

Beyond an age of waste

Turning rubbish into a resource



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Original English version:

United Nations Environment Programme (2024). Global Waste Management Outlook 2024: Beyond an age of waste – Turning rubbish into a resource.

ISBN: 978-92-807-4129-2

Job number: DTI/2619/NA

DOI: <https://doi.org/10.59117/20.500.11822/44939>

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Suggested citation:

United Nations Environment Programme (2024). Global Waste Management Outlook 2024 for Youth: Beyond an age of waste – Turning rubbish into a resource. Nairobi.

<https://wedocs.unep.org/20.500.11822/44992>

URL: <https://www.unep.org/resources/global-waste-management-outlook-2024>

Co-produced with:



ISWA
International Solid Waste Association



This publication was financially supported by the Governments of Japan and Sweden.

Introduction

Municipal solid waste is generated wherever there are human settlements—at our homes, schools and shops. It typically includes food waste, packaging waste, textiles and electronic products that are no longer of use because they are broken, worn out or were designed to have a short life.

People across the globe generate more than two billion tonnes of municipal solid waste every year. If this amount of waste was packed into shipping containers and these containers were placed end-to-end, the line of containers would reach to the moon and back, or circle the Earth 25 times.



Photo source: dlmazel / Adobe Stock

Other human activities—like industry and agriculture—also generate significant amounts of waste. Municipal waste is unique because it is directly influenced by the actions of each person in the world, even children, through our choices on what to consume and how to manage the waste.

It is very simple: The decisions we make every day on how to buy, use and discard materials determine the amount of municipal waste generated.

The [Global Waste Management Outlook 2024](#), a report by the United Nations, examines the amount of municipal solid waste worldwide, how it is managed, and its impact on the health of humans and the planet. This report reveals the true costs of waste and proposes actionable steps towards a zero waste future.

Why a youth edition?

One in three people on the planet are under 20 years old. We are not a minority. We are the leaders of today and tomorrow.

Pollution from waste knows no borders and its impact may last for hundreds of years. Given the long-term impacts of waste on the environment, ecosystems and human health, it is essential that youth be part of waste management discussions.

The Global Waste Management Outlook for Youth was created because it is vital that we, the younger generations, have the knowledge and skills to prevent waste and pollution from waste. This report teaches us how to play an active role in addressing the global waste problem.

By reducing waste and making sure we manage unavoidable waste carefully, we can protect the environment that we all rely on. There are lots of ways that we can all make a difference... Read on to find out more!

Glossary of important terms

Biodiversity: The wide range of plant and animal species found in nature.

Circular economy: An economic model in which products and materials are designed to be reused or recycled so that they last as long as possible, waste is avoided or minimised, and greenhouse gas emissions are prevented or reduced.

Climate change: Long-term change in the Earth's climate, driven by increasing temperatures.

Decomposition: The process of rotting or breaking down.

Disposal: The act of throwing away or getting rid of something, often at a landfill or dumpsite.

Greenhouse gas: Gases like carbon dioxide and methane, which absorb the sun's heat and thereby cause a warming planet.

Pollution: The introduction of harmful substances or products into the environment.

Recycling: Processing of waste materials for the original purpose or for other purposes.

Reuse: Use of a product more than once in its original form.

Scenario: A possible future situation.

Upcycle: To process waste to produce something of higher value than the original.

Waste-to-energy facility: The combustion of waste in an incinerator, with some of the heat being utilised to generate electricity.

Zero waste: Waste prevention activities aimed at having no waste that requires disposal.

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01

Why is waste such a threat?

The waste we generate in homes, schools and workplaces is one of the main reasons we are now facing the global crises of climate change, biodiversity loss and pollution. While each of these crises has its own causes and effects, the increasing amount of waste generated by people is impactful on all three.

If we do not reduce the amount of waste we are creating and improve our waste management, we will not have a viable future on this planet.

