

Down in the dumps: The poor world and the rich world face different problems with their waste

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Systems in both are improving but all are under strain

EVERY MORNING, JUST before 8am, a digger stretches out its steel limb from the bank of the Ciliwung river in central Jakarta. It claws load upon load of stinking rubbish from a barrier stretched across the stream and deposits it into the back of an orange lorry. A city employee stands by, one of 5,000 people working in *pasukan oranye* (orange teams), which dredge hundreds of tonnes of waste every day from the filthy waterways of the Indonesian capital. A rag-picker, treading precariously, sniffs for plastic bottles and other recyclables. Once full, the lorry departs for Bekasi landfill. There, amid more stench, dozens of waste-pickers mill around beside the swinging arms of the machines that unload the dripping rubbish. Their bounty is divided meticulously and sold on to scrap dealers or reprocessing facilities. The remaining trash is rearranged into landfill.

In many parts of the developing world formal collection is expanding. There are now some 6,000 community waste banks in Indonesia, where residents deposit recyclables in exchange for cash. Once rubbish makes it to the waste-management site, the systems can be relatively efficient. The problem is getting a nation's refuse to such sites in the first place, when door-to-door collection is still rare, and households and businesses seldom sort their garbage.

More than 14,000km from Jakarta, in San Jose, California, trash is arriving at the Newby Island waste-management plant. As in most developed nations, getting it there is not the problem. Domestic and commercial waste is collected from homes and offices efficiently. The difficulties start when the rubbish arrives. With labour costs high, there are no rag-pickers to sift through everything and work out what is worth recycling. The problem here is in the sorting. Aluminium cans are easy to deal with because they are all the same. But different types of plastics cannot be recycled together and machines do not have the sophistication to tell one type from another. So a lot goes to landfill or incineration, mixed with the remaining worthless waste. And now, suddenly, China has stopped accepting imports of low-grade plastic and paper, so Newby Island no longer has a place to send the mixed garbage that it lacks the hands to separate.

Both processes—in the developed and the developing world—are part of a global system that has improved substantially in recent decades as patterns of consumption, and therefore waste disposal, have changed. But both are under strain, as the volume of rubbish has increased with economic growth and as the global garbage industry has changed.

The improvements at Bekasi are part of a broader trend of developing-world governments finally grasping that proper rubbish collection is more than just keeping your streets smelling nice. It is a vital part of public health. Stinting on rubbish means paying more for hospitals. Numerous studies have shown that life in areas with patchy collection increases the risk of diseases as well as neurological conditions. In 2016 consultants at McKinsey calculated that burning, dumping or discharging a tonne of rubbish into waterways cost south Asian economies \$375 through

pollution and disease, against \$50-100 required for basic systems to dispose of that same tonne properly.

In the poorest countries, especially in Africa, rubbish is still just dumped anywhere, and management is limited. But there is also comparatively little of it. A typical citizen of Lesotho produces 110 grams a day, one-fortieth as much as a typical citizen of Iceland (the country with the highest rubbish-generation rate per person). It is the economies that are booming that present the challenge. Many are now pouring money into dealing with trash. Narendra Modi's government has earmarked \$9.5bn for solid-waste management in its \$30bn Swachh Bharat (Clean India) Mission. Indonesia is ploughing \$1bn into its plastic-clean-up campaign. Authorities in Morocco believe that \$300m they have invested in new sanitary landfills has already averted \$440m in environmental damage. Many projects enjoy backing from the World Bank and other multilateral lenders. Others are promoted by grassroots organisations and entrepreneurs.

They are bearing fruit. Collection rates in low-income countries have nearly doubled to 39% between 2012 and 2016, even as the volume of waste rose by a third. In middle-income countries like China, they rose on average to 51%. Rates for industrial waste are also improving (in places that have industry), though they already tend to be high because factories produce large, predictable volumes of more homogeneous refuse that is often valuable (like metal scrap).

As collection has improved, so has the next stage. China has emulated its rich Asian neighbours and embraced incineration. The Chinese authorities scrapped plans for some plants in the face of protests by local residents worried about air pollution. But they see incinerators as essential to tackling what the World Bank predicts could be a 50% rise in China's solid waste by 2050. They are trying to convince residents that incinerators are clean and safe (as modern ones are, in places like Taiwan) by, for instance, promoting school trips to facilities. The number of incinerators in China has shot up from 57 in 2010 to more than 400. They now consume one-fifth of the 220m tonnes of municipal refuse that the Chinese disgorge each year.

Poorer countries (including Indonesia) continue to rely on landfills, but these have also been getting more sanitary. Bekasi, which receives 7,000 tonnes of rubbish a day, now covers trash heaps with black plastic that captures the methane gas and other pollutants. In 2008-2014 Morocco increased the proportion of rubbish deposited in sanitary landfills rather than open dumps from 10% to 53%. This is expected to rise to 80% once five additional facilities are completed.

Many authorities enlist the private sector, while monitoring how it performs. Istanbul accelerated a switch to private providers in 2003 after discovering they were a third more efficient than the public sector. In Nepal operators are paid based on how many households get daily collection. Five Moroccan cities, home to a quarter of the kingdom's people, use citizen report cards when deciding to renew contracts with providers. Collection rates in Lahore, Pakistan's commercial capital, shot up from 51% to 88% once the city hired a private company to manage its rubbish. Lorries are monitored with GPS trackers to measure performance and ensure that unscrupulous trash collectors do not dump the stuff illegally rather than drive it to formal disposal sites.

