

OCEANS OF PLASTICS: DEVELOPING EFFECTIVE AFRICAN POLICY RESPONSES

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EXECUTIVE SUMMARY

While plastic is a revolutionary material, plastic waste is difficult to manage and has significant adverse effects if it escapes into the environment, especially the ocean. Many policy responses have been developed in an attempt to address this issue, yet the amount of plastic waste in the ocean continues to increase annually. This policy insight reviews the causes and consequences of marine plastic waste and assesses the international policy responses to the problem. Particular focus is given to the African continent, which is headed towards becoming the world's most polluted continent.

INTRODUCTION

Durable, versatile, resistant, light and affordable – these are the properties that make plastic a truly revolutionary material. The use of plastics has increased alongside global population growth, industrialisation and urbanisation, giving rise to the 'Age of Plastic'.

Plastic products are easy and cheap to manufacture (with production increasing every year), which has resulted in a 'throwaway culture', where products are meant to have a short service life before being discarded. The waste generated is difficult to manage and negate, as plastic waste generation increases annually¹ while existing plastic waste degrades very slowly. Of particular concern is the growing accumulation of plastic waste in the ocean. This poses a serious danger to marine and coastal ecosystems, with the result that the economies and societies dependant on these ecosystems are negatively affected.

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Asia (and the surrounding ocean) is currently considered the most polluted continent on earth, but Africa is on track to take this title. The rates of population growth, industrialisation and urbanisation in Africa already surpass those in Asia.² Furthermore, Africa is one of the least wealthy continents, lacking the resources and capacity to effectively collect, contain, dispose or recycle the increasing amount of plastic waste associated with growth and development.

There are numerous international policies that address the issue of plastic waste in the ocean, but these seem to be failing – particularly in Africa. The reasons for this are complex, but are best understood through a closer examination of how plastic waste ends up in the ocean and the negative effects thereof, as well as through an assessment of the existing policy responses.

SOURCES OF PLASTIC WASTE

About 80% of the plastic waste in the ocean is the result of waste discharged from land, which comes to about 4.8–12.7 million tonnes of plastic waste per year.³ This land-based plastic waste is the result of littering (especially along the coast), expanding industrial and urban centres and a lack of adequate waste disposal services and infrastructure. Open-air dumps and poorly managed landfills are susceptible to plastic waste being blown and washed away (waste leakages). Recycling (material reclamation) and waste-to-energy (energy reclamation) installations are crucial in maintaining a circular economy. However, these installations often require resources and capacity beyond the capabilities of lower-income nations, which then have to rely on dumps and landfills.⁴

If not collected and disposed of correctly, plastic waste is dispersed into the environment. The plastic waste being washed into river networks and man-made waterways has near-direct access to the ocean. Larger items may be filtered out (eg, through the installation of filters in waste-water treatment installations), but smaller and more buoyant items easily bypass barriers.

Plastic waste generated at sea is usually disposed of directly into the ocean. This comprises about 20% of the plastic waste in the ocean, and consists largely of abandoned, lost or otherwise discarded fishing gear (ALDFG). Other sources of ocean-based plastic waste include littering off ocean vessels, accidental loss of cargo and illegal dumping.

Once in the ocean, plastic waste (being lightweight and buoyant) is transported across the world by the wind and ocean currents. It tends to accumulate within ocean gyres, but also washes out on foreign coasts. As plastic waste breaks down (owing to photochemical, physical and biological forces) the smaller fragments sink down the water column. Down-welling systems (such as those at the equator, poles and gyre centres) also tend to pull plastic waste down the water column. On reaching the deep thermohaline circulation and ocean floor, plastic waste is removed from degradative forces and remains unchanged almost indefinitely. The ocean is truly becoming a plastic soup, with more and more reports of plastic waste in the most remote regions imaginable.⁵

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NEGATIVE IMPACTS OF PLASTIC WASTE

Plastic waste poses several threats to the marine environment. An academic review reported that 344 marine species (including marine birds, marine mammals and turtles) have been known to become entangled in plastic waste (particularly ALDFG).⁶ Entanglements can result in reduced and restricted movement (this is particularly hazardous for sharks, which require continuous movement and fully-opened mouths for gill ventilation), laceration, amputation and infection. The same review also reported that 331 marine species have been known to ingest plastic waste and fragments thereof. Ingestion of plastic waste can cause physical damage (choking, laceration and infection) and reduce or block the intestinal tract, resulting in starvation. This is of particular concern in marine birds, as research shows that they may regurgitate plastic waste when feeding their chicks.