Impact of waste on climate

What happens to our municipal waste after we've disposed of it has a bigger impact on the climate than we might realise. For example, if our food waste ends up in a landfill site or a dumpsite, as it rots it releases a very powerful gas called methane, which causes our planet to become warmer.



Photo source: vchalup / Adobe Stock

People who don't have a waste collection service sometimes burn their waste. This releases black soot that is drawn to the polar regions, settles on ice caps and absorbs the sun's rays, leading to ice melting and ultimately rising sea levels across the world.

Impact of waste on biodiversity

The long-term pollution of land and aquatic ecosystems by waste is one of the main drivers of biodiversity loss. Indiscriminate waste disposal practices can introduce hazardous chemicals into soil, water bodies and the air, causing long-term damage to entire ecosystems, and entering the human food chain.

Plastic waste in particular causes severe problems because it breaks up into smaller and smaller pieces. Once these tiny pieces of plastic are in a river or the sea, they get eaten by small animals, who get eaten by bigger animals and the

plastic accumulates in the food chain. In this way, plastics and other types of waste can negatively affect biological functions, which might lead to large-scale ecosystem disruption.

Impact of waste on our health

When waste is littered or burned, it releases harmful chemicals into our air, land and water. As these chemicals are absorbed by plants, animals or humans they can cause diseases and even death.

Every year, between 400,000 and a million people die because of diseases related to pollution from waste. Some of the harmful chemicals released from our waste last in nature for a very long time. That means the pollution from our waste is not only damaging our health; it may negatively affect the lives of our children and grandchildren.

Box 1

Did you know? Pollution from waste disproportionately impacts the health of women and children.

Children's bodies and brains are still in development, making them more sensitive to the negative impacts of pollution created by waste. Pollution builds up in body fat, and women naturally have more fat in their bodies than men do. When a mother breastfeeds her child, the pollution in the milk can be passed to her child.



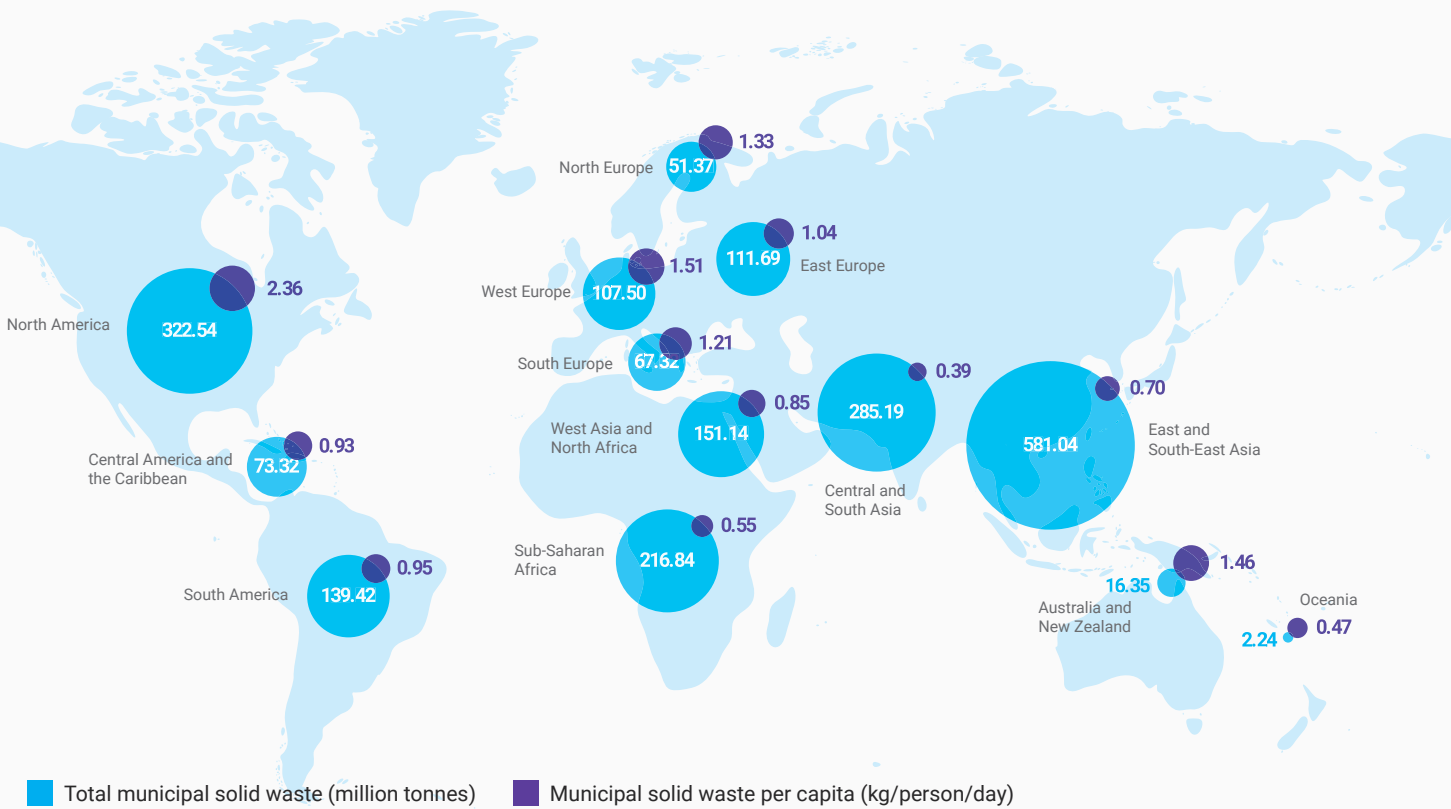
02 How much waste are we generating?

