

NO TIME TO WASTE

Tackling the plastic pollution crisis before it's too late
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A report by Tearfund, Fauna & Flora International (FFI), WasteAid and The Institute of Development Studies (IDS).

Written by Mari Williams, Rich Gower and Joanne Green (Tearfund) with support from Elisabeth Whitebread (FFI), Zoë Lenkiewicz (WasteAid) and Dr Patrick Schröder (IDS).

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Designed by Wingfinger

Cover photo: Hazel Thompson/Tearfund

Tearfund is a Christian relief and development agency working with partners and local churches to bring whole-life transformation to the poorest communities.

Fauna & Flora International (FFI) is the world's oldest international wildlife conservation organisation. Our mission is to conserve threatened species and ecosystems worldwide, choosing solutions that are sustainable, based on sound science, and which take into account human needs.

WasteAid shares recycling skills around the world: creating green jobs, improving children's health, and keeping plastic out of the oceans.

The Institute of Development Studies (IDS) is a global research and learning organisation for equitable and sustainable change.

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learn.tearfund.org
+44 (0) 20 3906 3906
publications@tearfund.org
twitter.com/tearfundlearn
facebook.com/tearfundlearn

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ENDORSEMENTS

This report is aptly named for the pressing need to tackle the problem of plastic pollution, now. For the city of Jos where I live, yesterday was a better time to act but today will have to be the next best option. This report outlines the present and foreseeable dangers of plastic pollution, especially on poor, developing communities and countries like mine. To continue to ignore this growing problem is akin to acknowledging that the flourishing of life and human development is of no value in this present age. We need to pay attention and act.

Ulan Garba Matta, Writer, Filmmaker and Team Lead of the Jos Green Centre, Jos, Nigeria

While reading the report *No time to waste: tackling the plastic pollution crisis before it's too late*, I was sitting on the plane and in front of me: plastic cup, plastic spoon, plastic knife, plastic fork, plastic plate and food in plastic packaging. All plastic for single use. We can and should organise our lives differently, better. The consequences of the irresponsible use of plastics are seriously detrimental to people and planet, as this report is clearly showing. Unfortunately, plastic does not feel the pressure of time; but humankind can no longer deny the case for urgent action, so, indeed... there is no time to waste.

Janez Potočnik, Co-chair International Resource Panel and former EU Environment Commissioner

This timely report is an important and urgent call to action for multinational corporations and developed country governments to tackle the scourge of plastics in poorer countries. Given the shocking damage plastic pollution is causing across the world to our environment, health and the livelihoods of communities, we simply don't have time to waste.

Kerry McCarthy MP, Labour Party, UK

In the UK many people have woken up to the plastic pollution crisis, with some businesses starting to cut down on plastic packaging. The UK government has already taken some clear actions, with further action planned. However, globally there is a need for much more urgent action. In many developing countries discarded plastic blocks drains, causes flooding and exacerbates the spread of disease. Unchecked plastic waste poisons wildlife and the open burning of plastic can cause dangerous air pollution. These problems can be solved, but we will need governments, corporations and local people to work together to deliver this change. Thank you for this report that shines a light and shows a way forward.

Vicky Ford MP, Conservative Party, UK

This timely report draws attention to the scandal of the global waste crisis. Extending solid waste collection to all and eliminating open dumping and burning, will both improve the health and livelihoods of billions of the world's poorest people and halve the quantity of plastics entering the oceans. Together we can make it happen.

David C Wilson, visiting Professor in Waste and Resource Management at Imperial College London. Lead author of UNEP and ISWA's inaugural Global Waste Management Outlook. Immediate Past President of CIWM, the UK professional body for resources and waste.

'No time to waste' – what an apt title for this report on handling the nightmare of plastic pollution. There have been urgent calls from all over, including the United Nations, but what is needed is for companies, governments and communities to take responsibility, including support for micro level initiatives that can implement these steps. This is a wake up call for various contexts, whether in the developed world or in the developing world, and the problem needs to be seriously addressed. The situation is growing out of control, as we see in India, and the poorest people are the ones who are suffering most. I commend the organisations who have produced this study and the issues it is addressing. Let's act!

Dr. Ken Gnanakan, Founder President, ACTS Group of Institutions, Bangalore, India

FOREWORD

I have seen for myself the effects of plastic pollution on some of our planet's most precious species and natural places – an unfolding catastrophe that has been overlooked for too long. But we ignore it at our peril. This report is one of the first to highlight the impacts of plastic pollution not just on wildlife but also on the world's poorest people.

Humankind's ability to produce this material on an industrial scale far outstrips our ability to manage it, and as a consequence plastic is choking our rivers and seas. This is particularly true in poorer countries, where the ability to manage waste is inevitably overwhelmed by the sheer quantity of plastic being used. In turn, this is causing serious illness and even death for countless people and wild species, as this report outlines.

Of course, once plastic reaches the sea, it becomes a global problem – no matter where it originates. To tackle this pollution, therefore, we need to respond at a global scale. We need leadership from those who are responsible for introducing plastic to countries where it cannot be adequately managed, and we need international action to support the communities and governments most acutely affected by this crisis.

If there is one thing humans are adept at, it is finding clever solutions to the conundrums we face. It is high time we turn our attention fully to one of the most pressing problems of today – averting the plastic pollution crisis – not only for the health of our planet, but for the wellbeing of people around the world.

Sir David Attenborough, Vice President, Fauna & Flora International

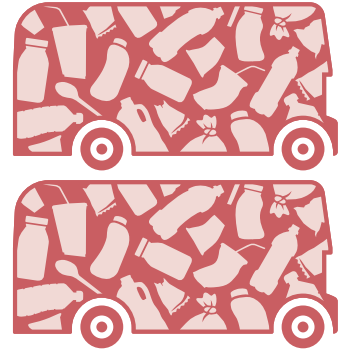


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THREE SHOCKING STATISTICS



...the UK throws away
2 double-decker busloads
of plastic waste

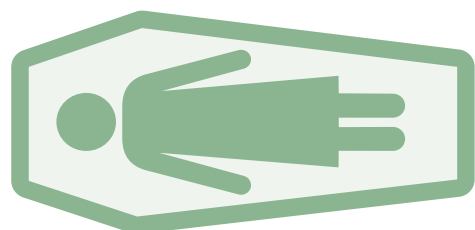


...30 double-decker busloads of plastic waste are
burned or dumped in developing countries



...one person dies from diseases
caused by mismanaged waste

Diseases such as diarrhoea, malaria,
heart disease and cancer. That's up
to a million people every year.



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EXECUTIVE SUMMARY

This report describes the environmental destruction, sickness, mortality, and damage to livelihoods that the plastic pollution crisis is causing. It outlines the problem – namely the huge recent increase in the production and distribution of single-use plastics, and its expansion across the globe to countries lacking the capacity to collect, manage and recycle waste. And it spells out the solutions.

Current trajectories point to increased illness and unnecessary deaths, further harm to livelihoods and greater destruction of our environment. But it doesn't have to be this way. In this report we outline the roles and responsibilities of four groups we believe to be key to tackling the plastic pollution crisis:

- multinational consumer goods companies who drive the production of single-use plastic packaging, and currently do little to collect and sustainably manage the waste they have created
- developed country governments who have enabled and incentivised a 'throwaway' culture and whose response to the crisis in developing countries has so far been weak
- developing¹ country governments whose citizens are the most severely impacted by the crisis
- citizens who can show that there is an overwhelming demand for change.

The world's plastic pollution problem

Plastic pollution is destroying our natural environment and harming the poorest people on the planet. For every person born since the 1950s, one tonne of plastic has been produced and less than a tenth of this has been recycled. Around half the amount of plastic waste we produce globally is packaging that is used just once.

Production is on an upward curve: unless urgent action is taken, global plastic production will double over the next ten to fifteen years. This growth is fastest in the countries least able to deal with it. Sub-Saharan African countries' overall waste generation is currently projected to triple by 2050.

The increasing usage of single-use plastics in developing countries is part of a bigger waste crisis: rising levels of waste generation where there are inadequate or non-existent waste management systems (and both are part of the bigger crisis of overconsumption). Two billion people lack access to properly regulated solid waste collection – that's one in four people globally – while a further one billion people don't have controlled waste disposal (their waste may be collected but it is then discarded somewhere unsafe). Without rubbish collection

¹ In the executive summary of this report we use the terms 'developing countries' and 'developed countries'. We recognise the limitations with these terms – not least the wide range of economic circumstances included when grouping low-income, lower-middle income and upper-middle income countries as 'developing' – but think that on balance these are the best terms to use in order to keep the language of the executive summary clear and accessible. In the rest of the report we use the terms low-income, middle-income and high-income, because much of the analysis we have used (for example from the World Bank) uses these descriptors for country groupings.

or proper disposal, people have no option but to burn or dump their waste. In the poorest countries, about 93 per cent of waste is burned or discarded in roads, open land, or waterways.

The impacts of plastic pollution are alarming.

Environmental destruction

Plastic pollution is threatening the health and future of our **oceans and marine life**. Some 8–12.7 million tonnes of mismanaged post-consumer plastic waste ends up in the oceans every year. Once in the ocean, plastic does not biodegrade, it simply breaks up into smaller and smaller pieces that are easily mistaken for food. Animals that ingest plastic suffer from choking, perforation of the gut, starvation (as a result of a false feeling of fullness) and reduced feeding, growth and reproduction.

The ingestion of plastic by marine animals also introduces hazardous substances into marine food chains, potentially concentrating and passing toxins up the food chain from prey to predator. A range of marine species face the added risk of becoming entangled in larger plastic debris items.

On land, plastic litters fields, waterways, hedgerows and trees across the globe. Piles of plastic pollution and waste release a toxic liquid runoff called leachate, which can contaminate soil and groundwater, and plastic also poses significant ingestion, choking and entanglement hazards to wildlife. There is evidence to suggest that the impacts of microplastics on freshwater animals can be as diverse and harmful as those for marine species.

Plastic pollution is also contributing to **climate change**. While global plastic production emits 400 million tonnes of greenhouse gases each year (more than the UK's total carbon footprint), according to the World Bank solid waste was responsible for a further five per cent of global emissions in 2016. The true figure may be much higher: emissions from backyard burning of waste are not included in most current emissions inventories, despite research revealing that in several developing countries they dwarf all other sources of carbon emissions combined.



📷 A woman and her baby with burning rubbish behind her in the Mocuba District of Mozambique. Photo: Ralph Hodgson/Tearfund

A public health emergency



📷 The river Tejipto, in Recife, Brazil, is clogged with plastic waste. Tearfund partner, Instituto Solidare, have a project called 'clean river, healthy city', which is working to clean up the river. Photo: Moises Lucas Lopes da Silva/Tearfund

Plastic pollution is creating a growing public health emergency in many towns and cities around the world. New research by Tearfund suggests that **between 400,000 and 1 million people die each year in developing countries because of diseases related to mismanaged waste.**² At the upper end that is one person every 30 seconds. Mismanaged waste, including plastics, harms people's health in developing countries in the following ways:

- **It blocks waterways and drains, which causes flooding,** resulting in **waterborne** diseases and death by **drowning**.
- **It creates a breeding ground** for disease-carrying flies, mosquitos and vermin. Mosquitoes spread **malaria** and **dengue**. Flies carry and transmit a number of diseases such as **typhoid fever** and **tuberculosis**, while rats spread **rabies** and **plague**.
- **It doubles the incidence of diarrhoeal disease** for people living among mismanaged waste. Diarrhoeal disease is the second leading cause of death in children under five years old.
- **It is openly burnt, releasing pollutants** that increase the risk of diseases such as **heart disease** and **cancer**, respiratory ailments, skin and eye diseases, nausea and headaches, and damage to the reproductive and nervous systems. Outdoor air pollution is responsible for 3.7 million deaths a year, and recent estimates suggest that open burning could be responsible for as much as a fifth of this death toll.
- **It poses direct risks to life through large informal dumpsites.** In 2017, landslides at waste dumps accounted for more than 150 known deaths.
- **It pollutes water and soil and enters the food chain.** Much of the plastic in water and on land disintegrates into tiny pieces. Microplastic is entering the food chain and being ingested by humans. The health impacts of this are as yet unknown.

2 This includes all types of municipal solid waste – organic, paper, cardboard, metals, glass and plastics.

Livelihoods harmed

Plastic pollution is also damaging livelihoods and curtailing growth in developing countries. The United Nations Environment Programme (UNEP) estimates that the economic costs (eg revenue losses to fisheries, aquaculture, and marine tourism industries) associated with ocean-based consumer plastic pollution alone amounts to 13 billion USD every year.

Plastic pollution damages agricultural livelihoods. Studies have found that in developing countries up to a third of cattle and half of the goat population have consumed significant amounts of plastic. When plastic is swallowed by animals it does not decompose in their digestive tracts. It leads to bloating, a host of adverse health effects, and eventually death by starvation. This has dire economic consequences for farmers.

Plastic pollution damages fishing livelihoods. As many as 820 million people directly and indirectly rely on fisheries as a source of income to support food security. Despite this, very little research has been conducted to assess the impact of plastic pollution on fishing communities.

Plastic pollution represents an existential threat to livelihoods related to tourism. Communities that depend on coral reef-related tourism are particularly vulnerable to plastic pollution. According to UNEP, at least 275 million people depend directly on reefs for livelihoods and sustenance.

A wake up call: it's time to act

Plastic pollution has a direct impact on over half of the Sustainable Development Goals (SDGs); they simply won't be met without tackling the crisis. Urgent action is needed to address the drivers of single-use plastic pollution upstream – ie the generation of plastic packaging – and downstream in the collection and management of plastic waste. This crisis is complex, but if all those who hold responsibility take the required action, it can be tackled. This report identifies four groups of stakeholders who have a role to play in tackling the plastic pollution crisis. Primary responsibility lies squarely with multinational corporations (MNCs) and developed country governments. However, we also highlight the important roles of two other groups. While developing country governments and citizens around the world have done less to create the problem, they are an important part of the solution.

The important role of waste pickers

In many places lacking formal waste collection and management systems, waste pickers often play an important role in sorting and recycling waste. These groups can exhibit high levels of entrepreneurship, resilience and ingenuity. However, their work is informal and they face considerable challenges including unhealthy conditions, lack of social security or health insurance and social marginalisation. The work itself is also extremely hazardous. In several countries, initiatives working with waste pickers and supporting them have resulted in a dramatic expansion in waste collection as well as improving their livelihoods, workplace safety and sense of dignity. In considering the solutions to the plastic pollution crisis, it is vital that any waste management initiatives treat waste pickers as a major stakeholder, and seek to work in partnership with them.



📷 Urgent action is needed to tackle the waste crisis. Photo: Hazel Thompson/Tearfund

Multinational consumer goods companies

Multinational consumer goods companies carry most responsibility for the plastic waste crisis, driving the production of single-use plastic packaging and doing little to collect and sustainably manage the waste they have created. A small number of companies dominate the market in fast-moving consumer goods both in the UK and overseas. Coca-Cola, for example, sells more drinks in South Africa than in the UK, and more in India than any country in Europe. And these companies are keen to continue expanding in emerging markets. However, evidence – including several waste and brand audits, and Tearfund and WasteAid's *Survey on the impacts of plastic pollution on poverty* – suggests that they are high on the list of plastic polluters.

Over the decades, the big MNCs have moved away from reusable and recyclable packaging towards a throw-away model. These products are pushed into countries where there is little or no capacity to collect or manage waste. As a result, large quantities of plastic end up blocking drains, producing toxic fumes in backyard bonfires or choking the environment.

Some elements of industry have also resisted legislative efforts to hold them responsible for the waste they create, for example by withstanding government-led 'Extended Producer Responsibility' (EPR), which requires manufacturers and retailers to pay for the costs of managing their products at the end of their life (Deposit Return Schemes are an example of this).

However, in recent years, as public attitudes towards plastic pollution are changing, governments have been emboldened to legislate. And MNCs – at least in their rhetoric – have also started to acknowledge that there is a problem, making a series of new voluntary commitments to address single-use plastic pollution, such as the New Plastics Economy Global Commitment launched in October 2018. Some of these initiatives are a step forward and may represent a willingness for companies to use their global influence for good. However, the commitments are relatively vague and weak and tend to focus on recycling rather than reducing the usage of single-use plastics. And while some companies have disclosed their global annual plastic footprint in volumes as part of the Global Commitment, we urgently need to see a *country by country* disclosure on the number of units sold, so that we can see the scale of the problem and the progress that is being made in developing countries. How do we know if companies are changing practice if we don't know how much plastic they are producing? Far stronger action is needed by MNCs to break the link between plastics and

poverty and stem the flood of plastic filling the oceans. MNCs cannot and should not wait for governments to legislate: they have the capacity, resources and systems to take action now.

RECOMMENDATIONS

Multinational corporations should:

- report, by 2020, on the number of units of single-use plastic products they use and sell *in each country*
- reduce this amount by half, country by country, by 2025, and instead use environmentally sustainable delivery methods like refillable or reusable containers
- recycle the single-use plastics they sell in developing countries, ensuring that by 2022 one is collected for every one sold, as part of adequate systems for collection, re-use, recycling and composting in communities that currently lack these systems³
- restore dignity through working in partnership with waste pickers to create safe jobs. Around the world, there are numerous examples of companies partnering with waste pickers to establish collection and recycling systems that are good for society and the environment.
- reimagine the way their products are delivered. Innovate and explore business models that won't harm people, the earth or the ocean.

Developed country governments

Developed country governments are also a key part of the problem. Plastic pollution is a consequence of the take-make-dispose model of economic development birthed and exported by developed countries. Plastics use is also driven by subsidy: virgin plastic is made from crude oil and natural gas, and fossil fuel industries receive huge subsidies that depress the price of plastic. Many developed country governments have not done enough to date (for example in the form of bans, regulations and laws) to combat the problem of plastic pollution.

Furthermore, for years many developed countries, faced with the problem of too much plastic waste, too little capacity to recycle and a lack of demand for recycled plastic, have exported the problem to poorer countries as a key strategy to deal with domestic post-consumer waste. At present, there is no mechanism for source countries to be held accountable for the impacts of plastic waste exported for recycling to other countries, particularly to countries less able to manage waste.

Developed countries' response to the crisis in developing countries has also been weak. Solid waste management has not been a priority for international aid – only 0.3 per cent of Official Development Assistance (ODA) is spent on waste management.

However, ODA in this area represents a huge and largely untapped opportunity to accelerate progress towards the SDGs.

3 MNCs often argue that governments must be involved for collection systems to function effectively, but experience in South Africa demonstrates that this is not the case. Effective industry-led EPR schemes have been established for tin cans, glass and PET by the relevant industries, dramatically increasing collection rates – see chapter 8.

RECOMMENDATIONS

Developed country governments should:

- phase out the use of fossil fuel subsidies, including fiscal support and public finance, which help drive the increasing production of virgin plastic
- increase the volume of aid for waste management from 0.3 per cent to 3 per cent, which could allow all 2 billion people currently without waste collection to be reached. ODA should focus on building government capacity to reduce the generation of unnecessary single-use plastic packaging, and to extending waste collection and management services to all.
- avoid investment in 'white elephant' projects in developing countries, such as incineration, that threaten waste picker livelihoods, are not suited to waste streams with high organic content and require high levels of institutional capacity to manage effectively
- prioritise technical assistance to developing country governments to:
 - develop and implement legal and fiscal measures to ban or reduce unnecessary, problematic, and non-recyclable plastic
 - implement locally appropriate EPR schemes to ensure businesses benefiting from single-use plastic contribute to its management
 - improve waste management governance and the enabling environment for effective waste management
 - scale up contextually relevant community-based recycling approaches
- ensure that export of domestic waste from their nations is minimised and, where any residual plastic waste is exported, that appropriate recycling facilities are in place in the receiving countries
- support developing countries to develop national strategies for plastics and waste, with goals and policy instruments for each area of the waste hierarchy. This should include support for dedicated plastics action plans to prevent pollution and help reduce the production of problematic, non-essential and nonrecyclable plastics.

Developing country governments

Developing country governments have a key role to play both upstream in regulating the plastic produced and used in-country, and downstream in ensuring sustainable waste management. Developing country governments have often lacked resources, but it's also fair to say that waste management often hasn't been a priority. This is beginning to change and many of the solutions are being pioneered in the Global South, by the nations and communities most affected by this crisis. For example a growing number of countries including Rwanda and Kenya have bans or taxes in place for single-use plastic bags, with many introduced in the last three years. There are also examples – such as in South Africa – of successful EPR schemes where governments have worked with businesses to increase their responsibility for collecting and processing the waste they create.

