months during the dry season. During the rainy season, Bantargebang constantly faces dangerous landslides. Thousands of scavengers enter the facility during dumping times, working in dangerous conditions to search for valuable waste. The geotechnical state of the facility is also at risk, with the waste mountain pushing down on the soil and causing the soil to liquefy and corrupt the pavement used by the thousands of trucks that arrive at the facility every day. Environmental and health disasters could strike if there were ever an earthquake. Several environmental justice issues arise with the existence of Bantargebang as the only dumping facility for the city of Jakarta. One is the unbearable living conditions in the surrounding neighborhoods. Local communities deal with the stench and environmental risks of the landfill. Along with monitoring the water and air quality of the Bekasi and the surrounding area daily to ensure the mitigation of health and safety risks, the government of Jakarta compensates the communities affected by the negative impacts of Bantargebang in several ways: environmental restoration, providing health services and infrastructure, improving educational services for surrounding areas, and providing direct financial assistance and insurance to affected communities. In 2021, government compensation reached IDR 379,519,499,250, having more than doubled since 2016.

Indonesia's role as a dumping site for western waste due to international waste trade exacerbates the existing waste management issues at TPST Bantargebang. The overwhelming volume of waste, paired with the introduction of non-degradable materials reflects a global trend of developed countries using developing nations as their landfills. Over 160 million Indonesians are without waste collection. Uncollected trash ends up on beaches, in rivers, in the ocean, in the streets, blocking drainage systems, contaminating food, burning, or piling up along parks and forests. Nature is hit hard by the detrimental effects of unmanaged waste, leading to environmental degradation and consequently causing harm to the health of humans and ecosystems that is far-reaching and devastating. The historical habit of dumping organic waste was not amended fast enough through policy to accommodate population growth accompanied by the introduction of non-degradable waste; years of poor disposal habits have gone on so long that now Jakarta is in a state where action has to be taken, and it is going to cost much more than the APBD can provide. Indonesia is made more vulnerable to becoming a destination for international waste with the

waste management policies and infrastructure that currently exist. Sustainable and holistic waste management that minimizes the amount of waste sent to landfills and maximizes the benefits of waste management operations in Jakarta is essential to leave TPST Bantargebang for purely waste residue to protect the local communities and ecosystems.

## Upstream, Downstream, Into Streams: Where Does Jakarta's Trash Go?

The beginning of the end for municipal solid waste in Jakarta starts with collection. Waste directed by households may end up at unit waste banks after being sorted for “valuable” waste or in green, yellow, or red waste sorting bins on the street. “Valuable”, means types of plastics or other non-degradable waste that can be used to manufacture textiles, containers, water bottles, furniture, or other products. The recyclable waste brought to waste banks is then sold to larger waste bank centers, which are then sold to off-takers who use recyclable waste for their production processes. The waste placed in public sorting bins however, identified by the Department of Environmental Services as TPS 1, is collected by waste scavengers/independent collectors or by government services. Although these public waste bins do help promote awareness of the existing types of waste, helping citizens differentiate what kind of waste is degradable, recyclable, non-degradable, hazardous, etc., these waste bins are ultimately dumped into a single garbage transportation truck that lacks waste sorting compartments within it. This waste is then taken to a temporary waste site within that municipality. This could be a temporary site where all waste gets dumped and held until transported to Bantargebang, or a TPS3R, which sorts waste on site. This stage of waste management serves as a source for the private sector to collect waste for various purposes, including ITF businesses, BSF Maggot or composting processes, startups that reimagine waste, and RDF plants. The residue from these temporary holding facilities is transported by the government to TPST Bantargebang. The waste that is not turned into electricity, RDF, or is taken by or sold to off-takers remains in the four active dumping zones in Bantargebang, piling onto the waste mountain that exists today.

