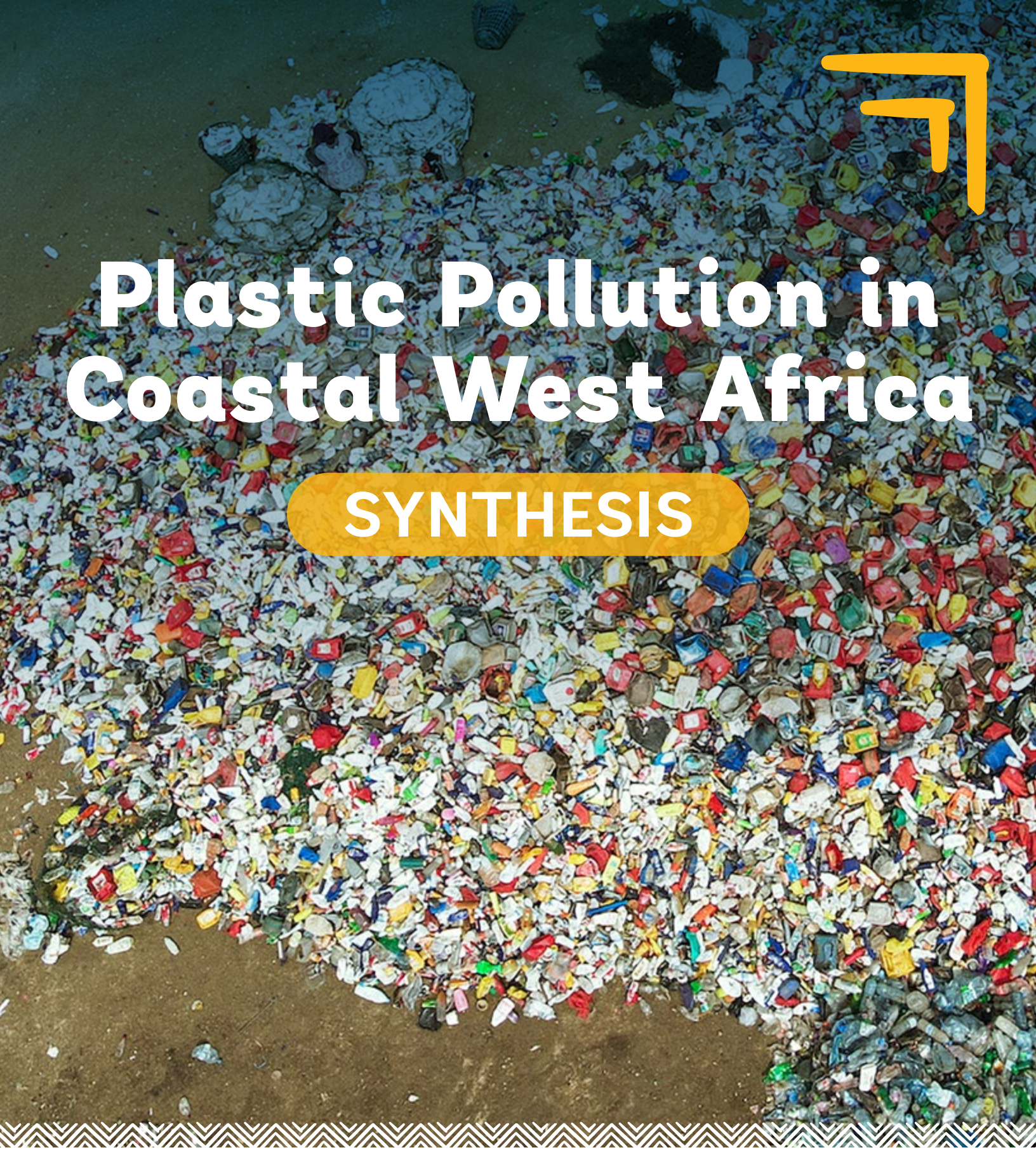


Plastic Pollution in Coastal West Africa

SYNTHESIS

WORLD BANK GROUP

NDF Nordic Development Fund

PROBLUE

WACA West Africa Coastal Areas Management Program

ACKNOWLEDGEMENTS

This **Synthesis Paper** and supporting **Technical Reports** were prepared under the guidance of Maria Sarraf (Practice Manager for the Environment, Natural Resources, and the Blue Economy in West Africa) at the World Bank.

The core task team consisted of Peter Kristensen, Sarah Jung, Sergio Vallesi, Madjiguene Seck, and Jayne Kwengwere. The Economics Technical Report was led by Susmita Dasgupta, and included Subhendu Roy and David Wheeler. The Circular Economy Technical Report was led by Dario Quaranta and included Tze Ni Yeoh, Maria Daniela Cordova Pizarro, Kweku Attafuah-Wadee, Roland Geyer, Keene Morrow, Robert Madeira, Carolina Pereira, and Prashant Singh. The Senegal Technical Report was led by Philippe Ambrosi and included David Dupré La Tour. The visuals team was led by Madjiguene Seck and included Mel D. Cole and Fatou Ndiaye. The eBook team was led by Sergio Vallesi and included Samuel Paquier, with valuable contributions from various partners (Grid Arendal, SCE, the International Union for Conservation of Nature, the United Nations Environment Programme, the Basel Convention, and The Ocean Cleanup) and World Bank colleagues. Peer reviewers included Anjali Acharya, Etienne Kechichian, Juan Jose Miranda, Morgan Graham, Nagaraja Rao Harshadeep, and Özgül Calicioglu. Editing and proofreading was by Jennifer Stastny; and design by The Ethical Agency

Regional partners—including the West African Economic and Monetary Union, the Abidjan Convention, and the International Union for Conservation of Nature—ensured a fit with ongoing actions and policies by various regional organizations.

The World Bank would like to thank the governments of Côte d'Ivoire, Ghana, Liberia, Nigeria, Senegal, and Sierra Leone for engaging in case studies that have informed the conclusions and recommendations of the Technical Reports.

The team also thanks Sara Lindemann of Leapfrog Projects, Sami Syrjälä at the Finnish Innovation Fund SITRA, and Umberto Binetti of the Waste and Resources Action Programme (WRAP) UK for collaborations in connection with the 2022 World Circular Economy Forum in Rwanda.

The team wishes to thank Delphine Arri, Milagros Cecilia Aime, and Anjali Acharya from the PROBLUE team for their guidance and support during the implementation of the studies, as well as Ernesto Sanchez-Triana and Helene Naber for ensuring linkages to the World Circular Economy Forum.

This work was made possible by financial contributions from the Nordic Development Fund; the World Bank; and PROBLUE, an umbrella multi-donor trust fund administered by the World Bank that supports the sustainable and integrated development of marine and coastal resources in healthy oceans.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF BOXES

©Mel D. Cole for World Bank

ABBREVIATIONS & DEFINITIONS

CE	circular economy: A productive-economic model which uncouples economic growth from resource consumption and associated environmental impacts, while enhancing social value. It rethinks the conventional linear economy ("take-make-dispose") by adopting designs, business models, and policies that regenerate natural systems and keep materials in use to retain embedded energy. Strategies to keep resources in use include regeneration, sharing, reuse, maintenance, repair, refurbishing, remanufacturing, and recycling.
CO_2	carbon dioxide
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EPR	extended producer responsibility
F.CFA	West and Central African CFA Franc
kg	kilogram
km	kilometer
kt	kiloton
LEM	linear economy model
LE	linear economy: An economy in which finite resources are extracted to make products that are used—generally not to their full potential—and then thrown away ("take-make-dispose")
NGO	Non governemental organization
PE	polyethylene
PEHD	high-density polyethylene
PET	polyethylene terephthalate
PP	polypropylene
PRO	producer responsibility organization
PS	polystyrene
PVC	polyvinyl chloride
rPET	recovered polyethylene terephthalate
SMEs	small and medium-sized enterprises
SUP	single-use plastic
TPS	thin polyethylene sheet
UNEP	United Nations Environment Programme
WACA	West Africa Coastal Areas Management Program
WACA countries	The 17 coastal countries and island states covered by the WACA Program include: Benin, Cabo Verde, Cameroon, Côte d'Ivoire, Equatorial Guinea, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mauritania, Nigeria, São Tomé and Príncipe, Senegal, Sierra Leone, and Togo
WAEMU	West African Economic and Monetary Union

West Africa and its people need a clean and healthy coastal environment that is resilient to climate change.