RECOMMENDATIONS

Developing country governments should:

- set out a national strategy for plastics and waste, with goals and policy instruments for each area of the waste hierarchy
- limit the worst forms of single-use plastic and incentivise innovative product design that reduces plastic use
- work with businesses to ramp up their responsibility for collecting and processing the waste they create (EPR) and require them to publish data on the amount of plastic packaging they are distributing
- set up an inclusive framework for waste management, which should:
 - clarify the roles of government agencies, local government, businesses, and society, and set out measures to promote transparency and accountability
 - partner with informal waste pickers, providing the instruments and technical support required for local government to contract with these groups and offering support for waste pickers to organise together as associations and cooperatives
 - include mechanisms for local communities to monitor and become involved in waste collection
- increase the political and financial resources available for waste management at both municipal and national level and work with donors to allocate more funding to this area. The focus should be on pioneering low-cost, inclusive solutions (as several nations are already doing).

Citizens

Citizens also have a role to play, using their voices and actions to persuade governments and companies to make the changes outlined in this report.

Lifestyle actions that reduce single-use plastics will help reduce the generation of plastic waste. By making changes and talking about them, social norms can be changed, which also opens up political space for governments and multinational businesses to act.

RECOMMENDATIONS

Citizens should:

- hold companies and governments to account for their responsibilities in tackling the plastic pollution crisis, starting by signing up to support Tearfund's campaign, which asks MNCs to take responsibility for the plastic they produce in developing countries
 - www.tearfund.org/rubbishcampaign
- write to their elected representative (in the UK via www.writetothem.com) telling them their concerns regarding plastic waste and asking them to take action
- take part in community initiatives to tackle plastic waste, such as community litter collections or local beach clean-ups
- reduce usage of single-use plastics where possible, for example by:
 - using a reusable water bottle, reusable shopping bags and reusable cup when buying hot drinks 'on the go'
 - cutting out non-essential items like cotton buds, glitter, plastic cups, plates and cutlery, and plastic straws⁴
 - buying groceries and toiletries with less or no packaging where possible, eg loose vegetables rather than those packaged in plastic, unwrapped soap etc⁵
 - buying from ethical companies who are committed (genuinely) to reduce plastic use

⁴ The exception being people with particular disabilities that require the use of straws.

⁵ Bio-based, 'biodegradable' or compostable plastics are not a solution to the plastic pollution crisis as they present similar risks to the environment as conventional plastics and can propagate linear material flows that undermine the transition to a circular economy.

INTRODUCTION

'Plastic pollution is poisoning our oceans and land, injuring marine life, and affecting our health. We can see plastics floating in our rivers, ocean, and lagoons, littering our landscapes and affecting our health, and the future of billions of children and youths.'

Idara, Nigeria⁶

The world's plastic pollution problem

Plastic pollution⁷ is out of control and the poorest people and the ecosystems on which we all depend are paying the price.

Plastic is everywhere. An estimated 8.3 billion metric tonnes of plastic has been produced since the 1950s.⁸ That's one tonne for each of us born within the same timeframe.⁹ Approximately 80 per cent has ended up in landfills, the oceans, loose in the environment, or openly burnt. Less than a tenth has been recycled.¹⁰

Around half the amount of plastic waste we produce globally is packaging material that is discarded after just one use.¹¹

Production is on an upwards curve. While plastic has been manufactured since the early 20th century, its recent growth has been phenomenal. Around half of the plastic ever manufactured was produced in the past 15 years,¹² and the world is now producing over 400 million tonnes of plastic every year.¹³ The projections are alarming: global plastic production is set to double over the next ten to fifteen years and this will inevitably continue to outpace and overwhelm any waste management systems put in place.¹⁴

Plastics growth is fastest in the countries least able to deal with it. Traditionally, plastic has been a relatively small component of waste generated in low- and middle-income countries. But this is changing fast. The plastic-dominated supply chain and packaging model – which originated in high-income countries – is being expanded throughout the rest of the world. According to the World Bank, municipal solid waste in low- and middle-income countries contains around 6.4 and 11 per cent respectively by weight of plastics¹⁵ although

6 The quotes provided at the beginning of each chapter are taken from Tearfund and WasteAid's *Survey on the impacts of plastic pollution on poverty*, a survey of development practitioners from across the globe. We have not used respondents' real names.

7 In this report we focus mostly on single-use plastic packaging. We have deliberately chosen not to include the impacts of other plastics for example, microplastic beads (such as those used in cosmetics) or microfibres (such as those released from synthetic clothing). While these undoubtedly add to the plastic pollution crisis, particularly in the marine environment, the focus of this report is on the links between environmental harm and the harm caused to people who are poor and vulnerable. Because of this, we have chosen to limit the scope of the report to plastic waste within municipal solid waste, which is mostly caused by single-use plastic packaging.

8 Geyer R et al (2017) 'Production, use, and fate of all plastics ever made', *Science Advances* 3 (7). <http://advances.sciencemag.org/content/3/7/e1700782>

9 According to the Population Reference Bureau, 8,425,614,944 people were born between 1950 and 2017. <https://www.prb.org/howmanypeoplehaveeverlivedonearth>

10 Geyer R et al (2017) 'Production, use, and fate of all plastics ever made', *Science Advances* 3 (7). <http://advances.sciencemag.org/content/3/7/e1700782>

11 UNEP (2018) *Single-use plastics: a roadmap for sustainability*. <https://wedocs.unep.org/handle/20.500.11822/25496>

12 Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development, p118. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>

13 UNEP (2018) *Single-use plastics: a roadmap for sustainability*. <https://wedocs.unep.org/handle/20.500.11822/25496>

14 Ibid.

15 Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development, p30. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>

other studies suggest a range more in the region of 10 to 20 per cent.¹⁶ These figures are significant because of the low density of plastic packaging: plastic is a very lightweight material (in particular flexible packaging such as bags and packets). For such a low density material to be contributing 10 to 20 per cent of the overall weight of unmanaged waste, the *proportion and volume* of plastic items within the total waste is very high.

The increasing usage of single-use plastics in low- and middle-income countries is part of a bigger waste crisis; the problem of escalating waste generation in many cities is compounded by inadequate or non-existent waste management systems. People in high-income countries are shielded from the negative impact of plastic pollution by regular bin collections. However, 2 billion people in low- or middle-income countries don't have access to properly regulated solid waste collection (bin collections) – all they can do with their waste is burn it or dump it.¹⁷ A further one billion people don't have controlled waste disposal (in other words, their waste may be collected but it is then discarded somewhere unsafe).¹⁸ Waste is growing fastest in sub-Saharan Africa where the total quantity of waste generated is expected to increase by more than three times by 2050.¹⁹

According to the World Bank, in low-income countries about 93 per cent of waste is burned or discarded in roads, open land, or waterways. This is in stark comparison to high-income countries, where only two per cent of waste is dumped.²⁰

Things look extremely bleak if the world continues with business as usual.



📷 Community member in the Coqueiral neighbourhood of Recife, Brazil, whose house regularly floods due to waste blocking the river and more frequent rains. Photo: Moises Lucas Lopes da Silva/Tearfund

16 Miezhah K et al (2015) 'Municipal solid waste characterization and quantification as a measure towards effective waste management in Ghana', *Waste Management*, 46 (Dec 2015), pp15-27. <https://www.ncbi.nlm.nih.gov/pubmed/26421480>
Zia A et al (2017) 'Influence of income level and seasons on quantity and composition of municipal solid waste: a case study of the capital city of Pakistan', *Sustainability*, 9 (9), 1568. <https://www.mdpi.com/2071-1050/9/9/1568/pdf>

17 UNEP/ISWA (2015) *Global waste management outlook*. <http://web.unep.org/ourplanet/september-2015/unep-publications/global-waste-management-outlook>

18 Ibid.

19 Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development, p17. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>

20 Ibid.

Not all plastic is problematic

It is important to acknowledge the benefits of some plastics. Plastic has played – and continues to play – a vital role in ensuring access to modern medicine. It has enabled some communities to access clean water. Plastic preserves and protects food, and so can play a role in reducing food waste. It has facilitated the development of many of our domestic household appliances, and has helped reduce energy costs by making products more lightweight.²¹

However, in our non-circular economies, the pollution caused by so-called 'disposable', single-use plastics is destroying the environment and harming health and livelihoods. The vast majority of single-use plastic produced is completely unnecessary. While some plastic can theoretically be recycled, such as PET (polyethylene terephthalate) which is used for soft drink bottles, even in a high-income country such as the UK the capacity to recycle is far below the capacity that's needed. This means that the UK exports its recyclable plastic elsewhere. What's more, many plastics used today are not designed for recovery and recycling, such as sachets and films.

This report starts by describing the impacts of the plastic pollution crisis on the environment, public health, and livelihoods, and then outlines the responsibilities of four key stakeholder groups. Actions are needed that address the drivers of single-use plastic pollution both upstream (generation of plastic packaging) and downstream (collection and management of plastic waste). Multinational consumer goods companies hold major responsibility for the plastic waste crisis in low- and middle-income countries, driving the production of single-use plastic packaging and doing little to collect and sustainably manage the waste they have created. High-income country governments are also a key part of the problem. The economic systems promoted and supported by these governments have provided an enabling environment that has allowed MNCs' polluting 'throwaway' business models to prosper. And their response to the crisis in low- and middle-income countries has been weak.

While MNCs and high-income governments hold primary responsibility, low- and middle-income country governments, whose citizens are the most severely impacted by the crisis, also have an important role to play. And finally we look at the role of citizens in holding companies and governments to account through campaigning and living out the changes they are calling for through lifestyle and consumption changes.

²¹ See *Eliminating avoidable plastic waste by 2042: a use-based approach to decision and policy making*, Resources Futures and Nextek. Published at the Resourcing the Future Conference, June 2018, <https://bit.ly/2l6qFoU>. This report helpfully categorises plastic according to the length of time a given plastic item is used for its intended purpose.



CASE STUDY 1

Pakistan

Rubina* lives with her husband and three children in Islamabad, Pakistan. She works in three households, cleaning, cooking and ironing before coming home to her own family. Her community faces huge challenges because of a lack of solid waste management. The waste is simply thrown out on the edges of the community and regularly set alight in an attempt to get rid of it. This causes a lot of respiratory problems and Rubina's son Javed, who has severe disabilities, is particularly prone. Rubina regularly has to take him by taxi to the hospital because his breathing is so bad. 'He has severe breathing problem,' she says. 'He feels pain because of the smoke and has an allergy to the soil. I take him to the hospital where he has oxygen. Otherwise, I boil water and the steam helps him.'

Her younger son (Tariq), aged four, has also suffered consequences from the rubbish. A year ago he was playing near the rubbish when some other children picked up some sort of chemical waste and rubbed it on his face, causing burns. He has also cut his hand on broken glass, requiring stitches. Rubina explains: 'I came back from my job one day and he was sitting outside weeping. There was a harmful waste thrown in the rubbish and his face was burnt by it. He was feeling a lot of pain and his lips were swollen. I took him immediately to the hospital. I can't tell you how much his face was burnt. It took him more than a whole month to recover.'

** Names have been changed for privacy purposes.*



Photo: Hazel Thompson/Tearfund

PART 1

THE PROBLEM

1 WASTE, PLASTICS AND THE ENVIRONMENT

'Plastic is mostly washed into the lake, affecting aquatic animals; and in soil, causing erosion and land degradation.'

Isaac, Kenya

The plastic pollution crisis is having a huge impact on the natural environment. In this chapter, we explore this in more depth. A large body of research has shown the impact of plastic pollution on the ocean, to which mismanaged waste is a major contributor, and we address this first. But plastic pollution is also known to have impacts on terrestrial wildlife, soils and freshwater systems, and both plastic production and plastic pollution are contributing to climate change. We look at these impacts in turn.

1.1 The impact of plastic pollution on our oceans

Plastic pollution is threatening the health and future of our oceans and marine life. Of all the damage being caused by the plastic crisis, this is the area that has received most recognition in recent years. In 2017, the BBC's *Blue Planet II* documentary series brought the enormity of the problem to the attention of millions.

The scale of ocean plastic pollution is frightening and plastic waste is a major contributor. Globally, some 8–12.7 million tonnes of mismanaged post-consumer plastic waste ends up in the oceans every year.²² Over 90 per cent of marine plastics come from land-based sources (rather than illegal waste dumping from boats at sea or commercial fishing activity) including mismanaged dumps and landfills.²³ And it is thought that mismanaged municipal solid waste in developing countries accounts for 50–70 per cent by weight of plastics entering the oceans.²⁴

Plastics have been accumulating in the marine environment over the past four decades.²⁵ Once in the ocean, plastic can travel thousands of miles, carried by ocean currents. It has been found in all marine habitats as well as the most remote places on earth. Systems of strong ocean currents, known as 'gyres', concentrate huge amounts of plastic debris in six so-called 'garbage patches' around the world, the largest one being in the North Pacific.²⁶ The gyres are not just circulating mounds of plastic, but in fact represent a dense smog of microplastic particles throughout the water column.

22 Jambeck J et al (2015) 'Plastic waste inputs from land into the ocean', *Science*, vol. 347 (6223), pp768–771. <https://science.sciencemag.org/content/347/6223/768>

23 CIWM and WasteAid (2018) *From the land to the sea: how better solid waste management can improve the lives of the world's poorest and halve the quantity of plastic entering the oceans*. <https://wasteaid.org/wp-content/uploads/2018/04/From-the-Land-to-the-Sea.pdf>

24 Ibid.

25 Wright S et al (2013) 'The physical impacts of microplastics on marine organisms: a review', *Environmental Bulletin*, 178, pp483–492. <https://www.ncbi.nlm.nih.gov/pubmed/23545014>

26 Van Sebille E et al (2012) 'Origin, dynamics and evolution of ocean garbage patches from observed surface drifters', *IOP Science, Environmental Research Letters*, vol. 7 (4). <https://iopscience.iop.org/article/10.1088/1748-9326/7/4/044040>



📷 Dead sea turtle among ocean plastic waste. Photo: iStock.com/Nevodka

The conditions of the marine environment cause plastic to break up into smaller and smaller pieces that are easily ingested by marine animals, who can mistake them for food.²⁷

More than 180 species of marine animals including mammals, birds, fish and invertebrates have been found to have ingested plastic.²⁸ A study in the Polynesian island countries of the South Pacific assessed the plastic ingestion by fish common in the diet of South Pacific island inhabitants.²⁹ The study examined 932 specimens from 34 commercial fish species across four South Pacific locations. Plastic was found in 33 of the 34 species. A recent study of marine mammals washed up on Britain's shores found microplastics in the guts of every animal examined.³⁰

When animals ingest plastic serious problems can occur, such as choking, perforation of the gut, and even starvation as a result of 'pseudo-satiation' (a false feeling of fullness). Eating small pieces of plastic known as microplastics (less than 5mm in size) can also lead to reduced feeding, growth and reproduction.³¹

A further, less visible but potentially devastating, impact of marine plastic pollution is the introduction of hazardous substances into marine food chains. Plastic particles in the ocean, especially microplastics, are known to release toxic chemicals, including additives such as bi-phenols. At the same time they attract and concentrate environmental pollutants already in the seawater, such as pesticides. Plastics have been shown to transfer these harmful substances to the animals that eat them,³² potentially concentrating and passing toxins up the food chain from prey to predator.³³ This poses risks of significantly higher concentrations of pollutants in animals further up the food chain. The potential build-up of toxins in marine life also raises

27 UNEP (2015) *Biodegradable plastics and marine litter: misconceptions, concerns and impacts on marine environments*. <https://wedocs.unep.org/handle/20.500.11822/7468>

28 Nurdle Free Oceans, Reducing plastic pollution in our seas. <https://www.nurdlehunt.org.uk/whats-the-problem/eaten-by-animals.html> [accessed 21 March 2019]

29 Markic A et al (2018) 'Double trouble in the South Pacific subtropical gyre: increased plastic ingestion by fish in the oceanic accumulation zone', *Marine Pollution Bulletin*, vol. 136, pp547–564. <https://www.ncbi.nlm.nih.gov/pubmed/30509840>

30 Nelms S et al (2019) 'Microplastics in marine mammals stranded around the British coast: ubiquitous but transitory?', *Scientific Reports*, 9 (1075). DOI: 10.1038/s41598-018-37428-3

31 Thiel M et al (2018) 'Impacts of marine plastic pollution from continental coasts to subtropical gyres – fish, seabirds, and other vertebrates in the SE Pacific', *Frontiers in Marine Science*, 5 (238). DOI: 10.3389/fmars.2018.00238

32 Tanaka K et al (2013) 'Accumulation of plastic-derived chemicals in tissues of seabirds ingesting marine plastics', *Marine pollution bulletin*, 69 (1-2), pp219–222. <https://www.ncbi.nlm.nih.gov/pubmed/23298431>

33 Farrell P and Nelson K (2013) 'Trophic level transfer of microplastic: *Mytilus edulis* (L.) to *Carcinus maenas* (L.)', *Environmental Pollution*, 177, pp1–3. <https://www.ncbi.nlm.nih.gov/pubmed/23434827>

concerns about human health impacts, particularly for the 3 billion people who depend on the oceans as their primary source of protein.³⁴

A range of marine species including whales, dolphins, turtles and birds face the added risk of becoming entangled in larger plastic debris items such as discarded fishing nets, plastic bags or plastic six-pack rings used for drinks packaging. A survey of entangled turtles showed that over 90 per cent died as a result of their entanglement. The turtles that survived often experienced serious wounds from entanglement, which led to maiming, amputation or choking. Others were forced to drag discarded rubbish or debris with them.³⁵

Plastic pollution has also been shown to have potentially far-reaching impacts on coral reefs. One study assessed the influence of plastic waste on disease risk in 124,000 reef-building corals from 159 reefs in the Asia-Pacific region. The likelihood of disease increases from 4 per cent to 89 per cent when corals are in contact with plastic. This is due to plastic waste hosting and facilitating the proliferation of pathogens that are known to trigger disease outbreaks.³⁶

In addition to the impacts of larger plastic items on corals' susceptibility to disease, scientific experiments have also demonstrated the potential impacts of microplastics that corals mistake for prey and can consume at the same rate as their natural food. This is particularly concerning because ingested microplastics have been discovered wrapped in the corals' internal tissues, which could harm their health.³⁷

These impacts threaten the long-term viability of reef ecosystems including reef-based fisheries, which are important for coastal communities. We discuss this impact on livelihoods in chapter 3. The scale of the problem is alarming. An estimated 11.1 billion plastic items could be entangled on coral reefs across the Asia-Pacific, with a projected increase of 40 per cent by 2025.³⁸



📷 A plastic bag on a coral reef. Photo: iStock.com/Velvetfish

34 United Nations. <https://www.un.org/sustainabledevelopment/oceans> [accessed March 2019]

35 University of Exeter (2017) 'Marine turtles dying after becoming entangled in plastic rubbish', *Science Daily*. <https://www.sciencedaily.com/releases/2017/12/171218154235.htm>

36 Lamb J et al (2018) 'Plastic waste associated with disease on coral reefs', *Science*, 359 (6374), pp460–462. <http://science.sciencemag.org/content/sci/359/6374/460.full.pdf>

37 Hall N et al (2015) 'Microplastic ingestion by scleractinian corals', *Marine Biology*, 162 (725). <https://doi.org/10.1007/s00227-015-2619-7>

38 Lamb J et al (2018) 'Plastic waste associated with disease on coral reefs', *Science*, 359 (6374), pp460–462. <http://science.sciencemag.org/content/sci/359/6374/460.full.pdf>

1.2 The impact of plastic pollution on terrestrial and freshwater biodiversity

Plastic pollution is also wreaking havoc on land as plastic litters fields, waterways, hedgerows and trees across the globe. Some plastics are extremely persistent in the environment with studies suggesting that certain plastics can take thousands of years to decompose in the environment.³⁹ This contaminates soil and water and poses significant ingestion, choking and entanglement hazards to wildlife on land, and in freshwater systems as well as in the ocean. There is evidence suggesting that the impacts of microplastics on freshwater animals can be as diverse and harmful as those for marine species.⁴⁰ According to recent studies, microplastics in terrestrial environments could affect animals that play a major role in key ecosystem processes, such as soil organisms or plant pollinators.⁴¹ The transfer of plastic debris along food chains has also been demonstrated for terrestrial systems,⁴² which could have implications for human health (see chapter 2).



📷 Plastic pollution in Guatemala. Photo: Juan Pablo Moreiras/Fauna & Flora International

It is estimated that one third of all plastic waste ends up in soils or freshwater.⁴³ When plastic sits in water it can release harmful chemicals, creating a liquid leachate that can drain into rivers, groundwater and soil.⁴⁴ This can cause a range of potentially harmful effects on the species that drink the water.⁴⁵ The potential impacts of this on human health are discussed in chapter 2.