To provide a broader scope of waste management, the DLH split waste management into three stages: Upstream Waste Management, Waste Management in the Center, and Downstream Waste Management. The first stage includes RW scope waste management (*KuPiLah*/Reduce-Sort-Process), waste banks, single-use plastic waste control (*KBRL*), independent area

waste management, Jakarta Recycle Center, and scheduled waste collection and transport. The next stage is one where Jakarta's government and the DLH are still in the process of development. Middle steps of waste management include upgrading all TPS to TPS3R, managing wastewater, managing B3 waste, Large-Scale Social Collaboration on waste management (*KSBB*), and construction of an RDF Plant in DKI Jakarta. The hope is that these initiatives will be up and running by the end of 2025. The DLH also manages Jakarta Recycling Center, where recyclable waste and organic waste from all districts are further sorted by material and then sold to support DLH operations, most of the time, profits made from JRC off-takers go towards running Bantargebang, since the APBD investment of IDR 1.3 Trillion barely cuts annual operational costs. Though it may seem like a sufficient amount of money, the existing levels of funding from the local government change drastically with every change in government leadership; this decrease in funding from recent leadership is what forced Bantargebang to close down its composting facility. Finally, TPST Bantargebang's management, waste power plant operations, RDF operations, and landfill mining facility operations all fall under downstream waste management. All of these initiatives run under Jakstrana, a project for the development of central and local government implemented by the Japan International Cooperation Agency to enhance effective solid waste management practices.

In a simulation run by InSWA, with 100% waste collection, the total cost of collecting 7,000 tons of waste daily is over IDR 5,000,000,000. The simulated process of a 3,000-ton inflow of waste to Bantargebang would cost IDR 2,300,000,000. If the amount of waste collected were to decrease to 1,000 tons a day the cost would be a quarter of that, or roughly IDR 524,550,925. This simulation shows that if somehow only 100 tons of waste entered the TPST facility per day, it would only cost IDR 50,000,000 in daily operational costs for the government; it illustrates that for a more sustainable future, the goal is to reduce the amount of waste entering the landfill to pure residue and on top of that, the amount of non-degradable waste generated must also decrease.

So far, this waste management flow, especially facilities that are provided to off-takers, has been effective in filtering thousands of tons of waste from entering the TPST facility. Nonetheless, these current strategies are reactive rather than proactive. The lack of regulation, public awareness, and participation is a significant obstacle to effective waste management in Jakarta, especially in moving towards a focus on waste prevention rather than waste disposal. Furthermore, strategies that rely heavily on community involvement meet limitations due to a weak relationship between the local government and the

community. Over-reliance on costly high-tech Western waste management methods also causes issues, because a reliance on infrastructure requires a budget that the government does not have and may not invest towards waste management efforts. For example, although many ITF plants (waste-to-energy) are being developed in Jakarta, experts believe that IFT is not the best solution in the context of Jakarta, because there would not be enough off-takers to make ITF profitable. RDF works in Jakarta because there is a strong existing cement industry, but for any kind of waste management technology, it is imperative to understand the business aspects of the operational costs and sales profits and see if that solution makes sense in the city of Jakarta specifically. This disagreement has increased tension between the public and private sector industries and experts involved in waste management, further hindering the full capacities of intersectoral collaboration.

## Bank Sampah

*Bank Sampah*, a waste bank, has become a well-known private-sector waste management strategy across Indonesian provinces. Sri Mulyorini, one of the founders of TPST Bantargebang argues that *Bank Sampah* has itself become a significant part of Indonesian culture with over 25 thousand active facilities spanning across Indonesia. Developed as a community-based effort towards cleanliness and economic empowerment, the concept of *Bank Sampah* is to incentivize waste collection, and management, and increase the life cycle of reusable wastes to decrease the amount of waste brought to the TPA/landfill. This approach to waste management in Jakarta has driven a circular economy and has become instrumental in addressing the city's waste disposal challenges. However, the success of each *Bank Sampah* is not without its obstacles.

The governor of Jakarta mandated in 2021 under Law No. 33 relating to waste management that every municipality is required to have a *Bank Sampah*. The city has *Bank Sampah Unit* (BSU), unit waste banks that are found in RW's, schools, and offices, and *Bank Sampah Induk* (BSI), mother waste banks that serve as the main centers of operation in the city. Each Bank Sampah looks and operates differently even if they are under the same BSI. Most community waste banks are managed by the older population and look different based on how much funding was put into that certain waste bank facility depending on the socioeconomic conditions of a community and the investment of the local government into that community. Unsurprisingly,

wealthier communities are at an advantage due to both of these factors, and socioeconomically low communities are forced to operate waste banks from their garages or own houses. Because of the differences in management resources, some waste banks may operate every day and others may operate only for a few hours once a week. In communities where facilities are weak, communication is necessary. Operators must be able to communicate to waste bank contributors exactly how waste is getting collected; if it should be dropped off at a certain building, what time, and any weight limits there may be. Each waste bank must also customize its reward system specifically to its community, as it competes with other waste banks and may lose participants if other waste banks have better reward rates.

