BALLARD BRIEF

January 2023

Effects of Plastic and Waste Pollution on Ocean Communities in the Asian Pacific Region

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Summary

Plastic and waste pollution is a global problem, but it affects ocean communities in the Asia Pacific Region (APR) the most due to their lack of resources to process the pollution. Additionally, low-income areas in these countries need access to sustainable non-plastic packaging options, which increases the amount of plastic generated. Direct pollution leads to poor ocean health and the disruption of important industries like tourism or fishing. Plastic pollutants eventually break down, which creates microplastics and releases toxic chemicals. These pollutants damage ecosystems and severely harm marine life. The overwhelming amount of waste pollution in the APR also damages communities and creates public health problems. Some organizations are working to increase the amount of available infrastructure in addition to cleaning up the existing waste pollution, but more must be done with urgency to sufficiently solve this problem.

Key Terms

Anthropogenic—Created, produced, or influenced by humans.[1]

Bantar Gebang—One of the largest landfills in the world, located near Jakarta, Indonesia.

Derelict Fishing Gear—Any lost or abandoned fishing gear in marine settings, including nets, lines, and traps.[2]

Endocrine Disrupting Chemicals (EDCs)—Pollutants or chemicals that disrupt hormone activity. A few common EDCs are BPA, dioxins, and perchlorates.[3]

Fast Moving Consumer Goods—Products that are sold and used quickly at low costs.[4]

Ghost Nets—Fishing nets that have been abandoned or discarded.[5]

Greenhouse Effect—Occurs when the sun's warmth gets trapped in the atmosphere when there is a higher presence of greenhouse gasses, which warms the planet.[6]

Microplastics—Small pieces of plastic that have been degraded from large plastic products.[7]

PET Plastic—The most common type of plastic used to make cups, bottles, containers, and more.[8] PET plastic (its chemical name is Polyethylene Terephthalate) is also easily recyclable.[9, 10]

Rafting Biota—Animal or plant life that attaches and grows on something outside its normal habitat. Rafting biota could be on driftwood, macroalgae, or plastics.[11]

Sachet—Small, often plastic, containers for food in individual daily portions.[12]

Single-use plastic—Plastic products that are usually only used once for a very short period of time, often for food products.[13]

Sustainable products—Products that offer positive environmental, social, and economic impacts both in production and consequences.[14]

Context

Q: What is plastic and waste pollution?

A: Waste pollution occurs when any kind of waste produced by humans is not dealt with or stored in an efficient and sustainable way, like recycling centers or landfills that correctly process the waste.[15] Waste pollution includes plastics, paper, metal, and food waste.[16] Population growth and increasing production have increased the number of waste humans produce, which requires more storage or processing of waste after it is used.[17] For example, an average person in Thailand produces about 1.6 kg (3.5 lbs) of mixed solid waste every day.[18]

Plastic pollution (one specific distinction of waste) occurs when products containing plastic do not end up in a landfill and end up polluting other areas. A common place for plastic pollution to end up is the ocean. In 2010 alone, 8 million metric tonnes of plastic directly entered the ocean.[19] In 2019, India contributed about 20% of the total amount of plastic waste, the Philippines contributed about 6%, and Indonesia contributed about 1%.[20]

Q: Who is affected most by plastic pollution?

A: Plastic pollution affects humans, animals, and the environment in detrimental ways. Plastic use increases anthropogenic inputs, like artificial chemicals created by humans, that affect natural environmental cycles by disrupting nutrient cycling and wildlife ecosystems. Ocean communities are especially impacted by plastic and waste pollution because they rely on ocean health, which is determined by measuring indicators like temperature, CO2 concentration, and fish availability.[21] Research shows that at least 555 species of marine life are affected by plastic waste, though the number is estimated to be much higher.[22] Coastal communities rely on the ocean for physical and environmental health because it affects weather patterns, pollution absorption, and nutrient cycling.[23] Nutrient cycling describes how essential nutrients like carbon and nitrogen move through the environment.[24] Additionally, these communities further rely on the health of the ocean because the ocean supplies large amounts of fish, generates tourism revenue, and regulates weather and climate patterns.[25, 26] Research has shown that increasing amounts of pollution have had a negative impact on fish populations available for food by disrupting fish growth and food webs.[27] Oceans are