As plastic waste breaks down into smaller fragments, it is more readily consumed by smaller organisms in the ocean's food web. At the microscopic level, plastic fragments absorb and exude certain chemicals. Once ingested, the fragments can release these chemicals into their hosts that may persist and even accumulate up the food web. Of particular concern is the spread and accumulation of hazardous organic chemicals, which could cause endocrine and reproductive disorders, especially higher up the food web, including in humans.⁷

Beyond these immediate threats, plastic waste can also change marine and coastal ecosystems as a whole, especially more sensitive ecosystems. The accumulation of items such as plastic bags can reduce the penetration of light and obstruct the flow of water, thus reducing nutrient access to stationary organisms and turning the underlying sediments anoxic (oxygen depleted).⁸ Larger items can be dragged along the ocean floor, causing physical damage as well as trapping or crushing smaller organisms. Additionally, items that float at or near the ocean surface can provide a vector for the spread of foreign species and diseases.

Plastic waste also represents a huge economic loss. It is a loss of material that could have otherwise been repaired, repurposed and/or recycled. If such measures were not feasible, plastic waste could still have been used for energy production (although this would result in air pollution as a by-product). Furthermore, numerous socio-economic studies detail the economic loss that results from the lowered aesthetic value caused by the increased presence of plastic waste at popular tourist destinations.⁹ The energy and resources used to remove plastic waste from these areas are themselves an economic loss, especially to the organisations tasked to implement and carry out such initiatives.

INTERNATIONAL POLICIES AND STRATEGIES

In recognition of the many negative environmental, economic and social effects of plastic waste in the ocean, numerous policies have been designed, implemented and enforced. These policies vary in scope and effect but, given the numerous sources of plastic waste in the ocean, this issue is best addressed at the regional and global level.

At these levels there are several conventions and associated protocols that bind signatories to conform to certain standards or initiate a change in practice.

It is then up to individual nations to design, implement and enforce their own domestic policies in order to adopt these standards and practices, as well as report to a centralised forum. Alternatively, research and corporate networks develop non-binding strategy documents and action plans, providing regional and global guidance on achieving the goals of binding international agreements. These are informed by the work of various experts in the field, while factoring in advances in research and technology and reflecting changes in economic and social trends.

What follows is a brief outline of the major international agreements that influence how marine plastic waste is addressed, with particular attention paid to the policies that influence African countries.

UN CONVENTION ON THE LAW OF THE SEA (UNCLOS)

This [international treaty](#) was adopted in 1982 and entered into force in 1994. A total of 167 nations (including the EU) are bound by it, including all 54 African nations. The convention (also referred to as the ‘Constitution for the Oceans’) is considered the most important treaty governing the marine environment, as it outlines the rights and responsibilities of each nation with respect to its use of the world’s oceans. In particular, Part XII, ‘Protection and preservation of the marine environment’, Section 1, Article 194, advises all nations to take measures to prevent, reduce and control pollution of the marine environment from both land-based and ocean-based sources. Although the convention itself does not bind nations to a particular set of policies and regulations, it does urge them to develop their own and cooperate with one another (Part XII, Section 2, articles 197–201).

TRANSFORMING OUR WORLD: THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT (A/RES/70/1)

This [non-binding strategy document](#) was developed and compiled in 2015 by the UN General Assembly. It is more commonly known as the 2030 Sustainable Development Goals (SDGs) and was developed to replace the Millennium Development Goals. This strategy document contains 17 goals covering a broad spectrum of global issues. These goals are subdivided into 169 targets, which are each associated with one or more indicators (232 in total). Marine plastic waste is directly addressed in Goal 14, ‘Life below water’, but several other goals and targets also indirectly address the issue (see Table 1).