A most common example of waste bank money flow is the following: A household or waste collector brings a plastic bottle that is worth 3,500 rupiah to a unit waste bank. That bottle gets recorded in the BSU and the BSU sells that bottle to the BSI for 4,500 rupiah. Then, the BSI would sell that bottle to off-takers for 5,000 rupiah, which then is put towards the BSUs that sell their trash to that BSI. Essentially, waste banks are funded by off-takers, such as Unilever, Danon, and Recycling Business Units (RBU) which are required by their EPR to include a certain percentage of recycled material in their production. Depending on the waste bank, those who bring waste to waste banks may be rewarded immediately or weeks later. Regardless of the system, unless an individual brings wheelbarrows of garbage to a community waste bank, the monetary incentive is not enough to support the livelihoods of these waste-collecting populations and this system is most active in communities where individuals collect waste for their survival.

The concept of using a reward system to incentivize waste collection and organization has inspired many Youth-led startups such as Rekosistem, Plastik Pay, and Alner that incentivize recycling and reusing plastics by designating monetary value to non-degradable waste. The rise in apps for recycling that offer door-to-door waste collection services has increased investments into similar types of social enterprises, making waste management a growing industry in Jakarta. But again, these projects do not necessarily constitute an effective practice because successful outcomes depend on the diverse local contexts that are present in Jakarta. Just like waste banks, these depend highly on whether communities express an enthusiasm to participate, how educated communities are on recycling, the training that staff or managers receive, and whether manipulating prices or having an excess of waste causes the value of collected recyclables to drop below profitable thresholds.



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## Discussing The Demand for Waste as a Profitable Resource

The synopsis of Law no.18 of 2008, one of the most referenced policies in existing resources on waste management, states that the purpose of implementing better waste management practices is to improve public livelihood and health, environmental quality, and to waste into a resource. The language used to describe the process of waste management by the DLH, “upstream” and “downstream” management, parallels language used in describing supply chains. The term upstream management is used to involve activities of sourcing raw materials and extending them to the manufacturing and production process. Whereas downstream management encompasses the distribution, sales, and services of the final product. By using these terms to describe waste management, the government solidifies the role of waste as a profitable resource.

While waste banks have been implemented as a means to empower communities and promote recycling, they are currently incentivized through the private sector’s demand for waste as a resource. The same goes for waste to energy and RDF businesses. This approach feeds the mindset that waste is a profitable commodity, rather than a problem that needs to be addressed through proper disposal, collection, and reduction. It is essential to transition waste banks into more of a public sector initiative that employs individuals in waste collection and management. This would provide stable employment and address social justice aspects of the issue that tie individuals’ incomes to the quantity and frequency of waste collection. This fosters instability and competition, which may even incentivize the creation of waste because of how important its existence becomes with this current waste bank model. It is no understatement that waste banks have helped individuals make money through trash, but the compensation is most of the time not enough to make a living. Furthermore, waste banks have prevented thousands of tons of recyclable waste from entering the city’s landfills.

Presently, political support for waste banks is lacking and not evenly distributed. If the private sector were to properly employ individuals for waste collection with support from the government, waste collection as a process and service would be streamlined. Furthermore, if household waste collection was done for a fee everywhere instead of just in wealthier neighborhoods, waste collection itself could expand as an industry and become a way for businesses and the DLH to earn more through their operations. Development through employment for waste collection services could be a game changer, and the government’s investment in waste collection services would help push the sector forward. DLH plans to charge for waste

collection services beginning next year, as they recognize that waste collection is a service that should require fees; this is especially true with current financial shortages in waste management.

In many ways, a premature circular economy mindset could be harmful to the future of waste management. A successful circular economy relies on the minimization of waste generation and closed-loop systems. Jumping to this goal prematurely and leaving the waste collection deficit overlooked would be devastating financially and in environmental and public health consequences. Achieving proper waste collection is essential to ensure waste is not left to remain polluting communities and ecosystems; attention to this should not be overshadowed by appealing technological solutions that only scratch the surface of the waste management crisis. By maximizing waste collection rates, the next steps can be taken to properly generate revenue from the sale of recyclable materials and create jobs in the waste management sector. The problem is not that current systems are wrong; it is that flashy technology and profitable solutions are becoming the focus of waste management efforts and investments in the sector when the overwhelming issue of waste collection from the source of generation receives little attention. The state of Jakarta's waste crisis has been compared to stage 5 cancer by waste management experts. This emergency requires more attention and education from the global community. The current focus on byproducts of waste can be seen as a "band-aid" solution that does not address the root cause of the situation. While waste banks have been a step in the right direction, they need to be reevaluated and integrated into a more comprehensive waste management system that begins with collecting waste from the source.