Kako Nubukpo

Commissioner
Department of Food Security, Agriculture, Mines, and Environment
West African Economic and Monetary Union

FOREWORD

by the West African Economic and Monetary Union

West Africa and its people need a clean and healthy coastal environment that is resilient to climate change. That is why the West African Economic and Monetary Union (WAEMU) has, for over three decades, supported countries and regional institutions in managing their coastlines, water resources, and environment.

At WAEMU, my department is leading regional integration on environmental affairs among member states. With support from the World Bank, this integration now includes coordination with the Economic Community of West African States (ECOWAS) and the Economic Community of Central African States (ECCAS).

In 2021, this regional integration was demonstrated by WAEMU convening West Africa's environment ministers to endorse the State of the Coast Report. The report, validated by a scientific committee, provides the arguments for imperative action to protect and manage the natural and man-made coastal areas.

On plastics specifically, WAEMU has promoted a regional harmonized policy since 2013. Within WAEMU, regulations to ban plastic bags and their components have been in process of adoption since 2017 and expanded to ECOWAS. We need to do more, especially in view of the recent decision by 175 countries of the United Nations to develop a legally binding agreement on plastic pollution by 2024, prompting a major step towards reducing both pollution and greenhouse gas emissions.

As the WACA plastics reports suggest, a regionally integrated solution is needed because plastics products are largely imported into West Africa, and because there are economies of scale in working across countries and regional institutions to harmonize policies, share knowledge and solutions, and build the capacity of key actors.

Looking ahead, WAEMU will continue developing a regional approach to plastic and waste management in West Africa that engages public decision-makers and private-sector leaders alike.

We look forward to working with members states of ECCAS, ECOWAS, and WAEMU, as well as scientists and centers of excellence (like the Africa Center of Excellence for Coastal Resilience at University of Cape Coast, Ghana), to make this a reality. We have successful operations and will seek the support of development partners to bring these to scale. We also look forward to collaborating with the World Bank, a key partner in bringing innovation and finance to countries for sustainable development.

Sincerely,

Kako Nubukpo

Commissioner
Department of Food Security, Agriculture, Mines, and Environment
West African Economic and Monetary Union

FOREWORD

by the World Bank

West Africa boasts a shoreline with myriad coastal and marine ecosystems. These ecosystems provide countries and communities with food, livelihoods, and economic opportunities, while protecting against the impact of climate change, which disproportionately affects Africa's most poor and vulnerable.

Plastics, while providing tremendous benefits to health and efficiencies for delivering services to population, has become a development challenge. Projections suggest that the problems will get bigger with time, unless addressed head on.

The World Bank's vision is to help countries reduce poverty and increase shared prosperity, including by developing sustainable blue economies. The World Bank also aims to address pollution, which is threatening the productivity of Africa's coastal and marine ecosystems. Plastic pollution, for example, worsens the effects of floods, thus exacerbating the vulnerability of those living in flood zones and along West Africa's coastline.

How can West African coastal countries manage plastics and maximize circular economy opportunities, while supporting the health and productivity benefits plastics offer?

The World Bank can help. Drawing on our experience in West Africa and across the world, we look forward to supporting countries in creating regional solutions that can be operationalized. Visionary ideas, innovations, and applicable science are all clear and available. Our aim now is to make sure that we channel these resources to initiatives that make a difference for the most vulnerable populations and sectors, and support healthy and productive sustainable economic development for all.

Sincerely,

Boutheina Guermazi

Regional Integration Director for Africa and the Middle East,
World Bank

"The World Bank's vision is to help countries reduce poverty and increase shared prosperity, including by developing sustainable blue economies."

Boutheina Guermazi

Regional Integration Director for Africa and the Middle East
World Bank

EXECUTIVE SUMMARY

©Mel D. Cole for World Bank

Plastic pollution is a worldwide environmental challenge. In coastal West Africa, about 80 percent of plastic waste is mismanaged, posing escalating challenges to people, the economy, and the coastal and marine environment.

This **Synthesis Paper** was prepared to inform decision-makers from the region about the challenges of plastic pollution and to convey the urgent need for action.

Since its inception at the 2015 United Nations Climate Change Conference (COP21), the **West Africa Coastal Areas Management Program (WACA)** has focused on coastal erosion, flooding, and pollution. There are seventeen coastal countries and island states covered by the WACA program: Benin, Cabo Verde, Cameroon, Côte d'Ivoire, Equatorial Guinea, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mauritania, Nigeria, São Tomé and Príncipe, Senegal, Sierra Leone, and Togo. Physical interventions are under way in nine of the seventeen countries to help manage healthy coastal landscapes and support national processes to advance a cleaner coastal environment. Other countries benefit from capacity building and knowledge exchange.

Aware of the ongoing plastic pollution challenge globally, including a projection that Africa could surpass Asia in becoming the world's largest plastic polluter, the World Bank set out to investigate trends, explore best-fit solutions, and identify critical actions. In the process WACA rallied not only local and international technical and financial partners but also affected communities. The aim is to curb plastic pollution in West Africa's coastal countries through combined efforts.

A regional approach has been initiated by regional institutions: WAEMU (West African Economic and Monetary Union) and ECOWAS (Economic Community of West African States) are working jointly on the development of a regional strategy for sustainable plastic waste management, while the Abidjan Convention advocates for member states to contribute momentum for the adoption of a legally binding international treaty against plastic pollution. These initiatives need support. Plastic pollution (marine in particular) is a transboundary challenge that is rooted in unsustainable production and consumption patterns; poor solid waste management; lack of infrastructure; lack of adequate legal and policy frameworks; a lack of financial resources; and poor enforcement—including on interregional cross-border trade of plastic waste. Joint action is needed to reduce plastic pollution, while ensuring a single market with high environmental standards and legal certainty for businesses.

This **Synthesis Paper** summarizes the findings from the research and engagement activities initiated by the World Bank, under the WACA Program, to tackle the problem of plastics pollution in coastal West Africa. It is supported by a series of three technical reports, an eBook, and a multi-media package.

- ***West Africa Circular Economy: Realizing the Potential of Plastics. A Regional Gap Analysis***: This report includes three areas of analysis at the regional level (covering 17 countries spanning from Mauritania to Gabon): (i) a plastic material flow analysis across borders in West Africa; (ii) a plastics circularity assessment in three sectors (construction, fisheries, and packaging); and (iii) a stakeholder engagement among public and private parties in West Africa
- ***The Economics of Plastic Use and Cleanup Priorities for West African Coastal Countries***: This report examines four economic areas: (i) the economic cost to society of marine plastic waste; (ii) policy and economic tax measures to reduce pollution from single-use plastics; (iii) a water sachet analysis that explores trade-offs between plastic pollution prevention and other social policies; and (iv) an economic-spatial analysis that proposes strategies for cost-effective cleanup operations.
- ***Producer Responsibility Organization (PRO) to Manage Polyethylene Terephthalate (PET) Bottles in Senegal***: This report explores options and opportunities for PET bottle recycling.
- ***WACA Plastic eBook***: A significant amount of data and analysis has been generated in the various countries. The team compiled the most compelling of these resources, with a view to making them accessible to technical and financial partners. This valuable body of knowledge is in the WACA Plastic eBook, available on the WACA website. The interactive format allows visitors to navigate summaries by country and data compilations, while accessing links to additional resources and organizations. Various technical reports and case studies are included. The eBook should help individuals to create their own rationale for mobilizing action.
- ***Multi-media package: a visual and artistic human narrative***: Multimedia approaches are used to present a human narrative on how plastics affect livelihoods.