As countries become wealthier, a wider range of products are available on the market. This usually leads to an increase in waste generated per person. With eight billion people on the planet, that adds up to a lot of waste.

In some regions of the world, people buy more than they need and generate a lot of waste in the process, while in other regions people buy less and generate less waste.

The purple circles in Figure 1 show the large differences in waste generated per capita (per person). The average person in North America generates more than two kilograms (kg) of waste every day, while in Central and South Asia, the average person generates just 0.4 kg (400 grams) of waste per day. The blue circles indicate the total amount of waste (in millions of tonnes) is highest in East and South-East Asia, which are among the world's most populated regions.

Figure 1: Waste generated by region, worldwide



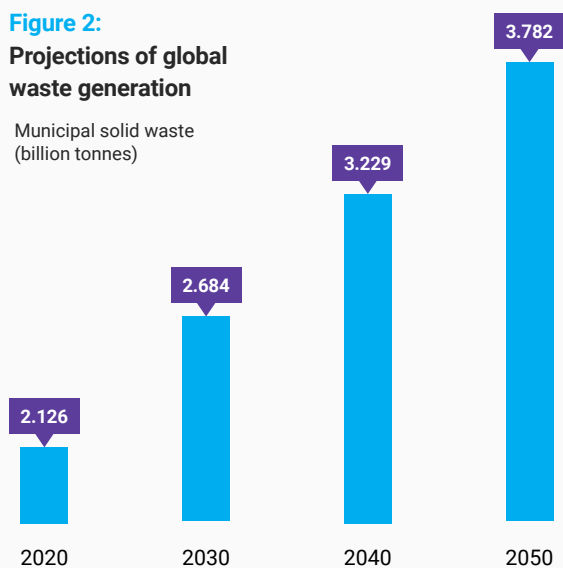
If we continue to buy, use and throw things away at the same rate as today, by 2050 the amount of waste generated every year will almost double. Figure 2 shows what the

future of waste may look like if we don't take urgent action to address the global waste crisis.



Figure 2:
Projections of global
waste generation

Municipal solid waste
(billion tonnes)



Box 2

Take action! Calculate how many kilograms of waste you generate each day, and then find ways to reduce your daily total.