CONVENTION ON THE PREVENTION OF MARINE POLLUTION BY DUMPING OF WASTES AND OTHER MATTER (LC '72)

This [international treaty](#) was adopted in 1972 and entered into force in 1975. There are 89 nations bound by this treaty, including 17 African nations. The convention (also referred to as the London Convention), and the more stringent London Protocol (adopted in 1996 and entered into force in 2006), aims to effectively control all sources of marine pollution, particularly through the adoption of the ‘Precautionary Approach’ and the ‘Polluter Pays Principle’. Under this convention and its protocols, the disposal of persistent plastic and synthetic waste at sea is prohibited. The 1996 amendment also shifted the focus landwards, with discussions now turning toward the regulation of waste water.

TABLE 1 THE SDGs AND TARGETS RELATING TO THE ISSUE OF PLASTIC WASTE

SDGs	SDG targets
Goal 6: Clean water and sanitation	Target 6.3: Improve water quality by reducing pollution
Goal 8: Decent work and economic growth	Target 8.4: Improve global resource efficiency, decouple economic growth from environmental degradation
Goal 9: Industry, innovation and infrastructure	Target 9.4: Upgrade infrastructure to make it more sustainable, adopt clean and environmentally sound technologies and industrial processes
Goal 11: Sustainable cities and communities	Target 11.6: Reduce the environmental impact of cities, including waste management
Goal 12: Responsible production and consumption	Target 12.4: Achieve environmentally sound management of all chemicals and wastes
	Target 12.5: Reduce waste generation through prevention, reduction, recycling and reuse
Goal 14: Life below water	Target 14.1: Reduce marine pollution
	Target 14.2: Sustainably manage and protect marine and coastal ecosystems
	Target 14.3: Implement international law

Source: UN General Assembly, *Transforming our World: the 2030 Agenda for Sustainable Development*, 25 September 2015, A/RES/70/1, 21 October 2015

INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS (MARPOL 73/78)

This [international treaty](#) was adopted in 1973, modified in 1978, and entered into force in 1983 with 156 signatory nations, including 35 African nations. The convention directly prohibits the dumping of plastic waste at sea. It also addresses the garbage (Annex V) and sewage (Annex VI) released from ocean vessels: all ocean vessels over 400 tonnes or certified to carry over 15 persons are obligated to maintain a ‘Garbage Record Book’ to be available and inspected by port authorities.

REGIONAL SEAS CONVENTION AND ACTION PLANS (RSCAPs)

These are regional conventions or programmes (the first of which was adopted in 1974) that operate under the UN Environmental Programme (UNEP). They emphasise a cooperative and collaborative approach to the regional conservation of the marine environment. There are 18 RSCAPs with 143 nations involved, including all coastal and island nations of Africa. Four of these RSCAPs were independently established and are partnered with UNEP. The remaining 14 RSCAPs were developed by UNEP, which remains the administrative body for half of them (see Table 2).

The UNEP-derived RSCAPs have adopted a [legally binding convention](#) that has been adapted to emphasise and address regional concerns. Within the overarching convention, marine plastic waste is addressed in Article 5, ‘Pollution from ships’; Article 6, ‘Pollution caused by dumping from ships and aircraft’; Article 7, ‘Pollution from land-based sources’; Article 8, ‘Pollution from activities relating to exploration and exploitation of the seabed’; and Article 12, ‘Co-operation in combating pollution in cases of emergency’. Several RSCAPs (including those not established by UNEP) have adopted additional conventions and protocols, again to emphasise and address regional concerns, and are also legally binding.