West Africa Circular Economy: Realizing the Potential of Plastics

The Economics of Plastic Use and Cleanup Priorities for West African Coastal Countries

Producer Responsibility Organisation to manage Polyethylene Terephtalate bottles in Senegal

WACA Plastic E-book

KEY FINDINGS AND MESSAGES

Plastic consumption is increasing in West Africa's coastal countries. Urbanization and economic growth have contributed to plastics becoming the primary material used in the food and water packaging industry. This generates a large amount of plastic waste. Plastic consumption in the 17 West African coastal countries was estimated at 7.9 million tons in 2021; at current growth rates, this could increase to 12 million tons by 2026.

Coastal West Africa has few plastic production sites. Most countries rely on imported virgin plastic resins and plastic products (such as wrapping) owing to sparse domestic production and limited recovered plastics. About three-quarters of the plastic used within the region is imported, mostly from Asia. Nigeria is the sole producer of virgin plastic resin (generating 486 kilotons (kt) in 2018) and only ***Nigeria, Ghana, and Côte d'Ivoire*** have significant conversion industries. These countries are also the largest exporters of plastics in the region. In the case of Côte d'Ivoire, 95 percent of plastic-related exports go to West African countries.

About 80 percent of plastic waste is mismanaged in coastal West Africa. West African coastal countries lack waste management systems, leading to a higher risk of solid waste ending up in marine and terrestrial environments, via wind, tidal transport, and/or transport to coastlines by inland waterways. A survey of the current literature reveals that, in 14 out of 17 targeted West African coastal countries, the share of mismanaged plastic waste in proportion to the total exceeds 80 percent. ***The main contributors to this pollution are Nigeria, Côte d'Ivoire, Ghana, and Senegal.***

The real damage cost of marine plastics in West Africa is estimated to be around US$ 10,000 to US$ 33,000 per ton of plastic waste. The four sectors that are particularly hard hit by plastic pollution (fisheries and aquaculture; marine-linked tourism; beach property; biodiversity and ecosystems) suffer potential damages between US$ 2,000 and US$ 7,000 per ton of plastic waste.

The hidden cost of plastic bags is substantial. The production cost of a single-use plastic (SUP) bag is estimated at three cents per bag. If one were to add to this cost the real damage that a SUP bag costs to the environment, the cost of a bag would rise to between nine and 21 cents. Multiple studies have shown that such an increase in price would result in a substantial fall in demand and virtual elimination of plastic bag use. Plastic products have been inexpensive for a long time because their prices do not reflect the damage they do to the environment, the planet, and society. By fixing this price distortion, plastic use will be reduced.

The cost to society of plastics pollution in just one canal in N'Djamena ***was estimated at over US$ 3,000 per ton*** in 2020.

Improvements are needed in solid waste management overall and plastic waste management in particular (waste collection, plastic containment in landfills, and informal plastic sorting for reuse). This includes recycling infrastructure. Only about 10 percent of total plastic waste is recycled in coastal West Africa.

1 For detailed calculations, see Section 3 of *The Economics of Plastic Use and Cleanup Priorities for West Africa Coastal Countries,* World Bank, 2023.

An econometric analysis indicates that import taxes on polyethylene (PE) sheets could play a role in reducing marine pollution by driving down SUP waste. In West African coastal countries, most SUP sachets, bags, and other containers are fabricated from thin polyethylene sheets (TPS), virtually all of which are imported. An econometric analysis of TPS import demand for seven West African coastal countries indicates a high degree of income and price responsiveness. A tariff on bulk imports of polyethylene could therefore act as a potent weapon in the struggle to reduce SUP pollution. ***However, given that SUPs are widely used for safe drinking water, the potential public health impacts of such measures will need to be carefully considered.*** Similar consideration needs to be given to the distributional effects of such import taxes on the poor.

A circular economy model (based on the principle of avoidance/reuse/recycling) offers strong potential for reducing plastic waste and associated carbon dioxide ($C0_2$) emissions. If countries introduce a pragmatic circular economy scenario—meaning 40 to 50 percent less plastic—in three significant sectors (packaging, construction, and fisheries), then 2.9 to 3.8 million tons less plastic waste will enter the environment by 2026. This will correspond to reducing carbon emissions by 30 to 60 percent (or 6 to 9.1 million tons of CO_2 emissions).

Since virgin plastic products are cheaper than recycled plastics, ***policy support may be required to increase the viability of a circular plastic economy.*** Governments need to set in place regulations to enable private sector investment and the creation of a dynamic market for recycled plastics and alternative plastics products.

Extended producer responsibility (EPR) policies could achieve significant results. In Senegal, analysis shows that an ***eco-organization focused on polyethylene terephthalate (PET) could go a long way towards cleaning up the country.*** Use of PET in the bottling industry in Senegal represents about 38,000 tons of plastic every year and accounts for 15 to 16 percent of plastic waste generated in the country. Unlike other plastic polymers like high-density polyethylene (PEHD) or polypropylene (PP), there is so far little collection and recycling of PET taking place in Senegal. By building on the existing network of informal waste reclaimers and setting up 37 collection points and four pellet plants in strategic regions, ***an eco-organization could help tackle 50 percent of PET pollution in Senegal within two to three years.*** With eco-contributions ranging from between 1 and 5 Central African CFA Franc (F.CFA) per bottle or container (and in line with current plastic taxation levels) the eco-organization would be able to support collection prices up to 150 F.CFA per kilogram (kg), or twice the current level in local initiatives. This would ***encourage collection and improve the livelihoods and income of a vast number of people.*** It is estimated that the eco-organization could generate about 3,000 full-time jobs with decent remuneration.

Coastal West African countries generated around 6.9 million tons of plastic waste in 2018 (about 30 percent of the total plastic waste generated in Africa).[2] Of this waste, about 20 percent was generated within 30 kilometers (km) of the coast, contributing to marine litter and coastal environmental degradation. A spatial analysis of plastic waste generation was performed to identify hotspots of plastic waste production. The highest levels of plastic waste were generated in densely populated coastal cities and along trade routes connected to roads or rivers. ***Seventy-one individual pollution hotspots were identified, with 32 in Nigeria alone.*** Nigeria produced the most, at 4.7 million tons per year. The island nations of Cabo Verde and São Tomé and Príncipe produced the least plastic waste.

Most of the plastic pollution stems from packaging, primarily from SUP for food and water consumption, and sanitary purposes. Consumers—particularly in urban areas—tend to prefer SUP products, such as plastic film, carrier bags, water sachets and PET bottles, because of their convenience and relative affordability, or because there is a lack of alternative solutions. Single-use water sachets have become particularly popular in West Africa, given the challenges faced in the provision of potable water for drinking, even in urban areas with piped networks. ***This reality should encourage governments and development partners to include drinking water supply as a measure to address plastic pollution.***

Overall, solid and plastic waste management and infrastructure need to improve. Effective plastic waste management requires efficient waste collection, improved plastic containment in landfills, and better regulation of informal plastic sorting for re-use. ***Plastic production for industrial or business initiatives does not make sufficient use of recovered plastic from the WACA countries.*** Investments in plastic waste recovery infrastructure would help to establish local supply and mobilize this untapped potential for greater sourcing of plastic waste and scrap from within the WACA countries. Existing recycling facilities have limited capacity to absorb recyclable plastic such as PET packaging. More sophisticated recycling infrastructure needs to be developed across the region.