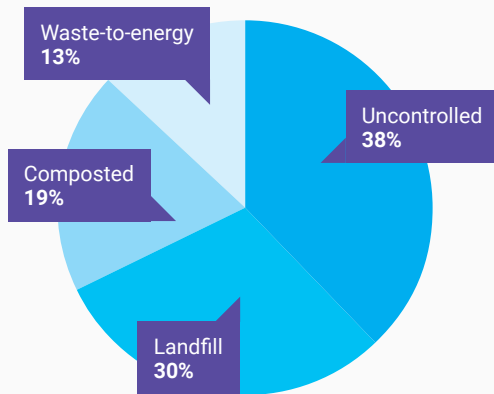
03 What happens to our waste?

Globally in the year 2020, around 30 per cent of the waste we generated was disposed of in landfills and 13 per cent was processed in waste-to-energy facilities.

In addition, 38 per cent was uncontrolled, meaning it was dumped or burned in the open, or disposed of at an informal dumpsite.

As Figure 3 shows, less than 20 per cent of municipal waste was recycled or composted. An ambitious yet realistic target is to recycle or compost 60 per cent of municipal waste.

Figure 3: Global waste in 2020



Box 3

Did you know? 2.7 billion people globally do not have their waste collected.

Communities on lower incomes are the least likely to have their waste collected. As a result, they are the most likely to have to burn or dump their waste in the environment, and to suffer from negative health impacts of pollution.

What happens to your waste depends on where you live and what is in the waste. It is likely managed in one of these ways:



Recycling: A single material, like paper, is processed to make new paper.



Composting: Food and garden waste is decomposed to make a soil conditioner.



Landfill: Waste is buried on a large area of land, with special measures to prevent pollution. When food waste rots in landfill it releases methane, a powerful greenhouse gas.



Waste-to-energy: Waste is burned inside a facility and releases heat that is used to generate electricity. These facilities also produce a toxic ash that needs to be disposed of in a hazardous waste landfill.



Open dumping: People dispose of their waste on nearby land or in a river. The waste may pollute agricultural land, harm animals, attract vermin, block drains, and eventually reach the sea causing marine pollution.

Box 4

Did you know? Millions of people work in waste collection and waste management.

Where the government does not provide waste management services, it is mostly done by workers in the informal economy. These workers, sometimes including children, often earn very little income and work in dangerous conditions.

Box 5

Take action! Learn where the waste from your home goes and how it gets there.

Why don't we recycle everything?

Recycling is an important part of the solution, but not everything can be recycled. Firstly, for recycling to succeed everyone needs to separate their materials carefully.

Food waste is wet, smelly and attracts flies. However, if it is separated from other materials, it can be used to make compost, biogas (a form of renewable energy) or year-round animal feed.

Paper and card, glass, metals and some plastics can be recycled if they are clean and dry. Other things that end up in our waste, like nappies (diapers), old clothes and some fabric bags cannot be recycled. These need to be avoided or collected and disposed with care.

Box 6

Take action! Separate your food waste from other waste to reduce the total amount of waste that needs to be managed.



Open burning: To prevent waste attracting vermin that spread disease, people set fire to it. The burning waste releases harmful gases and soot, contributing to a wide range of health problems as well as climate change.



Informal dumpsite: Like a landfill, but without special measures to prevent pollution. As a result, the surrounding land and water can become very polluted. Fires often break out at informal dumpsites and can be very difficult to extinguish. These can be very dangerous and unhealthy places.



Photo source: Envato Elements

How can we reduce our waste?

There are lots of ways to reduce waste, and it starts with how products are designed. Products that prevent waste are designed to last a long time, are easy to repair or upgrade or repurpose, and can be dismantled for efficient recycling.