TABLE 2 STATUS OF RECS’ REGIONAL ECONOMIC INTEGRATION

Secretariat/ Regional Coordinating Unit (RCU)	Region	Administration	Participating nations	Policies within the RSCAP
Caribbean RCU	Wider Caribbean region	UNEP-administered RSCAP	Antigua and Barbuda, Bahamas, Barbados, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, French Caribbean Territories, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, the Netherlands Caribbean Territories, Nicaragua, Panama, St Kitts & Nevis, Saint Lucia, St Vincent & the Grenadines, Suriname, Trinidad and Tobago, UK Caribbean Territories, US, Venezuela	<ul style="list-style-type: none"> • Cartagena Convention 1986 • Plan 1981
Coordinating Unit for the Mediterranean Action Plan	Mediterranean Sea	UNEP-administered RSCAP	Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, European Community, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Morocco, Serbia, Montenegro, Slovenia, Spain, Syria, Tunisia, Turkey	<ul style="list-style-type: none"> • Barcelona Convention 1978/2004 • Mediterranean Action Plan 1975
RCU for East Asian Seas	East Asian seas	UNEP-administered RSCAP	Australia, Cambodia, China, Indonesia, Malaysia, Philippines, Republic of Korea, Singapore, Thailand, Vietnam	<ul style="list-style-type: none"> • Action Plan for the Protection and Development of the Marine and Coastal Areas of the East Asian Region 1981/1994
Eastern Africa RCU	East African region	UNEP-administered RSCAP	Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, Tanzania, South Africa	<ul style="list-style-type: none"> • Nairobi Convention 1996/2010 • East Africa Action Plan 1986
NOWPAP RCU	North-West Pacific region	UNEP-administered RSCAP	China, Republic of Korea, Japan, Russian Federation	<ul style="list-style-type: none"> • North-West Pacific Action Plan 1994

Secretariat/RCU	Region	Administration	Participating nations	Policies within the RSCAP
UNEP acts as Secretariat to the Action Plan	West and Central African region	UNEP-administered RSCAP	Angola, Benin, Cameroon, Cape Verde, Congo, DRC, Côte d'Ivoire, Equatorial Guinea, Guinea-Bissau, Liberia, Mauritania, Namibia, Nigeria, São Tomé and Príncipe, Senegal, Sierra Leone, Togo, South Africa	<ul style="list-style-type: none"> • Abidjan Convention 1984 • West and Central Africa Action Plan 1984
Conference of the Parties and Secretariat	Caspian Sea	UNEP-administered RSCAP	Azerbaijan, Iran, Kazakhstan, Russian Federation, Turkmenistan	<ul style="list-style-type: none"> • Tehran Convention 2003 • Caspian Environmental Programme 1992
Black Sea Commission	Black Sea	Non-UNEP administered RSCAP	Bulgaria, Romania, Russian Federation, Georgia, Turkey, Ukraine	<ul style="list-style-type: none"> • Bucharest Convention 1992 • Revised Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea 2009
North-East Pacific Programme	North-East Pacific region	Non-UNEP administered RSCAP	Columbia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama	<ul style="list-style-type: none"> • Antigua Convention 2002 • Plan of Action for the Protection and Sustainable Development of the Marine and Coastal Areas of the North East Pacific 2002
Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden	Red Sea and Gulf of Aden	Non-UNEP administered RSCAP	Djibouti, Egypt, Jordan, Palestine (PLO), Saudi Arabia, Somalia, Sudan, Yemen	<ul style="list-style-type: none"> • Jeddah Convention 1985 • Action Plan for the Red Sea and Gulf of Aden 1982/1995/2005
Regional Organisation for the Protection of the Marine Environment (ROPME)	ROPME Sea Area	Non-UNEP administered RSCAP	Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates	<ul style="list-style-type: none"> • Kuwait Convention 1979 • Action Plan for the Protection of the Marine Environment and the Coastal Areas of Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates 1979

