UN environment programme

Beyond an age of waste

Turning rubbish into a resource

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Global Waste Management Outlook 2024 for Youth

Original full 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 (2025). *Global Waste Management Outlook 2024 for Youth: Beyond an age of waste – Turning rubbish into a resource*. Nairobi. https://wedocs.unep.org/20.500.11822/46051

Production: Nairobi

URL: https://www.unep.org/resources/report/global-waste-management-outlook-2024-youth-beyond-age-waste-turning-rubbish

Design & illustration: Abel Ayalew / UNEP

Co-produced with:

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

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.

Open burning: Waste that is combusted without emissions cleaning.

Extended Producer Responsibility (EPR): It is an environmental policy approach in which a producer's responsibility for a product is extended to the waste stage of that product's life cycle.

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Introduction

Municipal solid waste is generated wherever there are human settlements–at our homes, schools and shops. It includes a range of items, for example food waste, packaging waste, textiles and electronic products.

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. Remember: this level of production happens every year, consistently.

Photo source: *dimazel / Adobe Stock*

Other human activities, such as 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 and youth, 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 products and goods determine the amount of municipal waste generated.

The **Global Waste Management Outlook 2024**, a report by the United Nations Environment Programme (UNEP), 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 revealed the true costs of waste and proposed actionable steps towards a zero waste future.

Why a youth edition?

One in three people on the planet is under 20 years old. This is not a minority — young people 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!

01 Why is waste such a threat?

"Waste" means different things to different people — it can be called trash, refuse, or garbage, but it's essentially the unwanted by-product of what we produce and consume. It can be categorized by material (like food or plastic), product type (like e-waste or vehicles), or source (such as municipal solid waste, or MSW).

This report focuses on MSW — waste from households, shops, and public services — excluding industrial waste. Waste is a major driver of climate change, biodiversity loss, and pollution. Unless we cut down what we produce and improve how we manage it, our planet's limited resources will not sustain us.

If we do not reduce the amount of waste we are creating and improve how we manage it, we will not have a viable future on this planet. The Earth simply doesn't have enough materials to keep producing all the things we buy and throw away. If we keep consuming at the current pace, we'll run out of resources before long. This is especially important as the world's population continues to grow, putting even more pressure on our planet's limited resources.

Photo source: *vchalup / Adobe Stock*

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.

People who don't have a waste collection service sometimes openly burn their waste in their neighbourhoods without any controls on the smoke and chemicals that are released. This releases black carbon, 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, the sea, or the soil, 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 dumped or openly burned, it can release 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 mismanaged waste (Williams et al. 2019). 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.