39 UNEP (2018) *Single-use plastics: a roadmap for sustainability*, p12. <https://wedocs.unep.org/handle/20.500.11822/25496>

40 Eerkes-Medrano D et al (2015) 'Microplastics in freshwater systems: a review of the emerging threats, identification of knowledge gaps and prioritisation of research needs', *Water Research* (75), pp63–82. <https://www.sciencedirect.com/science/article/abs/pii/S0043135415000858>

41 Machado A et al (2018) 'Microplastics as an emerging threat to terrestrial ecosystems', *Global Change Biology* DOI: 10.1111/gcb.14020

42 Lwanga E et al (2017) 'Field evidence for transfer of plastic debris along a terrestrial food chain', *Scientific Reports* 7 (14071). <https://www.nature.com/articles/s41598-017-14588-2>

43 Machado A et al (2018) 'Microplastics as an emerging threat to terrestrial ecosystems', *Global Change Biology*. DOI: 10.1111/gcb.14020

44 Akinbile C and Mohd S (2011) 'Environmental Impact of leachate pollution on groundwater supplies in Akure, Nigeria', *International Journal of Environmental Science and Development* 2 (1), pp81–86. <http://www.ijesd.org/papers/101-F10106.pdf>. Cited in Kaza S et al (2018) *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*, Urban Development. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>

45 Machado A et al (2018) 'Microplastics as an emerging threat to terrestrial ecosystems', *Global Change Biology*. DOI: 10.1111/gcb.14020

1.3 The contribution of plastic pollution to climate change

As well as impacting directly upon biodiversity in our oceans and on land, plastic pollution is also contributing to climate change, which in turn causes further harm to biodiversity and ecosystems.

Emissions from plastic production

Global plastic production emits 400 million tonnes of greenhouse gases each year.⁴⁶ This is huge – more than the UK's total carbon footprint.⁴⁷ If the growth of plastic production continues at the current rate, by 2050 the plastic industry could account for 20 per cent of the world's total oil consumption.⁴⁸

Emissions from plastic waste

The problem of emissions does not end once the plastic is produced. Plastic waste is also contributing to climate change. Plastic comprises a growing proportion of solid waste; and according to the World Bank, solid waste was responsible for 1.6 billion tonnes of CO₂-equivalent emissions estimated for 2016 – about five per cent of global emissions – and these figures are anticipated to increase to 2.6 billion tonnes by 2050 if no improvements are made in the sector.⁴⁹

However, the figure may be much higher as there are several sources of greenhouse gases not included in assessments of emissions from waste.

A recent groundbreaking study has shown that plastic releases the greenhouse gases methane and ethylene when exposed to sunlight.⁵⁰ This is a previously unaccounted-for source of greenhouse gases and a source that is expected to increase as more plastic is produced and accumulated in the environment.⁵¹

Furthermore, emissions from open burning of waste are not included in most current emissions inventories. Standard assessments consider the emissions from inadequate waste collection systems, disposal in open dumps, and landfills without landfill gas collection systems, but not from open burning of waste, even though these emissions are among the most significant in low- and middle-income countries.⁵²

Recent research shows that in several low-income countries these emissions far exceed all other sources of carbon emissions combined, and are thus much more important than previously thought.⁵³ For example, in Comoros, Chad, Rwanda and the Solomon Islands the estimated CO₂ emissions from open waste burning range between three and four times higher than the reported anthropogenic CO₂ emissions.⁵⁴ In Mali and Burundi, the figure is around five times higher.⁵⁵

46 Ellen MacArthur Foundation (2016) *The New Plastics Economy*. https://www.ellenmacarthurfoundation.org/assets/downloads/EllenMacArthurFoundation_TheNewPlasticsEconomy_Pages.pdf

47 The UK's total net CO₂ emissions in 2017 was 367 million tonnes. Department for Business, Energy and Industrial Strategy (2018) *2017 UK Greenhouse gas emissions, provisional figures*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/695930/2017_Provisional_Emissions_statistics_2.pdf [accessed 21 March 2019]

48 World Economic Forum (2016) *The New Plastics Economy: rethinking the future of plastics*, cited in UNEP (2018) *Single-use plastics: a roadmap for sustainability*. <https://wedocs.unep.org/handle/20.500.11822/25496>

49 Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development, p118. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>

50 Royer S-J et al (2018) 'Production of methane and ethylene from plastic in the environment', *PLoS ONE* 13 (8). <https://doi.org/10.1371/journal.pone.0200574>

51 Ibid.

52 Wiedinmyer C et al (2014) 'Global emissions of trace gases, particulate matter, and hazardous air pollutants from open burning of domestic waste', *Environmental Science and Technology*, 48 (16), pp9523–9530. <https://www.ncbi.nlm.nih.gov/pubmed/25019173>

53 Ibid. See the supplementary tables, Sheet S5. <https://pubs.acs.org/doi/suppl/10.1021/es502250z> [accessed 21 March 2019]

54 Ibid.

55 Mali 4.7; Burundi 5.2

2 WASTE, PLASTICS AND HEALTH

'Plastic waste causes serious flooding, air pollution and disease.'

David, Cameroon

'There are many health impacts [of mismanaged waste], especially for children. Dengue fever, leishmaniasis, chikungunya, microcephaly, respiratory diseases, lots of viruses. It's much worse in flooded regions, where dirty water provides mosquito breeding grounds. Rat urine also spreads disease: it's a big crisis.'

Maria, Brazil

Plastic pollution is creating a growing public health emergency in many towns and cities around the world, and the poorest and most vulnerable people are most at risk. The impacts of unmanaged waste on human health have been less publicised than the environmental impacts, but they are equally devastating. **At least 30 diseases** can be associated with uncollected waste, of which plastic is a growing component. Several of these diseases are primary causes of death and sickness in low- and middle-income countries.⁵⁶ Indeed, new research by Tearfund suggests that **between 400,000 and 1 million people die each year in low- and middle-income countries because of diseases related to mismanaged waste.**⁵⁷ At the upper end, that is one person every 30 seconds.

In this chapter, we explore the health impacts of the plastic and waste crisis in more detail. We highlight five core ways the health and lives of billions of poor and vulnerable people – particularly children – are put at risk by mismanaged household waste. We also highlight a sixth potential health hazard, which is potentially huge, but as yet little understood: the introduction of microplastics into the food chain.



Many communities in low- and middle-income countries have no safe way to manage their waste. Photo: Hazel Thompson/Tearfund

⁵⁶ Brewer T (2018) *Tearfund Literature Review on mismanaged solid waste and health impacts*. Unpublished

⁵⁷ See the Annex for the methodology behind this statistic.



📷 A drainage channel blocked with plastic waste, Brazil. Photo: Moises Lucas Lopes da Silva/Tearfund

2.1 Health hazard: flooding caused by blocked waterways and drains

Plastic pollution is notorious for blocking waterways and drains in low- and middle-income countries, causing flooding. When combined with inadequate sanitation services, these floods can quickly lead to severe outbreaks of cholera and other diarrhoeal diseases, as well as causing drowning and damage to property (with knock-on health effects).

As long ago as 1988, vast tracts of Bangladesh were submerged by floods attributed to plastic waste.⁵⁸ Since then, areas of Uganda, West Africa and India have all had similar experiences.⁵⁹ The damage caused by such floods can be significant. For example in 2011, floods in Accra, Ghana, caused by blocked waterways, damaged 17,000 homes and led to 100 cholera deaths.⁶⁰

In 2018, WasteAid, on behalf of Tearfund, carried out a survey of development practitioners from across the globe, looking at the impacts of plastic pollution on poverty.⁶¹ Over 90 per cent of the development practitioners surveyed said that waste had caused flooding in their area over the previous two years. Over half (56 per cent) indicated that flooding caused by plastic was a serious problem in slums, with at least four or five incidents per year where plastic was a factor.

2.2 Health hazard: breeding grounds for disease vectors

Plastic pollution provides disease-carrying flies, mosquitos and vermin with a variety of habitats and breeding grounds, dramatically increasing their numbers in communities with unmanaged waste.

58 UNEP (2018) *Single-use plastics: a roadmap for sustainability*, p13. <https://wedocs.unep.org/handle/20.500.11822/25496>

59 Wilson DC et al (2013) 'Integrated sustainable waste management in developing countries. Proceedings of the Institution of Civil Engineers', *Waste and Resource Management*, 166 (2), pp52–68

60 Amoako C and Frimpong Boamah E (2015) 'The three-dimensional causes of flooding in Accra, Ghana', *International Journal of Urban Sustainable Development*, 7 (1), pp109–129

61 Tearfund and WasteAid (2018) *Survey on the impacts of plastic pollution on poverty*

Mosquitoes are the most common disease vector across the Global South. One of the diseases carried by mosquitoes is **dengue**, a severe, flu-like illness. It can develop into 'severe dengue', which is a leading cause of serious illness and death among children in some Asian and Latin American countries.⁶² According to a World Health Organisation (WHO) report, rain collecting in plastic food packaging is considered 'notorious' for the breeding of dengue-carrying mosquitoes.⁶³ These mosquitoes bite during the day, so mosquito nets offer limited protection, and there is no treatment or vaccine. Preventing the mosquitoes from breeding is the main way to reduce transmission of dengue and it's estimated that improved water and/or waste management could reduce the impacts of dengue by 95 per cent.⁶⁴

Flies also carry and transmit a number of diseases. Rubbish, including discarded plastic, is a major breeding ground for flies, which transmit **typhoid fever**, **dysentery**, **cholera**, **leprosy** and **tuberculosis**,⁶⁵ while rats and other vermin spread **rabies**, **leptospirosis**, **hanta virus**, **typhus** and **plague**.⁶⁶



CASE STUDY 2

Meera

.....

Meera lives in Islamabad, in Pakistan. She is 45 years old and has seven children aged between 2 and 16. Their home is on the edge of the community and rubbish collects outside the home, providing a breeding ground for mosquitoes. She has recently suffered from typhoid and dengue fever. She was ill for three months and the medication she requires is very expensive, putting a lot of strain on the family income. She has suffered from attacks of paralysis and is unable to work so the family is dependent on the income her husband and 16-year-old son are able to bring in from their work as cleaners. Meera's community is part of a new solid waste management project supported by Tearfund – she hopes it will create a cleaner environment and eradicate these preventable diseases.



Photo: Hazel Thompson/Tearfund

62 World Health Organisation (2018) *Factsheet on dengue and severe dengue*. <https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue> [accessed 21 March 2019]

63 Prüss-Ustün A et al (2016) *Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks*, World Health Organisation

64 Ibid.

65 Keiding J (1986) *The housefly – biology and control. Training and information guide (advanced level)*, chapter 6, Switzerland, Geneva: Division of Control of Tropical Diseases, World Health Organization

66 Cointreau S (2006) *Occupational and Environmental Health Issues of Solid Waste Management – Special Emphasis on Middle- and Lower-Income Countries*. Washington DC: The World Bank

2.3 Health hazard: increased diarrhoeal disease

According to the UN, living among uncollected waste **doubles the incidence of diarrhoeal disease**.⁶⁷ In many countries, it is common practice to dispose of child faeces as part of the household rubbish – either in plastic bags or in disposable nappies.⁶⁸ Faeces may also be in the environment through flooding caused by blocked drains and waterways (as mentioned previously).



📷 Nappies in discarded waste in Vanuatu, South Pacific. Photo: Nicole Garofano/WasteAid

Children playing in the piles of rubbish surrounding their houses, or on nearby waste ground or roadsides, come into direct contact with faecal matter and are exposed to diarrhoeal diseases. Flies (which breed in rubbish) also transmit diarrhoeal disease between faeces and uncovered food or drink. Diarrhoeal disease is the second leading cause of death in children under five years old.⁶⁹ Repeated episodes of diarrhoea can be particularly damaging to young children, having long term consequences on their development through increased malnutrition.⁷⁰

Faecal contamination of the environment also spreads **intestinal worms** such as hookworm. These are usually picked up either by ingesting eggs or by walking barefoot over larvae in the soil, which means that children are particularly at risk.⁷¹

67 UN Habitat (2010) *Solid Waste Management in the World's Cities*. <https://unhabitat.org/wp-content/uploads/2015/12/SolidWaste.pdf>. Other studies suggest even higher figures. For example, a study in Ethiopia found that diarrhoeal disease was more than three times as likely where waste was not managed properly: Gebru T et al (2014) 'Risk factors of diarrhoeal disease in under-five children among health extension model and non-model families in Sheko district rural community, Southwest Ethiopia: comparative cross-sectional study', *BMC Public Health*, 14, p395; and a study in Brazil published by the Royal Society of Tropical Medicine and Hygiene found that exposure to waste in the environment quadrupled the incidence of diarrhoea: Rego et al (2005) 'Diarrhoea and garbage disposal in Salvador, Brazil', *Transactions of the Royal Society of Tropical Medicine and Hygiene*, vol. 99 (1).

68 UNICEF's Multiple Indicator Cluster Survey (MICS) data cited in Brewer T (2018) *Tearfund Literature Review on mismanaged solid waste and health impacts*. Unpublished.

69 World Health Organisation (2017) *Factsheet on diarrhoeal disease*. <https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease> [accessed 21 March 2019]

70 Dangour A et al (2013) 'Interventions to improve water quality and supply, sanitation and hygiene practices, and their effects on the nutritional status of children', *Cochrane Database of Systematic Reviews*, 8 (8). <https://www.ncbi.nlm.nih.gov/pubmed/23904195>

71 World Health Organisation (2018) *Fact sheet on soil-transmitted helminth infections*. <http://www.who.int/en/news-room/fact-sheets/detail/soil-transmitted-helminth-infections> [accessed 21 March 2019]

2.4 Health hazard: air pollution through burning waste

Many people affected by a build-up of uncollected waste use burning as the only practicable means of disposal. According to the World Health Organisation, tackling waste management is a central strategy to reducing air pollution in the poorest cities.⁷² The health impacts are huge: ambient air pollution is responsible for 3.7 million deaths a year,⁷³ and recent estimates suggest that open burning could be responsible for as much as a fifth of this death toll.⁷⁴

There is compelling evidence that plastic is a significant contributor to the hazards associated with burning waste. Open burning of plastic waste releases black carbon,⁷⁵ dioxins, furans, mercury and polychlorinated biphenyls into the atmosphere. All of these are direct threats to human health. They increase the risk of diseases such as **heart disease** and **cancer**, respiratory ailments such as **asthma** and **emphysema**, **skin and eye diseases**, **nausea and headaches** and **damage to the reproductive and nervous systems**.⁷⁶

Research has shown that air pollution significantly increases the risk of **premature birth** and **low birth weight**, leading to lifelong damage to health.⁷⁷ Recent evidence has also shown that particles of air pollution travel through pregnant women's lungs and lodge in their placentas.⁷⁸

In Ethiopia, a study showed that children from slums with uncollected waste were six times more likely to suffer from **acute respiratory infections** than those living where there were regular waste collections.⁷⁹



📷 Toxic fumes are released from burning plastic, but many communities have no other options to get rid of their waste.
Photo: Hazel Thompson/Tearfund

72 World Health Organisation News Release, 'Air pollution levels rising in many of the world's poorest cities', 12 May 2016. <http://www.who.int/en/news-room/detail/12-05-2016-air-pollution-levels-rising-in-many-of-the-world-s-poorest-cities> [accessed 21 March 2019]

73 World Health Organisation (2014) 'Burden of disease from ambient air pollution for 2012'. https://www.who.int/phe/health_topics/outdoorair/databases/AAP_BoD_results_March2014.pdf [accessed 21 March 2019]

74 Wiedinmyer C et al (2014) 'Global emissions of trace gases, particulate matter, and hazardous air pollutants from open burning of domestic waste', *Environmental Science and Technology*, vol. 48 (16), pp9523–9530. <https://www.ncbi.nlm.nih.gov/pubmed/25019173>

75 Reyna-Bensusan N et al (2018) 'Uncontrolled burning of solid waste by households in Mexico is a significant contributor to climate change in the country', *Environmental Research*, 163, pp280–288. <https://www.ncbi.nlm.nih.gov/pubmed/29482066>

76 Verma R et al (2016) 'Toxic Pollutants from plastic waste – a review', *Procedia Environmental Sciences*, 35, pp701–708. <https://www.sciencedirect.com/science/article/pii/S187802961630158X>

77 Smith R et al (2017) 'Impact of London's road traffic air and noise pollution on birth weight: retrospective population based cohort study', *BMJ*, 2017 (359). <https://www.bmj.com/content/359/bmj.j5299>

78 Carrington D, 'Air pollution particles found in mothers' placentas', *The Guardian*, 16 September 2018. <https://www.theguardian.com/environment/2018/sep/16/air-pollution-particles-found-in-mothers-placentas>

79 United Nations Human Settlements Programme (UN-HABITAT) (2008) *State of the World's Cities 2008/2009 HARMONIOUS CITIES*. London: Earthscan, p129. <http://wedocs.unep.org/handle/20.500.11822/18333>

2.5 Health hazard: landslides

Large uncontrolled dumpsites may also pose direct risks to life if attention is not given to slope stability. In 2017, landslides at waste dumps in Colombo, Sri Lanka; Addis Ababa, Ethiopia; Conakry, Guinea; and Delhi, India accounted for more than 150 deaths.⁸⁰ The most serious of these was the landslide at a dumpsite in Ethiopia in March 2017, which killed 115 people.⁸¹ In February 2018, 16 people died when heavy rains triggered a landslide in a dumpsite in Maputo, Mozambique.⁸²

2.6 Health hazard: polluting water and soil, and entering the food chain

The hazard of plastic polluting marine life, freshwater and soils was discussed in chapter 1. Microplastics – pieces of plastic smaller than five millimetres in length – are introduced into the environment both directly (eg as microbeads from cosmetics) and indirectly via the degradation of larger pieces of plastic. These microplastics disintegrate further into nanoplastics, which are less than 0.1 micrometre (one millionth of a metre) in size.⁸³ This 'breaking down' process has worrying impacts, as explained by scientists studying this phenomenon: 'Generally speaking, when plastic particles break down, they gain new physical and chemical properties, increasing the risk that they will have a toxic effect on organisms. And the larger the number of potentially affected species and ecological functions, the more likely it is that toxic effects will occur.'⁸⁴

As discussed in chapter 1, microplastic ingestion has the potential to introduce hazardous substances into marine food chains. The impact of microplastics in soils, sediments and freshwater is less well understood than ocean microplastics, but could have a long-term negative effect on such ecosystems. The results of the little research done to-date in this area are concerning: fragments of plastic are present practically all over the world and experiments have demonstrated their potential to trigger a range of adverse effects in species studied under laboratory conditions.⁸⁵

Microplastics have already been detected not only in fish and seafood, but also in both tap and bottled water and across a wide range of foods. The transfer of microplastics up the food chain has been demonstrated.⁸⁶ Microplastic is entering the food chain and being ingested by humans. The health impacts of this are as yet unknown, but are the subject of several large-scale research programmes currently being undertaken.⁸⁷

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- 80 Kaza S (2018) 'Landslides, dumpsites and waste pickers', *World Bank Sustainable Cities blog*. <http://blogs.worldbank.org/sustainablecities/landslides-dumpsites-and-waste-pickers> [accessed 21 March 2019]
- 81 Maasho A, 'Ethiopia trash dump landslide death toll rises to 115', *Reuters*, 16 March 2017. <https://uk.reuters.com/article/uk-ethiopia-accident/ethiopia-trash-dump-landslide-death-toll-rises-to-115-idUKKBN16N0ND> [accessed 21 March 2019]
- 82 Swingler S, 'Living and dying on a rubbish dump: the landfill collapse in Mozambique', *The Guardian*, 26 February 2018. <https://www.theguardian.com/global-development/2018/feb/26/explosion-fatal-rubbish-landslide-mozambique-hulene-dump> [accessed 21 March 2019]
- 83 Machado A et al (2018) 'Microplastics as an emerging threat to terrestrial ecosystems', *Global Change Biology*. DOI: 10.1111/gcb.14020
- 84 Forschungsverbund Berlin, 'An underestimated threat: land-based pollution with microplastics', *ScienceDaily*, 5 February 2018. www.sciencedaily.com/releases/2018/02/180205125728.htm
- 85 Machado A et al (2018) 'Microplastics as an emerging threat to terrestrial ecosystems', *Global Change Biology*. DOI: 10.1111/gcb.14020
- 86 Setälä O et al (2014) 'Ingestion and transfer of microplastics in the plankton food web', *Environmental Pollution*, 185, pp77–83. <https://www.ncbi.nlm.nih.gov/pubmed/24220023>
- 87 See, for example, an Indonesian study into health risks of microplastics: Shukman D, 'Indonesian study into health risks of microplastics', *BBC News*, 8 May 2018. <https://www.bbc.co.uk/news/science-environment-43913597> [accessed 21 March 2019]

3 WASTE, PLASTICS AND LIVELIHOODS

'Plastic waste is ingested by domestic and wild animals.'