among the most important economic resources because they are necessary for fishing and tourism.[28] In 2021, tourism generated $41 billion in the Philippines, $29.6 billion in Thailand, and $28.9 billion in Indonesia, much of which comes from tourism for beaches, mangroves, and islands.[29] Plastic pollution affects both the tourists that visit these countries and those who rely on income from providing tourism and fishing in these waters.

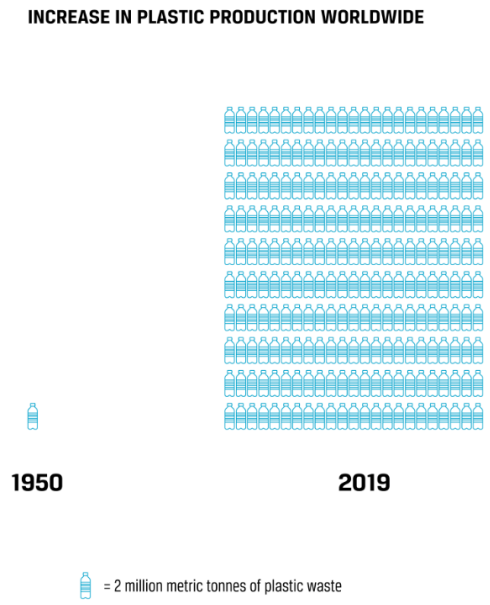
Q: Where is plastic and waste pollution most prevalent?

A: The plastic pollution crisis impacts many communities, but it is most prevalent in coastal communities, which are communities near or surrounded by the ocean. Countries in the APR, or Asia Pacific Region (this region includes up to 40 countries, but this brief will focus on Indonesia, Philippines, Malaysia, India, and Thailand due to high data availability and more pressing pollution concerns), are extremely affected by oceanic waste pollution because most of their land area is directly surrounded by the ocean.[30] For example, Indonesia is made up of more than 17,500 islands, of which about 10,500 are inhabited, and the Philippines is made up of approximately 7,100 islands, of which about 2,000 are inhabited.[31, 32]

Communities with lower socioeconomic conditions are more likely to contribute to and be affected by waste and plastic pollution. Research shows the Philippines recently produced about 5 million metric tonnes of plastic annually, of which 1.1 million metric tonnes entered the environment.[33] In contrast to the Philippines, Australia, which is a nearby country with more robust waste management facilities, produced about 2 million metric tonnes of plastic each year, but only 11,000 metric tonnes entered the environment.[34]

Q: When did plastic production and waste pollution become a problem for countries in the Asia Pacific region?

A: The increase in the amount of plastic produced has caused the amount of plastic polluting the ocean to increase at a rapid rate. The world produced about 2 million metric tonnes of plastic in 1950 but 460 million metric tonnes of plastic in 2019.[35] Plastic pollution in the ocean has increased over time because it takes up to 1,000 years to break down, but plastic has been a common resource for less than 150 years, giving it no time to break down and degrade.[36] Thus, plastic has added up and accumulated over time. Scientists estimate that about 5 million metric tonnes of plastic entered the ocean in 2010 while 8 million metric tonnes entered oceans in 2020.[37, 38] Plastic pollution is expected to double by 2040, and by 2050, it's expected to increase by 2.5 times.[39] Specifically, in the APR, in 2017, the Philippines contributed 1.1 million metric tonnes of waste pollution, and Indonesia contributed more than 1.2 million metric tonnes.[40, 41] Plastic pollution has also been much higher in other APR countries, as Thailand produced 28.7 million metric tonnes of waste in 2019.[42]