Informal workers, or rag-pickers, remain an important part of the system. UN Habitat, the United Nations agency for human settlements, believes that such people can collect 50-100% of rubbish at no cost to municipalities. The World Bank estimates that they pick 20% of China's municipal waste. "Waste-pickers know physics, chemistry, economics," marvels Gonzalo Muñoz, founder and boss of TriCiclos, a Chilean waste-management company. "They don't know they know—but they do." That is just as well, for ordinary citizens lack this knowledge. In China, for instance, a new requirement for big cities to install colour-coded bins in public areas and buildings has shown mixed results, with few citizens knowing what to throw where.

This explains why the Chinese authorities tolerate informal waste-pickers. Local governments in other countries actively embrace the sector, which is thought to include more than 15m people worldwide. A Brazilian law from 2010 recognised co-operatives of such *catadores* as service providers. This granted them access to benefits such as pensions. Their national union won the rights to clean up football stadiums during the 2014 World Cup in Brazil. Technology is making informal collection more efficient. Mobile apps to match scavengers with rubbish producers are proliferating. Last year a free mobile app called Cataki, which links those throwing stuff away with those collecting it, was launched in São Paulo. Indian raddiwallahs in Bengaluru have used a similar app called "I Got Garbage" since 2014.

Americans talk trash

In rich countries like America, the absence of professional waste-pickers presents a problem. The general public is not very good at sorting rubbish. Households and businesses serviced by municipal waste-management providers may actually have got worse at sorting in the past 20 years, says Peter Keller of Republic Services, America's second-biggest waste-management firm, which runs Newby Island in San Jose.

Citizens of rich countries, where almost 100% of municipal waste gets collected, take such services for granted—unless the collectors go on strike, as happened in the Belgian city of Ghent in early August, leaving streets in a stink for days. In some industrialised nations, increasingly, residents are charged based on volume (known as "pay-as-you-throw"). To encourage sorting, such schemes often exempt recyclables. In Taipei, the binmen will only accept unsorted general waste in official bags, which come in different sizes at different prices. They inspect recyclables to weed out cheats. The recyclables then proceed to materials-recovery facilities (MRFs) for further triage. General waste is whisked to incinerators or (now rarely in Taiwan's case) landfills.

In many parts of Europe and America rubbish collection is generally paid for by municipal taxes and the garbage disappears to huge facilities like Newby Island. The plant's operator, Republic Services, runs 91 MRFs nationwide, next door to landfills (of which it runs 191) or incinerators (of which it owns 114) which burn waste to produce electricity. It receives 156 trucks carrying 1,600 tonnes each day from as far afield as Fresno, 200km to the east. That is down from 2,200 tonnes a day a few years ago. The volume of recyclables has reached 1,400 tonnes a day, a lot by American standards, says Mr Keller.

That should come as no surprise. After all, inhabitants of the San Francisco Bay area pride themselves on their recycling prowess. San Francisco boasts a recycling rate of 80%, one of the

highest of any rich-world city. San Franciscans may therefore be shocked to learn that a lot of them, as Mr Keller puts it, “aren’t very good at it”. “A pair of blue jeans can jam the whole line for an hour,” he groans. More than 100 sorters try to pluck such items from the stream before that happens. Even so, a big plant like Newby experiences on average five such stoppages every day. Such disruptions cost the city of Phoenix in Arizona \$1m a year in stalled equipment and repairs.

Scott Smithline, who oversees recycling at California’s Environmental Protection Agency, cites two possible reasons. The first is that many people do not know what is recyclable. Beer bottles and soft-drink cans are, he says. Egg cartons and glossy magazines are not, for there is no market for the materials of which they are made. Some things are recyclable on their own, but not when combined, such as “paper” cups lined with plastic film. It is hard to blame consumers for feeling increasingly baffled, he admits.

The other problem is that residents only have to separate recyclables from non-recyclables (though compost bins for organic waste have appeared now, too). Cans, bottles and papers are all thrown into one bin. This mix can, to some degree, be sorted at plants like Newby, enabled by clever technology which uses optical sensors and magnets to separate materials automatically. These were no match for humans when it came to sorting, but were good enough for China’s recycling industry, when it took off in the 1990s, to supply the country’s growing ranks of manufacturers hungry for all manner of materials. It snapped up tonnes of imperfectly sorted Western waste, preferring it to the even more impure refuse available at home.

As the volume of recyclables swelled in America and Europe, the quality of recycled output declined because everything was mixed in together. This did not trouble MRF operators so long as they could offload their increasingly impure stock abroad. Then China announced it would not accept any plastics or cardboard, and American waste-management companies have been scrambling to find what to do with their poor-quality waste.

Efforts are springing up to teach residents how better to sort their rubbish. Some American and European cities now pick up different materials on alternate days. Reverse-vending machines, which accept empty drinks bottles and return money to users, are appearing in supermarkets. More cities are adopting pay-as-you-throw schemes. Consumer habits will take longer to change. Developing countries need to concentrate on getting binmen to the kerb of every residence and help stop people throwing trash into rivers. The developed world needs to relearn how to recycle. The Chinese ban has lent all of this a new urgency.