Ezekiel, Nigeria

As well as blighting our natural environment and harming human health, plastic pollution is also damaging livelihoods and curtailing economic development in low- and middle-income countries. In this report we have already noted the devastating effects of flooding caused by blocked drains, which often has significant economic ramifications. Plastic waste also directly affects fishing, agriculture and tourism.

The United Nations Environment Programme (UNEP) estimates that costs associated with ocean-based consumer plastic pollution alone amount to 13 billion USD every year. This includes revenue losses to fisheries, aquaculture, and marine tourism industries, in addition to the cost of cleaning up litter on beaches.⁸⁸

This field of research is still in its infancy, but it is already clear that plastic pollution in the ocean and on land has a direct impact on the livelihoods of people who are poor. In this chapter we explore the impacts of plastic pollution on livelihoods in three key sectors for many low- and middle-income countries: agriculture, fisheries and tourism.



📷 A beach covered in plastic waste, Bunaken Island in North Sulawesi, Indonesia. Photo: Andrew Church/Fauna & Flora International

88 UNEP (2014) *Valuing plastics: the business case for measuring, managing and disclosing plastic use in the consumer goods industry*. <http://wedocs.unep.org/handle/20.500.11822/9238>

Waste management – a cost-effective strategy

A study focused on South-East Asia estimated the economic cost of uncollected household waste that is burned, dumped, or discharged to waterways to be 375 USD/tonne.⁸⁹ For the same region, the World Bank estimated the integrated waste management costs for basic systems meeting good international hygienic standards (including collection, transport, treatment and disposal of waste) to be 50–100 USD/tonne.⁹⁰ Taking the mid-point of the estimated integrated waste management costs (75 USD), this means **the cost of uncollected household waste is five times that of the cost of integrated waste management.**

3.1 The impact of plastic pollution on agricultural livelihoods

When plastic litters hedgerows, fields and waterways, animals can mistake it for food and eat it. Studies have found that up to a third of cattle and half of the goat population in the Global South have consumed significant amounts of plastic.⁹¹ Research on abattoirs in Kenya shows that cows with plastics in their digestive system are a daily occurrence. In one case, a slaughtered cow had 2.5kg of plastic waste in its digestive system – about the same weight as a laptop.⁹² When plastic is swallowed by animals, it does not decompose in their digestive tracts and cannot move through their guts. It leads to bloating, a host of adverse health effects and eventually death by starvation.⁹³ Alongside the evident suffering this causes the animals, this has dire economic consequences for farmers.⁹⁴



📷 A buffalo roams freely on a waste-covered river bank in Pakistan. Photo: Liaquat Gill/Pak Mission Society

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- 89 McKinsey (2016) *The Circular Economy: moving from theory to practice*. McKinsey Centre for Business and Environment Special Edition. Cited in Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development, p116. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>
- 90 Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development, p18. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>
- 91 Various sources, including Tiruneh R and Yesuwork H (2010) 'Occurrence of rumen foreign bodies in sheep and goats slaughtered at the Addis Ababa Municipality Abattoir', *Ethiopian Veterinary Journal*, vol. 14 (1); and Mushongal et al (2015) 'Investigations of foreign bodies in the fore-stomach of cattle at Ngoma Slaughterhouse, Rwanda', *J. S. Afr. Vet. Assoc.*, vol. 86 (11) Pretoria. Cited in CIWM and WasteAid UK (2018) *From the Land to the Sea: how better solid waste management can improve the lives of the world's poorest and halve the quantity of plastic entering the oceans*.
- 92 UNEP (2017) 'Free of plastic bags: how the menace of polythene bags has been handled in Kenya'. <http://web.unep.org/ourplanet/december-2017/articles/free-plastic-bags> [accessed 21 March 2019]
- 93 UNEP/ISWA (2015) *Global waste management outlook*. <http://web.unep.org/ourplanet/september-2015/unep-publications/global-waste-management-outlook>
- 94 Ramaswamy V and Sharma H (2012) 'Plastic bags – threat to environment and cattle health: retrospective study from Gondar city in Ethiopia', *IIOAB Journal – India* 2 (1), pp7–12



CASE STUDY 3

Rwanda's cows and the plastic bag ban



📷 The route from Kigali to Eastern Province, Rwanda. Kigali is now considered by many to be the cleanest city in Africa.
Photo: Eleanor Bentall/Tearfund

Rwanda outlawed the use of non-biodegradable plastic bags in 2008. At the time, many people asked: 'Is this really necessary? Surely Rwanda has bigger and more important things to worry about?' A few years before that, though, farmers were losing their livestock to plastic bags at an alarming rate. Rivers, streams and drains were blocked by plastic bags. Even farmers' fields were choked by these bags.

I personally came face to face with the plastic bag menace in 2006. At that time, my mother owned six dairy cows. One of the cows began to lose weight and became sickly. My mother called in a vet, but the cow got worse. Within four weeks, four cows had died. When the vet performed an autopsy, it turned out they had all eaten plastic bags. Sadly, this was not an isolated incident. Plastic bags were affecting the local economy across Rwanda. People called urgently on the government to do something. There were discussions at all levels, from community meetings to parliamentary debates. Eventually a law was passed banning plastic bags.

But first the country desperately needed to rid itself of the bags that were already littering it. Special clean-up days were organised, and the results were shocking. There were mountains of plastic bags in virtually every village. Burning them would have caused huge amounts of air pollution, but there was no way to dispose of them. This needed a solution at government level.

The government invested in a plastic recycling plant through incentives to the private sector. The mountains of plastic bags began to disappear from villages, transported to the new plant. Soon, other types of plastic waste followed. Today, the country is virtually plastic-bag free. After the clean-up campaign, the government began to enforce the ban throughout Rwanda, including at the borders. Plastic bags were confiscated, and users and sellers were given heavy fines. Businesses were encouraged and supported to find alternatives. The ban went far beyond just outlawing plastic bags: it created a sense of environmental responsibility among Rwandans.

This case study was written by Emmanuel Murangira, Tearfund's Country Representative in Rwanda, and first published in Tearfund's magazine, *Footsteps* 107.⁹⁵

95 Tearfund (2019) *Footsteps* 107 – Waste, https://learn.tearfund.org/en/resources/publications/footsteps/footsteps_101-110/footsteps_107. For more detailed analysis of Rwanda's solid waste management and recycling systems, see Kabera T, Wilson D, Nishimwe H (2019) 'Benchmarking performance of solid waste management and recycling systems in East Africa: comparing Kigali Rwanda with other major cities', *Waste Management and Research*, 37 (1_suppl), pp58–72. <https://doi.org/10.1177/0734242X18819752>

The impact of plastic and its lethal impact on animals is under-researched and underreported. Often there are no official reports unless cattle deaths have medico-legal implications to settle compensation claims.⁹⁶ The impact of plastic pollution on agriculture is an area in desperate need of research.

3.2 The impact of plastic pollution on fishing livelihoods

The impacts of plastic pollution on marine ecosystems were described in chapter 1, and include the death of marine life and potentially the decline in both diversity and population numbers of various species.

As many as 820 million people directly and indirectly rely on fisheries as a source of income to support food security,⁹⁷ so the human impact of these changes could be vast. Despite this, very little research has been conducted to assess the impact of plastic pollution on fishing communities. As long ago as 1992, the negative impacts of plastic pollution and marine debris on small-scale subsistence fishing communities and livelihoods were documented in Indonesia.⁹⁸ The study found that plastic waste impacted fishing activities through propeller entanglements, damage to fishing gear and injuries to people. The most direct impact was a decreased yield of fish caused by plastic pollution. But there were also indirect costs – increased expenditure (for example for repairs or for medicine for an injury) or an increased amount of time spent on fishing or fishing-related activities. The report also highlighted that for fisherfolk living at the subsistence level, even a minor decrease in fishing yield can mean that they cannot provide for their own basic needs such as food.



Beach litter collected in Bali. Photo: David Leeke/Waste Aid

96 Gupta P (2018) 'Chapter 4 Epidemiology of Animal Poisonings in Asia', *Veterinary Toxicology (Third Edition) Basic and Clinical Principles*, pp57–69

97 Béné C et al (2015) 'Feeding 9 billion by 2050 – putting fish back on the menu', *Food Security* 7 (2), pp261–274, cited in IIED Briefing (December 2016) 'A sustainable future for fisheries: how fiscal policy can be used to achieve SDG 14'. <http://pubs.iied.org/pdfs/17411IIED.pdf>

98 Nash A (1992) 'Impacts of marine debris on subsistence fishermen: an exploratory study', *Marine Pollution Bulletin*, vol. 24 (3), pp150–156

More recently in 2018, a study in the state of Maharashtra, India, analysed the impacts of pollution, including plastics, on the fish catch and livelihoods of marine fishermen.⁹⁹ The study showed that destruction and pollution of mangroves through chemicals, sewage, plastics and other debris are perceived to be impacting fishing livelihoods. In an article in *National Geographic* in 2018, fishermen in the Arabian Sea reported catching more plastic than fish when they cast out their nets.¹⁰⁰

Another emerging threat to both fishing communities and human health is the accumulation of microplastics in fish stocks – discussed previously in chapter 1.

Most studies have focused on plastics in the marine environment; less research has been carried out on plastics in freshwater ecosystems. Indeed, as of 2018, only 23 countries in the world had studied plastic pollution in freshwater systems.¹⁰¹ This is particularly relevant for low- and middle-income countries where open uncontrolled dumping leads to leachate polluting water sources. There is an urgent need for more research (and action) to study the impact of plastic pollution on freshwater fisheries given the economic importance and threats to human health.

3.3 The impact of plastic pollution on livelihoods related to tourism

Many low- and middle-income countries rely on tourism as a crucial source of income, jobs and foreign exchange. Plastic waste represents an existential threat to these businesses. For example, recent news reports have focused on the extent of the plastic pollution crisis on the island of Bali, which is economically dependent on tourism.¹⁰² There, a plastic deluge 'ends up in unsightly mounds on Bali's beaches, horrifying tourists and environmentalists alike'.¹⁰³

Communities that depend on coral reef-related tourism may be particularly vulnerable to plastic pollution. The impacts of plastic pollution on coral reefs was discussed in chapter 1. These in turn impact the communities who rely on these reefs for their livelihoods.

According to UNEP, some 850 million people live within 100km of coral reefs and derive benefits from them, with at least 275 million people depending directly on reefs for livelihoods and sustenance.¹⁰⁴

Coral reefs generate up to 1.25 million USD per hectare annually from tourism, coastal protection, bioprospecting and fisheries.¹⁰⁵ Communities that rely on coral reefs for livelihoods are located mostly in small-island states, among many countries in the Coral Triangle and among coastal populations in low- and middle-income countries.

99 Malakar K et al (2018) 'Perceptions of multi-stresses impacting livelihoods of marine fishermen', *Marine Policy* 97, pp18–26

100 *National Geographic* (2018) 'How India's fishermen turn ocean plastic into roads'. <https://news.nationalgeographic.com/2018/05/fishermen-kerala-india-recycle-plastic-pollution-culture>

101 Blettler M et al (2018) 'Freshwater plastic pollution: recognizing research biases and identifying knowledge gaps', *Water Research* 143, pp416–424

102 Tourism's contribution to the economy of Bali was 68.28 per cent in 2014 – Antara M, Sumarniasih M (2017) 'Role of tourism in economy of Bali and Indonesia', *Journal of Tourism and Hospitality Management*, vol. 5 (2), pp34–44

103 For example Lamb K, 'Plastic, plastic, plastic': British diver films sea of rubbish off Bali, *The Guardian*, 6 March 2018. <https://www.theguardian.com/world/2018/mar/06/plastic-british-diver-films-sea-rubbish-bali-indonesia> [accessed 21 March 2019]

104 UNEP, 'Valuable but vulnerable'. http://coral.unep.ch/Coral_Reefs.html [accessed 21 March 2019]

105 Ibid.

4 PLASTIC POLLUTION AND THE SUSTAINABLE DEVELOPMENT GOALS (SDGS)

'There is just too much plastic!'

Nadira, Indonesia

The first part of this report has shown how far-reaching and serious the impacts of plastic pollution are on our oceans and land and the ecosystems and wildlife they sustain; on the health of billions of the world's poorest and most vulnerable people; and on the livelihoods of millions more.

In 2015, all United Nations member states adopted the 2030 Agenda for Sustainable Development. It provides a 'shared blueprint for peace and prosperity for people and the planet, now and into the future'.¹⁰⁶ It includes the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries.

Plastic pollution has a direct impact on more than half of the Goals.



Goal 1: End poverty in all its forms everywhere

Plastic pollution increases poverty and vulnerability through causing disasters such as flooding, harming people's health (and their ability to earn livelihoods), and directly affecting livelihoods in agriculture, fishing and tourism.

*For example, floods in Accra, Ghana, in 2011 caused by blocked waterways damaged 17,000 homes and led to 100 cholera deaths.*¹⁰⁷



Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Plastic is polluting our soils, freshwater, oceans and forests, and threatening biodiversity, on which the production of nutritious food depends.

*Fisheries provide more than 3 billion people with 20 per cent of their protein consumption. In West Africa, South Asia, South-East Asia and Small Island Developing States (SIDS) fish account for 50–60 per cent of total dietary protein.*¹⁰⁸



Goal 3: Ensure healthy lives and promote well-being for all at all ages

Plastic causes flooding and the spread of waterborne diseases such as malaria, dengue fever, dysentery and cholera. Burning plastic pollutes the air, increasing the risk of diseases such as heart disease and cancer.

*Between 400,000 and 1 million people die each year in low- and middle-income countries because of diseases related to uncollected waste. At the upper end that is one person every 30 seconds.*¹⁰⁹

¹⁰⁶ <https://sustainabledevelopment.un.org/sdgs>

¹⁰⁷ Amoako C, Frimpong Boamah E (2015) 'The three-dimensional causes of flooding in Accra, Ghana', *International Journal of Urban Sustainable Development*, 7 (1), pp109–129

¹⁰⁸ HLPE (2014) 'Sustainable fisheries and aquaculture for food security and nutrition', High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome. Cited in IIED Briefing (December 2016) *A sustainable future for fisheries: how fiscal policy can be used to achieve SDG 14*. <http://pubs.iied.org/pdfs/17411IIED.pdf>

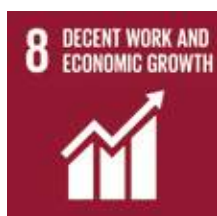
¹⁰⁹ See the Annex for the methodology behind this statistic.



Goal 6: Ensure availability and sustainable management of water and sanitation for all

Plastic blocks drains and pollutes freshwater sources. Dumped waste and flooding are also major drivers of unsanitary living conditions.

Living among plastic pollution and uncollected waste doubles the incidence of diarrhoeal disease.¹¹⁰



Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Plastic pollution is hampering livelihoods and economic growth.

Costs associated with ocean-based consumer plastic pollution alone amount to 13 billion USD every year – including revenue losses to fisheries, aquaculture, and marine tourism industries, in addition to the cost of cleaning up litter on beaches.¹¹¹



Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

Many cities in low- and middle-income countries lack effective waste management collection systems and so plastic pollutes the air, water and land in these cities.

Globally, 2 billion people lack waste collection, and a further 1 billion people lack safe disposal of waste.¹¹²



Goal 12: Ensure sustainable consumption and production patterns

Global plastic production is completely unsustainable and plastics use is growing fastest in countries where there is no prospect for safe disposal.

Plastic packaging accounts for nearly half of all plastic waste globally.¹¹³



Goal 13: Take urgent action to combat climate change and its impacts

Plastic production and pollution is contributing to climate change.

Global plastic production emits 400 million tonnes of greenhouse gases each year¹¹⁴ – more than the UK's total carbon footprint.¹¹⁵

¹¹⁰ UN Habitat (2010) *Solid waste management in the world's cities*. <https://unhabitat.org/wp-content/uploads/2015/12/SolidWaste.pdf>

¹¹¹ UNEP (2014) *Valuing plastics: the business case for measuring, managing and disclosing plastic use in the consumer goods industry*. <https://wedocs.unep.org/handle/20.500.11822/9238>

¹¹² UNEP/ISWA (2015) *Global waste management outlook*. <http://web.unep.org/ourplanet/september-2015/unep-publications/global-waste-management-outlook>

¹¹³ UNEP (2018) *Single-use plastics: a roadmap for sustainability*. <https://wedocs.unep.org/handle/20.500.11822/25496>

¹¹⁴ Ellen MacArthur Foundation (2016) *The New Plastics Economy*. https://www.ellenmacarthurfoundation.org/assets/downloads/EllenMacArthurFoundation_TheNewPlasticsEconomy_Pages.pdf

¹¹⁵ The UK's total net CO₂ emissions in 2017 was 367 million tonnes. Department for Business, Energy & Industrial Strategy (2018) *2017 UK Greenhouse Gas Emissions, Provisional Figures*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/695930/2017_Provisional_Emissions_statistics_2.pdf [accessed 21 March 2019]



Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Plastic is polluting the oceans and threatening marine biodiversity.

*An estimated 8–12.7 million tonnes of plastic is entering the oceans every year.¹¹⁶
There could be more plastic than fish in the ocean by 2050.¹¹⁷*



Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Plastic is polluting terrestrial ecosystems and threatening terrestrial biodiversity.

It is estimated that one third of all plastic waste ends up in soils or freshwater.¹¹⁸



Goal 17: Strengthen the means of implementation and revitalise the global partnership for sustainable development

Additional financial resources including Official Development Assistance (ODA) are needed to tackle the plastic pollution crisis.

Currently only 0.3 per cent of ODA is spent on waste management.¹¹⁹

We won't meet the SDGs without tackling the plastic pollution crisis. As a global community, we are at a crossroads. We can choose to ignore the evidence and carry on with our linear business models, churn out more and more plastic because it's cheap, fail to invest in circular models and sustainable waste management systems and ignore the devastation being wreaked across the planet. If we choose this path, and plastic production is allowed to continue to increase in line with predicted growth, it will completely overwhelm even the waste management systems of high-income countries. Communities will continue to be engulfed by mountains of plastic waste, our oceans will continue to fill up with plastic, and people and animals will continue to suffer.

Or, the global community can act, while there is still time. In Part 2 of this report, we outline the action that we believe is needed to tackle this crisis.

¹¹⁶ Jambeck J R et al (2015) 'Plastic waste inputs from land into the ocean', *Science*, 347 (6223), pp768–771. <https://science.sciencemag.org/content/347/6223/768>

¹¹⁷ World Economic Forum and the Ellen MacArthur Foundation (2016) *The New Plastics Economy*. https://www.ellenmacarthurfoundation.org/assets/downloads/EllenMacArthurFoundation_TheNewPlasticsEconomy_Pages.pdf

¹¹⁸ Machado A et al (2018) 'Microplastics as an emerging threat to terrestrial ecosystems', *Global Change Biology*. DOI: 10.1111/gcb.14020

¹¹⁹ Lerpiniere D et al (2014) *Review of international development co-operation in solid waste management*. Report prepared by University of Leeds and formatted by D-Waste on behalf of ISWA Globalisation and Waste Management Task Force. Vienna: International Solid Waste Association.

PART 2

THE SOLUTION

5 WORKING WITH WASTE PICKERS

In many cities lacking formal waste collection and management systems, waste pickers play a vital role in collecting, sorting and recycling waste. Informal waste recycling is a common livelihood for people who are poor and living in urban areas in low- and middle-income countries. About one per cent of the urban population (that's more than 15 million people) earn their living in this way.¹²⁰ In some places informal-sector service providers are responsible for a significant percentage of waste collection. For example in Lusaka, Zambia, this is over 30 per cent.¹²¹

These groups can exhibit high levels of entrepreneurship, resilience and ingenuity. However, their work is unregulated and waste pickers are often a vulnerable demographic – typically women, children, the elderly, the unemployed, or migrants.¹²² They also face considerable challenges: unhealthy conditions, lack of social security and health insurance, fluctuations in the price of recyclable materials, lack of educational and training opportunities and strong social stigma.¹²³



📷 Children working at a rubbish dump in Livingstone, Guatemala. Photo: Juan Pablo Moreiras/Fauna & Flora International

120 Medina M (2010) 'Scrap and trade: scavenging myths,' Our World, United Nations University, Tokyo, 15 March 2019. <https://ourworld.unu.edu/en/scavenging-from-waste>. Cited in Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development, p129. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>

121 UNEP/ISWA (2015) *Global waste management outlook*. <http://web.unep.org/ourplanet/september-2015/unep-publications/global-waste-management-outlook>

122 Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development, p130. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>

123 Ibid.

The work itself is also extremely hazardous. Waste pickers are particularly vulnerable to many of the health impacts described in chapter 2, such as dysentery, diarrhoea and cholera. Sharp items such as broken glass or needles pose a danger and open wounds are easily infected.