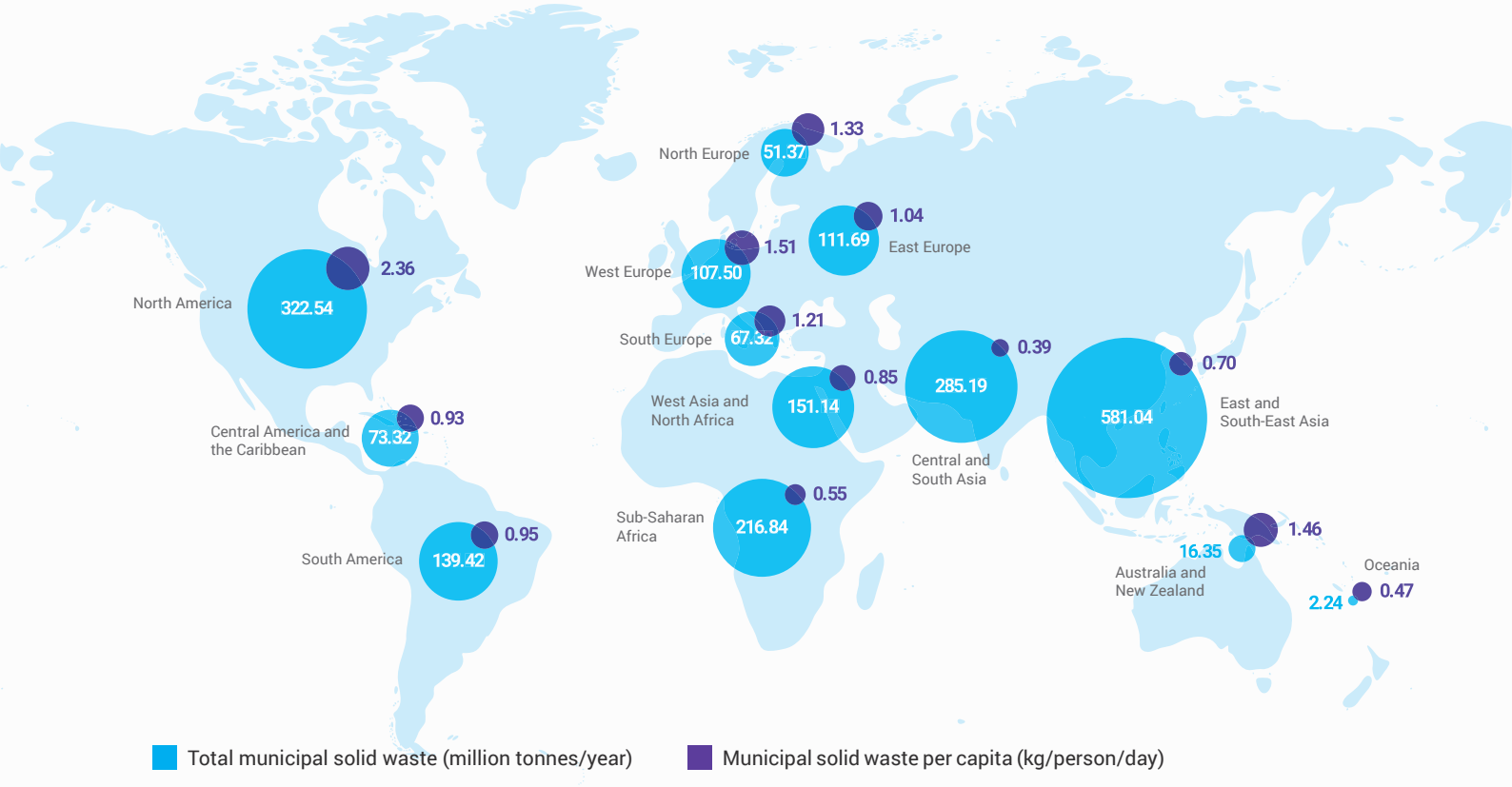
02 How much waste are we generating?

As countries become wealthier, a wider range of products become 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.

Data related to waste generation and management is often incomplete or inconsistent. Where waste is not being managed, there are few opportunities to measure it. The purple circles in Figure 1 show the best available estimates of waste generation 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 annual 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.

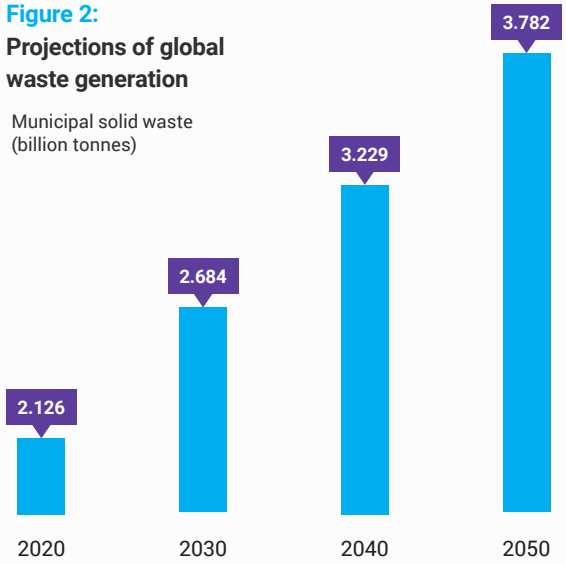
Figure 1: Waste generated by region, worldwide



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.

With the global population and GDP projected to keep rising, the Global Waste Management Outlook 2024 2024 warns that waste generation could increase by more than 50 per cent by 2050 if current trends continue, putting immense pressure on already struggling waste systems.