The Great Pacific Garbage Patch, located in the Pacific Ocean, is a floating patch with, as of a 2018 estimate, 1.8 trillion pieces of garbage and plastic that have accumulated and coupled together over time.[43] Scientists were aware of plastic accumulation as early as the 1980s, but the Great Pacific

Garbage Patch was not actually discovered until 1997. Studies have found that the Great Pacific Garbage Patch grew more than 200% in size from 1970 to 2015.[44, 45] This increase in plastic had an effect on marine life as well. Research shows that global numbers of marine species affected by plastic pollution almost doubled from 1997 to 2015.[46]

Contributing Factors

Poor Waste Management and Infrastructure

A lack of waste management and infrastructure increases plastic and waste pollution because it prevents plastic and other kinds of waste from being recycled or disposed of correctly. Countries in the Asian Pacific Region generally produce more mismanaged waste (waste that doesn't end up in proper processing facilities like landfills or recycling centers) than other regions.[47] In 2019, the Philippines produced over 4 million metric tonnes of mismanaged waste, and India produced almost 13 million metric tonnes of the same waste.[48] In comparison, Australia contributed only 5,266 metric tonnes in 2019.[49] Mismanaged waste causes litter and trash to build up in communities and eventually travel along rivers to water pathways that lead to the ocean.[50] Communities in lower socioeconomic areas suffer more than developed countries because there is less infrastructure to properly dispose of the waste.[51, 52] For example, in the Philippines, local governments are responsible for handling and processing waste, but there is not enough funding to do so properly. The Philippines National Department of Environment and Natural Resources had to shut down 335 dumpsites in 2022, leaving the responsibility to local governments or communities to create new dumpsites or landfills.[53] In Indonesia, many communities don't have access to waste infrastructure, like functioning recycling centers or proper trash waste collection.[54]

Without the proper tools, trash and recyclable materials accumulate and pollute the land and the water.[55] Even when incinerators or waste centers exist, they are not usually capable of handling all of the necessary materials.[56] Bantar Gebang, which was built in the 1980s, is the main landfill for Jakarta (an Indonesian province and the country's capital), but it lacks the proper infrastructure to handle the amount of waste the surrounding cities produce.[57, 58] Around 7,000 metric tonnes of waste enter Bantar Gebang daily, but the incinerator can only handle 100 metric tonnes every day.[59] For context, Jakarta produced an annual total of 7,000 metric tonnes of waste in 1985.[60, 61]This disparity creates a constantly increasing problem with storage and waste management so that the trash ultimately pollutes the surrounding communities and environment.[62] In some cases, the landfills are so overflowed that it takes over the surrounding area and forces individuals and families to live within the landfill, among the trash.[63] Another issue is the lack of waste collection systems.[64] Waste collection programs rarely reach entire cities, and they frequently leave 20–50% of waste uncollected.[65] Waste collection capital, such as garbage trucks, is depreciated and unusable up to 50% of the time.[66]

Along with a lack of incinerator capacity, there is also a lack of recycling capability that increases plastic pollution. Only 10% of plastic in Indonesia is recycled, meaning approximately 6.2 million metric tonnes of plastic (out of 62 million metric tonnes of plastic) is collected or stored properly.[67] Australia is in a similar geographic position and has similar ecological features to Indonesia or the Philippines, but its waste management system is much more developed and reliable.[68] Australia opened a large recycling facility capable of recycling 1 billion PET bottles per year.[69] Comparatively, Indonesia started construction on a similar recycling facility, but it is capable of recycling only 25,000 PET bottles per year.[70] This difference in infrastructure capacity has clear

effects. There is a smaller amount of plastic polluting the beaches, coral reefs, and living spaces in Australia.[71] This comparison demonstrates the immense impact proper waste management can have and the disadvantage many APR countries in low-socioeconomic areas face.

