



# Plastics and cities: A story of love and hate

## WASTE



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**B**irds circling above the dumping grounds and street children milling around mark the site of the garbage disposal site in Dandora, eight kilometres

outside of Nairobi city. Thousands of waste pickers scavenge through the 2,000 metric tonnes of garbage arriving daily.

Top finds include high-density plastics, bottles, e-waste and metals. Companies such as Mr Green Africa see these waste pickers as today's invisible heroes, and by trading in recyclable plastics, they have not only created recognised employment for many but also recycled more than 3,000 metric tonnes of plastic.

However, there are too few operations like these because the market for recycled plastics is small. As a result, the plan for Dandora is to turn waste into energy through a new incineration plant capable of producing 40 megawatts of electricity.

Cities, such as Nairobi, will increasingly rely on excellent waste management operations, designed around people's needs and the delivery of a safe and healthy environment. Good waste management is part of making these cities more attractive for inward investment and attracting people to relocate.

However, anyone living with the odours and hazards coming from garbage disposal sites, open-pit burning and waterways clogged with litter and plastic waste knows that poor waste disposal can cancel out all the positive impacts of sparkling new buildings and expanded roads. Nairobi is no different.

However, the combination of improvements in county waste management and the 2017 ban on single-use plastic bags has significantly reduced the presence of plastics in the urban environment. But there are further steps that still need to be taken care of if Nairobi is to be known as a liveable city and centre of innovation in sustainability.

Plastics are big businesses worldwide. By 2022, the market for manufactured plastic products is projected to exceed Sh212 trillion (\$2 trillion), mainly due to the high demand for textiles.

Over the past four decades, global plastics production has more than quadrupled, and of the 9.2 billion metric tonnes produced, 6.3 billion tonnes have become waste. Of this, 12 percent has been incinerated, less than 10 percent recycled and nearly 80 percent either discarded or landfilled, meaning that 90.5 percent of plastics go unrecycled. This low recycling rate is the result of the complexity



## 2,000

Metric tonnes of garbage are delivered to the Dandora dumping site every day.

## 3,000

Metric tonnes of plastic recycled with the help of the waste pickers at Dandora

of resin mixtures and the lack of information about the disposal of different plastics.

On the other hand, the negative impacts of plastics on the environment and society are also significant. The toxic chemicals, which leach out of plastics, are harmful to thousands of informal waste pickers. They also cause significant losses to maritime industries, damage infrastructure, and contaminate water and the air we breathe. In addition, they compromise the city's floods defence infrastructure.

Companies are being forced to make tough decisions about whether recycling is still an economically viable option or not.

On the other hand, the Covid-19 global pandemic has become a stress test for the 4Rs – refuse, reduce, reuse, recycle – the principles for strategies to prevent plastics pollution. This is raising fears that reused or recycled plastic products may not be hygienic. Unfortunately, plastics have become indispensable during the pandemic, and in many places efforts to reduce the use of plastics are being rolled back as front-line workers have demanded greater supplies of personal protective equipment.

Conversely, some African entrepreneurs and scientists have responded in more inno-

A boy ravages through garbage at a dumpsite in Dandora. Waste recycling is big business globally.

—FILE PHOTO

**Thinking ahead to a post-Covid time, Nairobi should focus on becoming a capital city with zero-plastic waste. Not only would urban life be enriched by a cleaner environment, but the use of biobased plastic materials produced locally would open up opportunities across the Kenyan economy.**

vative ways, reflective of a circular economy. Peter Okwolo, for example, a co-founder of Takataka Plastics in Gulu, Uganda, took just one week to design, test and manufacture affordable Covid-19 face shields using recycled plastic waste.

These are now being used in medical centres. There are also emerging machine learning

technologies coming on stream to help sort waste from different feedstocks for recycling.

Consumers often choose plastic products with harmful colourants and plasticisers, which are more expensive to recycle and more hazardous as waste. Removing these additives or replacing them with simpler and more homogenous molecules can make recycling easier.

But potentially, the best solution is to replace fossil-fuel-based plastics with bio-based alternatives.

Not only can bio-based plastics emulate many of the features of plastic, such as being lightweight, transparent and flexible without harmful chemical additives, they can also deliver hygiene, biodegradability and a new sustainable fashion and design culture.

Prof Irene Samy at the Nile University in Egypt has developed a unique alternative to plastic by turning dried shrimp cells into thin films of biodegradable plastic for eco-friendly grocery bags and packaging. By utilising chitosan—a material found in the shells of many crustaceans—her team has been able to produce a clear, thin plastic that is completely degradable. Consider the large quantities of shrimp shell waste produced each year in Kenya.

The Strathmore Business School is now looking at chitosan-based plastic to drastically reduce plastic waste and create new markets for biobased plastics.

Replacing synthetic polymers with a natural form of polylactic acid would reduce greenhouse gas emissions by 800 million tonnes every year. Using biobased plastics in textiles would also dramatically reduce the concentration of microplastics in drinking water supplies and coastal fisheries.

Thinking ahead to a post-Covid time, Nairobi could potentially focus on becoming a capital city with zero-plastic waste. Not only would urban life be enriched by a cleaner environment, but the use of biobased plastic materials produced locally would open up opportunities across the Kenyan economy.

To achieve such an outcome would require several steps to be taken. For example, building awareness about the benefits of a city with zero-plastic waste, and how to achieve it using realistic, alternative sources of materials. Creating the demand for biobased and recycled products can be enhanced by addressing pervasive psychological and behavioural barriers, such as the need for highly coloured packaging or the perception that reused or recycled products are unhygienic.

Other measures that can be taken include investing in localised production facilities to deliver biobased feedstocks and materials for manufacturing and establishing new policy incentives that encourage circularity.

For example, bans and fees have shifted some behaviours, but Kenyans could scale up sustainable plastic solutions through clear bioplastic and recycling labels and standards.

Every piece of plastic discarded, whether it is a food packaging, cigarette end, milk carton, synthetic fabric, baby wipes and diapers, or personal care products, will eventually end up clogging our waterways and breaking up into microplastics, harming our health and wellbeing. A zero-plastic waste future is one that will turn our cities into liveable spaces for everyone.

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