Figure 2:
Projections of global waste generation



Box 1

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

Photo source: *Envato Elements*

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

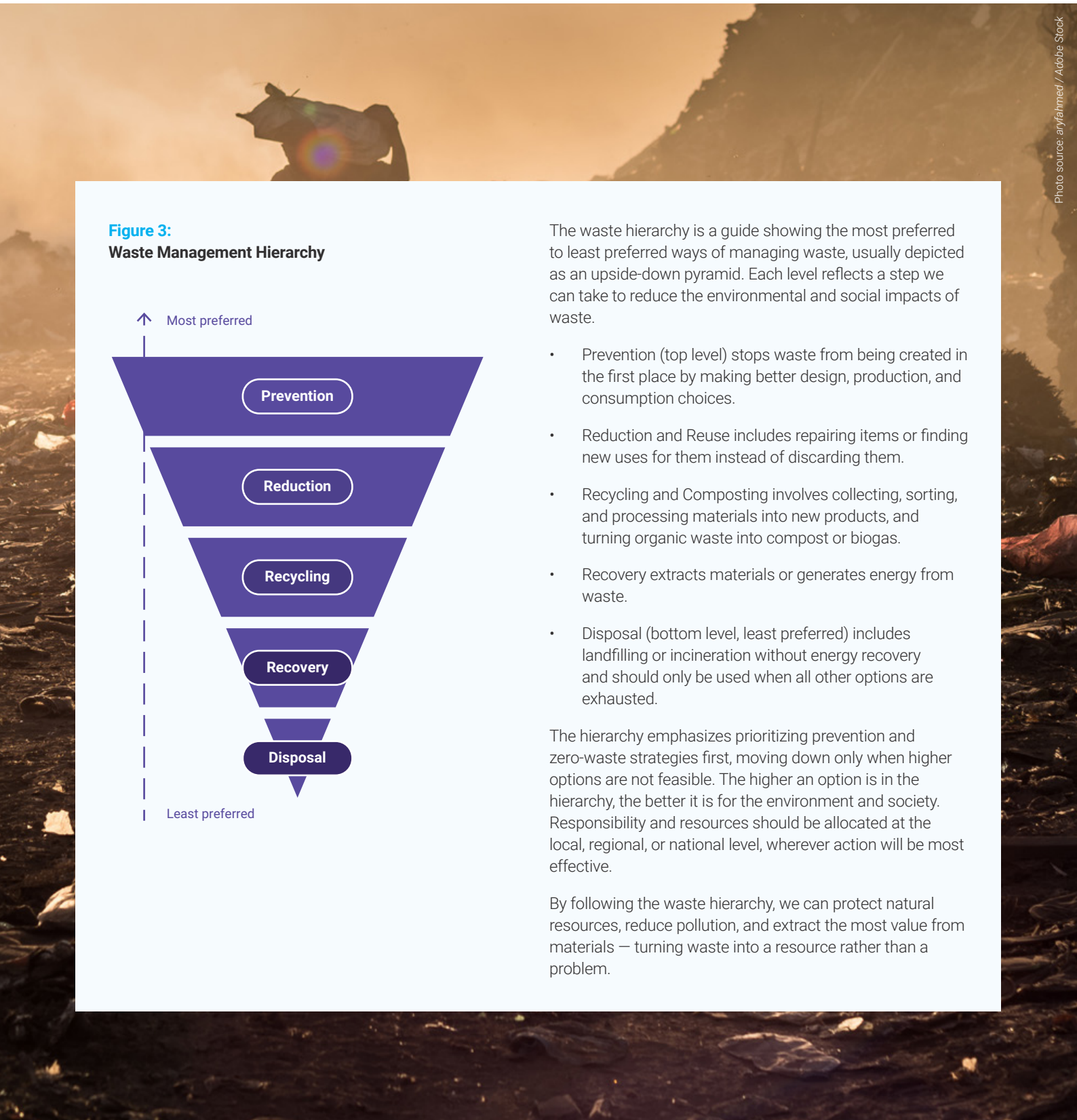


Photo source: aryfahmed / Adobe Stock

Figure 3:
Waste Management Hierarchy

The waste hierarchy is a guide showing the most preferred to least preferred ways of managing waste, usually depicted as an upside-down pyramid. Each level reflects a step we can take to reduce the environmental and social impacts of waste.

- Prevention (top level) stops waste from being created in the first place by making better design, production, and consumption choices.
- Reduction and Reuse includes repairing items or finding new uses for them instead of discarding them.
- Recycling and Composting involves collecting, sorting, and processing materials into new products, and turning organic waste into compost or biogas.
- Recovery extracts materials or generates energy from waste.
- Disposal (bottom level, least preferred) includes landfilling or incineration without energy recovery and should only be used when all other options are exhausted.