The fishing industry also contributes to the mismanagement of plastic pollution. Fishing gear, which includes nets, fishing line, and hooks, make up 73–90% of marine debris in gulfs near the APR.[72, 73] One study shows that 48,000 metric tonnes of fishing gear entered the ocean in 2018.[74, 75] Derelict fishing gear, in particular, damages corals because it latches on to the fragile coral arms and damages polyps (small organisms that makeup corals).[76] Abandoned fishing gear also harms plants and marine wildlife when it gets wrapped around them, and it pollutes the whole ocean community with microplastics.[77] Fishing gear pollution is common because nets and other gear are frequently lost, abandoned, or damaged by fishing boats.[78] Regulation on net disposal and abandonment is not well enforced, so many boats face no repercussions after abandoning gear.[79] Reasons for abandoning gear include net damage, weather, illegal fishing, and small availability of collection facilities.[80] The presence of plastic can damage equipment and force fishermen to move locations, even if it means going to an area with a "lower fish yield."[81] A study off the coast of Indonesia found that 50% of fishing expeditions found plastic debris in their nets.[82] Because fishing gear is not properly disposed of, poor waste management in the fishing industry contributes to waste and plastic pollution.

The Global Waste Trade

Waste and plastic amounts are especially high in the Asia Pacific Region because of the Global Waste Trade. The Global Waste Trade (GWT) is a multi-billion-dollar global industry that exports and imports various waste and plastics between countries so they can be processed.[83] This trading system is only for recyclable materials, mostly plastics, but there have still been problems with sorting and transportation.[84] Any plastics that are contaminated cannot be recycled or processed efficiently, so they frequently end up in landfills.[85] Some countries even mislabel their waste on purpose in order to transport it, and the importing country is forced to process the non-recyclable waste and store it in its own landfills.[86] This trading system began in the 1990s but became a large industry in 2003.[87, 88]

Trading waste in developing countries is cheaper because of less complex industry standards and practices, and developing countries benefit from the extra revenue they gain from accepting the waste.[89] However, many countries have stopped accepting waste imports because of the burden millions of metric tonnes of extra waste impose on processing.[90] China was the biggest waste importer for many years, but after its decision to accept a much lower amount of waste in 2018 because of the overwhelming amounts of imports, the Philippines, Vietnam, Malaysia, and Indonesia had huge import increases.[91] This may be linked to the research findings that the Philippines, Vietnam, Thailand, and Malaysia are among the countries that produce the most waste in the ocean.[92]

The GWT processes a huge amount of plastic globally; 5 million metric tonnes of plastic were traded in 2020 alone.[93] Data and trade mapping show that "the flow of trade is predominantly from developed countries in Europe and North America to Asia and Africa."[94] The highest plastic waste exporters in 2017 were Japan, the United States, the Netherlands, Germany, Australia, Belgium, and the United Kingdom, which are all developed countries.[95] In May 2021, the US exported more than 2.5 million kg of plastic waste, which is about 250,000 metric tonnes.[96] This waste was exported to developing countries in the APR, primarily Indonesia, India, Malaysia, and Thailand. Indonesia received over 300,000 metric tonnes of waste in 2018.[97] In January 2022 alone, Indonesia received over 20 million kgs of plastic waste, which is about 20,000 metric tonnes.[98] In October of 2021, India received more than 5 million kg of plastic waste, most of which came from the US.[99] Malaysia received 800,000 metric tonnes of waste in 2018.[100] The Philippines received just over 16,000 metric tonnes in 2019.[101] In October 2021, Thailand received almost 6 million kgs of plastic waste, which is about 6,000 metric tonnes.[102] All of these statistics illustrate the large amount of waste that is transported to APR countries and the additional waste they must process.