Secretariat/RCU	Region	Administration	Participating nations	Policies within the RSCAP
South Asia Cooperative Environment Programme	South Asian seas	Non-UNEP administered RSCAP	Bangladesh, India, Maldives, Pakistan, Sri Lanka	<ul style="list-style-type: none"> • South Asian Seas Action Plan 1995
Permanent Commission for the South Pacific, UNEP and additional stakeholders	South-East Pacific region	Non-UNEP administered RSCAP	Chile, Colombia, Ecuador, Panama, Peru	<ul style="list-style-type: none"> • Lima Convention • South-East Pacific Action Plan
Secretariat of the Pacific Regional Environment Programme	Pacific region	Non-UNEP administered RSCAP	American Samoa, Northern Mariana Islands, Australia, Cook Islands, Palau, Federated States of Micronesia, Papua New Guinea, Fiji, Pitcairn Islands, French Polynesia, Solomon Islands, Guam, Tokelau, Kiribati, Tonga, Marshall Islands, Tuvalu, Nauru, Vanuatu, New Caledonia, Wallis and Futuna, New Zealand, Western Samoa, Niue, France, US	<ul style="list-style-type: none"> • Apia Convention 1990 • Noumea Convention 1990
Arctic Council	Arctic region	Independent RSCAP	Canada, Denmark, Finland, Iceland, Norway, Russian Federation, Sweden, US	<ul style="list-style-type: none"> • Arctic Environmental Protection Strategy 1991
Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) Commission	Antarctic region	Independent RSCAP	Argentina, Australia, Belgium, Brazil, Bulgaria, Canada, Chile, Finland, France, Germany, Greece, India, Italy, Japan, Republic of Korea, Namibia, Netherlands, New Zealand, Norway, Peru, Poland, Russian Federation, South Africa, Spain, Sweden, Ukraine, UK, US, Uruguay, Vanuatu, European Community	<ul style="list-style-type: none"> • CCAMLR Convention 1982 • Antarctic Treaty 1961 • Protocol on Environmental Protection to the Antarctic Treaty 1998
Helsinki Convention and protocols	Baltic Sea	Independent RSCAP	Denmark, Estonia, EU, Finland, Germany, Latvia, Lithuania, Poland, Russian Federation, Sweden	<ul style="list-style-type: none"> • Helsinki Convention 1974/1992 • Baltic Sea Comprehensive Environmental Action Programme 1992
OSPAR Commission	North-East Atlantic region	Independent RSCAP	Belgium, Denmark, EU, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK	<ul style="list-style-type: none"> • OSPAR Convention 1998 • OSPAR Action Plan 1998–2003

Source: Biodiversitya-z.org, 'UNEP Regional Seas Programme', factsheet, <http://www.biodiversitya-z.org/content/unep-regional-seas-programme#summary-of-unep-regional-seas-programmes>, accessed 1 June 2018

CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS (CMS)

This [international treaty](#) was adopted in 1979 and entered into force in 1983. There are 126 nations bound by this treaty, including 44 African nations. The convention (also referred to as the Bonn Convention) was developed to conserve and manage migratory species throughout their range. Seven of the nine agreements, as well as seven of the 19 memoranda of understanding, relate to marine and coastal migratory species. The original convention did not consider marine plastic waste, and since then Resolution 10.4 'Marine debris' (UNEP/CMS/Resolution 10.4) and Resolution 11.30 'Management of marine debris' (UNEP/CMS/Resolution 11.30) have addressed the issue and outlined steps for further action.

BASEL CONVENTION ON THE CONTROL OF TRANSBOUNDARY MOVEMENTS OF HAZARDOUS WASTES AND THEIR DISPOSAL

This [international treaty](#) was adopted in 1989 and entered into force in 1992. A total of 185 nations (including the EU) are bound by this law, including all 54 African nations. The convention (also referred to as the Basel Convention) was developed in order to manage and reduce the movement of hazardous waste between nations, particularly electronic waste. The convention also establishes the concept of hazardous waste and forbids the trading of waste to nations that do not have the infrastructure to safely dismantle and dispose of said waste.

CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

This [international treaty](#) was adopted in 1992 and entered into force in 1993. A total of 196 nations are bound by this treaty, including all 54 African nations. The convention has three main objectives:

- to conserve biological diversity;
- to use these resources sustainably; and
- to fairly and equitably share the benefits arising from the utilisation of genetic resources.

Marine plastic waste is indirectly addressed in the convention text under Article 8, 'In-situ conservation', where nations are required to preserve the environment and prevent degradation. In December 2016 Decision 10, 'Addressing impacts of marine debris and anthropogenic underwater noise on marine and coastal biodiversity' (CBD/COP/DEC/XIII/10), was adopted to directly address and mitigate the impacts of marine plastic waste on biodiversity.