The hierarchy emphasizes prioritizing prevention and zero-waste strategies first, moving down only when higher options are not feasible. The higher an option is in the hierarchy, the better it is for the environment and society. Responsibility and resources should be allocated at the local, regional, or national level, wherever action will be most effective.

By following the waste hierarchy, we can protect natural resources, reduce pollution, and extract the most value from materials — turning waste into a resource rather than a problem.

Box 2

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 3

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

Why can't everything be recycled?

Recycling is an important part of the solution, but not everything can be recycled.

Firstly, design and material choices by brands and manufacturers have a major impact on whether something can be technically and economically recycled. Where multiple materials are used in a product, they are more difficult (or even impossible) to separate for recycling. By avoiding items that will be hard to recycle, we can help influence positive change.

How we manage our own waste also has an impact on what can be recycled. When all waste items are mixed together they can be difficult and expensive to sort for recycling. Separating food waste and dry recyclable materials from wastes that cannot be recycled helps with the success of recycling programmes.

Box 4

Take action! By separating your food waste and recyclables, you help ensure they can be managed in the right way: turned into compost, recycled materials, or energy instead of polluting the environment.

Photo source: *Envato Elements*

How can we reduce our waste?

Reducing waste starts with how products are designed. Products that help prevent waste are built to last, easy to repair, upgrade, or repurpose, and can be dismantled for efficient recycling.

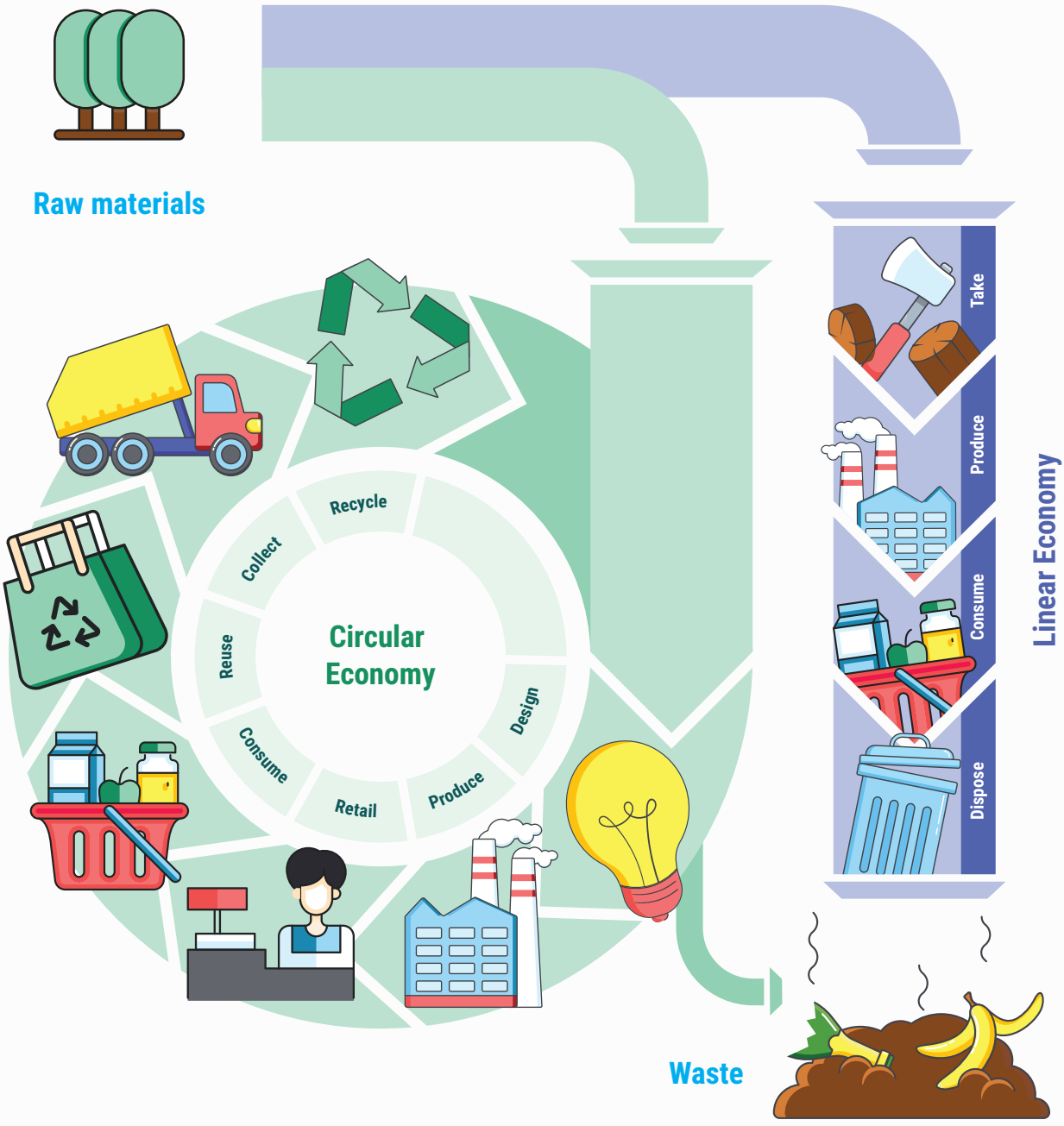
To reduce the total amount of municipal waste, we need:

1. Governments to promote design strategies that prevent waste.
2. Businesses to rethink product design with durability, repairability, and recyclability in mind.
3. Consumers to choose products designed to minimize waste and maximize reuse.

Box 5

Did you know? Improved waste management is essential for a circular economy.

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 avoided 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, an estimated 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 6

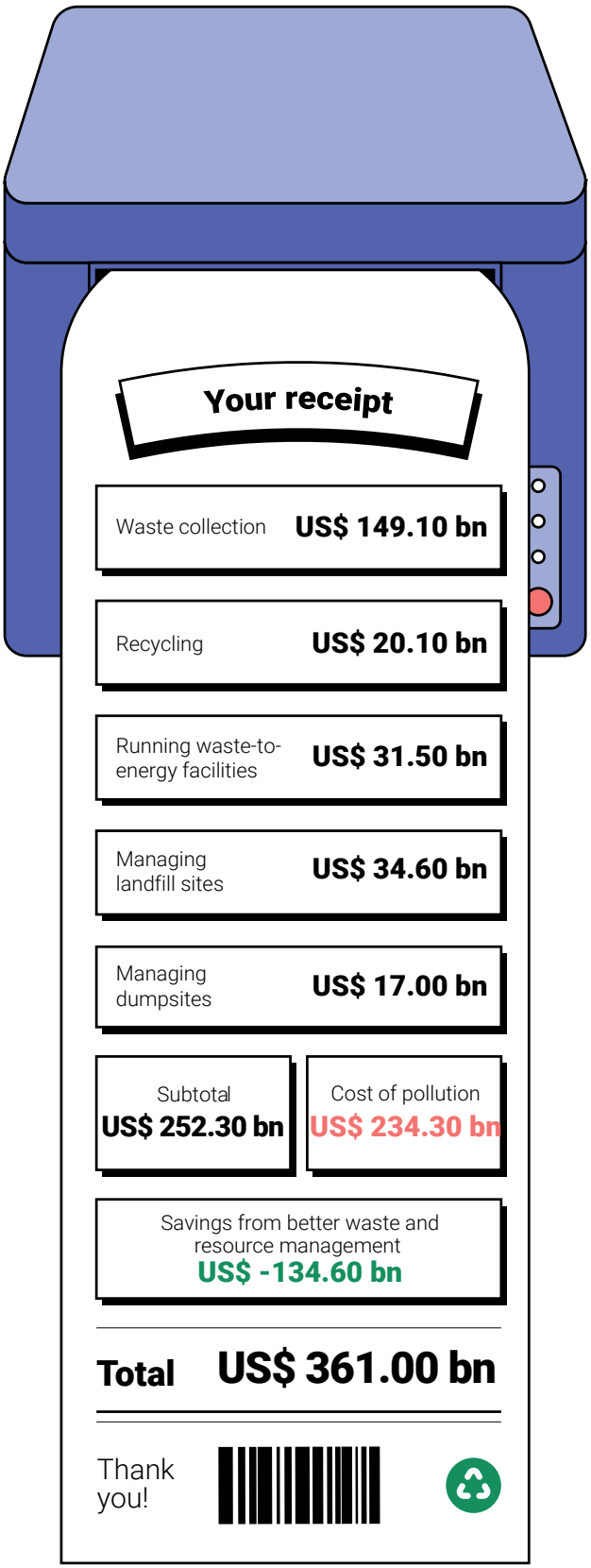
Did you know? The hidden costs of dumping and openly burning waste outweigh the costs of providing a simple waste management service.