Small Selection of Sustainable Products for Coastal Communities

The small selection of sustainable products exacerbates plastic pollution because more plastic must be created for single-use packaging compared to sustainable options that don't use plastic. Higher rates of plastic production lead to more plastic waste. The biggest waste pollution problems often occur in coastal communities that are already at a disadvantage because of severe socioeconomic limitations. Offering renewable or recyclable options uses more expensive materials, some of which cost companies 25% more in production than plastic materials, which results in up to 75%

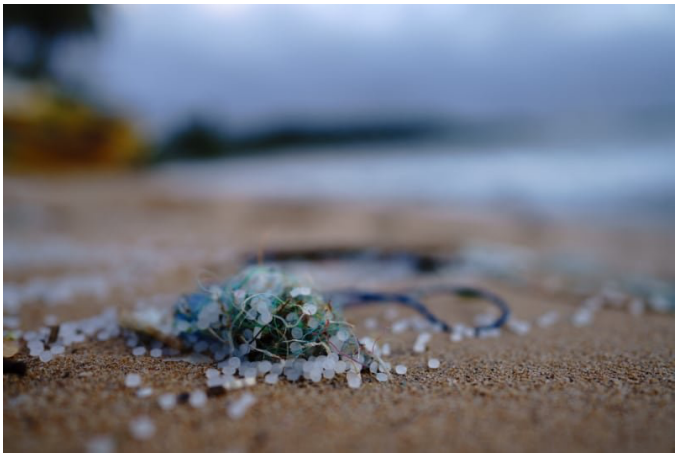
higher costs for consumers.[103, 104, 105] This cost increase may be impossible for communities in poverty to absorb. In addition to higher costs, research shows that sustainable products account for only 1–3% of the entire market, so even individuals that can pay higher prices have very few choices.[106] This perpetuates the problem because people in impoverished communities rely on the cheapest packaging options, which are plastic-based.[107] Almost 97% of packaging is plastic, and consequently, these areas have large amounts of plastic waste.[108] More than half of plastic pollution produced in the Philippines is from packaging that is difficult to recycle and, therefore, ends up in landfills or the environment.[109] Fast Moving Consumer Goods (FMCGs), which most often contain single-use plastics, are very common in these areas.[110] An example of these FMCGs are sachets, which are single-use packets commonly used to package food in small portions. Sachets are difficult to recycle in advanced recycling systems because they have layers of plastic and aluminum, which are difficult to separate during the recycling process.[111] One study found that 855 million sachets end up in landfills every year, many of which can end up in the ocean.[112] The industry for FMCGs in Indonesia is worth more than 60 million USD.[113] The cheap cost and easy production of these goods make them appealing to manufacturers, and the low price makes them appealing to customers; therefore, producers are more inclined to use plastic despite the environmental costs.

Consequences

Microplastics

An easily identifiable consequence of plastic pollution from coastal communities is the presence of plastic in oceans in the form of microplastics. Microplastics are small particles that form when powerful ocean waves and currents break down large plastics into particles generally between 500 micrometers and 5 millimeters in length or diameter. The size of microplastics

means some are too small to see with the naked eye, and some are the size of a standard pencil eraser.[114, 115] Mismanaged waste from ocean communities in APR countries is a large contributor to ocean plastic, which creates a large number of microplastics.[116] Additionally, microplastics are frequently found on beaches because waves push existing microplastics onto the shore, and waves can break down larger plastic pieces into smaller particles on the shore.[117]



Research in Thailand found up to 200,000 pieces of microplastics per kilogram of sand.[118] Similar research found that 143 kg (4,743 pieces of microplastic) of microplastics were found in a 1 km (over half a mile) stretch of beach in India.[119] The small size of microplastics makes it easy for marine life, like fish and birds, to eat large amounts of microplastics. Scientists and locals in the APR have cut open fish and birds to find their stomachs completely full of microplastics, and 96% of the plastics they found were recyclable.[120] A study conducted in the eastern Pacific Ocean found microplastics in every water sample and every marine organism sampled over a 460,000 square kilometer area.[121] Microplastics have been found in fish available to purchase for food, and when humans eat these fish, they also eat microplastics. Studies done in 2021 estimate that the average human eats up to 53,864 particles of microplastics each year (about 15 kg).[122] The concentration of microplastics found in fish sold as food is highest for mollusks grown in Asian countries.[123] Much of this waste comes from APR countries because they are surrounded by the Pacific Ocean, but waste can travel from other surrounding countries like the US, South America, and Africa.[124] The presence of these microplastics negatively affects the health of marine organisms, tourism,