Support of governments promoting and enabling a change in consumer consumption patterns could increase the demand for recycled plastics. Policymakers can facilitate the creation of markets for more sustainable and easy-to-recycle products, by incentivizing recyclable/reusable products and fostering reduction of non-recyclable materials for packaging. They can also facilitate international partnerships with leading global universities researching new and innovative packaging materials made from sustainable sources. The development and promotion of alternative reusable products requires planning well in advance of implementing plastic-reduction policies/incentives/financing mechanisms to support the transition from conventional plastic to alternative plastic producers.

Effective waste management requires consumer sensitization, stakeholder participation in policy and strategy design, and promoting the development of environmentally friendly alternatives. Successful global experience indicates that effective outcomes require broad-based awareness-raising about plastic pollution that includes regular public consultations; stakeholder engagement in designing mitigation policies and strategies; and the development of reasonably priced, environmentally friendly alternatives well in advance of implementing plastic-reduction policies.

Data for the plastics value chain in the region is sparse. Both government and private sector stakeholders will need to facilitate the development of data collection systems that track the flow of plastics across the value chain. This will enable the orientation and prioritization of strategies and policies suited to specific regional and local situations.

There is no one-size-fits-all solution. It is important to acknowledge the specific situational realities in each country and to search for solutions that are fit for purpose in each context. Location-specific analyses are needed to determine the most cost-effective policy mix for plastic waste remediation, with the most practical policy solutions likely entailing some combination of quantity- and price-based approaches, balanced by highly targeted cleanup strategies.

2 United Nations Environment Programme (UNEP). 2018. Africa Waste Management Outlook. Nairobi: United Nations Environment Programme.

Call to action

The World Bank is issuing a call to action—with short-term achievability—to find suitable plastic substitutes to meet growing demand for plastics in the WACA countries.

With regional integration as a prerequisite, the World Bank proposes the following solution areas:

- ***Investment:*** Key investment is needed in solid waste management infrastructure.
- ***Regulation:*** Consideration of regional policies and agreements, and careful assessment of regulations (for example, screening for social and economic impact using tools like The Plastics Policy Simulator (PPS).
- ***Plastic substitutes:*** Development of new products made of plastic alternatives, a transition that will require innovation and business incentives.
- ***Circular economy:*** Commitment to a circular economy, requiring transformative policies that increase the viability of local or regional efforts.
- ***Multi-stakeholder dialogues:*** Close engagement with members of the public and the private, informal, and development sectors.
- ***Plastic supply:*** Adjustment of countries' rules on plastic products and plastic waste imports, with incentives on regional imports, and either a ban or taxes on the import of polyethylene sheets and waste. This can play a key role in reducing plastic waste in the region.
- ***Plastic demand:*** Promotion of innovations in SUP alternatives, coupled with consumer education on plastic pollution risks and the importance of a circular approach.
- ***Workers in collection and sorting:*** Recognition of informal waste reclaimers and involvement of the informal sector in seeking solutions.
- ***Recycling:*** Discussions on recovered-plastic trade and coordination of industrialization plans at the regional level.

It is imperative to have ***coordinated regional action that offers economies of scale.*** Based on previous engagement by the World Bank it is clear that, for economies of scale, coordinated action needs to be anchored in regional commissions. This ensures that cross-border solutions consider national implementation and local solutions. A ***community of partners*** would convene, innovate, leverage, attract finance, and set goals. This combined effort would ***support countries in the ongoing process of developing and implementing the legally binding agreement on plastic pollution expected by 2024,*** a major step towards reducing greenhouse gas emissions from plastic production, use, and disposal.

©Smart Edge

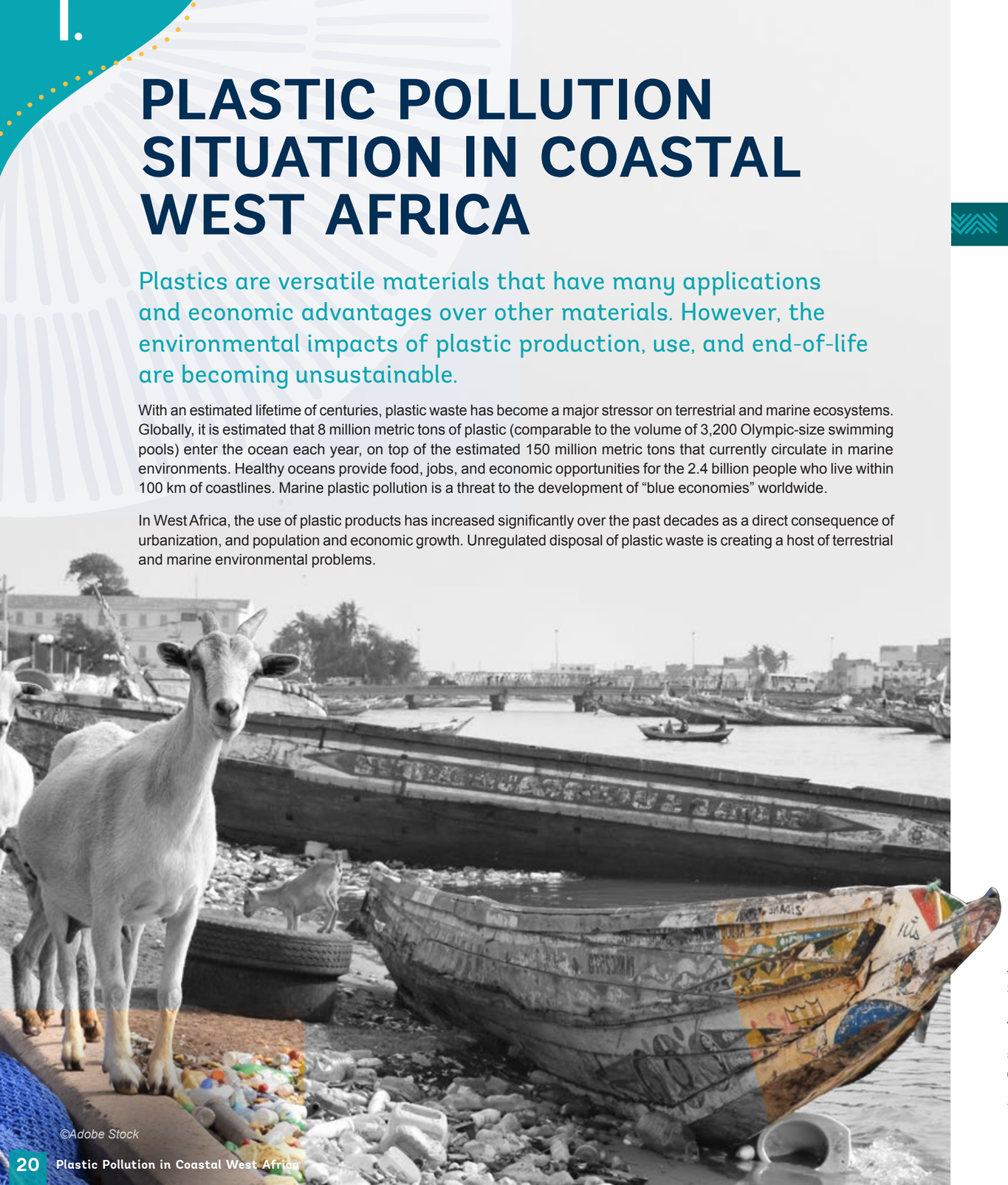
I.