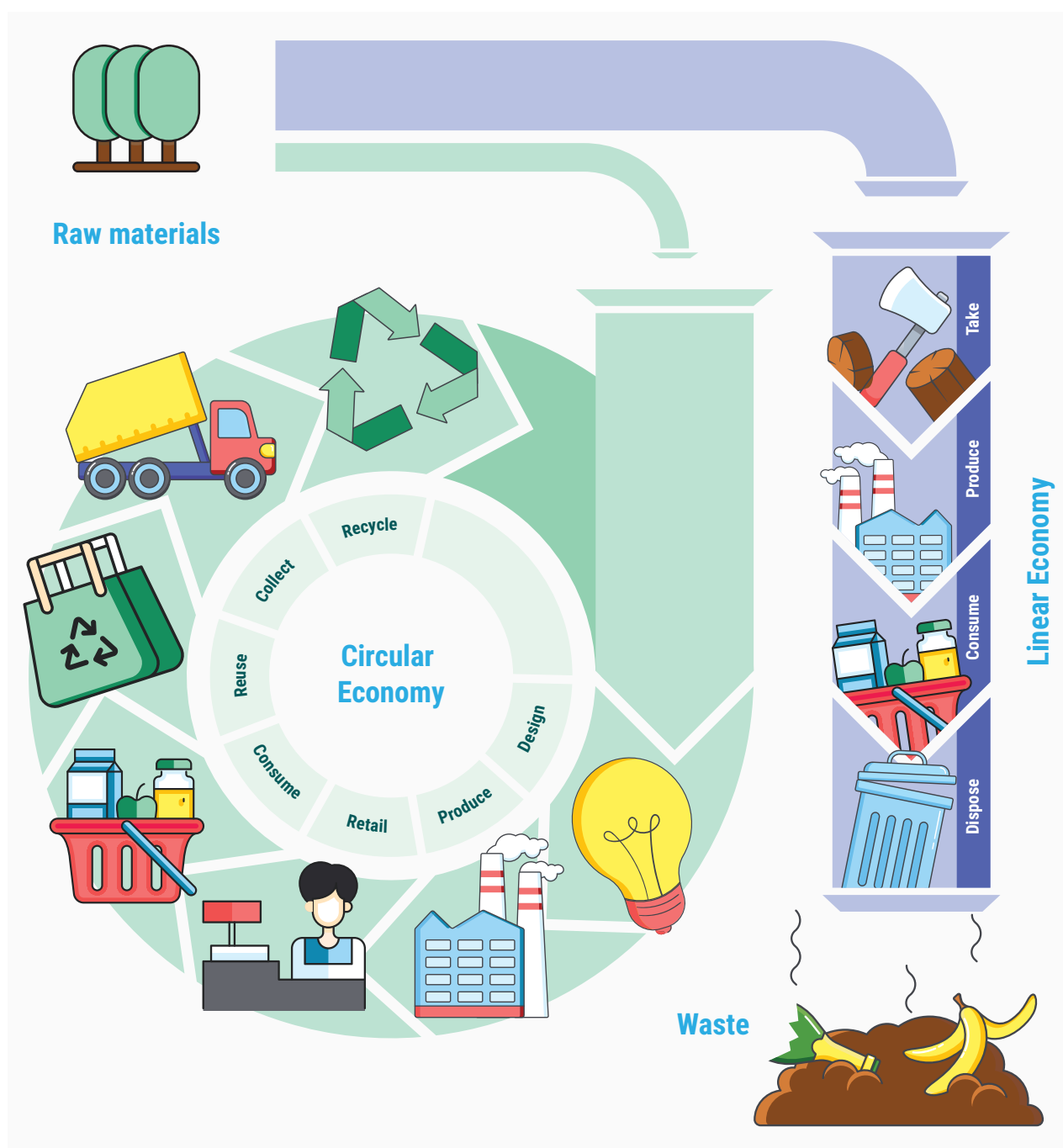
To reduce our total amount of municipal waste, we need:

1. Governments to encourage design for waste prevention
2. Businesses to rethink product design
3. Consumers to buy products that have been designed to prevent waste

Box 7

Did you know? A more circular economy is essential for improved waste management.