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 facilities to treat 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 openly burning and dumping.

Photo source: *Envato Elements*



Box 7

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 reduce waste, improve recyclability, and help pay for the collection and management of their products once they become waste.

This approach is called Extended Producer Responsibility, and it is a popular way to make sure businesses pay for the pollution their products may 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.

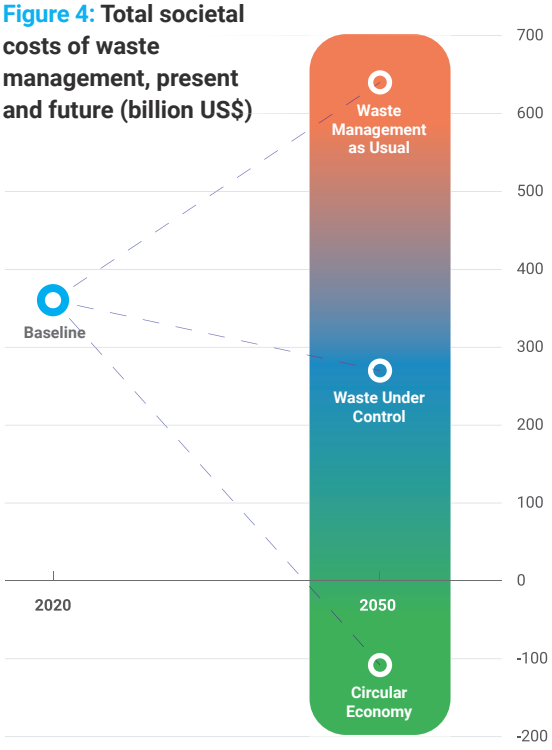
Figure 4 shows the costs of waste management services in 2020 and in 2050 for the different scenarios. The dotted lines show the hidden costs of pollution from waste, under each of the three scenarios.

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

Box 8

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

Figure 4: Total societal 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, initiate 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 circular economy business

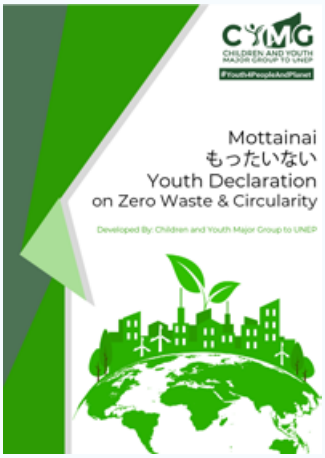
- Start a business that meets local needs while preventing waste through refill, reuse or recycling.

Box 9

Mottainai Youth Declaration on Zero Waste and Circularity

This declaration, developed by the Children and Youth Major Group (CYMG) to UNEP, draws from global youth consultations and the Youth Day of the UNEP IETC Global Dialogue on the Circular Economy Model of Waste Management, held on 19 February 2025 in Osaka, Japan. CYMG unites youth networks, organizations, and individuals committed to tackling the triple planetary crisis of climate change, biodiversity loss, and pollution.

It amplifies the voices of young people and our shared commitment to circularity and a zero-waste future, calling on governments, international organizations, the private sector, and civil society to partner with youth in building resilient, inclusive, and regenerative systems that leave no one behind.



Learn more

Box 10

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 you 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.
- 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.
- Food waste doesn't have to end up in the bin it can be transformed into valuable new products that help people and the planet. Here are a few ways to give food waste a second life:
    - Make compost to restore tired soils and help plants grow naturally.
    - Raise black soldier fly larvae to turn food scraps into protein-rich animal feed.
    - Create biochar that keeps soils healthy and locks carbon in the ground for hundreds of years.
    - Produce charcoal briquettes for cleaner cooking and heating.
    - Generate renewable energy by turning food waste into biogas that can power homes and communities.