PLASTIC POLLUTION SITUATION IN COASTAL WEST AFRICA

Plastics are versatile materials that have many applications and economic advantages over other materials. However, the environmental impacts of plastic production, use, and end-of-life are becoming unsustainable.

With an estimated lifetime of centuries, plastic waste has become a major stressor on terrestrial and marine ecosystems. Globally, it is estimated that 8 million metric tons of plastic (comparable to the volume of 3,200 Olympic-size swimming pools) enter the ocean each year, on top of the estimated 150 million metric tons that currently circulate in marine environments. Healthy oceans provide food, jobs, and economic opportunities for the 2.4 billion people who live within 100 km of coastlines. Marine plastic pollution is a threat to the development of "blue economies" worldwide.

In West Africa, the use of plastic products has increased significantly over the past decades as a direct consequence of urbanization, and population and economic growth. Unregulated disposal of plastic waste is creating a host of terrestrial and marine environmental problems.



©Adobe Stock

Although the plastic waste ratio per person in Sub-Saharan Africa (15 kg/capita/year)[3] is low compared with European Organization for Economic Co-operation and Development (OECD) countries (114 kg/capita/year) or the United States (221 kg/capita/year), Africa is estimated to be the second-largest source of ocean plastic pollution from rivers, with a share of 7.8 percent (after Asia).[4] Three African rivers figure among the world's top 20 plastic pollution sources: the Cross River (Nigeria and Cameroon), the Imo River (Nigeria), and the Kwa Ibo River (Nigeria).[5] This is because waste management systems in the region are less effective than those in high-income countries. About 80 percent of plastic waste is mismanaged in coastal West Africa.

Projections for 2025 indicate that mismanaged plastic waste from Africa will likely comprise 10.6 percent of the global total. With continuing rapid urbanization, Africa could become the largest contributor to global mismanaged plastic waste by 2060.[6]

A.

The existing linear plastic economy

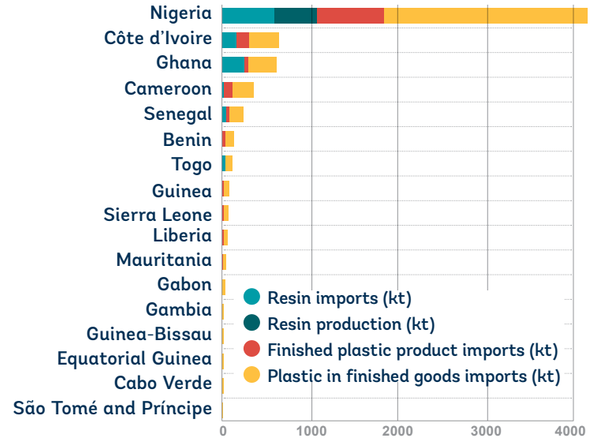
Plastics—especially virgin plastic and raw material such as resins—are inexpensive, holding very low marginal value at end-of-life. Under these circumstances, the economics of plastic circularity are challenging. This is the case even for highly developed economies such as Canada and the United States, which have achieved recycling rates of only about nine percent.

The plastic material flow analysis conducted for the 17 WACA countries shows that countries depend highly on imported virgin plastic resins and plastic products, owing to sparse domestic production/conversion and limited recovered plastics.[7]

Plastic consumption in the WACA countries was estimated at 7.9 million tons for 2021, growing to 12.0 million tons by 2026 using a linear economy (or business-as-usual) model. Plastic enters the WACA countries in direct (resin and production) and indirect (embedded, wrapping) forms, which compose 43 percent and 57 percent of the total, respectively. Nigeria is the only producer of virgin plastic resin (generating 486 kt in 2018) and only a few countries have significant conversion industries—notably, Nigeria, Ghana, and Côte d'Ivoire. These countries are also the largest exporters of plastics in the region. In the case of Côte d'Ivoire, 95 percent of all plastic-related exports go to West African countries.

Though approximately half of coastal West African countries report significant imports of plastic articles, most plastic enters the region in finished goods, such as plastic embedded in multi-material goods, or as packaging and wrapping. Three-quarters of the plastic consumed within the region is imported, mainly from Asia.

Figure 1: *Plastic Entering Use (Imports and Resin Production) in West and Central Coastal Africa in 2018*



Using UN Comtrade data for 2018, 10 countries in the West Africa region reported importing plastic waste and scrap from around the world. Nigeria, Ghana, and Senegal are the largest importers of recovered plastic, and Asia (US$ 17 million), Europe (US$ 4 million), and North America (US$ 1 million) are the largest sources of plastic waste and scrap imports for the reported 10 countries in 2018. By contrast, only US$ 0.13 million of plastic waste and scrap was imported from West African sources. This differential highlights the need to reduce the sourcing of plastic waste from outside West Africa and to increase the levels of investment in plastic waste recovery infrastructure within the region.

3 Organization for Economic Co-operation and Development (OECD). 2022. "Global Plastics Outlook: Policy Scenarios to 2060." Paris: OECD Publishing. https://doi.org/10.1787/aa1edf33-en.

4 Jambeck, Jenna R. et al. 2015. "Marine pollution. Plastic waste inputs from land into the ocean." Science 347, no. 6223 (February): 768–771. http://doi.org/10.1126/science.1260352.

5 Lebreton, Laurent C.M. et al. 2017. "River plastic emissions to the world's oceans." Nature Communications 8, no. 15611 (June). http://doi.org/10.1038/ncomms15611.

6 Lebreton, Laurent C.M. and Anthony Andrady. 2019. "Future scenarios of global plastic waste generation and disposal." Palgrave Communications 5, no. 6 (January). http://doi.org/10.1057/s41599-018-0212-7.

7 Material flow analysis conducted using data relating to plastic trade, domestic industrial production, and waste generation, in "West Africa Circular Economy: Realizing the Potential of Plastics. A Regional Gap Analysis" (World Bank, 2023).

B.

Three significant sectors for the implementation of circular economy strategies for plastic reduction: Packaging, construction, and fisheries

The analysis[8] explored the potential for reducing plastic waste in coastal West Africa through a circular economy model. Three sectors (packaging, construction, and fisheries) were considered because of their relative importance to the economies in the region and their identification as industries with significant opportunities for the incorporation of circular economy solutions.[9]

The three sectors represent 78 percent of total plastic demand in 2021. The packaging sector is the largest plastics consumer sector across the region, with a demand of 4.6 million tons in 2021 (58 percent of the region's demand).

Figure 2: *Plastic demand from packaging, construction, and aquaculture and fisheries in coastal West Africa in 2021 and 2026 under a business-as-usual (BAU) scenario (in Million Tons)*