GLOBAL PROGRAMME OF ACTION FOR THE PROTECTION OF THE MARINE ENVIRONMENT FROM LAND-BASED ACTIVITIES (GPA)

This is an [intergovernmental programme](#) (first established in 1995) that operates under UNEP. The GPA aims at preventing the degradation of the marine environment from land-based activities. What makes this programme unique is that it is perhaps the only global intergovernmental mechanism in place that directly addresses the connection between terrestrial, freshwater, coastal and marine ecosystems. Although its regulatory power is limited, the GPA aims to guide local, national and regional policy development. This has led to the development and

adoption of the Manila Declaration at the third intergovernmental review meeting of the GPA in 2012 (UNEP/GPA/CRP.1/Rev.1).

STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS

This [international treaty](#) was adopted in 2001 and entered into force in 2004. A total of 181 nations are bound by it, including all 54 African nations. The convention (also referred to as the Stockholm Convention) aims to protect human and environmental health by prohibiting (Appendix A, listing 24 chemical groups), restricting (Appendix B, listing two chemical groups) or controlling (Appendix C, listing seven chemical groups) the production and use of persistent organic chemicals. Several of these chemicals are associated with the manufacturing of plastics and the degradation of the resulting waste.

HONOLULU STRATEGY – GLOBAL FRAMEWORK FOR PREVENTION AND MANAGEMENT OF MARINE DEBRIS

This is a [non-binding strategy document](#) that was developed during the Fifth International Marine Debris Conference (attended by 440 delegates from 38 nations in March 2011) and compiled by UNEP and the National Oceanic and Atmospheric Administration. This document outlines various strategies (including market-based strategies) that can be developed into policies to prevent or reduce marine waste (including plastic waste). The overarching goals of this document are:

- Goal A ‘Reduced amount and impact of land-based sources of marine debris introduction into the sea’;
- Goal B ‘Reduced amount and impact of sea-based sources of marine debris, including solid waste; lost cargo; abandoned, lost, or otherwise discarded fishing gear (ALDFG); and abandoned fishing vessels, introduced into the sea’; and
- Goal C ‘Reduced amount and impact of accumulated marine debris on shorelines, in benthic habitats, and in pelagic waters’.

This strategy document also serves as a reference for collaborative efforts in developing regional to local programmes and projects.

SIDS ACCELERATED MODALITIES OF ACTION PATHWAY (A/RES/69/15)

This non-binding strategy document (referred to as the [SAMOA Pathway](#)) was developed during the Third International Conference on Small Island Developing States (attended by approximately 3 500 delegates in September 2014) and compiled by the UN General Assembly. Small island developing states (SIDS) are small maritime nations that have limited space, resources and capacity, making environmental and waste management a challenge. Africa has six SIDS: Cape Verde, Comoros, Madagascar, Mauritius, São Tomé and Príncipe, and the Seychelles. The SAMOA Pathway is a guide to achieving sustainable development for SIDS. Conservation of the marine environment is addressed under the section ‘Oceans and seas’ (articles 54–58), with Article 58(b) directly addressing the issue of marine plastic waste. Sustainable use of resources is addressed under the section ‘Management of chemicals and waste, including hazardous waste’ (articles 70 and

71), with Article 71(d) advocating reduction, reuse, recycling, recover and return policies.

UNEA RESOLUTION 'MARINE LITTER AND MICROPLASTICS' (UNEP/EA.3/L.20)

This **non-binding treaty** was proposed at the third meeting of the UN Environment Assembly (UNEA) in Nairobi in December 2017 and signed by 193 nations. The treaty directly addresses the growing issue of plastic waste, acknowledging previous resolutions from UNEA's first and second meetings (Resolution 1/6, 'Marine plastic debris and microplastics' [UNEP/EA.2/5], and Resolution 2/11, 'Marine plastic litter and microplastics' [UNEP/EA.2/Res.11]). Member nations are urged to collaborate in research efforts to develop effective and efficient long-term strategies (articles 1–4), and to include the private sector, civil society and plastic industry (articles 5–6). UNEA is urged to prioritise this issue (Article 7) and work with member states towards developing a legally binding international policy (articles 8–11).