Waste pickers are often excluded from frameworks for waste management, even though their involvement can improve the welfare and livelihoods of some of the poorest people in society and simultaneously reduce costs for municipalities.



CASE STUDY 4

Waste picking in Bogotá, Colombia



📷 Cecilia working at the La Pensilvanie collection centre, Bogotá, Colombia. Photo: Juan Arredondo/Getty Images Reportage

Cecilia Serrano is a waste picker in **Bogotá, Colombia**, working at the collection centre La Pensilvania, which is managed by the Asociación de Recicladores de Bogotá (ARB), an organisation of waste pickers' associations and cooperatives that advocates for waste pickers' rights to access waste and to be contracted for waste collection and recycling services. By sorting, compacting, and preparing materials for reuse by the manufacturing industry, waste pickers play an important environmental and economic role in reducing the demand for new raw materials.

There are many examples of successful partnerships with informal waste pickers. Extended Producer Responsibility (EPR) initiatives in South Africa (see chapter 8) involve paying collectors for metal, plastic and glass as well as supporting the development of cooperatives and small enterprises in collection and recycling.

The Brazilian Solid Waste Management Law (2010) provides one example, by obliging manufacturers and distributors to give primacy to partnerships with cooperatives and other forms of waste picker associations when establishing reverse logistics programmes.¹²⁴ For example, community cooperative Vira-Lata provides

124 Fernandes A (2016) *Closing the loop: the benefits of the circular economy for developing countries and emerging economies*, EPEA Brasil, Tearfund and NuReS (Núcleo de Redes de Suprimentos)

reverse logistics¹²⁵ for several large MNCs, including Diageo, by collecting drinks bottles and returning them to glass bottle producers. Their involvement is more cost-effective than the companies collecting the bottles themselves.¹²⁶

In several countries, providing waste pickers with support has resulted in a dramatic expansion in waste collection as well as improving their livelihoods, workplace safety and sense of dignity.



CASE STUDY 5

SWACH in Pune, India¹²⁷

The example of waste pickers organising to secure a contract and provide waste collection services in **Pune, India** is a particularly positive one. In 2008, the poor state of solid waste management (SWM) in Pune motivated a union of waste pickers (KPKKP) to create a workers' cooperative, SWACH (Solid Waste Collection and Handling) of which approximately 80 per cent are women. In 2008, SWACH signed a Memorandum of Understanding with the Pune Municipal Corporation (PMC) to provide door-to-door collection services, a form of pro-poor public-private partnership.¹²⁸

SWACH has helped provide sustainable livelihoods for more than 3,000 waste pickers in Pune. The formation of the workers' cooperative has demonstrated that door-to-door collection of waste and recyclables can be achieved by building on the existing waste pickers' activities. The service has helped to secure waste pickers' access to valuable recyclables, improve their working conditions and income and improve their status in society. SWACH has also established a school education programme.

SWACH illustrates an effective model for bridging the gap between informal waste pickers and municipal waste management service needs. It has helped waste pickers transition from scavenging to service, improving their working conditions and legitimising their work. SWACH has delivered significant financial benefits to the city. It is estimated that the programme's activities have saved the municipality approximately 7.9 million USD a year.¹²⁹ However, it has faced challenges including efforts by the municipality to privatise waste management service provision, requiring intense and on-going efforts to secure government buy-in and support. And, at times, the local government has failed to honour commitments made.^{130 131}

Waste pickers should be supported (financially and technically) to organise together as associations and cooperatives. There is a growing evidence base for 'what works' here – for example in Maputo, Mozambique, the German government agency GIZ supported the registration and training of informal waste collectors. Half of the poorer districts are now covered by these small businesses, giving an additional 500,000 people access to waste disposal services.¹³²

In considering the solutions to the plastic pollution crisis, it is vital that **all actors** seeking to improve waste management initiatives or frameworks treat waste pickers as a major stakeholder and seek to work in partnership with them to create safe, dignified jobs.

125 Collecting end-of-life goods or packaging and returning it to the manufacturer or distributor.

126 Fernandes A (2016) *Closing the loop: the benefits of the circular economy for developing countries and emerging economies*, EPEA Brasil, Tearfund and NuReS (Núcleo de Redes de Suprimentos)

127 This case study has been taken from: Lerpiniere D et al (2019) 'Briefing paper: successful approaches to improving solid waste management in low and middle income countries', Tearfund.

128 WIEGO (2012) *Integrating waste pickers into municipal solid waste management in Pune, India*, WIEGO Policy Brief No. 8

129 Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>

130 GAIA (2012) *On the road to Zero Waste – success and lessons from around the world*. <http://www.no-burn.org/wp-content/uploads/On-the-Road-to-Zero-Waste.pdf>

131 SWACH outreach report, June 2018

132 Gower R and Schröder P (2016) *Virtuous circle: how the circular economy can create jobs and save lives in low- and middle-income countries*, Tearfund and IDS; and Gunsilius E et al (2011) *Recovering resources, creating opportunities: integrating the informal sector into solid waste management*, GIZ on behalf of the German Federal Ministry for Economic Cooperation and Development; and <https://www.giz.de/en/worldwide/15913.html>

6 MULTINATIONAL COMPANIES AND PLASTIC POLLUTION

'Brands are not doing anything to solve the problem with their packaging. It would be great to make public the amount of plastic they are putting onto the market and what they do to solve it.'

Sofia, Colombia

A small number of companies dominate the market in fast-moving consumer goods both in the UK and overseas. For example, of the top 15 global brands in these sectors, four companies – Coca-Cola, PepsiCo, Nestlé and Unilever – own all but three.¹³³ And they are pervasive in low- and middle-income countries. Coca-Cola sells more drinks in South Africa than in the UK, and more in India than any country in Europe.¹³⁴ And these companies are always looking for new ways to expand in emerging markets: in India, for example, trainee Unilever managers now spend a month living in a rural village to help them understand how to sell their products there.¹³⁵

There are many problematic single-use plastics being distributed by MNCs in low- and middle-income countries where there are inadequate or non-existent waste management systems. Here we highlight two examples: sachets and PET bottles.



📷 Lays chips top right, owned by PepsiCo and Everyday milk at the bottom, owned by Nestlé, in packaging collected by the Community Recycling Centre in Islamabad, Pakistan. Photo: Hazel Thompson/Tearfund

133 Kantar World Panel (2018) 'A global ranking of the most chosen consumer goods brands'. <https://www.kantarworldpanel.com/brand-footprint-ranking/#/download> [accessed 21 March 2019]

134 Coca-Cola Company Annual Report 2017. <https://www.coca-colacompany.com/company-reports> [accessed 21 March 2019]

135 Mahajan V (2016) 'How Unilever reaches rural consumers in emerging markets', *Harvard Business Review*. <https://hbr.org/2016/12/how-unilever-reaches-rural-consumers-in-emerging-markets>

6.1 The 'sachet economy'

The growing 'sachet economy' in many low- and middle-income countries is one of the most visible – and harmful – examples of plastic expansion. Single-portion plastic sachets (made from a multi-laminate material) are used for products as diverse as coffee and washing powder. They are a low-value, currently non-recyclable item that are easier and cheaper to produce and transport than bottles with tamper-proof lids.

The uptake in some low- and middle-income countries has been huge. In India and South-East Asian countries, sample-size sachets of food and non-food products are estimated to account for 95 per cent of industry sales in terms of volume and 60 per cent in terms of value.¹³⁶

But while sachets may bring convenience, and – in some places – a level of affordability, they are a significant contributor to the waste crisis in many poor contexts. In Tearfund and WasteAid's survey on the impacts of plastic pollution on poverty,¹³⁷ plastic sachets were the most commonly identified item among mismanaged solid waste. The scale of the problem is also apparent from waste audits. For example, in a waste and brand audit carried out in the Philippines, a total of 54,260 pieces of plastic waste were collected, with most products being sachets.¹³⁸ The prolific use of sachets in many parts of Asia and Africa has been justified around arguments of accessibility: many families are unable to afford standard sizes of new (often internationally owned) branded products, so single-serve sachets are more accessible ways for them to access these products. In some cases the cost per sachet is cheaper than larger packets, so it also drives richer people to buy them in bulk, for example in India. However, in other countries, such as Indonesia, the long-term cost of multiple sachets is considerably more than buying the full-sized item.¹³⁹



📷 Non-recyclable plastic sachets are sold in huge quantities across many low- and middle-income countries.
Photo: Tom Price/Integral Alliance

136 Future Market Insights (2017) 'Sachet packaging market: 1 ml – 2ml segment by pack size to nearly double in value terms over the forecast period, global industry analysis 2012 – 2016 and opportunity assessment 2017 – 2027'. <https://www.futuremarketinsights.com/reports/sachet-packaging-market> [accessed 21 March 2019]

137 Tearfund and WasteAid (2018) *Survey on the impacts of plastic pollution on poverty*

138 Greenpeace International press release, 'Nestlé, Unilever, P&G among worst offenders for plastic pollution in Philippines in beach audit', 22 September 2017. <https://www.greenpeace.org/international/press-release/7621/nestle-unilever-pg-among-worst-offenders-for-plastic-pollution-in-philippines-in-beach-audit> [accessed 21 March 2019]

139 Singh R et al (2009) 'Buying less, more often: an evaluation of sachet marketing strategy in an emerging market', *The Marketing Review*, 9 (1), pp3–17

Unilever – a key producer of sachets – describes the problem well: *'Sachet waste, also known as multi-layer flexible packaging, is a problem. There are hundreds of billions of sachets sold around the world every year by many different companies – giving consumers a convenient way to buy anything from shampoo to food to toothpaste – but currently, there isn't a cost-effective way to recycle the leftover packaging. At best, the sachets end up in landfill. At worst, they end up as litter in the streets, the waterways and the oceans.'*¹⁴⁰ Companies sometimes suggest that the alternative of refillable smaller size receptacles is open to abuse and mislabelling at point of sale, and at least one company – also Unilever – is investigating the potential for recycling sachets.¹⁴¹ However, in reality, sachets are not collected by anyone because they have low value and are currently non-recyclable.

6.2 Plastic PET bottles

Another problematic item is the ubiquitous PET (polyethylene terephthalate) bottles, most commonly used for soft drinks, including water. PET bottles make up the second largest category of plastic packaging used globally.¹⁴² In 2015, global consumption reached 471 billion bottles,¹⁴³ which if placed end to end would stretch from Earth to Mars.¹⁴⁴

Unlike sachets, PET bottles are in theory recyclable. However, globally only 14 per cent of plastic packaging (including PET bottles) is collected for recycling.¹⁴⁵ Even where the capacity to recycle exists, such as in the UK, recycling rates are shockingly low. The UK public uses 13 billion plastic bottles every year of which only 7.5 billion are recycled. This means 5.5 billion plastic bottles in the UK alone are littered, landfilled or incinerated annually.¹⁴⁶

In many low- and middle-income countries, the capacity to recycle PET (and other plastics) simply doesn't exist and so PET bottles add to the sea of plastic pollution overwhelming communities. In Tearfund and WasteAid's survey on the impacts of plastic pollution on poverty, plastic bottles were the second most frequently identified item in mismanaged solid waste (after sachets).¹⁴⁷ Among the bottles, carbonated drinks were reported to be the most prevalent products. In Break Free From Plastic's (BFFP) recent global waste and brand audit, which involved 239 clean-ups in 42 countries on six continents and collected around 188,000 pieces of plastic pollution, PET was also the second most common plastic type found. Nearly 46,000 pieces of PET plastic – almost a quarter of the total number – were recorded.¹⁴⁸

140 Unilever (2017) 'CreaSolv®: a breakthrough recycling technology we want to share'. <https://www.unilever.com/news/news-and-features/Feature-article/2017/CreaSolv-a-breakthrough-waste-recycling-technology-that-we-want-to-share.html> [accessed 21 March 2019]

141 Ibid.

142 Greenpeace, 'Bottling it: the failure of major soft drinks companies to address ocean plastic pollution'. https://storage.googleapis.com/gpubk-static/legacy/Bottling-IT_FINAL.pdf [accessed 21 March 2019]

143 Gordon L and Downey R (2016) 'Asia Pacific consolidates its position as global growth region for PET bottles', *Euromonitor International blog*. <https://blog.euromonitor.com/asia-pacific-consolidates-its-position-as-headline-global-growth-region-for-pet-bottles> [accessed 21 March 2019]

144 Based on the height of a Coca-Cola bottle which is 20.32cm. 450bn x 20.32cm comes to 90 million kilometres. The distance from the Earth to Mars ranges from 56 million kms to 401 million kms.

145 Ellen MacArthur Foundation (2016) *The New Plastics Economy: rethinking the future of plastics*. https://www.ellenmacarthurfoundation.org/assets/downloads/EllenMacArthurFoundation_TheNewPlasticsEconomy_15-3-16.pdf

146 House of Commons Environmental Audit Committee (2017) *Plastic bottles: turning back the plastic tide*. <https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/339/339.pdf>

147 Tearfund and WasteAid (2018) *Survey on the impacts of plastic pollution on poverty*

148 Break Free From Plastic Coalition (2018) *The Brand Audit Report*. <https://www.breakfreefromplastic.org/globalbrandauditreport2018>

Why consumer goods companies?

It's important to note that there are several other industries beyond consumer goods who bear responsibility for the global waste crisis and where fundamental change is needed in business models and practices. For example, maritime sources of marine litter comprise wastes from the fisheries and shipping sectors (including cargo and leisure) and recreational activities. Items include equipment from the fisheries sector (eg redundant nets) and wastes generated by shipping activities.¹⁴⁹ However, for the municipal solid waste that is swamping towns and cities in low- and middle-income countries, consumer goods companies hold a significant part of the blame. We focus on these companies within this report.

6.3 Using their influence for good or ill?

The dominant market position of the big multinationals allows enormous influence that could be used for good, but at the moment, evidence suggests they are high on the list of plastic polluters. In recent waste and brand audits in India and the Philippines, branded packaging from MNCs was the most commonly found plastic waste.¹⁵⁰ In BFFP's global waste audit, Coca-Cola, PepsiCo and Nestlé were found to be the most prolific plastic polluters. When BFFP looked specifically at single-use sachets – one of the most prevalent forms of plastic – PepsiCo and Unilever topped the list.¹⁵¹

Tearfund and WasteAid's survey on the impacts of plastic pollution on poverty¹⁵² revealed a similar pattern. Unilever and Coca-Cola were the foremost contributors. Half of all the waste identified was produced by MNCs.

Over the decades, the big MNCs have moved away from reusable and recyclable packaging towards a throwaway model. In the 1970s, Coca-Cola's own research showed that no other packaging system could match returnable glass bottles on energy efficiency and reducing waste and pollution, yet they have largely abandoned this approach in favour of cheaper, throwaway plastic.¹⁵³ Unilever pioneered the use of throwaway laminate sachets,¹⁵⁴ and now they sell 27 billion a year in India alone.¹⁵⁵

These products are pushed into countries with few or no waste collection systems. As a result, large quantities of plastic waste end up blocking drains, producing toxic fumes in backyard bonfires, or finding their way to the ocean.

149 Velis C, Lerpiniere D, Tsakona M (2017) *How to prevent marine plastic litter – now! An ISWA facilitated partnership to prevent marine litter, with a global call to action for investing in sustainable waste and resources management worldwide*. Report prepared on behalf of the International Solid Waste Association (ISWA). An output of ISWA Marine Litter Task Force, Vienna. <http://marinelitter.iswa.org/marine-task-force-report-2017>

150 GAIA (2018) *Are businesses ready to beat plastic pollution?* <http://www.no-burn.org/wp-content/uploads/GAIA-Abridged-Report-4June18-2.pdf>; <https://zerowaste.asia/wasteaudits/philippine-2018-waba-results>

151 Break Free From Plastic Coalition (2018) *The brand audit report*. <https://www.breakfreefromplastic.org/globalbrandauditreport2018>

152 Tearfund and WasteAid (2018) *Survey on the impacts of plastic pollution on poverty*

153 Elmore B, 'Plastic bottles are a recycling disaster, Coca-Cola should have known better', *The Guardian*, 2 May 2017. <https://www.theguardian.com/commentisfree/2017/may/02/plastic-bottles-coca-cola-recycling-coke> [accessed 21 March 2019]

154 Mahajan V (2016) 'How Unilever reaches rural consumers in emerging markets', *Harvard Business Review*. <https://hbr.org/2016/12/how-unilever-reaches-rural-consumers-in-emerging-markets>

155 Ibid.



📷 Plastic waste litters river banks and open spaces around the globe. Photo: Hazel Thompson/Tearfund

6.4 Resisting regulation

Companies have taken some steps in the right direction. For example, Unilever removed microbeads from their products in 2014¹⁵⁶ before governments (including the UK) introduced bans on products containing them. Various companies have taken steps to increase the recycled content of their plastic products.

However, these steps are not commensurate with the huge scale of the problem. Much more ambitious action is needed and yet some industry groups have resisted efforts to tighten plastic pollution legislation such as EPR.

EPR emerged as a concept in Sweden in 1990 and is (usually) a government-led framework that requires manufacturers and retailers to pay for the costs of managing their products at the end of their life. This incentivises businesses to design and produce goods in ways that facilitate simple recycling or reuse. Deposit Return Schemes, where producers make up the shortfall between the costs of the scheme and the amount raised in unclaimed deposits are an example of this. Various efforts have been made by governments around the world to introduce and strengthen EPR regimes over recent decades.

However, a 2018 investigation by the *Daily Mail* suggested that government-enforced action on plastics pollution had been frustrated over the years by *'Highly effective, and often secret lobbying campaigns by a global network of corporations, including everyone from plastics producers to oil giants (whose products are used to make plastic), to drinks firms, packaging suppliers, coffee and fast food chains, and supermarket giants.'*¹⁵⁷

Research from the Corporate Europe Observatory paints a similar picture,¹⁵⁸ showing that some industry groups mounted a concerted campaign against stricter EU rules. In the 12 months preceding the publication of the final 'European strategy for plastics' in January 2018, industry groups had 70 meetings with European

156 Unilever, Microplastics. <https://www.unilever.com/sustainable-living/what-matters-to-you/micro-plastics.html> [accessed 21 March 2019]

157 Adams G, 'Revealed: how the plastic industry knew 50 years ago it was causing a pollution crisis and hid it from the world', *Mail Online*, 5 January 2018. <https://www.dailymail.co.uk/news/article-5240389/Plastic-industry-hid-pollution-crisis-50-years.html> [accessed 21 March 2019]

158 Corporate Europe Observatory (2018) 'Plastics pressure: industry turns up the heat to avoid plastics regulation spurred by public demand'. <https://corporateeurope.org/power-lobbies/2018/11/plastic-pressure> [accessed 21 March 2019]

Commission officials; by comparison charities had just 16 meetings.¹⁵⁹ Plastics Europe alone employs eight full-time equivalent lobbyists and spends more than 1.5 million euros a year on lobbying. Country officials working on the dossier described the lobbying as 'very intensive'.¹⁶⁰

Put together with other sources such as reports of a leaked letter from MNCs lobbying EU member states to water down legislation aimed at tackling plastic pollution,¹⁶¹ leaked emails showing 'disruptive/unfair' EPR identified as a 'fight back' lobbying priority by Coca-Cola,¹⁶² and freedom of information requests revealing lobbying by the British Plastics Federation (BPF) that led to cuts in recycling targets,¹⁶³ we see a picture where elements of industry are working hard to resist regulation intended to help solve the plastics crisis.

6.5 Tentative steps in the right direction?

'The New Plastics Economy Global Commitment' was launched in October 2018 by the Ellen MacArthur Foundation and UN Environment. It 'unites over 250 businesses, governments, NGOs, universities, and other organisations from around the world behind a common vision that addresses the issue at its root cause',¹⁶⁴ with businesses and governments committing to a set of targets. These changes are a step forward, and may represent a willingness for companies to use their global influence for good as long as commitments made become much more ambitious and concrete, as promised. The problem is that these commitments are still relatively weak, and tend to focus on recycling rather than reducing usage of single-use plastics. In the table below, we analyse these commitments in more detail.