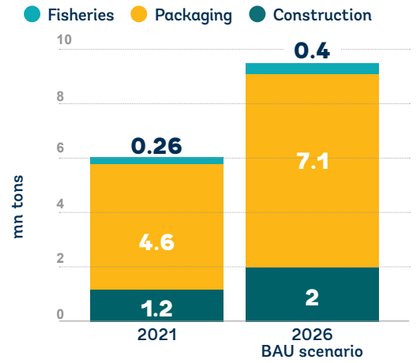
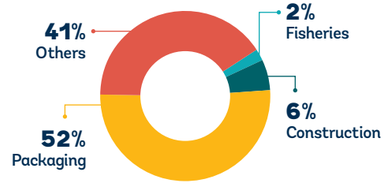
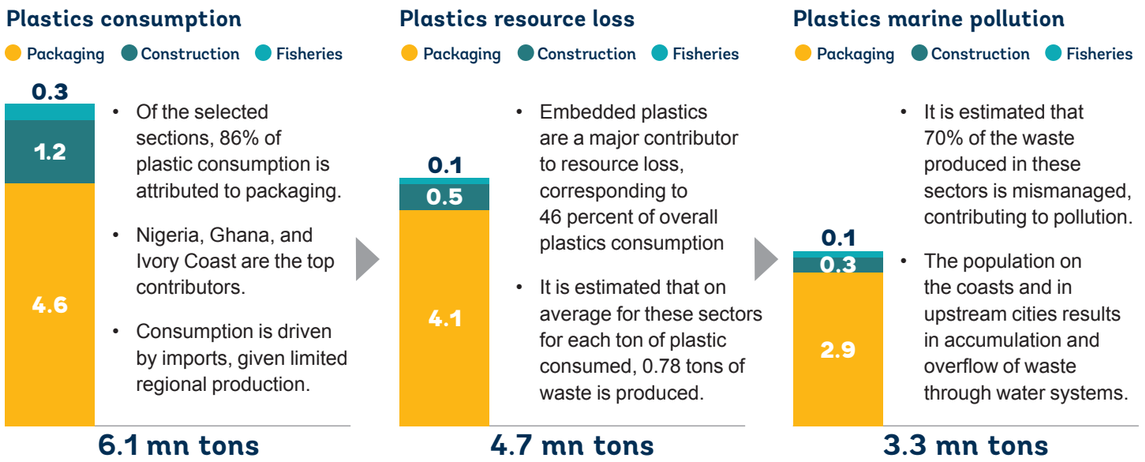


Figure 3: *Plastics consumption, resource loss and leakage to the ocean in coastal West Africa in 2021*

Nigeria presents the largest plastics resource loss in the region, accounting for 63%, due to the country's dominance in size and population.



Others include automobile industry; electric and electronic goods; sports and leisure.



Across the three sectors, 4.7 million tons of consumed plastic are estimated to be "lost resources" (unused products or waste), from which 3.3 million tons will enter the marine environment.

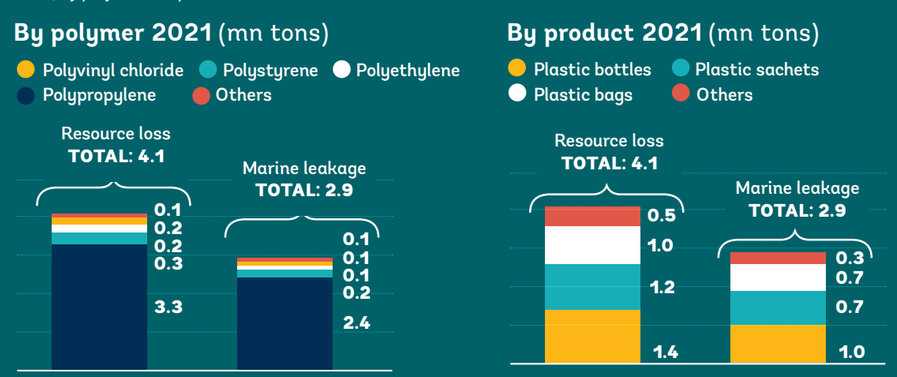
Source: *World Bank. 2023. "West Africa Circular Economy: Realizing the Potential of Plastics. A Regional Gap Analysis."*

8 World Bank. 2023. "West Africa Circular Economy: Realizing the Potential of Plastics. A Regional Gap Analysis."

9 World Economic Forum. 2021. "Five Big Bets for the Circular Economy in Africa." Geneva: World Economic Forum. https://www.afdb.org/en/documents/five-big-bets-circular-economy-africa

Packaging

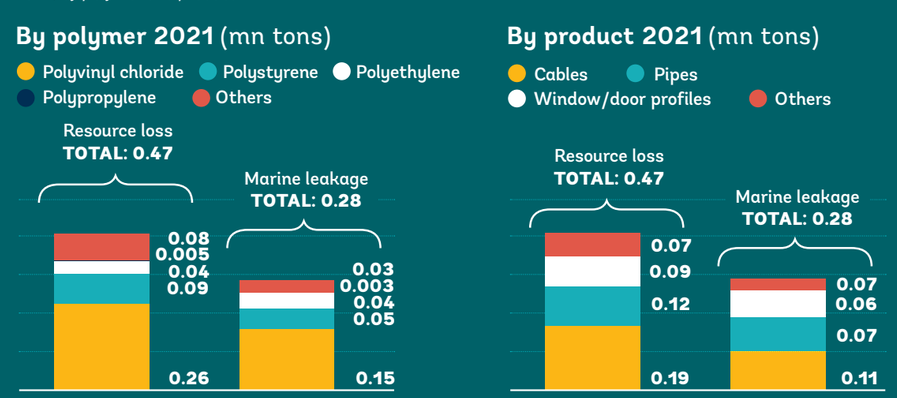
Figure 4: *Contribution (million tons of plastic) of the packaging sector to plastic waste and marine litter in 2021, by polymer and product*



Source: *World Bank. 2023. "West Africa Circular Economy: Realizing the Potential of Plastics. A Regional Gap Analysis."*

Construction

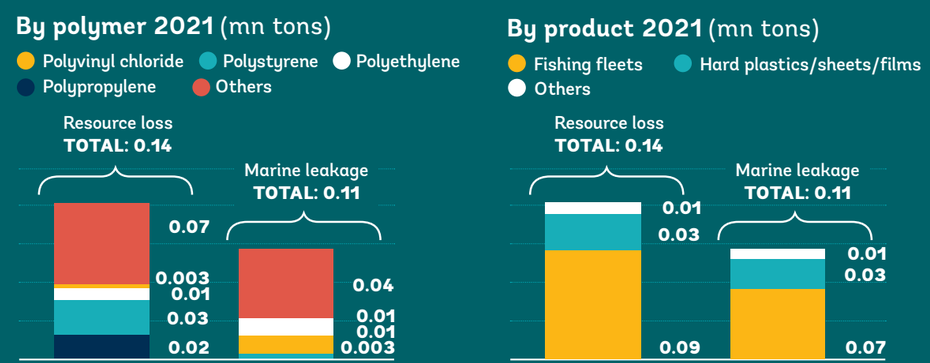
Figure 5: *Contribution (million tons of plastic) of the construction sector to plastic waste and marine litter in 2021, by polymer and product*



Source: *World Bank. 2023. "West Africa Circular Economy: Realizing the Potential of Plastics. A Regional Gap Analysis."*

Fisheries

Figure 6: *Contribution (million tons of plastic) of the fisheries sector to plastic waste and marine litter in 2021, by polymer and product*



Source: *World Bank. 2023. "West Africa Circular Economy: Realizing the Potential of Plastics. A Regional Gap Analysis."*

C.

Plastic pollution hotspots and vectors of transport

The study[10] estimated that the 17 coastal West African countries generated 6,930 kt of plastic waste in 2018. Of this, about 20 percent was generated within 30 km of the coast. A spatial analysis of plastic waste generation was performed to identify hotspots of plastic waste production. This study found that the highest levels of plastic waste were generated in densely populated coastal cities and along trade routes connected to roads or rivers.

The island nations of Cabo Verde and São Tomé and Príncipe produced the least plastic waste, while Nigeria produced the most, at 4,719 kt per year. Seventy-one hotspots were identified, with 32 in Nigeria.