CHANGING THE FOCUS OF POLICIES AND STRATEGIES

International policies have historically focused on ocean-based plastic waste. However, there is now greater understanding of the extent to which plastic waste in the ocean derives from land-based sources, necessitating a shift in policy focus. While this is addressed in non-binding policies, there is a need to develop, implement and enforce binding policies targeted at preventing, reducing and even eliminating land-based sources of plastic waste. Noticeable exceptions are the directives established by the European Commission, which oblige all members to adhere to strict protocols, submitting reports to a central forum for review. Examples include:

Urban Waste Water Directive (Dir. 91/271/EEC)

Aims to regulate the collection and treatment of waste water.

European Packaging and Packaging Waste Directive (Dir. 94/62/EC)

Aims to manage and reduce the materials needed for packaging.

Landfill Directive (Dir. 1999/31/EC)

Aims to reduce the amount of waste reaching landfills, and establishes protocols for operating landfills effectively.

Waste Framework Directive (Dir. 2008/98/EC)

A semi-binding directive that aims to manage and prevent waste. The directive outlines the basic concepts and definitions around waste and waste management, such as the concept of 'extended producer responsibility'. It also outlines basic waste management principles, such as the 'European Waste Hierarchy', in which waste should be filtered out of the waste stream through prevention, reuse, recycling, recovery and then disposal methods.

Ecodesign Directive (Dir. 2009/125/EC)

Outlines requirements to which manufacturers need to adhere for certain products in order to extend service life, thereby reducing the amount of waste generated.

Policy responses to marine plastic waste should also seek to induce change within both the plastics industry and broader society

Policy responses to marine plastic waste should also seek to induce change within both the plastics industry and broader society, from manufacturing (eg, limiting/banning the production of certain plastics that cannot be reclaimed/recycled and providing tax incentives for sustainable practices) to distribution (eg, more stringent protocols for transporting plastic goods, as well as managing and reducing packaging materials), consumption (eg, limiting/banning single-use plastic products and putting in place economic incentives for sustainable practices) and disposal (eg, more stringent protocols for the collection, transport and effective disposal/recycling of plastic products). Microplastics (plastic particles smaller than 5mm) are already being re-classified as hazardous materials in the UK, US and Canada, with protocols being established to monitor and regulate their production and distribution. At the same time, the EU (especially France) is discussing the possibility of banning all forms of single-use plastic products.

AFRICAN SOLUTIONS TO AFRICAN PROBLEMS

Africa and its surrounding ocean are at risk of becoming the most polluted region on earth ... the continent still lacks the resources and capacity needed to incite action at ground level

As mentioned, Africa and its surrounding ocean are at risk of becoming the most polluted region on earth. Many African nations are signatories to international policies and were involved in the development of the strategy documents and action plans outlined previously. The political framework on waste and waste management is well established (with countries developing policies that extend well beyond the original ocean-based policies), but the continent still lacks the resources and capacity needed to incite action at ground level. For example, in South Africa there are numerous legislative instruments that outline sustainable waste management.

South African Constitution (Act 108 of 1996)

Chapter 10 outlines the right of every South African to municipal services such as waste collection and regulation.

Environmental Conservation Act (Act 73 of 1993)

Part IV prohibits littering and Part V restricts and prohibits environmentally detrimental activities.

National Water Act (Act 36 of 1998)

Chapter 4 prohibits the pollution of water sources.

National Environmental Management: Waste Act (Act 59 of 2008)

The whole act defines and outlines waste management; in particular, Chapter 4 outlines the various waste treatment options, including reduction, re-use and recycling (Part 3).

Yet despite these legislative instruments many South Africans, particularly in rural areas and informal settlements, still have little to no access to waste management, resulting in high levels of littering and dumping. In order to fulfil the social need for waste management, numerous small-scale enterprises have been established based on waste's potential as an economic resource. Such enterprises are gaining support from the government, and are partnering with the disposal sector and recyclers to facilitate and extend sustainable waste management. In time, such economic models and networks could incite local and municipal action, which

could ultimately result in national policy implementation and enforcement. For example, Rwanda is the first nation to have banned the manufacturing, sale, distribution, use and import of plastic shopping bags, instead promoting locally made alternatives. Some African nations have followed suit and banned plastic shopping bags (such as Benin, Kenya, Tanzania, Mali and Morocco), while others have set up a partial ban or tax levy on the sale and distribution of plastic shopping bags (such as South Africa and Zimbabwe).