In a circular economy, products and materials are designed to be reused or recycled so that they last as long as possible, waste is avoided or minimised, and greenhouse gas emissions are prevented or reduced.



What does waste management cost?

The more waste our society generates, the more we need to invest in waste management services.

In 2020, around US\$250 billion was spent on waste management services worldwide, equal to the global cost of all the damages caused by extreme storms and other natural disasters in that year.

However, the direct costs of waste management are not the whole picture. Mismanaged waste leads to climate change, biodiversity loss and pollution, and this creates significant costs to society.

The total cost of municipal waste in 2020, including collecting and managing the waste and non-direct costs caused by pollution from waste, was around US\$360 billion.

Box 8

Did you know? The hidden costs of dumping and burning waste outweigh the costs of providing a simple waste management service.

How can our communities improve waste management?

A good waste management service includes regular waste collection, a network of recycling facilities nearby to process different materials, and safe and well-run places to dispose of waste that cannot be recycled.

To improve waste management, we need to have relevant knowledge and skills, enough money to provide the services and run the facilities, and strong rules to prevent burning and dumping.

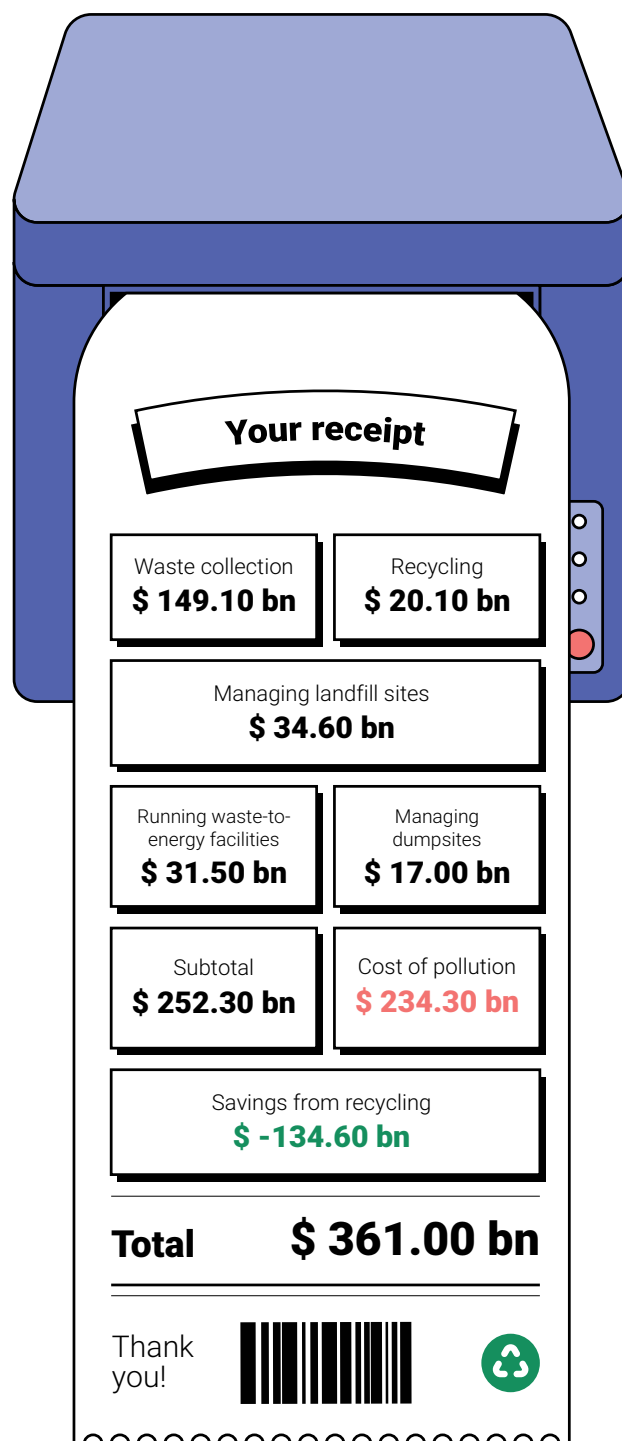


Photo source: Envato Elements

Box 9

Did you know? In some countries, businesses pay a fee to cover the costs of managing the waste created by their products and packaging.