In January 2019, several fossil fuel companies, waste management firms and consumer goods companies¹⁶⁵ made a different set of promises as part of the 'End Plastic Waste Alliance'.¹⁶⁶ The Alliance has dedicated a combined total of 1 billion USD over the next five years to develop better plastic recycling practices and infrastructure around the world. However, the companies promise little that will tackle the actual source of the problem and as was recently publicised (2019), the Alliance's founding companies are among the world's biggest investors in new plastic production plants,¹⁶⁷ which will deepen the world's plastic pollution crisis. The hypocrisy is astounding. As currently formulated, the End Plastic Waste Alliance will not 'end plastic waste' and it has been labelled a greenwashing stunt by charities from around the world.¹⁶⁸

Far stronger action is needed. Multinationals bear a responsibility for the packaging they produce, particularly in markets without waste collection systems (they are sometimes one of the few actors capable of providing the necessary upfront investment to establish these systems). Unless they change course, they risk contributing to an extremely bleak future where the ocean continues to be filled with plastic, communities are flooded with dirty water from blocked rivers and burning plastic chokes the air. They can do better.

159 Corporate Europe Observatory (2018) 'Plastic promises: industry seeking to avoid binding regulations'. <https://corporateeurope.org/power-lobbies/2018/05/plastic-promises> [accessed 21 March 2019]

160 Corporate Europe Observatory (2018) 'Plastics pressure: industry turns up the heat to avoid plastics regulation spurred by public demand'. <https://corporateeurope.org/power-lobbies/2018/11/plastic-pressure> [accessed 21 March 2019]

161 Chapman B, 'Coca-Cola, Pepsi and Nestlé attempt to water down new plastics laws, leaked letter reveals', *The Independent*, 18 October 2018. <https://www.independent.co.uk/news/business/news/coca-cola-pepsi-nestle-plastic-pollution-leaked-letter-water-down-laws-a8590916.html> [accessed 21 March 2019]

162 Pfister K, 'New #CokeLeak: Coca-Cola's Policy Priorities', *Medium*, 18 October 2016. <https://medium.com/cokeleak/new-email-leak-coca-cola-policy-priorities-390eb1dfda82> [accessed 21 March 2019]

163 Rodionova Z, 'Government cut recycling targets after lobbying from plastics industry', *The Independent*, 17 February 2017. <https://www.independent.co.uk/news/business/news/government-recycling-targets-cut-pressure-plastics-lobbying-industry-a7585501.html> [accessed 21 March 2019]

164 The New Plastics Economy Global Commitment. <https://newplasticseconomy.org/assets/doc/global-commitment-download.pdf> [accessed 21 March 2019]

165 Although not Coca-Cola, Unilever, PepsiCo or Nestlé.

166 End Plastic Waste Alliance. <https://endplasticwaste.org>

167 Laville S, 'Founders of plastic waste alliance "investing billions in new plants"', *The Guardian*, 21 January 2019. <https://www.theguardian.com/environment/2019/jan/21/founders-of-plastic-waste-alliance-investing-billions-in-new-plants> [accessed 21 March 2019]

168 McDermid C (2019) 'Dozens of companies launch US\$1 billion bid to end plastic pollution in Asia but environmentalists dismiss it as 'greenwashing' stunt', *Break Free From Plastic blog*. <https://www.breakfreefromplastic.org/2019/02/13/companies-bid-end-plastic-pollution-asia-greenwashing-stunt> [accessed 21 March 2019]

RECOMMENDATIONS

Multinational corporations should:

- report, by 2020, on the number of units of single-use plastic products they use and sell *in each country*
- reduce this amount by half, country by country, by 2025, and instead use environmentally sustainable delivery methods like refillable or reusable containers
- recycle the single-use plastics they sell in low- and middle-income countries, ensuring that by 2022 one is collected for every one sold, as part of adequate systems for collection, re-use, recycling and composting in communities that currently lack these systems¹⁶⁹
- restore dignity through working in partnership with waste pickers to create safe jobs. Around the world, there are numerous examples of companies partnering with waste pickers to establish collection and recycling systems that are good for society and the environment.
- reimagine the way their products are delivered. Innovate and explore business models that won't harm people, the earth or the ocean.

Their primary focus must be on low- and middle-income countries where waste management systems are lacking, because this is where the worst effects of the plastics crisis are being felt.

¹⁶⁹ MNCs often argue that governments must be involved for collection systems to function effectively, but experience in South Africa demonstrates that this is not the case. Effective industry-led EPR schemes have been established for tin cans, glass and PET by the relevant industries, dramatically increasing collection rates – see chapter 8.

TABLE New industry-led initiatives to tackle plastic pollution

	The End Plastic Waste Alliance	The New Plastics Economy Global Commitment	Our analysis
REPORTING	No commitment	'All business and government signatories have signed up to a clear set of 2025 targets underpinned by shared definitions, and will report on progress annually to ensure transparency and help drive momentum.'	While some companies have disclosed their global annual plastic footprint in volumes as part of the Global Commitment, we need to urgently see a <i>country by country</i> disclosure on the number of units sold so that we can see the scale of the problem and progress being made in low- and middle-income countries. How do we know if companies are reducing their single-use plastics if we don't know how much they are producing and the steps they are taking to reduce and/or recover the plastic they create?
REDUCING	No commitment	'take action to eliminate problematic or unnecessary plastic packaging by 2025' 'take action to move from single-use towards reuse models where relevant by 2025'	A promise to 'take action' is too vague, and 'problematic or unnecessary' is open to interpretation. There are no specific targets for how much plastic packaging will be reduced. They have given themselves five years to start thinking about the problem, rather than five years to eliminate the problem. Tellingly, the Alliance grouping make no commitments to reduce their usage of single-use plastics.
RECYCLING	'infrastructure development to collect and manage waste and increase recycling'	'100% of plastic packaging to be reusable, recyclable, or compostable by 2025' 'set an ambitious 2025 recycled content target across all plastic packaging used'	Without a baseline and measurable targets the Alliance's promise is utterly meaningless. Making products recyclable is not enough. There is very little capacity to recycle plastic in many low- and middle-income countries. There is no detail on what collecting plastic means and what responsibility companies will take for making that happen.
RESTORING	'education and engagement of governments, businesses, and communities to mobilize action' 'clean up of concentrated areas of plastic waste already in the environment, particularly the major conduits of waste, like rivers, that carry land-based plastic waste to the sea'	No commitment	Education and engagement on what? It's important this doesn't result in businesses lobbying against action to reduce or ban single-use plastics. There is no mention of working with waste pickers. Ignoring potential partnerships with waste pickers who already play an important role is inefficient and risks sidelining already very vulnerable people.
REIMAGINING	'innovation to advance and scale new technologies that make recycling and recovering plastics easier and create value from all post-use plastics'	No commitment	Innovation is vital, but we need a much greater rethinking than indicated here. We need ambitious targets that shift us beyond single-use plastics.

7 HIGH-INCOME GOVERNMENTS, DONORS AND PLASTIC POLLUTION

'The whole island is basically a dump, there is not one location on the island that has inhabitants, which isn't polluted, as the island has no waste management system.'

Irene, Indonesia

High-income country governments are also a key part of the problem and therefore hold a significant amount of responsibility in tackling the crisis.

7.1 Flawed, polluting models of economic growth

Plastic pollution is a consequence of the take-make-dispose model of economic development birthed and exported by high-income countries. The unsustainable consumption and production models promoted and supported by these governments have provided an enabling environment that has allowed business models based on single-use plastic to prosper. And many high-income governments have done little to-date (for example in the form of bans, regulations and laws) to combat the problem of plastic pollution.

Current economic models, with large subsidies given to the oil and gas sectors (virgin plastic is made from crude oil and natural gas), depress the price of plastic – driving supply. The G7 alone shell out 100 billion USD per year in subsidies to the production and use of coal, oil and gas.¹⁷⁰



Islamabad, Pakistan. The take-make-dispose model of economic development has been exported across the globe by high-income countries. Photo: Hazel Thompson/Tearfund

¹⁷⁰ Whitley S et al (2018) 'G7 fossil fuel subsidy scorecard: tracking the phase-out of fiscal support and public finance for oil, gas and coal', *ODI Briefing Papers*. <https://www.odi.org/publications/11131-g7-fossil-fuel-subsidy-scorecard>

7.2 Export of plastic waste

Furthermore, many high-income countries – despite having waste management systems far more developed than low- and middle-income countries – have exported their waste to poorer countries as a key strategy to deal with domestic post-consumer waste. In 2017, Europe exported one-sixth of its plastic waste, largely to Asia.¹⁷¹ In the UK, around 650,000 tonnes of waste plastic resins are exported each year and historically, over half of these have been sent to China.¹⁷² In January 2018, China closed its borders to other countries' recycling waste and since then the UK has exported plastic waste to Malaysia, Indonesia, Vietnam, Pakistan and Turkey. Major concerns have been raised over inspections to ensure correct treatment of this waste in those countries. A recent report by Greenpeace's journalism team, *Unearthed*, disclosed that packaging from everyday British products – exported as recycling – have been discarded at multiple illegal dump sites in Malaysia.¹⁷³ The UK's Environment Agency (EA) has embarked on a major investigation into claims of fraud and corruption, including allegations that exported UK plastic waste is not being recycled.¹⁷⁴ At present, there is no mechanism for source countries to be held accountable for the impacts of plastic waste exported for recycling to other countries, particularly to countries less able to manage waste.

High-income countries must ensure that export of domestic waste from their nations is minimised, and, where any residual plastic waste is exported, that appropriate recycling facilities are in place in the receiving countries.

7.3 A weak response through aid

Low- and lower-middle-income countries now need support to resolve the crisis caused by these business models. This is particularly important where businesses fail to act on their own and must be legally obliged to act by government.

Unfortunately the rich world's response has been largely weak. Just 0.3 per cent of Official Development Assistance (ODA) is spent on solid waste management, according to a comprehensive analysis undertaken in 2014.¹⁷⁵ In 2017, just 0.024 per cent of UK ODA was spent on projects primarily aimed at waste management/disposal.¹⁷⁶ Historically, donors have also focused on 'white elephant' projects such as large incinerators, which are ill-suited to the types of waste and regulatory environment present in most low- and middle-income countries.

However, ODA in this area also represents a huge and largely untapped opportunity to accelerate progress towards the SDGs, as explained in chapter 4. Moving to more circular waste systems has a direct impact on over half of the Goals, including reducing pollution, improving health outcomes and creating livelihoods for people living in poverty.

Increasing the volume of aid for waste management from 0.3 per cent to 3 per cent could allow all 2 billion people currently without waste collection to be reached, simultaneously protecting the environment, improving public health and creating jobs.

171 *The Economist* (2018) quoted in Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, p117. Urban Development. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>

172 National Audit Office (2018) *The packaging recycling obligations*, Department for Environment, Food & Rural Affairs and Environment Agency. <https://www.nao.org.uk/wp-content/uploads/2018/07/The-packaging-recycling-obligations.pdf>

173 Ross A (2018) 'UK household plastics found in illegal dumps in Malaysia', *Greenpeace Unearthed*. <https://unearthed.greenpeace.org/2018/10/21/uk-household-plastics-found-in-illegal-dumps-in-malaysia>

174 Laville S, 'UK plastics recycling industry under investigation for fraud and corruption', *The Guardian*, 19 October 2019. <https://www.theguardian.com/environment/2018/oct/18/uk-recycling-industry-under-investigation-for-and-corruption> [accessed 21 March 2019]

175 Lerpiniere D et al (2014) *Review of international development co-operation in solid waste management*. Report prepared by University of Leeds and formatted by D-Waste on behalf of ISWA Globalisation and Waste Management Task Force. Vienna: International Solid Waste Association.

176 Based on the data underlying DFID's *Statistics on International Development 2017*. <https://www.gov.uk/government/statistics/statistics-on-international-development-2017>. This is the percentage of projects categorised under OECD DAC code 14050 for 'waste management / disposal'. There may be elements of other projects that include waste management but are coded differently.

7.4 Aid quality – what works?

ODA should focus on building government capacity to reduce the generation of unnecessary single-use plastic packaging through EPR, which is a central means of ensuring investment in recycling and waste collection, and other legal and fiscal measures, and to extending waste collection and management services to all.

Reducing single-use plastics

Technical support and ODA can enable low- and middle-income governments to develop and adopt a range of regulatory and fiscal interventions to reduce overall production and use of plastic materials. Many low- and middle-income countries are already pressing ahead with measures like these, as described in the next chapter. However, implementation often proves challenging and technical assistance can be invaluable.

Expanding waste management

ODA can also support the expansion and reform of waste management systems. Waste management is a complex area involving multiple groups and requiring careful design – a tricky ask for over-stretched local governments. In a recent study examining successful interventions in this area,¹⁷⁷ Tearfund found that four of the biggest challenges associated with reforming solid waste management (SWM) systems are:

1. governance
2. stakeholder engagement
3. financing
4. technology



📷 A municipal waste dump in Brazil. Photo: Eleanor Bental/Tearfund

177 Lerpiniere D et al (2019) 'Briefing paper: successful approaches to solid waste management in low and middle income countries', Tearfund

Using specific examples, we identified four keys to successful aid projects in this area:

1. **Clarify the responsibilities of the different government agencies involved in solid waste management and establish transparency and public accountability for agencies and contractors.** For example, institutional reform in Morocco produced impressive results: the economic performance of the municipal solid waste sector greatly improved, arrears paid to contractors reduced by a fifth and more than 44 million USD in revenue was recovered through eco taxes. More than 1,000 jobs were created for waste pickers and waste collection coverage increased from 32 per cent to 53 per cent.¹⁷⁸
2. **Ensure all the right stakeholders are effectively engaged (government agencies, households, waste pickers, contractors) and coordinated, with careful attention paid to what incentives are needed to engage each actor effectively.** For example, in Bo City, Sierra Leone, donor and NGO support led to whole system reforms: leaders actively engaged a broad range of stakeholders and were subsequently able to establish a waste collection system for over 70 per cent of the city's population. This has significantly reduced dumping, stimulated the development of local recycling businesses and contributed to a significant drop in disease. In 2013, more than 500,000 cases of cholera, diarrhoea, malaria and other water- and vector-borne diseases were recorded. In 2016, just 4,082 cases were recorded. It is likely that this was caused by a range of factors, including improvements in sanitation, but it is understood that improvements to waste management have played a key role.¹⁷⁹
3. **Ensure financial sustainability through innovative approaches to user fees and a recognition that some value can be generated from waste.** For example, in 2007 the German government provided technical assistance to the local government in Bayawan City in the Philippines, to improve the financial sustainability of their waste management system.¹⁸⁰ The local government implemented a Pay-As-You-Throw (PAYT) scheme based on householders purchasing stickers for each 40-litre bag of residual (ie non-recyclable) waste. The scheme is understood to have been accepted by the community and increased the cost-recovery rate. Quantities of waste collected have also reduced as more materials are diverted via local recyclers, extending the expected life of the city's sanitary landfill site.¹⁸¹
4. **Invest in appropriate (often low) technology approaches and associated staff capacity building, with a view to facilitating easy replication, scale-up and integration into existing systems.** For example, the Integrated Resources Recovery Centre's (IRRC) model (a bottom-up, community-based approach carried out in partnership with the local government), has been designed to be easily adaptable. Originating in Bangladesh, it has subsequently been successfully piloted in Pakistan, Vietnam and Sri Lanka. UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific) argues that its success is due at least in part to its modular design, which makes it easy to expand, replicate and integrate with existing facilities.¹⁸²

WasteAid and CIWM's *Making waste work* toolkit provides simple and low-cost techniques for people to address the waste problem in their own communities.¹⁸³

178 Independent Evaluation Group (2015) *Implementation Completion Report Review*. <http://bit.ly/2DzgNlt>

179 DFID (2017) *Project Completion Review*. <http://bit.ly/2FNP4PD>

180 BMZ (2012) *Economic instruments for solid waste management, case study Bayawan*, Philippines. <https://www.giz.de/en/downloads/giz2012-en-economic-instruments-philippines.pdf>

181 Ibid.

182 EUESCAP (2017) *Sustainable Development Benefits of Integrated Waste Management: Integrated Resource Recovery Centers*. <https://www.unescap.org/sites/default/files/Sustainable%20Development%20Benefits%20of%20Waste%20Management.pdf>

183 Lenkiewicz Z and Webster M (2017) *Making waste work: a toolkit*, WasteAid and CIWM. <https://wasteaid.org/toolkit/making-waste-work>



CASE STUDY 6

Good practice in action

Rashid Hameed* is 51 years old and lives in one of the 34 informal settlements in Islamabad, Pakistan. His community has no waste collection service, and rubbish is openly dumped and burned. Rashid explains: 'Our slum is located on the bank of a stream, which is full of solid waste and is a breeding place for mosquitoes, flies and rats. These cause diseases in our children and old people, and we spend a great deal of money on their treatment. People living outside the slum discriminate against us because of our unclean environment.'

Rashid's situation might seem bleak, but a neighbouring area has been transformed through a community recycling and waste management centre.

In this nearby community, the Dr Akhtar Hameed Khan Memorial Trust (AHKMT) introduced a transformative approach to managing waste in 2014. AHKMT set up an Integrated Resource Recovery Centre (IRRC), which allows 90 per cent of a community's waste to be recycled. It provides a 'triple win' – it creates jobs, improves residents' health and protects the environment from open burning and dumping.

In this scheme, paid workers collect local households' waste six days a week. They take it to the centre, where staff sort the waste. They keep the organic waste and use it to make high-quality organic compost, which is sold on to plant nurseries. The plastics, metals and other dry recyclables are sold to a local buyer. Only around ten per cent of the waste cannot be recycled or composted, and this is disposed of at a municipal landfill.

The centre pays for its activities from the sale of recyclable materials and compost, and by charging a small amount to each household for waste collection (approximately 200 PKR per month, or 2 USD). AHKMT provided the start-up costs for the centre, but by its third year it was able to pay for its own running costs – and make a profit. The IRRC currently serves 1,670 households and processes 1,000 tonnes of waste each year.

When starting a project such as the IRRC, it is important to make sure no harm is done to those already working informally as waste pickers. Instead, the centre makes sure it employs existing local waste pickers among its staff, providing them with safer and better-paid employment. The centre calls their waste workers 'E-guards' (Environment guards) and supplies them with a protective uniform, giving them dignity and respect in the community.



📷 'Environment guards' collect household waste and transport it to the IRRC in Islamabad. Photo: Hamid Ullah/AHKMT

Faraz Karim* is 45 years old and has been working at the IRRC for the past three years. His job is to separate organic, recyclable and rejected waste. He earns 14,000 rupees per month (approximately 113 USD) from the IRRC, and also gets health benefits through Social Security.

Before, he worked as a house servant and earned much less. He says: 'After joining the IRRC, my life has changed completely. My financial situation has improved, and I have learnt health and hygiene practices that have improved my health and the health of my family. I have gained knowledge of solid waste management, composting and recycling, which is very useful for me and my community. I am happy and satisfied as I am playing a productive role in society.'

The IRRC model was first used in Bangladesh in 2007 by the NGO Waste Concern. Since then, it has been introduced successfully in a number of East Asian countries. IRRCs are an effective solution in circumstances where the government does not have the capacity to provide waste disposal services.

Tearfund's partner Pak Mission Society (PMS) is adapting the IRRC model to serve poor communities. PMS started one IRRC in Pakistan in 2018 and plans to introduce the model much more widely during 2019.

* Names have been changed to protect identities.

This case study was first published in Tearfund's magazine, *Footsteps* 107.¹⁸⁴

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7.5 Aid quality – what doesn't work?

In addition to understanding what approaches work in terms of successful ODA support for the expansion and reform of waste management systems, it's also important to consider what does not work.

High-tech centralised approaches

Recent history shows many examples of high-tech, centralised interventions that failed to increase collection rates and safe disposal. Waste management technologies need to be both appropriate and financially sustainable under local conditions – as described on page 49.