## Governance of Culture, Regulation, and Incentive Shape Public Action

In examining the root of Jakarta's waste management issue, we can see that culture, regulation, and incentive play major roles in shaping how the public handles waste. The cultural context of Jakarta, in which waste management takes place plays a significant role in shaping the public's behavior towards disposing waste. In Japanese culture, it is not considered polite to eat or drink while walking around, meaning there are not many trash bins on the streets because there is no need for them in a culture where people are not carrying around food and drink and throwing it out as they are walking about cities in Japan.

This cultural influence on waste management practices can be seen in the way that people in Japan are accustomed to disposing of their waste properly without the need for explicit regulations. In Jakarta, religious organizations have created a larger presence in the city's environmental movement. Islamic organizations such as Nahdlatul Ulama (NU) Muhammadiyah and the Catholic Church have promoted environmental stewardship, reaching millions of people through the cultural role of religion in Jakarta. While most of the impact happens at the community level, for example, through NU's "Ngaji Sampah", or "Sermons on Waste," Islamic principles are used to encourage the reduction of plastic waste and action towards protecting the environment. Muhammadiyah has developed a program to train imams to become "environmental preachers". These are just a few efforts that religious organizations have initiated that demonstrate the influence of extensive networks in promoting environmental action, though there is not much existing data on the impact of religious teachings on waste reduction or household waste management practices.

The government has the role of enacting policies that support institutions that effectively manage waste by setting standards of behavior for citizens and corporations. Bebassari shared an example of how people can change their behavior within a few hours. One can fly from Indonesia to Singapore in an hour and become disciplined to dispose of their waste properly once they land because, in Singapore, people are incentivized to follow disposal laws to prevent harsh disciplinary action. Under Section 20(1) of the National Environmental Agency of Singapore's Public Environmental Health Act, just a first conviction of illegal waste dumping results in a \$50,000 fine or up to 12 months of imprisonment or both. Although this is a much more extreme measure of a government increasing social graciousness and maintaining a city's cleanliness through policy, it is a good example of how public behaviors are changed based on government action. Up until now, it has seemed to have taken tragedies like the Leuwigajah TPA tragedy in 2005 for the government to take action in Jakarta. Several regulations exist involving waste management in the current capital city. Some that are outlined in InSWA's guidelines on the 5 aspects of waste management, *Kebersihan Adalah Investasi: Sampahku Tanggung Jawabku-Filosofi dan Panduan Pengelolaan Sampah, Berlandaskan 5 Aspek Pengelolaan Sampah*, include:

Law No. 18 of 2008 on waste management in Jakarta

Article 3:

- The Government and Regional Government are tasked with ensuring that good and environmentally sound waste management is implemented by the objectives as intended in this law

## Article 11:

- Every person has the right to receive services in waste management in a good and environmentally sound manner from the Government, Regional Government, and/or other parties who are given responsibility for this;
- Participate in the decision-making, implantation, and supervision process in the field of waste management;
- Obtain protection and compensation due to negative impact from activities at the final waste processing site;
- Obtain guidance to be able to carry out waste management in a good and environmentally sound manner

## Article 12:

- Everyone who manages household waste and similar household waste is obliged to reduce and handle waste in an environmentally sound manner

## Article 15:

- Producers are obliged to manage packaging and/or goods they produce that cannot or are difficult to decompose by natural processes

## Article 44:

- Regional Governments must make plans to close final waste processing sites that use open dumps no later than 1 year from the enactment of this Law;
- The Regional Government must close the final waste processing site that uses its open disposal system for a maximum of 5 years from the entry into force of this Law

## Article 45:

- Managers of residential areas, commercial areas, industrial areas, special areas, public facilities, social facilities, and other facilities that do not yet have waste sorting facilities at the time this Law is promulgated are required to build or provide waste sorting facilities no later than 1 year

## Government Regulation No. 81 of 2021

## Article 12:

- Producers are required to limit waste generation by developing a plan and/or program to limit waste generation as a part of their business and/or activities; and/or producing products using packaging that is easily decomposed by natural processes and which creates little waste as possible