Figure 7: *Regional plastic waste generation per square kilometer in 2018*

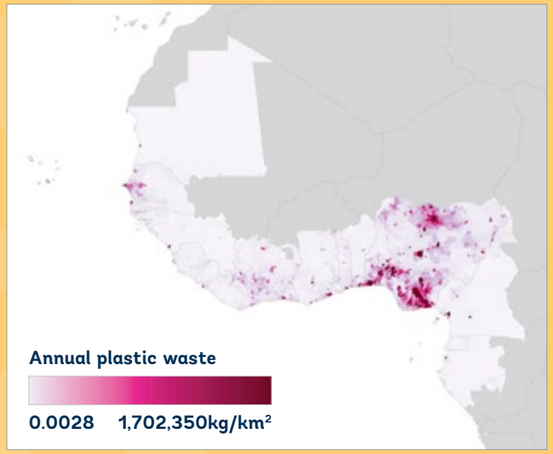
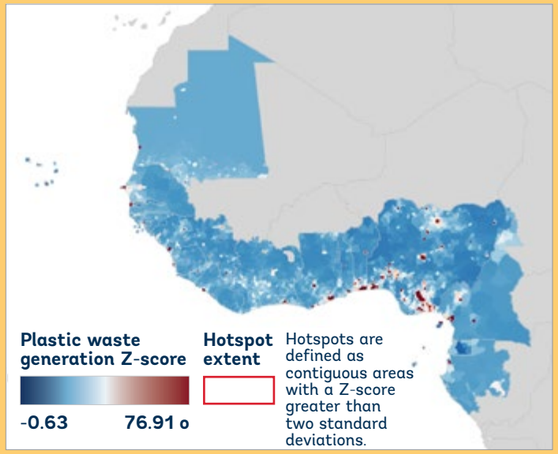


Figure 8: *Plastic waste generation hotspots in 2018*



Source: *World Bank. 2023. "West Africa Circular Economy: Realizing the Potential of Plastics. A Regional Gap Analysis."*

10 World Bank. 2023. "West Africa Circular Economy: Realizing the Potential of Plastics. A Regional Gap Analysis."

CASE STUDY 1

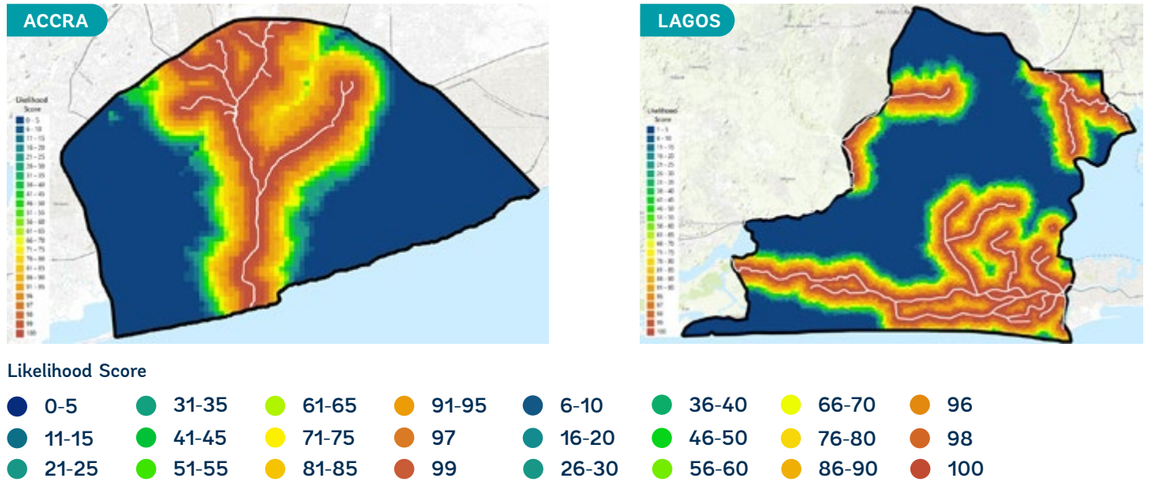
Designing a cleanup strategy for marine plastic pollution

Understanding the specifics of waste generation and transport in the region can help in designing the most relevant strategies.

A case study developed an illustrative cleanup strategy for marine plastic pollution in Accra and Lagos. Its focus was single-use plastic (SUP) drinking-water containers. A hotspot targeting strategy was developed for the two cities, using a methodology that combined georeferenced household survey data on plastic use; measures of seasonal variation in marine plastic pollution from satellite imagery; and a model of plastic waste transport to the ocean using information on topography, seasonal rainfall, drainage to rivers, and river transport to the ocean. The results provide clear evidence of the accumulation of SUP container waste in hotspots during low-rainfall periods, followed by rapid river transport through flooding and runoff with the return of heavier rainfall.

Plastic waste collection would also benefit from cleanup measures with better targets. Priority should be given to areas with a high incidence of plastic waste disposal near rivers, particularly more elevated areas with steeper slopes. Cleanup resources should be concentrated in marine plastic hotspot areas before the onset of the first-semester rainy season.

Figure 9: *Maps showing the likelihood of river transport of plastic waste*



Source: *World Bank. 2023. "The Economics of Plastic Use and Cleanup Priorities for West African Coastal Countries."*

D.

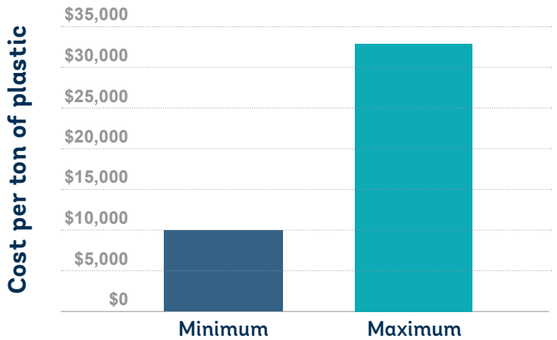
The economic cost of plastic pollution

The literature describes two main approaches to estimate the external costs of plastics in the marine environment: (i) damage to overall marine ecosystem services (holistic approach) and (ii) aggregation of sector-specific costs (partial approach).

Using the first approach, the annual damage cost was estimated in a range of US$ 10,000 to US$ 33,000 per ton of plastic.[11]

The second approach investigated four sectors where economic damage from the presence of plastic is clearly visible: (i) fisheries and aquaculture; (ii) marine-linked tourism; (iii) waterfront property values; and (iv) biodiversity and ecosystems. The annual damage cost for these sectors was estimated to range from US$ 2,000 to US$ 7,000 per ton of plastic waste.

Figure 10: *Damage cost estimates from plastics for marine ecosystem services*



Source: *World Bank. 2023. "The Economics of Plastic Use and Cleanup Priorities for West African Coastal Countries."*

Figure 11: *Damage cost estimates from plastics for marine ecosystem services*

Source: *World Bank. 2023. "The Economics of Plastic Use and Cleanup Priorities for West African Coastal Countries."*

A study[12] conducted in Chad estimates the damages caused by the inappropriate disposal of plastic waste in an inland context. The study area is located along a canal that crosses N'Djamena, the capital. Using data from a primary survey and applying standard valuation techniques, the study estimates the social cost of plastic pollution at over US$ 3,000 per ton of plastic waste in 2020. It also shows that the impacts of plastic waste vary significantly across the study area: households residing within 20 meters of the canal bear more than 75 percent of the total damages.

Figure 12: *Study area: canal in Chad where the social cost of plastic pollution was estimated (Source: Google Earth)*

Figure 13: *Plastic waste in the canal in Chad (Source: A. Singambaye)*

11 Barrett et al. 2020; Conservancy 2015; Costanza et al. 2014; Jang et al. 2015.

12 Croitoru, Lelia, Amos Singambaye, and Aurélie Rossignol. 2022. "The Cost of Plastic Pollution in N'Djamena: A Case Study." Journal of Environmental Protection 13, no. 8 (August): 575–588. https://doi.org/ 10.4236/jep.2022.138036.

The study estimates the real damage cost of marine plastics at

US$ 10,000 to US$ 33,000 per ton

OF PLASTIC WASTE

©Mel D. Cole for World Bank

II.

CHALLENGES TO MANAGING PLASTIC POLLUTION

©Mel D. Cole for World Bank

A.