A UN-Habitat report explains the need for local contextualisation of approaches: 'For example, large waste-compaction collection vehicles designed to collect low-density, high-volume wastes on broad suburban streets built to withstand high axle-loading rates in Europe or North America are unlikely to be suitable for use in a developing country city. There the vehicles have to be smaller, lighter and narrower to allow collecting much denser wastes from narrow streets and transporting it over rutted roads going up and down steep hills – even well-surfaced main roads tend to be designed for lower axle-loading rates. In many cases, a small truck, a tractor or even a donkey fits local collection needs, while a 20 tonne compactor truck does not.'¹⁸⁵

As the *Global Waste Management Outlook* argues, 'The focus should be on delivery of basic service needs of citizens; generating local business and employment opportunities; maximizing waste reduction (expenditure-reducing) and reuse, recycling and recovery (income-generating) opportunities; and fostering a healthy environment for the private sector to invest in.'¹⁸⁶

184 Tearfund (2019) *Footsteps* 107 – Waste, https://learn.tearfund.org/en/resources/publications/footsteps/footsteps_101-110/footsteps_107. For more detailed analysis of Rwanda's solid waste management and recycling systems, see Kabera T et al (2019) 'Benchmarking performance of solid waste management and recycling systems in East Africa: comparing Kigali Rwanda with other major cities'. *Waste Management and Research*, 37 (1_suppl), pp58–72. <https://doi.org/10.1177/0734242X18819752>

185 UN-Habitat (2010) *Solid waste management in the world's cities*. <https://unhabitat.org/wp-content/uploads/2015/12/SolidWaste.pdf>

186 UNEP/ISWA (2015) *Global waste management outlook*. <http://web.unep.org/ourplanet/september-2015/unep-publications/global-waste-management-outlook>



CASE STUDY 7

Failed technical solutions in the Democratic Republic of Congo (DRC)



📷 Maintenance has ceased at this sanitary landfill site. There are no other sanitary landfill sites in DRC. Photo: Mike Webster/Waste Aid

Kinshasa, a city of some 12 million people, is the capital of DRC, one of the poorest countries in the world with a per capita GDP in 2014 of just 479 USD.

Mike Webster, from WasteAid, travelled there in 2018: 'Beyond the upscale central district of Gombe where there is basic organisation for waste collection, you don't have to travel far to see drainage channels thick with plastic waste, large scale *décharges pirates* (open dumps) scattered across the city and open burning. Meanwhile, the evidence of harm caused by poor waste management is widespread – 45 people died in floods while I was there, with much of the blame placed by the local communities on blocked drainage channels. This led to a cholera outbreak with, at the time of writing, around 500 cases and more than 30 fatalities. And this is just the acute, direct effect. What about the long-term impact on the public health of those that live with this every day – gastro-enteric disease, respiratory illness and environmental enteropathy [a disease of the intestine]?'

There have been efforts to address this – between 2007 and 2017, EU-funded programmes delivered comprehensive waste collection and sanitation services in 9 of the 24 communes, building transfer stations, supporting teams of sanitation workers and building DRC's first ever sanitary landfill at Mpsa, on the edge of Kinshasa. It cost 1 million USD per month to run and collected 11,000m³ of waste per week. The impact was dramatic – flood zones decreased by 40 per cent and waterborne disease by 50 to 70 per cent, saving thousands of lives.

However, it was handed over to the provincial government in August 2015. Since that time, the collections have ceased, the transfer sites are dilapidated and overflowing with uncollected waste and the maintenance of the sanitary landfill has ceased.

'I saw first-hand the failure of traditional approaches taken by the international community to improve waste collection and disposal and the need for international waste managers to innovate to provide sustainable waste services. To my mind, this shows the blind spot of the waste sector. We are very good at providing quality technical solutions but are less good at considering how they will be financed and managed in the long term. We need to think about new cost-recovery models, new partners that have an interest in cleaner, healthier communities. Perhaps the private sector, perhaps faith groups, and perhaps working at a more manageable scale than such large, city-wide municipal waste collections.'

This case study is adapted from a blog entry by Mike Webster, CEO and co-founder of WasteAid.¹⁸⁷

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Incineration

Incineration is often branded as a type of 'waste-to-energy' approach but it is no magic bullet even though it is being promoted as a solution in many low- and middle-income countries. For example, in Ethiopia, a UK-based company called Cambridge Industries has been involved in building a large incinerator to deal with Addis Ababa's waste. It states that this is 'Phase I of a wider rollout program to develop multiple waste-to-energy plants across SSA's [sub-Saharan Africa's] major cities.'¹⁸⁸

Incineration is not appropriate for the types of waste found in most low- and middle-income countries. A key parameter is the energy content of waste, the 'lower calorific value' (LCV). According to the German government agency GIZ, in low- and middle-income countries the 'LCV of unsorted MSW [Municipal Solid Waste] is often below [the appropriate] threshold due to a dominant organic content with high moisture and a significant level of inert waste fractions such as ash or sand'.¹⁸⁹

Even if it were appropriate for the types of waste generated, incineration would still be problematic in low- and middle-income countries.¹⁹⁰ The technology depends critically for its environmental safety on high levels of emission control, to remove particulates, acid gases and products of incomplete combustion such as dioxins from the exhaust gases. This can represent up to half of the capital costs and a significant proportion of the operating costs. So a strong, independent environmental regulator is required, to ensure that the proper technology is planned, installed and used routinely. The resulting fly-ash is classified as a hazardous waste, which needs to be managed properly, again requiring a strong environmental regulator. Both the very high investment and operating costs, and the institutional capacity required to ensure proper control, mean that incineration should not be considered a cost-effective or safe solution for donors looking to spend ODA in the poorest countries.

187 Webster M (2018) 'Kin-la-Belle or Kin-la-poubelle? Open Waste Dumping in DRC', *ISWA blog*. <https://www.iswa.org/home/news/news-detail/article/kin-la-belle-or-kin-la-poubelle/109> [accessed 21 March 2019]

188 Cambridge Industries, 'Reppie Waste-to-Energy, Africa's first'. <http://cambridge-industries.com/#reppie-section>

189 GIZ (2017) *Waste-to-Energy options in municipal solid waste management, a guide for decision makers in developing and emerging countries*, p21. https://www.giz.de/en/downloads/GIZ_WasteToEnergy_Guidelines_2017.pdf

190 Boyd S and Schröder P (2017) *Smokescreen*, Tearfund

RECOMMENDATIONS

High-income governments should:

- phase out the use of fossil fuel subsidies, including fiscal support and public finance, which help drive the increasing production of virgin plastic
- increase the volume of aid for waste management from 0.3 per cent to 3 per cent, which could allow all 2 billion people currently without waste collection to be reached. ODA should focus on building government capacity to reduce the generation of unnecessary single-use plastic packaging and to extending waste collection and management services to all.
- avoid investment in 'white elephant' projects in developing countries, such as incineration, that threaten waste picker livelihoods, are not suited to waste streams with high organic content and require high levels of institutional capacity to manage effectively
- prioritise technical assistance to low- and middle-income governments to:
 - develop and implement legal and fiscal measures to ban or reduce unnecessary, problematic, and non-recyclable plastic
 - implement locally appropriate EPR schemes to ensure businesses benefiting from single-use plastic contribute to its management
 - improve waste management governance and the enabling environment for effective waste management
 - scale up contextually relevant community-based recycling approaches
- ensure that export of domestic waste from their nations is minimised and, where any residual plastic waste is exported, that appropriate recycling facilities are in place in the receiving countries
- support low- and middle-income countries to develop national strategies for plastics and waste with goals and policy instruments for each area of the waste hierarchy, including support for dedicated plastics action plans to prevent pollution and help reduce the production of problematic, non-essential and nonrecyclable plastics

8 LOW- AND MIDDLE-INCOME GOVERNMENTS AND PLASTIC POLLUTION

'The plastic bag ban has had a good effect, but plastic water bottles still cause flooding in cities.'

Anne, Kenya

'A lack of recycling services means people dump waste indiscriminately.'

Solomon, Nigeria

Although the problem of plastic overuse originated in high-income countries, many of the solutions are being pioneered in the Global South by the nations and communities most affected by this crisis. For example, Bangladesh was the first country to introduce a nationwide ban on plastic bags – in 2002 – because their crippling effect on drainage systems contributed to widespread flooding in the preceding decade (although the ban remains poorly enforced).¹⁹¹ Now 25 African countries have similar national bans – more than the rest of the world combined.¹⁹²

As more success stories emerge (see below), these solutions can be copied, adapted and improved around the world.

However, the context in low- and middle-income countries is challenging. In low-income countries, over 90 per cent of waste is mismanaged, and most households don't have access to waste collection.¹⁹³ Waste management is a heavy burden for local governments in these nations. According to the *Global Waste Management Outlook*, the cost of collection alone is unaffordable in many places.¹⁹⁴ Even at current levels of waste collection, waste management typically comprises almost 20 per cent of municipal budgets in low-income countries, compared with just 4 per cent in high-income countries.¹⁹⁵

Nevertheless, there are several examples of local governments innovating to pioneer low-cost, inclusive solutions. In Kigali, Rwanda, a public–private partnership has achieved collection coverage of 88 per cent. The model is based on exclusive franchises in 35 sectors being tendered every three years. Households pay an affordable fee depending on their ability to pay (with a free service provided to the poorest category). Ninety-five per cent fee collection rates are achieved, partly through co-collection with charges for other community services.¹⁹⁶

191 'In 1988, poor drainage resulting from plastic bag litter clogging drains contributed to devastating floods in Bangladesh, causing several deaths as two-thirds of the country was submerged', UNEP (2018) *Single-use plastics: a roadmap for sustainability*, p13. <https://wedocs.unep.org/handle/20.500.11822/25496>

192 UNEP (2018) *Single-use plastics: a roadmap for sustainability*. <https://wedocs.unep.org/handle/20.500.11822/25496>

193 Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>

194 UNEP/ISWA (2015) *Global waste management outlook*. <http://web.unep.org/ourplanet/september-2015/unep-publications/global-waste-management-outlook>

195 Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>

196 Kabera T et al (2019) 'Benchmarking performance of solid waste management and recycling systems in East Africa: comparing Kigali Rwanda with other major cities', *Waste Management and Research*, 37 (1_suppl), pp58–72. <https://doi.org/10.1177/0734242X18819752>



📷 In the absence of integrated sustainable waste management, waste collects in streets and public spaces in low- and middle-income countries. Port-au-Prince, Haiti. Photo: Sam Hill/Tearfund

In Maputo, Mozambique, a rapid increase in collection rates was achieved by inviting small community-based companies to provide waste collection in hard-to-reach areas, with collection fees staggered by income level. The city now has a collection rate of 80 per cent, one of the highest in its income group and a 'phenomenal achievement' according to the *Global Waste Management Outlook*.¹⁹⁷

In general, however, waste has been a low priority for governments in low- and middle-income countries. Collection schemes are sometimes prioritised by local mayors and municipalities, but until recently the topic rarely caught the eye of national governments. Perhaps one reason for low levels of international aid in this area (see chapter 7) is that low-income governments are not requesting it.

This is problematic because although local governments are legally responsible for clearing up the rubbish created by businesses and households, the policy levers that could reduce the flow of this rubbish are held by national government. Put simply, local governments will find it easier to introduce collection schemes if national governments introduce supportive legislation, for example by banning the worst types of rubbish, making businesses responsible for more of the costs of EPR, and mapping out a framework for bringing together all of the groups that need to be involved.

The situation is beginning to change and success stories are starting to emerge.

8.1 Limiting the worst forms of rubbish

Some of the most damaging forms of single-use plastic are unnecessary. It has been known, for at least 30 years, that plastic bags block drainage systems,¹⁹⁸ and yet switching to reusable bags is relatively simple.¹⁹⁹ A growing number of countries have bans or taxes in place for single-use plastic bags, with many introduced in the last three years.²⁰⁰

197 UNEP/ISWA (2015) *Global waste management outlook*, see particularly box 5.6 and figure 3.9. <http://web.unep.org/ourplanet/september-2015/unep-publications/global-waste-management-outlook>

198 UNEP (2018) *Single-use plastics: a roadmap for sustainability*, p13. <https://wedocs.unep.org/handle/20.500.11822/25496>

199 Although care must be taken to ensure that reusable bags themselves can be safely recycled at the end of their life.

200 For example in Kenya: Otieno B, 'State plans incentives for non-plastic bag makers', *Business Daily*, 26 August 2017. <https://www.businessdailyafrica.com/news/State-plans-incentives-nonplastic-bag-makers/539546-4072016-15p3i66z/index.html>

According to Erik Solheim, former Head of UN Environment, 'Rwanda, a pioneer in banning single-use plastic bags, is now one of the cleanest nations on earth.'²⁰¹ And UNEP's landmark paper on single-use plastics also finds that 'plastic bag bans, if properly planned and enforced, can effectively counter one of the causes of plastic overuse'²⁰² (particularly when combined with measures to expand waste management and improve incentives for producers, retailers and consumers).

It is still too early for a comprehensive assessment of the numerous recent bans and levies on plastic bags, although for those countries with good monitoring data, 60 per cent saw a dramatic drop in bag usage in the first year.²⁰³ The most common problems are lack of enforcement, incentives and lack of affordable alternatives, and UNEP's report includes a guide to implementing effective regulation in this area.²⁰⁴ There are other pernicious plastics that governments could consider banning, such as polystyrene that is not recyclable.

Governments can also provide incentives for innovative product design that aims to reduce the plastic content of products or improve recyclability, along with shifts to viable alternative, non-plastic materials (while being aware of the negative impacts that some proposed alternatives may have);²⁰⁵ and they can incentivise the use of reusable and refillable items (such as food containers and drinking bottles), through awareness, subsidies for refillables and levies for non-reusable items through the supply chain.



📷 Mixed plastic pollution – including plastic bags – in a storm drain, Bali. A growing number of countries have bans or taxes in place for single-use plastic bags. Photo: Zoe Lenkiewicz/WasteAid

201 Foreword to UNEP (2018) *Single-use plastics: a roadmap for sustainability*. <https://wedocs.unep.org/handle/20.500.11822/25496>

202 UNEP (2018) *Single-use plastics: a roadmap for sustainability*. <https://wedocs.unep.org/handle/20.500.11822/25496>

203 Ibid.

204 Ibid.

205 Rakowski S, 'Fauna & Flora International backs call to ban "oxo-degradable" plastic packaging', *Fauna & Flora International News Release*, 15 November 2017. <https://www.fauna-flora.org/news/ffi-backs-call-to-ban-oxo-degradable-plastic-packaging>

Water sachets – a mixed blessing

In many low-income countries LDPE (low-density polyethylene) water sachets have provided clean drinking water for people who otherwise couldn't afford it. However, they too contribute to plastic pollution. There is a paradox here, and there are no easy answers.

These sachets are different to the multi-laminate sachets discussed in chapter 6. They are made of a single plastic – LDPE – which is in theory recyclable. They also tend to be manufactured and used by national or regional firms, rather than MNCs. However, while they are in theory recyclable, the capacity to recycle them simply doesn't exist in many low-income contexts.

An immediate solution to this problem is for the LDPE sachets to be collected and recycled. However, the obvious longer term – more economically and environmentally sustainable – solution is for governments and donors to also increase investment in water, sanitation and hygiene (WASH), which will mean people can access safe water without having to buy it in plastic sachets.



Water sachets such as these are ubiquitous in many low-and middle-income countries. Photo: Jack Wakefield/Tearfund

8.2 Working with business

Where businesses refuse to act on their own, government legislation will force their hand. A government-led EPR framework that requires manufacturers and retailers to pay for the costs of managing their products at the end of their life, means that it becomes in the interest of business to design and produce goods in ways that facilitate simple recycling or reuse. The concept is well established in high-income countries, although it has sometimes been resisted by industry (see chapter 6).

There are several notable success stories in developing countries. South Africa has three successful EPR initiatives (for tin cans, glass and PET bottles), which were established voluntarily by industries in coordination with the government (under the potential threat of legislation for glass and PET bottles if they failed to act).²⁰⁶ In each case the major players in the supply chain have collaborated to establish and fund an organisation that both supports recovery of recyclable materials (for example by paying a good price to collectors) and

206 UNEP/ISWA (2015) *Global waste management outlook*, p163–164. <http://web.unep.org/ourplanet/september-2015/unep-publications/global-waste-management-outlook>

ensures a steady supply of high-quality recyclate for manufacturers. This approach has successfully increased collection rates – putting South Africa in the top six countries globally for tin can collection, for example. It has also spurred greater use of recyclate by business.²⁰⁷

However, regulatory action by governments doesn't excuse companies from taking the initiative themselves to make voluntary changes to tackle the crisis. Often concurrent action is called for with all actors making the changes they can.

One of the crucial differences between high- and middle- or low-income country contexts when it comes to EPR is the existence of informal waste pickers,²⁰⁸ as the success of EPR often relies on their involvement. This often reduces costs for business and government,²⁰⁹ and without it, a dual waste system undermines the operation and objectives of EPR legislation (as occurred in India's first attempt to introduce EPR for electronic waste).²¹⁰ Furthermore, tens of thousands of the most vulnerable adults and children earn a living by collecting recyclable waste, and an inclusive approach provides them with an opportunity to increase their dignity, improve their health and bolster their pay.



📷 Liberia Mapesmoawe (left) and Justina Mokoena (right) are both waste pickers on the Boitshepi landfill in South Africa and members of the growing Majakathatha Cooperative. Photo: Jonathan Torgovnik/Getty Images Reportage

Even in countries where establishing full EPR appears challenging, developing country governments can require companies to publish data on the amount of plastic packaging they are distributing. This information is rarely available at present, and it would help civil society and the media to hold business to account, thereby creating additional incentives for producer responsibility.

207 Nahman A (2010) 'Extended producer responsibility for packaging waste in South Africa: current approaches and lessons learned', *Resources, Conservation and Recycling*, vol. 54 (3)

208 Ibid.

209 Gower R and Schröder P (2016) *Virtuous circle: how the circular economy can create jobs and save lives in low- and middle-income countries*, Tearfund and IDS

210 Lines K et al (2016) *Green and inclusive? Recycling e-waste in China and India*, IIED

8.3 Setting up an inclusive framework for waste management

Waste management is a complex area that requires an integrated approach covering generation, collection, sorting, recycling and safe disposal. It also affects multiple groups: producers, distributors, retailers, households, the recycling industry, informal waste pickers and local government. Even for basic organisation of waste collection, there are at least five stakeholder groups whose participation helps make an intervention financially sustainable and socially accepted: households, informal waste pickers, local government, producers and the recycling industry. As explained in chapter 5, waste pickers are often excluded, even though their involvement can improve the welfare and livelihoods of some of the poorest people in society and simultaneously reduce costs for municipalities.

This is a difficult area for local government. Their financial resources are stretched, and they often also lack the time or technical expertise to negotiate suitable multi-stakeholder arrangements. For example in Brazil, before 2007, municipalities had 'no legal instruments to enable them to hire waste picker organisations to perform waste collection... [while] these organisations had no means of meeting the legal requirements to bid for formal government contracts'.²¹¹ This is common around the world.

National governments need to start by clarifying the role of municipalities, national environmental regulators and other government agencies, and setting out measures to promote transparency and accountability.

It is also important that local governments are provided with the instruments and technical support required to contract with waste pickers and engage with other stakeholders. (There is a growing evidence base for policy in this area.²¹²) This should be accompanied by a programme of financial and technical support for waste pickers to organise together as associations and cooperatives (see chapter 5).

Finally, national governments can provide mechanisms for local communities to become involved in decision-making about waste collection. In Brazil, legislation gives local people the right to sit in a 'Local Environment Council', which allows them to participate in the formulation of public policy. These councils exist at the national, state and municipal level and have been used effectively across the country.

These activities reinforce and complement national efforts to introduce EPR.

8.4 Accessing and mobilising funding

In addition to action in these three areas, low- and middle-income countries must work with donors to allocate more funding to waste management. Low-cost innovative approaches are emerging – in some cases these models can even pay for themselves after a few years. For example, in Pakistan, the collection and recycling centre set up by AHKMT (described in chapter 7) was able to pay for its own running costs by its third year of operation. However, all of these initiatives require some level of seed funding.

These four themes would ideally be combined into a national strategy for plastics and waste, which sets goals and policy instruments for each area of the waste hierarchy (from preventing waste, through encouraging repair, reuse and recycling, and including safe collection and disposal of what's left). The ambition of this strategy needs to be commensurate with available funds, but typical goals would include waste minimisation, universal access to collection and environmentally sound management. UNEP's *Global Waste Management Outlook* provides detailed advice and guidance in this area.

Globally, the citizens of low- and middle-income countries are the most affected by the waste crisis. Their governments have a crucial role to play in bringing the problem under control.

211 Fernandes A (2016) *Closing the loop: the benefits of the circular economy for developing countries and emerging economies*, EPEA Brasil, Tearfund and NuReS (Núcleo de Redes de Suprimentos)

212 Gower R and Schröder P (2016) *Virtuous circle: how the circular economy can create jobs and save lives in low- and middle-income countries*, Tearfund and IDS; Gunsilius E et al (2011) *Recovering resources, creating opportunities: integrating the informal sector into solid waste management*, GIZ on behalf of the German Federal Ministry for Economic Cooperation and Development

RECOMMENDATIONS

Low- and middle-income governments should:

- set out a national strategy for plastics and waste, with goals and policy instruments for each area of the waste hierarchy
- limit the worst forms of single-use plastic and incentivise innovative product design that reduces plastic use
- work with business to ramp up their responsibility for collecting and processing the waste they create (EPR), and require them to publish data on the amount of plastic packaging they are distributing
- set up an inclusive framework for waste management, which should:
 - clarify the roles of government agencies, local government, businesses, and society, and set out measures to promote transparency and accountability
 - partner with informal waste pickers, providing the instruments and technical support required for local government to contract with these groups and offering support for waste pickers to organise together as associations and cooperatives
 - include mechanisms for local communities to monitor and become involved in waste collection
- increase the political and financial resources available for waste management at both municipal and national level and work with donors to allocate more funding to this area. The focus should be on pioneering low-cost, inclusive solutions (as several nations are already doing).