## Article 13:

- Producers are required to recycle waste by developing a waste recycling program as part of their business and/or activities

## Article 14:

- Producers are required to reuse waste by developing and/or waste reuse programs as part of business and/or activities by waste management policies and strategies; using production raw

materials that can be reused and/or pulling back waste from products and product packaging for reuse

Article 15:

- The use of packaging production raw materials that can be decomposed by nature, which creates as little waste as possible, and which can be recycled and/or reused as intended in p 12 to article 14 is carried out in stages every ten years through a road map

Article 18:

- Managers of residential areas, commercial areas, special industrial areas, public facilities, social facilities, and other facilities in carrying out waste collection are required to provide TPS3R TPS and/or segregated waste collection;
- The Regency/City Government provides TPS and/or TPS3R in residential areas

Article 19:

- Garbage transportation is carried out by the Regency/City Government
- The Regency/City Government in carrying out waste transportation provides waste transportation equipment including segregated waste that does not pollute the environment
- Regency/City Government transports waste from TPS and/or TPS3R to TPA, TPST

Article 35:

- Community participation can take the form of:
  - providing suggestions, considerations, and/or suggestions to the government and/or Regional government in waste management activities;
  - providing suggestions and opinions in the formulation of household waste management policies and strategies carried out independently and/or in partnership with the Regency/City Government;
  - providing education and training, campaigns, and assistance by community groups to community members in waste management to change the behavior of community members

Many of these articles have been expanded upon in more recent regulations, but these were the original standards for waste management and show how the realization of the need for better waste management was only recognized in 2008. More recently, Jakstrada, a policy strategy for waste management was signed to implement various guidelines for waste management in Indonesia. Who is keeping businesses and the public accountable? No systems are in place to ensure that these regulations are being followed except if entities of waste generation themselves make the effort to track their waste flow. These regulations demonstrate that creating laws is not something that is set in place and left to solve the issue. Community participation has the capability of being developed through systematic changes, which could include stricter and more regulated sanctions. A more recent regulation, one that has seemed to create a lasting impact on Jakarta's citizens is Law No. 77 from 2021's set of regulations on waste management. By this law, every RW must have a new sector called *Bidang Pengelolaan*

*Sampah Lingkungan Hidup* (BPS RW), or an Environmental Waste Management Sector that is supported by DLH DKI Jakarta.

The scale of each BPS varies, but there is a significant rise in demand for employment in this sector at the University of Indonesia and other local universities where DLH has given lectures.

Although it is more common for educational institutions to educate children on the importance of managing waste and the possible consequences, there is no time to wait for younger generations to grow and amend Jakarta's waste issues. Initiatives by the DLH that have been enacted to influence Jakarta's citizens are having an active social media presence for all sectors including waste management, hosting events such as the annual Circular Economy Festival in Menteng, guest lecturing at all levels of education. The general public also lacks awareness of the environment and the health hazards that are connected to the poor management of waste in Jakarta.

If awareness of Jakarta's waste management were to increase throughout the general public, it would not ensure action. The same goes for governmental regulation. How can we expect people in Jakarta to adhere to governmental policy if the relationship between the government and the public is corrupted? Challenges in waste management extend beyond awareness to include issues with waste organization and disposal. In Jakarta, these challenges in incentivizing proper waste disposal behavior at the individual level appear in low, middle, and high economic classes. Poorer communities are the most vulnerable to the health consequences of careless disposal of waste, yet they cannot afford to view waste management as a priority. Communities of low socioeconomic status are the ones that use contaminated rivers for bathing and drinking water. Without complete access to sanitation, they are forced to rely on rivers for their basic needs, further worsening the waste management crisis. Upper-class households may not even see where their waste goes since they pay for government services or their servants to take the waste out of their household waste bins. Most likely already paying a monthly fee for government services to transport waste to Bantargebang, the rich have no incentive to do differently if they are not aware of the role their personal waste plays in this waste emergency. Socioeconomic disparities that hinder effective waste management practices need to be highlighted in waste management strategies moving forward,

Citizens have a role in generating waste and can influence the effectiveness of policy through actions and awareness. The power of grassroots action by civilians can also have a tangible impact that can then be scaled up and applied to larger communities and even cities. Low community involvement is one of the contributing factors to the continuing inefficiencies of