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?

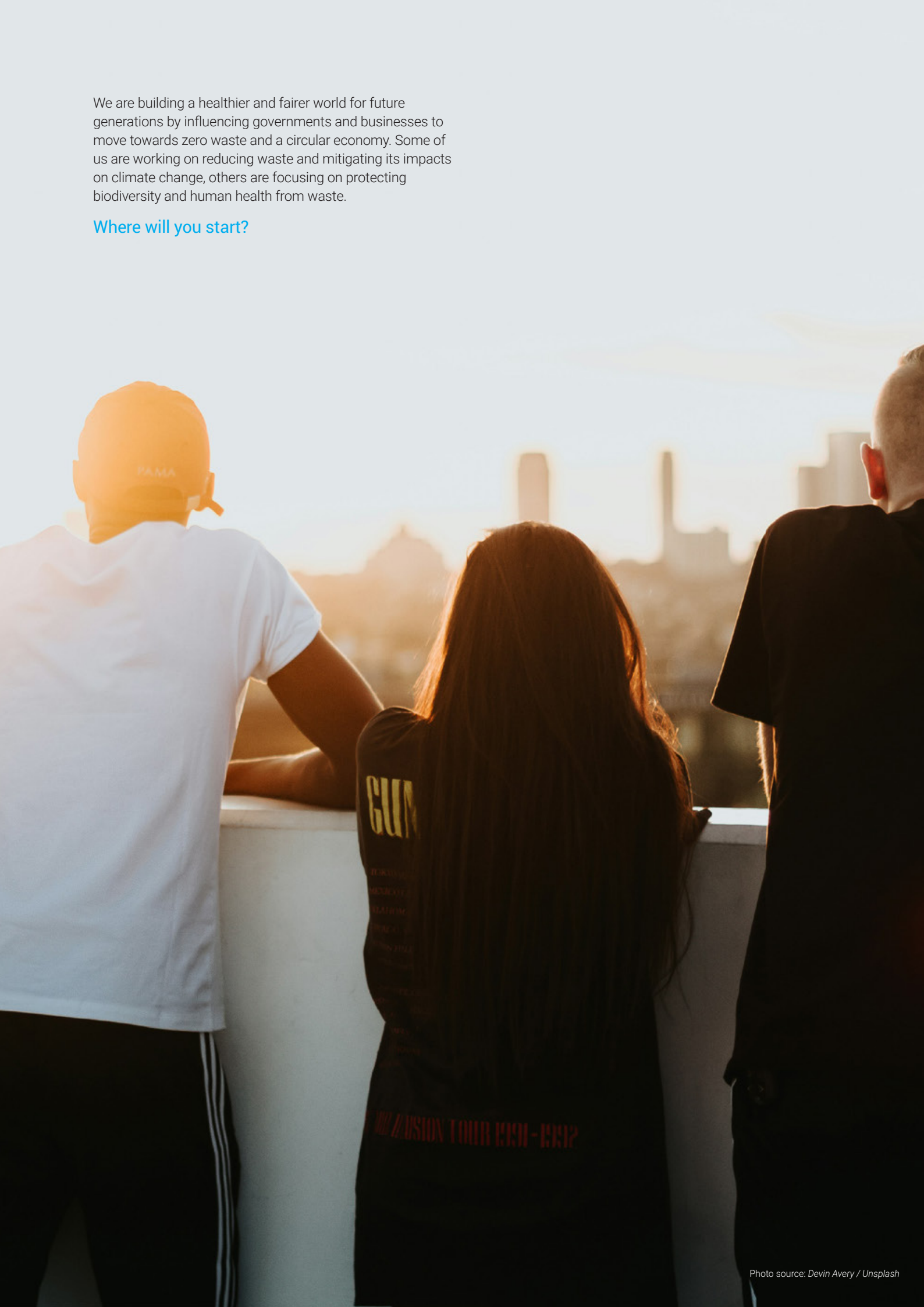


Photo source: *Devin Avery / Unsplash*

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Useful resources

https://www.unep.org/interactives/beat-waste-pollution/

https://www.unep.org/beatpollution/

https://www.cymgenv.net/mottainai-youth-declaration-on-zero-waste-and-circularity

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