9 THE ROLE OF CITIZENS

'When extraordinary things are achieved against apparently impossible odds, it's often because of a shift in values and a civil society movement that pushes for change.'

Tearfund²¹³

The public response to the *Blue Planet II* television series towards the end of 2017 is a masterclass on how pressure from ordinary people can propel an issue up the policy agenda. Many people and organisations are also demonstrating their own willingness to reduce their plastic footprint to show demand for a more sustainable way of doing business.

While the lion's share of responsibility lies firmly at the feet of the MNCs and high-income governments, each person and community has a role to play in tackling the plastic pollution crisis. Indeed, as Tearfund has observed: 'When extraordinary things are achieved against apparently impossible odds, it's often because of a shift in values and a civil society movement that pushes for change.'²¹⁴



By taking campaign actions, such as writing to companies and MPs, calling for change, citizens can make a difference. Photo: Tearfund

²¹³ Evans A and Gower R (2015) *The restorative economy – completing our unfinished millennium jubilee*, Tearfund, p19
²¹⁴ Ibid.

9.1 Holding companies and governments to account

Individuals and communities around the world have played a huge role in recent years in bringing the plastic pollution crisis to light and doing their bit to respond, whether that's through reducing the amount of single-use plastics bought, mobilising beach clean-ups or the inspiring examples of community-led waste management such as those featured in chapter 8.

As we look towards the huge – but achievable – task of tackling this mammoth crisis, it is vital that ordinary people continue to speak out and act. Citizens and consumers need to use their voices and actions to urge governments and companies to make changes to their economies and business models that help people in poverty and our planet to flourish. Both politicians and business bosses need to hear how important this issue is to individuals and communities, and be held to account for the actions they take in response.

9.2 Lifestyle – reducing single-use plastics

While calling for governments and companies to act, there are increasing numbers of ways that individuals and communities can live out the changes they are calling for. Consumers have often been forced into a linear, disposable lifestyle, where companies encourage their audiences to buy for convenience, use things and then throw them away. It can be hard to break out of this model – 'ethical' items are often marketed at a higher price point, and for specialist products there may be no available alternative. However, becoming an 'early-adopter' of a more sustainable approach creates pressure for new packaging models that make it easier for others to follow a sustainable path in the future.

The recommendations listed on page 64 include some suggestions on how to reduce single-use plastic consumption. When it comes to packaging, it is best to cut down on using disposable packaging altogether rather than switching one type of packaging for another. For example, many businesses are switching from plastic packaging and utensils to paper or wood. Unfortunately, single-use paper²¹⁵ can have a higher carbon footprint than plastic and climate change is still the greatest challenge the world faces, so one bad choice is simply substituted for another!²¹⁶

Where single-use plastic is unavoidable it should be recycled (which means it must also be recyclable – not all plastic packaging is). However, it's important to stress that while recycling plastic is better than sending it to landfill, it is by no means the panacea. Even in a high-income country such as the UK, the capacity to recycle is already far below the capacity that's needed (meaning the UK is exporting its recyclable plastic elsewhere). By continuing to buy such products, the harmful business models and practices of the MNCs are being sustained.

Some people think 'alternative' plastics (such as bio-plastics,²¹⁷ biodegradable and compostable plastics) are the answer, but research suggests that the alternative plastics currently available may be just as harmful to the environment as conventional plastics.²¹⁸ Increasing the use of plant-based alternatives (bio-based plastics) will also be problematic if increasing amounts of land and resources are given over to their production. Additionally, waste collection systems in the UK are not designed to collect and handle biodegradable or compostable items. Unless special arrangements are made for them to be collected and composted at an appropriate industrial facility, they will be sent to landfill where they won't biodegrade and will contribute to methane emissions like any other waste product.

215 Environment Agency (2011) *Life cycle assessment of supermarket carrier bags: a review of the bags available in 2006*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291023/scho0711buan-e-e.pdf [accessed 21 March 2019]

216 Ibid.

217 A type of biodegradable plastic derived from biological substances rather than petroleum.

218 Masterson A (2018) 'Biodegradable plastic bags may be major pollutants', *Cosmos Magazine*. <https://cosmosmagazine.com/geoscience/biodegradable-plastic-bags-may-be-major-pollutants>

Making lifestyle changes to reduce the use of plastics is important so that, as concerned citizens, we live the change we want to see. If it becomes a widespread movement it will also significantly reduce the amount of plastic waste exported to low- and middle-income countries, as well as clean up the streets and marine habitats and reduce the impact on climate change. By making these changes and talking about it, the word can spread, changing social norms. This also opens up political space for governments and multinational businesses to act so that the system itself changes and enables a society where it's easy to live without single-use plastic.

RECOMMENDATIONS

Citizens should:

- hold companies and governments to account for their responsibilities in tackling the plastic pollution crisis, starting by signing up to support Tearfund's campaign asking MNCs to take responsibility for the plastic they produce in developing countries – www.tearfund.org/rubbishcampaign
- write to their elected representative (in the UK via www.writetothem.com) telling them their concerns regarding plastic waste, and asking them to take action
- take part in community initiatives to tackle plastic waste, such as community litter collections or local beach clean-ups
- reduce usage of single-use plastics where possible, for example, by:
 - using a reusable water bottle, reusable shopping bags and reusable cup when buying hot drinks 'on the go'
 - cutting out non-essential items like cotton buds; glitter; plastic cups, plates and cutlery; and plastic straws²¹⁹
 - buying groceries and toiletries with less or no packaging where possible eg loose vegetables rather than those packaged in plastic; unwrapped soap etc²²⁰
 - buying from ethical companies who are committed (genuinely) to reduce plastic use

²¹⁹ The exception being people with particular disabilities that require the use of straws.

²²⁰ Bio-based, 'biodegradable' or compostable plastics are not a solution to the plastic pollution crisis as they mostly present similar risks to the environment as conventional plastics and can propagate linear material flows that undermine the transition to a circular economy.

CONCLUSION

This report has set out the plastic pollution problem facing our world and its poorest people. It has explained the damage being caused to our environment, our oceans and to the health and livelihoods of poor communities. It has presented solutions: clear actions that need to be taken by those most responsible for the problem – MNCs and high-income governments – as well as low- and middle-income governments and individuals.

The challenge is complex and requires bold action, but it is not insurmountable.

As a global community we have no choice but to reimagine and transform our take-make-throw economy. We need thriving, responsible businesses that deliver goods that customers need, in packaging models that can be used again and again, not substituting one environmental bad choice for another. We need many more visionary governments who promote and incentivise this approach through regulation and fiscal measures, and we need donors (high-income country governments and global institutions) who will rapidly invest in waste management solutions that work for people in poverty, create jobs and save lives. In just a couple of years, many people's eyes have been opened to the sheer irrationality of the single-use-plastic business model for consumer goods, and many inspirational communities across the world have mobilised to demand better, and clean up their beaches and streets. Change is coming, but we cannot be complacent: we must keep up the pressure, there is no time to waste.

ANNEX: EXPLAINING OUR STATISTICS

This report contains three new statistics and this annex explains how they were calculated.

- Every 30 seconds the UK public throws away two double-decker busloads of plastic.
- In low- and middle-income countries, a double-decker busload of plastic is burnt or dumped every second.
- Each year between 400,000 and 1 million people die from diseases caused by rubbish. At the upper end, that's one person every 30 seconds.

UK plastic by the busload

According to the World Bank's *What a Waste* report, the UK produces 32 million tonnes of Municipal Solid Waste (MSW) a year.²²¹ The World Bank estimates that plastic accounts for 13 per cent of MSW in high-income countries, therefore we calculate the amount of plastic within the UK's MSW to be approximately 4 million tonnes.

Converting the weight of mixed plastic waste to volume is not at all straightforward. Not least because different types of plastics have different densities and therefore the conversion ratio differs between plastic types. It also differs depending on whether the plastic waste has been crushed or not.

To convert the weight of the UK's plastic waste to volume, we used the same ratio as that used by the *Everyday Plastic* report.²²² Note that this is based on plastic as it is thrown from the household, so before being mechanically crushed. In this report, 35kg of uncrushed plastic waste was equivalent to 1.5m³. Therefore we calculate that 4 trillion kg of uncrushed plastic waste is equivalent to a volume of approximately 180 million m³.

The dimensions for a London double-decker bus are...



This gives a useable volume of 90m³.

Therefore it takes 2 million double-decker buses to transport the plastic waste thrown away by UK households and businesses each year.

There are 525,600 minutes in a year, making this one bus every 16 seconds, or approximately 2 buses every 30 seconds.

221 Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>. This report defines Municipal Solid Waste as including 'residential, commercial, and institutional waste'.

222 Webb D and Schneider J (2018) *Everyday Plastic: what we throw away and where it goes*. <https://www.everydayplastic.org>

Plastic in low- and middle-income countries by the busload

The World Bank's *What a Waste* report also provide figures for total household waste by country-income group, along with estimates of the percentage that is plastic and the percentage that is 'mismanaged'.²²³

'Mismanaged' means subject to open dumping or burning. Combining these figures allows us to estimate that 70 million tonnes of plastic are burnt or dumped in low- and middle-income countries each year.

As with the previous statistic, we use the *Everyday Plastic* report's conversion factor for weight to volume, for plastic waste.²²⁴ Although this is based on a UK waste sample, our understanding of plastic waste composition across countries suggests that it is likely to be broadly similar globally. This results in a volume estimate of 3 billion m³ of mismanaged plastic waste in low- and middle-income countries each year.

This is equivalent to more than 33 million double-decker buses (see previous statistic). There are 31.5 million seconds in a year, making this one bus a second.

Deaths resulting from waste each year

This is the most complicated of the three statistics.

As described in chapter 2 of the report, the links between waste and ill health are serious and multi-faceted. For the purposes of the calculation, we focus on three channels:

- **Premature mortality from air pollution** caused by open burning of waste (which is linked with stroke, chronic obstructive pulmonary disease, ischaemic heart disease, lung cancer, lower respiratory infections and neonatal preterm birth).
- **Diarrhoeal disease** caused by blocked drains, flooding, and other insanitary conditions arising from dumped waste.
- **Mosquito-borne disease** including dengue and malaria caused by increased mosquito breeding grounds arising from dumped waste and flooding.

There are other causes that we cannot calculate, including death by drowning, falling or wounding, and other diseases such leptospirosis. We do mention these in chapter 2, but do not include them in our calculations.

In each case we produce an upper- and lower-bound estimate. Taken together, these provide a range of approximately 400,000 to 1.1 million deaths annually (rounded to the nearest hundred thousand).

Premature mortality from air pollution

The World Health Organisation's (WHO) most recent analysis of deaths attributable to air pollution (focusing on PM2.5 and other air pollution associated with it) suggests a figure of 4.2 million deaths a year in 2016.²²⁵

In a landmark paper in 2014, Wiedinmyer et al²²⁶ produced estimates of the emissions caused by open burning of waste. At a global level, Wiedinmyer estimated that open burning of waste created emissions equivalent to 29 per cent of all previously known PM2.5 emissions (or to put it another way, 22 per cent of a newly revised global total).²²⁷

223 Kaza S et al (2018) *What a waste 2.0: a global snapshot of solid waste management to 2050*, Urban Development. Washington, DC: World Bank. <http://hdl.handle.net/10986/30317>. This report defines Municipal Solid Waste as including 'residential, commercial, and institutional waste'.

224 Webb D, Schneider J (2018) *Everyday Plastic: what we throw away and where it goes*. <https://www.everydayplastic.org>

225 WHO (2018) *Ambient outdoor air quality and health factsheet*. [https://www.who.int/en/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/en/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health)

226 Wiedinmyer et al (2014) 'Global emissions of trace gases, particulate matter, and hazardous air pollutants from open burning of domestic waste', *Environ. Sci. Technol.* 2014, p48. <https://www.ncbi.nlm.nih.gov/pubmed/25019173>

227 According to WHO, 91 per cent of deaths from all sources of air pollution are in low- and middle-income countries, and according to Wiedinmyer's background data, 97 per cent of openly burnt waste is in these countries too, so we assume that all deaths related to open burning of waste occur in low- and middle-income countries.

There are reasons to believe that air pollution from open burning is more dangerous than other forms – notably because these emissions are often produced in close proximity to human habitation (often in backyards in informal settlements). However, some of the sources used for Wiedinmyer's meta-analysis are relatively old (from around 2010) and it is therefore possible that less waste is now being burned because of improvements in waste collection in upper-middle income countries such as China. However, it is also true that waste generation itself is increasing rapidly in these countries, which could offset improvements in waste collection.

Taking these factors into account, we calculate an upper-bound estimate of deaths arising from open burning of waste equivalent to 22 per cent of WHO's estimate, or 920,000 deaths a year.

As a lower-bound, we use an estimate provided by Kodros et al (2016).²²⁸ Kodros used Wiedinmyer's figures to inform a global model of air pollution and disease prevalence, in order to estimate the number of premature adult deaths caused by PM2.5. His model and accompanying data is older²²⁹ than that used in the recent WHO analysis (note that WHO's estimate has trebled since its 2011 calculations),²³⁰ and he estimates that open burning of waste gives rise to 270,000 premature deaths each year. He also notes that the spatial resolution of his model is not fine enough to capture the full effect of emissions being co-located with human habitation: tests with a more detailed resolution for Asia suggest at least 25 per cent more mortalities. As a result, he suggests that his estimate constitutes a lower-bound.

Kodros' estimate only includes adult mortality, therefore we add estimates for mortality caused by lower respiratory infections in children and neonatal pre-term birth. In order to estimate the role of burnt waste in these deaths, we take the total number of deaths related to lower respiratory infections and neonatal pre-term birth from the IHME Global Burden of Disease database and adjust this according to the proportion that WHO judges to be related to ambient air pollution.²³¹ We apportion these 'air pollution related deaths' between waste-collection and no-collection areas,²³² inferring that the rate of death is slightly higher in no-collection areas because of higher levels of air pollution. We then conservatively assume that 22 per cent of deaths in no-collection areas are related to burning of waste. This suggests an additional 5,000 deaths.

Diarrhoeal disease

As stated in chapter 2, diarrhoeal disease is the second leading cause of mortality in children under five years old,²³³ and dumped waste significantly increases its incidence. There are no conclusive studies in this area, but many indicate a strong causal relationship: for example, according to UN Habitat, living among uncollected waste doubles the incidence of diarrhoeal disease;²³⁴ a study in Ethiopia²³⁵ indicated that diarrhoeal disease was three times as likely where waste wasn't managed properly; a study in Nigeria²³⁶ suggested that blocked drains double the incidence of diarrhoea, as does 'waste creating breeding places for flies'; and a study in Brazil²³⁷ (published by the Royal Society of Tropical Medicine and Hygiene) suggested that exposure to waste in the environment could quadruple the incidence of diarrhoea.

However, it is statistically difficult to isolate the impact of waste management from other factors, particularly since the affected communities often also lack access to clean drinking water, sanitation, medical help and other essential services. As a corollary, recent trials providing access to water and sanitation have shown that

228 Kodros et al (2016) 'Global burden of mortalities due to chronic exposure to ambient PM2.5 from open combustion of domestic waste', *Environmental Research Letters*, vol. 11 (12)

229 Cohen et al (2017) 'Estimates and 25-year trends of the global burden of disease attributable to ambient air pollution: an analysis of data from the Global Burden of Diseases Study 2015', *The Lancet*, vol. 389 (10082), pp1907–1918. [https://doi.org/10.1016/S0140-6736\(17\)30505-6](https://doi.org/10.1016/S0140-6736(17)30505-6)

230 WHO (2014) 'Burden of disease from ambient air pollution for 2012'. https://www.who.int/phe/health_topics/outdoorair/databases/AAP_BoD_results_March2014.pdf

231 Based on Prüss-Ustün A et al (2016) *Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks*, World Health Organisation

232 Using data from UNEP/ISWA (2015) *Global waste management outlook*. <http://web.unep.org/ourplanet/september-2015/unep-publications/global-waste-management-outlook>

233 Prüss-Ustün A (2016) *Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks*, World Health Organisation

234 UN Habitat (2009) *Solid Waste Management in the World's Cities*. <https://unhabitat.org/wp-content/uploads/2015/12/SolidWaste.pdf>

235 Gebru T, Taha M and Kassahun W (2014) 'Risk factors of diarrhoeal disease in under-five children among health extension model and non-model families in Sheko district rural community, Southwest Ethiopia: comparative cross-sectional study', *BMC Public Health*, 14, 395

236 Olorunfoba E, Folarin T and Ayede A (2014) 'Hygiene and sanitation risk factors of diarrhoeal disease among under-five children in Ibadan, Nigeria', *African Health Studies*, vol. 14 (4)

237 Rego R, Moraes L and Dourado I (2005) 'Diarrhoea and garbage disposal in Salvador, Brazil', *Transactions of the Royal Society of Tropical Medicine and Hygiene*, vol. 99 (1)

we do not see the great reductions in diarrhoea one might expect from comparable observational studies.²³⁸ We therefore moderate the risk factor associated with lack of waste collection, as described below.

For our lower-bound estimate, we assume that diarrhoeal disease is 50 per cent more prevalent in areas without waste collection (since waste collection is also a proxy for lack of access to other essential services). We then suggest that introducing waste collection reduces diarrhoea in these areas by just eight per cent – much lower than indicated by the studies on incidence mentioned above. (By way of comparison, provision of improved sanitation (toilets) is generally held to reduce incidence of diarrhoea by a third, and handwashing with soap by about half.²³⁹) These figures suggest that lack of waste collection is responsible for around four per cent of all deaths caused by diarrhoea.

For our upper-bound estimate, we assume that diarrhoeal disease is twice as likely in areas without waste collection and that introducing waste collection reduces mortality by 15 per cent – again much lower than indicated by the studies on incidence. These figures suggest that lack of waste collection is responsible for around nine per cent of all deaths from diarrhoea.

This produces a range of 67,000 to 141,000 deaths per year. It is worth emphasising again that a much higher estimate could be produced if we relied solely on risk factors from observational studies, but we moderate these as described above.

Mosquito-borne disease

Uncollected waste is notorious for providing breeding grounds for mosquitoes.²⁴⁰ The species that carry dengue and malaria prefer clean water, meaning that rainwater caught in discarded plastic containers is of primary concern. Both malaria and dengue are significant causes of premature mortality in developing countries.

For our statistics, we take WHO's judgement for the proportion of total dengue and malaria deaths caused by environmental factors (ie provision of breeding grounds)²⁴¹ and apportion these deaths between waste-collection and no-collection areas.²⁴² We know that these diseases are more prevalent among those in poverty (for example because of the quality of their housing²⁴³) and that lack of waste collection is also a proxy for poverty.

Therefore, for our upper-bound estimate we assume that these (environmentally caused) deaths are 50 per cent more prevalent in no-collection areas. We then further assume that providing waste management reduces their incidence by a quarter. For our lower-bound estimate, we assume that these deaths are 35 per cent more likely in no-collection areas and that providing waste management reduces their incidence by 15 per cent. These calculations are performed separately for low-income, lower-middle income and upper-middle income countries to account for differences in waste collection coverage. This produces a range of 27,000 to 48,000 deaths per year.

238 Cairncross S et al (2010) 'Water, sanitation and hygiene for the prevention of diarrhoea'. *International Journal of Epidemiology*, 39 (Suppl 1), pp193-205

239 Ibid.

240 Prüss-Ustün A et al (2016) 'Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks', World Health Organisation

241 Ibid.

242 Using data from UNEP/ISWA (2015) *Global waste management outlook*. <http://web.unep.org/ourplanet/september-2015/unep-publications/global-waste-management-outlook>

243 Teklehaimanot A and Mejia P (2008) *Malaria and poverty*, The Earth Institute at Columbia University

'It is high time we turn our
attention fully to one of the
most pressing problems of today
– averting the plastic pollution
crisis – not only for the health of
our planet, but for the wellbeing
of people around the world.'

SIR DAVID ATTENBOROUGH



learn.tearfund.org

100 Church Road, Teddington TW11 8QE, United Kingdom
T UK +44 (0) 20 3906 3906 E publications@tearfund.org

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