Jakarta's current waste management system, along with weak strategies. 100% of Jakarta's citizens contribute to the compilation of waste at Bantargebang. While education is crucial, policy implementation is hindered by government corruption, leading to a reliance on community initiatives like waste banks. Bridging the gap between communities and the government requires building trust and facilitating communication, possibly through educating community leaders with government support. Ultimately, waste management should transition from inconvenience to a source of community pride, with government funding and collaboration with the private sector. A cultural shift towards reducing waste production necessitates governmental intervention, such as restrictions on plastic usage by private companies. Collaboration between the government and private waste management sectors, coupled with employment initiatives and cultural change, could pave the way for a more sustainable waste management system in Indonesia. To truly mitigate disaster in the long run, developing and implementing waste management processes that are environmentally effective, economically affordable, and socially acceptable is crucial, as well as fostering a culture of environmental consciousness through institutional, government, and community education and engagement. Perhaps the diverse systems of management of waste banks are the key to successful incentivization of action.

## Conclusion

The private sector's demand for waste as a resource has fostered a culture of waste management that prioritizes profit over sustainability. While waste banks and other community-based initiatives have shown promise, Jakarta's waste management system is limited by a lack of regulation, awareness, and participation. The government could assert its commitment to the people by supporting the development of waste collection services that employ individuals to collect and manage waste just like any other employee in the service world would.

Insufficient government funding makes intersectoral collaboration critical for the success of waste management operations. DLH was initially an organization independent from the government, but because there were many funding gaps on DLH's end and gaps in management efficiency on the government's end, the government took on DLH to expand support from stakeholders. Just as DLH was before, many private sector entities, institutions, foundations, NGOs, communities, and

individuals work towards the same goal of effective and sustainable waste management on their own. These groups are sought out by the DLH through Large-Scale Social Collaboration, KSBB. From then on, the KSBB program expanded to other sectors of DLH such as air control, water control, and climate change control.

Popular sources of funding for waste management projects are Public-Private Partnerships (PPPs), Corporate Social Responsibility funds (CSR), and Extended Producer Responsibility investments (EPR). PPPs exist to assist either a private or public organization in investments. For example, if the APBD is insufficient for a government project, the government will invite a private sector group into the scheme and this is where PPP stems from. For PPPs to start, there needs to be some kind of product that the public needs for the government to care enough to invest in it. This gives a bit of background on how RDF plants have been able to gain a lot of attention in Jakarta because of the present cement industry.

CSR is a commitment that companies make to improve the quality of their governance and social and environmental impacts on society in the greater scheme of their businesses. Companies in Jakarta are required by law to implement CSR into their business strategies in compliance with ISO 26000, which are international standard of CSR strategies. An example of how CSR helps support waste management efforts is InSWA's developing startup. With investment from Wira Gulfinda Sarana (WGS) through their CSR, InSWA is building a research center for waste management in Plumpang, home to a significant portion of Jakarta's uncollected waste. CSR has evolved since the 90s to center around the mutual interest of all stakeholders. Through CSR, companies not only improve their performance by evaluating their impact on their employees and stakeholders but they are also able to reevaluate how they impact society and the environment through their operations. Article 15 in Law No. 18 of 2008 states: that producers are obliged to manage packaging and/or goods they produce that cannot or are difficult to decompose by natural processes. This article aligns with the concept of Extended Producer Responsibility (EPR), which is an absolute non-negotiable for a business to achieve "Green" or "Sustainable Business" status. An example of this is if a food production company sources their packaging material from a village in Jakarta where a group of women make bags from the waste of food products. Not only does this promote zero-plastic waste, but it also contributes to the economy of the village that develops these sustainable crafts. Still, with the existence of this law, few binding programs facilitate EPR, and this needs to be further regulated by the government.



The current waste management landscape in Jakarta is a complex issue that requires a multifaceted approach to address the crisis at its roots. While innovative solutions and technologies are being explored, it is imperative to recognize that these reactive strategies may worsen the risks of unmanaged waste if they are not implemented in conjunction with proactive measures. This requires prioritizing and strengthening waste collection and addressing socioeconomic disparities that lead to a lack of public awareness and action. This field study highlights the need for a complete shift in the existing waste management paradigm, one that tunes into community engagement and the systemic inefficiencies in infrastructure and intersectoral collaboration. By redirecting attention towards proactive strategies at every stage of waste management, those working towards a more sustainable Jakarta may be able to imagine a brighter, cleaner, just future.

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