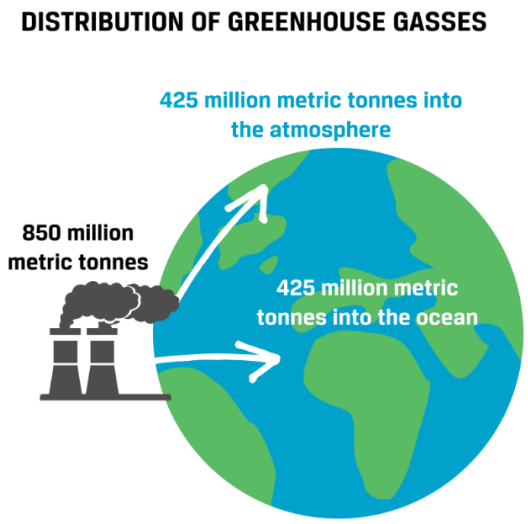
and clean water sources because of the effects of chemicals in plastics.[125]

Disruption of Pacific Ecosystem Cycles

Plastic pollution in APR ocean communities negatively affects ecosystem cycles in the Pacific Ocean because plastic contains harmful chemicals that are released into the ocean, and ocean health affects human lives. When sunlight reaches plastic, it essentially cooks the plastic, which releases greenhouse gasses like methane and carbon dioxide into both the ocean and the atmosphere.[126] This process contributes to the greenhouse effect and continues the warming cycle in the oceans, which causes increasing acidity and temperatures.[127] Marine life is very sensitive to environmental changes like pH or temperature, so these changes can cause mass mortality in fish and other organisms.[128] Global production of plastics contributes more than 1.8 billion metric tonnes of greenhouse gasses, and the breakdown of plastic releases about 18 million metric tonnes of greenhouse gasses to the ocean and atmosphere.[129] Research shows that BPA is diffusing into the ocean at a rate of 1.84–4.83 nanograms/centimeter^2/hour, and these levels are detrimental to the environment.[130]

Oceans are one of the largest carbon sinks, which means it absorbs CO2 from the atmosphere through organisms like phytoplankton. Plastic production in 2019 produced 850 million metric tonnes of greenhouse gasses like CO2, but oceans can only absorb up to 50% of these gasses without negative effects on marine life.[131, 132] Ocean plastic also prevents this necessary phytoplankton activity because microplastics impact their ability to absorb CO2.[133] Higher temperatures caused by climate change also increase chemical output into

oceans from biodegrading ocean plastic like methane.[134]



Waste and plastic pollution also have a large effect on the health and function of marine life. Seventeen percent of marine species found with ingested plastic are listed on the endangered species list, which indicates that plastic pollution could be associated with endangered animals.[135] Seventy-nine percent of species with direct contact with plastic pollution experience serious injuries, which can include deep cuts, stomach blockage, or death.[136] Studies conclude that toxic chemicals disrupt endocrine hormone activity in marine organisms, which negatively impacts various bodily functions like the reproductive system function and metabolism.[137, 138] These disruptions in hormone function also affect growth, so fewer fish are able to grow and develop correctly.[139] There are even instances where nanoparticles, which are particles under 100 nanometers in size, that come from microplastics can cross certain biological membranes and disrupt cell activity from inside the cell, which can kill the cell or otherwise harm it and prevent proper function.[140, 141] Studies have also found that plastic particles can transport rafting biota or bacteria across oceans because they provide a surface on which microorganisms can grow.[142] Some of these biotas become invasive species in different regions, which can be extremely destructive for ocean ecosystem function.[143] One example of this is Bugula neritina which is an invasive animal in the Pacific Ocean that was found attached to plastic pieces floating in the ocean.[144] Microorganisms are small, but they can have a huge effect on how an ecosystem functions. Introducing invasive species to these delicate ecosystems is