The fee encourages businesses to rethink the materials they use and the design of their products to make sure everything can be recycled. This approach is called Extended Producer Responsibility, and it is a popular way to make sure businesses pay for the pollution they cause.

Currently, in many places worldwide, waste prevention and waste management are not a priority for governments and municipalities. Some decision-makers do not understand the full negative impacts of uncontrolled waste and therefore think that waste management costs are not worth the investment. But when waste management services are effective, the community saves money and has a healthier living environment.

The United Nations' Global Waste Management Outlook 2024 examined how waste may affect our lives in the future. Three scenarios were analysed, and a projection was made on the impact of each scenario:

Waste Management as Usual

We continue to buy, use and throw away things, the same as we do today. Waste generation continues to grow, and pollution from waste increases.

Waste Under Control

Waste generation is still growing, but at a slower rate than today. Everyone has their waste collected, and uncontrolled waste disposal ends by 2050.

Circular Economy

Governments and citizens prioritise waste prevention so that every year, there is less waste to manage. Everyone has their waste collected and uncontrolled waste disposal ends by 2050. Recycling rates improve to 60 per cent worldwide.

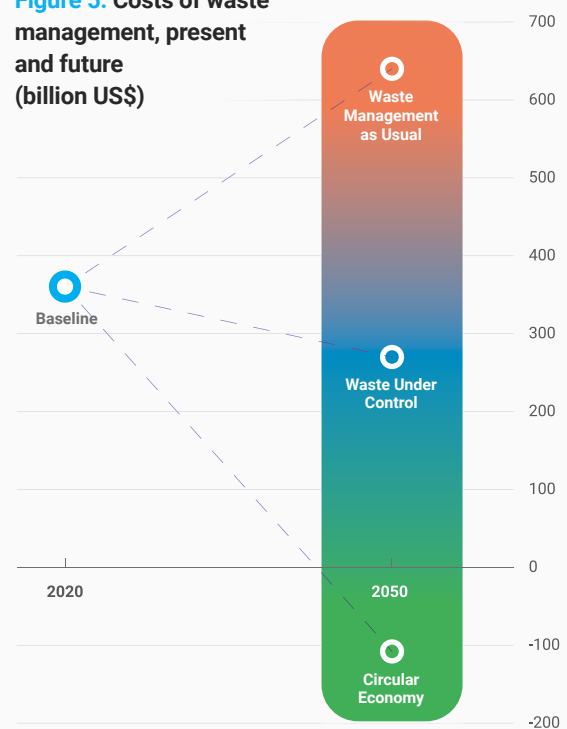
Figure 4 shows the costs of waste management services in 2020 and in 2050 for the different scenarios. The dotted lines show the hidden costs of pollution from waste, under each of the three scenarios.

By looking at different possible scenarios, we can decide on the future we want.

Box 10

Take action! Put pressure on your government to help prevent waste and to ensure that waste is managed with care.

Figure 5: Costs of waste management, present and future (billion US\$)



04 How can we make a difference?



Be an influencer!

Contact your local and national government to demand change

- Encourage your government to introduce bans on unnecessary and polluting products such as disposable e-cigarettes and packaging materials that cannot be easily recycled.
- Find out if your government is encouraging businesses to help pay for waste management services.
- Ask your government if it has produced a Circular Economy Roadmap, and if it has included waste prevention and food waste recycling plans in its climate commitments.
- Persuade the government and your local municipality to take simple steps and lead by example. For example, could they install water dispensers in their meeting rooms and ban single-use plastic water bottles?