It is essential to not only get the policies right but also consider the role of government in providing waste management services (including through working with private sector entities). It is also essential to consider the involvement of both the private sector and civil society more broadly in addressing waste management, as is being done in the African Marine Waste Network (AMWN) (see Box 1).

BOX 1 AFRICAN MARINE WASTE NETWORK (AMWN)

The AMWN, managed and directed by the Sustainable Seas Trust, is an international network of stakeholders from across the waste sector and plastic industry intent on reducing plastic waste on the African continent and in the surrounding ocean. The AMWN runs several projects in four focus areas:

Facilitate communication and networking

In 2017 the Sustainable Seas Trust hosted an international conference to develop a strategy document for Africa. The success of this conference led to the development of numerous partnerships, which are driving various projects. The AMWN is growing an online platform to facilitate communication and offer best practice guides to decision makers. The AMWN is also encouraging support for and the inclusion of civil society through channels such as art, social media, radio and TV, as well as newspaper and online articles.

Establish economic incentives and enterprises

Recognising plastic waste as an underutilised resource, the AMWN is working toward sourcing and supporting local entrepreneurial enterprises driving sustainable waste practices, especially in impoverished communities.

Conduct waste research

The AMWN, in partnership with universities and research institutions, is developing a model to improve waste management in Africa. This will serve as a baseline for future clean-up and monitoring initiatives. The AMWN is also conducting several field studies to assess the extent and influence of plastic waste's effects on Africa's environment (monitoring plastic waste in rivers and waterways), economy (assessing the economic impact of ALDFG) and societies (determining the amount of microplastics in maricultural food products).

Build capacity and promote education

In order to build the capacity required to meet the challenges of a growing waste crisis in Africa, the AMWN is developing the African Waste Academy, centred around the development of an Education Resource Book. This will provide the resources to develop curricula for schools and teaching programmes to educate governments, industries, the tourism sector and civil society.

The holistic approach of the AMWN is aimed at ensuring that plastic waste is addressed at multiple levels to guarantee not only policy development but also the promotion of sustainable economic growth. It also aims to raise awareness and generate action from civil society.

CONCLUSIONS AND RECOMMENDATIONS

International policies govern the way the world operates. Given the amounts of plastic waste found in the ocean, it is crucial to ensure that current policies are implemented more effectively (through regional/national/local programmes and initiatives) and to promote the design and implementation of new international policies specifically targeting the production, distribution and management of plastics and their waste.

Research plays a critical role in such efforts. The environmental, economic and social costs and benefits of the various strategies and initiatives proposed in strategy documents and action plans need to be analysed and quantified. Any incentive or initiative aimed at reducing plastic waste requires a foundation of credible research in order to effectively and efficiently deploy resources and capacity to critical areas. For example, environmental research aiming to quantify the amount of plastic waste in the ocean has been criticised, as there is a lack of uniform methods, resulting in non-comparable data and conflicting results. This, in turn, undermines efforts to assess and monitor strategies and incentives.

Additionally, it is necessary to address the ‘market failure’ of plastic waste, namely the loss of materials and energy. The entire supply chain needs to shift from a linear to a circular system. Waste streams need to be reintroduced into the supply chain as a secondary point of material and energy extraction. Old products should be collected, reused, repurposed or recycled to avoid further primary material extraction. Otherwise, old products should be collected and burnt to generate energy, avoiding further primary energy extraction. This will require capacity development, economic investments (especially in impoverished regions), infrastructure redevelopment and revolutionary technologies and initiatives. Protocol development can stimulate this change, but only through collaborations and partnerships can these be viable and sustainable.

Finally, public perceptions of the use of plastic products need to change. This will help to effectively reduce the amount of unnecessary plastic waste and increase the amount of materials being reintroduced into the economy through repair, repurpose and/or recycle streams. This can be accomplished by developing and investing in education and outreach programmes that not only educate the general public but also modify people’s behaviour.

ENDNOTES

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