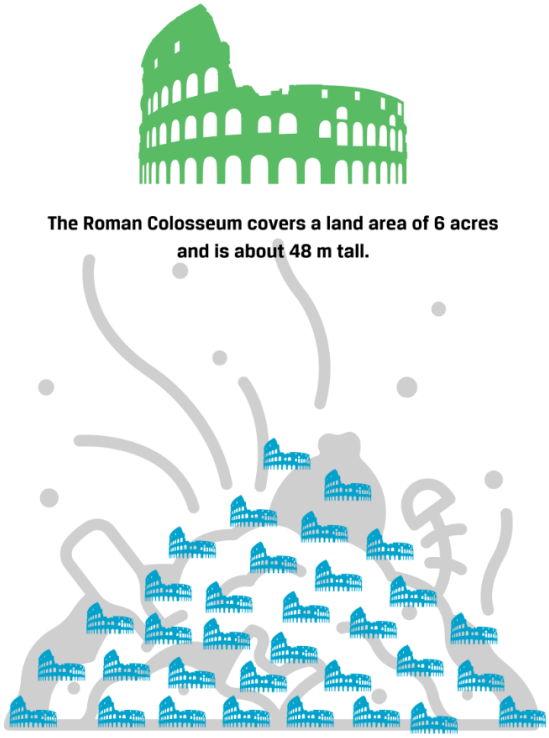
dangerous, and the nature of plastic ocean travel makes this hard to mitigate.[145] Plastic pollution also impacts food cycling because plastic affects plankton and phytoplankton. These organisms are extremely important in marine ecosystem food chains because they photosynthesize and provide food for many ocean creatures.[146]

Public Health

Waste pollution negatively affects the economy and health of the surrounding communities because more residents get sick and have less access to safe, sanitary employment when pollution levels are high. Many pollutants are found in landfills, which can expose residents to toxic chemicals like heavy metals that leach into groundwater and soils.[147] Toxic chemicals, such as Bisphenol A (BPA), leach out of broken-down plastics, which can then settle in oceans, soils, and groundwater, directly affecting the water quality and agriculture of communities surrounding landfills.[148] BPA can cause health problems like hormone disruption, developmental disorders, and cancer.[149] The quality of life and living conditions are unsanitary and dangerous within this area.[150] Landfills are "breeding grounds for disease."[151] Groundwater near landfills is usually contaminated and dangerous for drinking.[152] Waste attracts pests like mosquitoes and roaches, which expose residents to various diseases.[153] A woman in poverty who gives birth within the landfill faces healthcare limitations for herself and her baby, as they will rarely have access to professional medical care, social services, official birth certificates, and other necessary documents.[154, 155] Studies have shown that living near landfills is associated with increased health problems like severe and chronic headaches or respiratory problems, pregnancy failure or birth defects, and serious liver problems.[156] Waste pollution has also led to an increase in COVID-19 and other highly transmissible illness infections in the APR because untreated medical waste can infect those living in a landfill.[157] There is no separation of waste types or

sources in many landfills in Indonesia, so medical waste is mixed in with all other waste.[158] This is dangerous because scavengers that search through landfills to find recyclable materials and resources come into contact with infected materials used in hospitals to treat patients.[159] The lack of organization and separation causes disease, especially highly contagious diseases such as COVID-19, to spread quickly.

Waste pollution and landfills can also engulf a community and its citizens. An example of this is Bantar Gebang, a landfill overtaking villages in the West Java province of Indonesia. It began operations in 1989 and used to be surrounded by rice fields, but waste has overtaken the surrounding land.[160] Bantar Gebang covers 200 acres of land and reaches heights of 40 meters; locals, geographers, and concerned citizens have taken to calling it "trash mountain."[161] More than 3,000 families and scavengers have to live in the landfill because it has taken over so much land area.[162]



The Roman Colosseum covers a land area of 6 acres and is about 48 m tall.

The waste in Bantar Gebang would fill about 33 Colosseums.