Contact businesses and demand a future free of unnecessary waste

- Business practices influence waste generation significantly. If businesses embraced refill rather than single-use packaging, a huge amount of waste could be prevented. What waste would you like to see eliminated?

Become a changemaker at your school or university

- Create a student-led sustainability club or committee to actively address waste reduction initiatives and environmental concerns.
- Carry out a waste 'audit' and identify ways to reduce waste at school or college.
- Conduct awareness campaigns through posters, presentations or social media to educate peers about the importance of waste reduction and recycling (for example, initiative a zero waste week on campus).
- Install composting bins in the yard and turn canteen food waste into compost.
- Ask your teachers to explore courses on zero waste and circular economy business models, and to include solid waste management and recycling in their environmental management syllabus.

Set an example for others in your community

- Organise a community cleanup event to collect litter and raise awareness about the impact of waste pollution on the environment
- Carry a refillable water bottle and avoid buying drinks in single-use packaging.
- Bring your own shopping bag and refuse single-use plastic bags.
- Separate your food waste and recyclable materials so that they can be collected and turned into new products.

Make a personal commitment to prevent waste

- Avoid buying things that are used a small number of times before disposal.
- Look for products that are refillable to avoid single-use packaging.
- Reuse the things we already have and think carefully before buying anything new.

Start your own zero waste or circular economy business

- Start a business that meets local needs while preventing waste through refill, reuse, recycling or upcycling.

Box 11

Be a Zero Waste Entrepreneur!

The shift to a circular economy contributes towards many of the Sustainable Development Goals and creates new and exciting business opportunities. From community-based initiatives to small business start-ups, there are endless ways to make a positive impact.

Here are some ways to can get started on your journey as a zero waste entrepreneur:

- Develop apps that can help provide waste collection services for underserved communities and secure better working conditions for waste collectors.
- Embrace digital technologies to create awareness campaigns and deliver training and knowledge sharing activities to change behaviour.
- Establish refill services of everyday products to support the phase out of single-use packaging. By buying in bulk, you can reduce costs, so your customers can save money and prevent waste.
- Upcycle waste materials into attractive products. For example, plastic bags can be crocheted or woven and used to make bags, clothes and even shoes, tyres can be upcycled into attractive furniture, and old clothes can be transformed into stylish new fashion.
- Open a sharing library for toys, games, sports equipment, musical instruments, books, tools or anything else you can think of. People pay a small fee to borrow items instead of buying them new. The library could be in a physical space, or it could work online through a sharing app.
- Explore artificial intelligence usages, for example for identifying and sorting waste materials, reducing food waste and predicting hotspots of pollution from waste in marine environments.
- Utilise food waste to make:
 - ▶ Compost to help restore degraded agricultural land
 - ▶ Protein-rich animal feed via black soldier fly larvae
 - ▶ Biochar to promote healthy soils and lock carbon into the ground for centuries
 - ▶ Charcoal briquettes for cooking and heating
 - ▶ Renewable electricity via biogas production

We are building a healthier and fairer world for future generations by influencing governments and businesses to move towards zero waste and a circular economy. Some of us are working on reducing waste and mitigating its impacts on climate change, others are focusing on protecting biodiversity and human health from waste.

[Where will you start?](#)



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Useful resources

<https://www.unep.org/interactives/beat-waste-pollution/>
<https://www.unep.org/interactives/beat-plastic-pollution/>
<https://www.unep.org/beatpollution/>

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This publication is supported by the Environment Fund - UNEP's core financial fund. The Fund is used to provide scientific evidence on the state of the global environment, identify emerging environmental issues and innovative solutions, raise awareness and advocacy, bring together stakeholders to agree on action, and for building capacity of partners. Core funding gives UNEP the strength and flexibility to implement the programme of work (in support of the 2030 Agenda) as approved by its Member States, and to strategically respond to emerging challenges. UNEP is grateful to all the Member States that contribute to the Environment Fund.

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