Practices

Material Recovery Facilities

Material Recovery Facilities (MRFs) are recycling systems that process materials that can be reused or recycled, but many are out of commission or ineffective.[163] Implementing the construction and management of these facilities will create a more official and reliable

recycling system with governmental support.[164] A few companies provide tool kits, which are a comprehensive guide for those in the beginning stages of building and starting an MRF, and consulting services to restore existing MRFs, build new sites, and create a sustainable recycling system that will generate revenue for the surrounding communities.[165] Asian Development Bank is one such organization that provides tool kits for community instruction to restore function to the MRFs.

Impact

MRFs from these organizations can process 2–15 metric tonnes of mixed waste (including paper, plastic, and metals) daily, depending on whether the system is manual or semi-automated.[166] There are small MRFs that are perfectly suitable for smaller communities or communities that use small amounts of plastic, but there are also large MRFs that can assist large recycling systems. Functional MRFs can help reduce waste through proper sorting. An MRF can process around 15 metric tonnes of waste per day, exact numbers depending on the size of the facility.[167] A similar kind of MRF in Australia doubled a community's ability to process recycling, processing about 60,000 metric tonnes of material annually, which is about 164 metric tonnes per day.[168, 169]

Gaps

Although they have positive indicators of processing waste, Material Recovery Facilities have significant barriers. Small, manual MRFs cost between 500,000–1.5 million Philippine pesos (between $5,000–25,000), and larger, more automated MRFs can cost up to 25 million Philippine pesos (about $43,000).[170] There are very few findings on how much extra waste MRFs can process. There are also

limitations on what can be sorted or recycled through MRFs. MRFs can usually sort items like aluminum, glass, and plastic, but communities can only resell specific products, like plastics with PET.[171] Another issue is finding communities that will participate in the MRF function. Community engagement is essential for effective impact because community members have to assist in waste collection and MRF functioning.[172] The Philippines aims to have a minimum of 1,700 functioning MRFs, but there are currently only 964 built MRFs.[173]

Decrease in Plastic Usage

The most effective way to reduce plastic pollution is to reduce plastic production and usage and replace them with more sustainable and reusable products. Cleaning up existing ocean waste through the collection and removal of plastic that already pollutes the ocean is important, but it will not have a sufficient impact if 14 million metric tonnes of plastic still go into the ocean every year.[174] Plastic removed from the ocean will quickly be replaced by new plastic unless new plastic is not produced or used. A study found that even if all government systems used the most advanced technologies for recycling or "better" plastic production, it would not make a big enough impact to stop the negative consequences of plastic pollution.[175] Their findings prove that using reusable materials or sustainable plastic substitutes will be essential in solving the plastic pollution crisis.

Impact

Research shows that changing from plastic to more sustainable solutions will have a huge impact on the amount of plastic pollution in the ocean. Pew Foundation found that a "system change would reduce annual rates of aquatic and terrestrial plastic pollution by nearly 80% compared with the current trajectory by 2040."[176] Preventing plastic pollution by stopping production would help slow down the rates of pollution, which would provide relief to the current system and offer time to clean up and process the existing waste. Switching

only 10% of plastic and single-use packaging could keep 7 million metric tonnes of plastic out of the environment.[177]

Gaps

There is little research on how impactful using less plastic currently is on the environment. Although prevention is essential in preventing more pollution, cleaning up the existing waste is still important. The plastic currently in the ocean and water pathways will continue to break down into smaller microplastics, which will ultimately end up in marine organisms and human diets. The existing trash suffocating impoverished communities still need to be cleaned up to improve their lives and living conditions. Therefore, only preventing plastic pollution does not help solve the current issue of plastic waste pollution in the ocean.

Another gap in this practice is that introducing sustainable substitutes to poorer communities is challenging because of the high cost of these products. Most of these major sustainability projects have been started in areas higher on the socioeconomic scale, such as Australia. The initial cost of sustainable materials is higher than plastic because it includes researching and creating new products and using inputs with more sustainable lifespans.[178] One study has found that sustainable products can be up to 75–85% more expensive than plastic products.[179] This cost may prevent necessary changes among the poorer APR communities.

Endnotes

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