Waste management, infrastructure, and logistics

Solid waste management is a pressing issue in West Africa. Population growth, amid high poverty rates, makes waste-service fee collection and financing of the overall system key challenges for the region. Because governments have limited resources, waste often becomes a lower priority sector,[13] resulting in high rates of mismanaged solid waste.

A survey of the current literature reveals that, in 14 out of 17 targeted West African coastal countries, the share of mismanaged plastic waste in proportion to the total exceeds 80 percent.[14] West African coastal countries lack waste management systems, leading to higher risk of solid waste ending up in marine and terrestrial environments. All coastal countries need well-functioning plastic-waste-management infrastructure, policies, and practices in place, to lower the risk of plastic waste generated in coastal areas entering the oceans.

A stakeholder engagement exercise similarly highlighted concerns about the means for the plastic value chain within the West Africa region. Plastic industry stakeholders identified that countries are struggling to secure funding for recycling infrastructure. This is largely because of the relatively low profitability linked to low levels of suitable recyclable plastic. While a significant informal workforce has developed in regions lacking solid-waste-management infrastructure, informal collectors use rudimentary collection methods. The majority of plastic retrieved from waste is contaminated and not suitable for recycling.

B.

Public awareness and littering

According to private sector stakeholders interviewed in Ghana, there are limited efforts at consumer sensitization on the part of public stakeholders. Coupled with nonexistent incentives to access and improve waste collection services and infrastructure, this impedes the promotion of plastic waste prevention and at-source segregation by households and businesses.

Consumers across the region are unaware of the importance of properly managing plastic and plastic waste. Similarly, commercial and industrial establishments are not sensitized to circular economy business models and practices.

Private industries do not prioritize consumer education on plastic products and packaging (for example, through waste prevention campaigns or adequate labeling information on appropriate final disposal and recycling). This contributes to the elevated levels of contamination of potentially recoverable plastics. The challenge is further heightened by the ease with which citizens can engage in improper waste disposal, as indicated by public and private sector interviewees in Liberia and Nigeria, respectively. Many Nigerian citizens have grown accustomed to illicit waste disposal activities, such as burning and burying plastic waste, in a climate of weak enforcement.

C.

Demand for single-use plastic and lack of alternatives

Many consumers in the WACA countries lack critical awareness of the importance of circular approaches to plastic consumption, thereby exacerbating the region's plastic management challenge. As indicated by public and private sector interviewees from Ghana, Liberia, and Nigeria, many consumers—especially in urban areas—tend to prefer single-use plastic (SUP) products such as plastic film, carrier bags, and PET bottles. For example, according to a prominent private sector recycler in Ghana, Ghanaians have a high preference for SUPs, largely because of their convenience and relative affordability, with limited or no consideration given to sustainable consumption.

According to private sector recyclers in Ghana and Nigeria, the adoption of water sachets is a notable consumption trend in the region over the last three decades. The challenges faced in the provision of potable water for drinking, even in urban areas with piped networks, have contributed to the proliferation of plastic film, single-use water sachets across the WACA countries, especially among low-income households. These water sachets, as well as SUP film in food packaging, have been shown to improve water and food hygiene and thereby reduce potential health risks to the population. It could be risky to eliminate this consumption practice, considering the public health benefit it has offered.

13 Kaza, Silpa; Lisa C. Yao; Perinaz Bhada-Tata; Frank van Woerden. 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 License: CC BY 3.0 IGO.

14 These figures are for 2010, which is the latest year for which the available data permits cross-comparison.

CASE STUDY 2

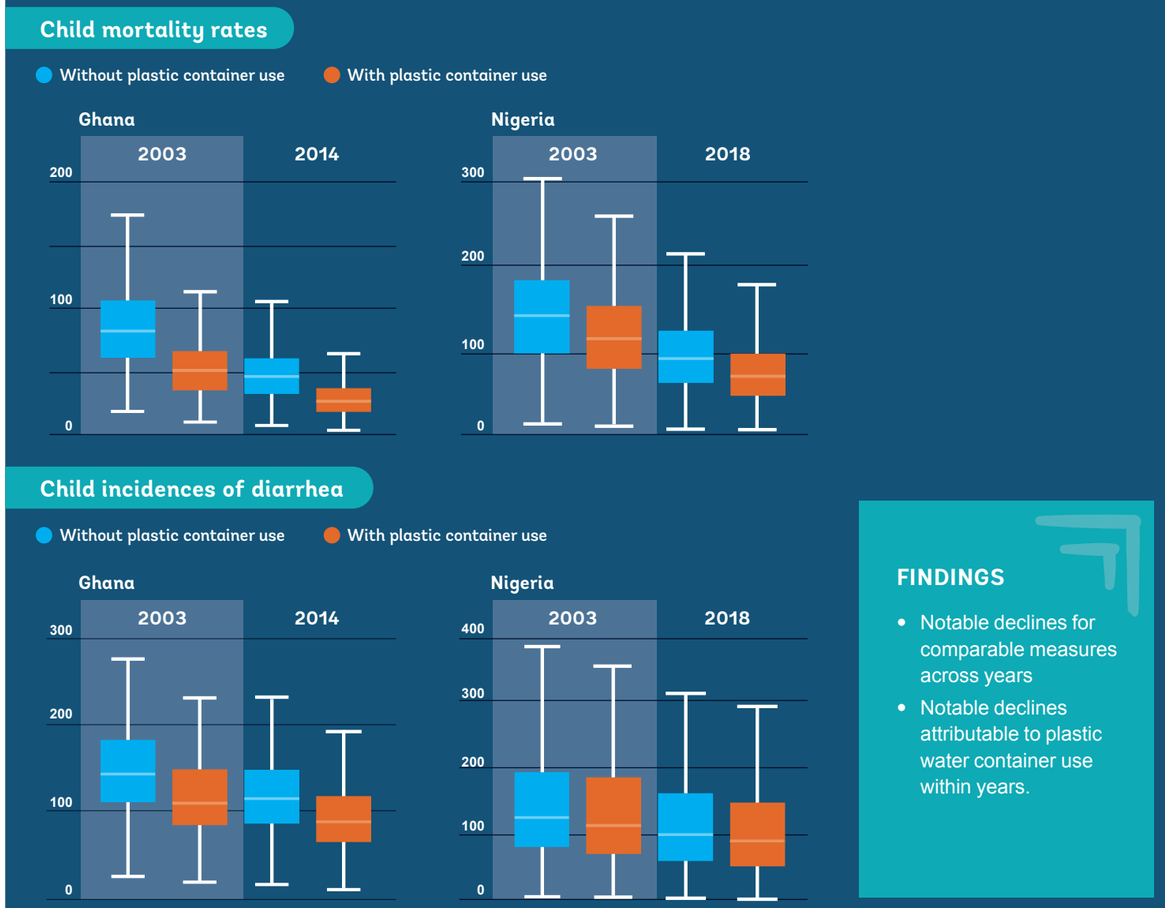
The health effects of plastic containers

While the case for public intervention to reduce plastic waste seems clear, attention must be paid to potential conflicts with public health outcomes.

An econometric analysis was conducted for Ghana and Nigeria to assess the public health risks from policies to reduce waste from using SUP drinking water containers. Using Demographic and Health Survey data for the two countries, the analysis tested whether child morbidity and mortality are lower in households that use SUP drinking-water containers, after controlling for income, education, and other socioeconomic factors widely cited in the literature. The individual results showed notable declines in the median predicted rate of child mortality (42 percent and 20 percent) and incidence of diarrhea (21 percent and 10 percent) for all children up to five years of age, attributable to SUP container use across and within years.

Thus, measures to reduce plastic sachets and bottles should be accompanied by programs designed to improve health outcomes for children, particularly in poor households. Alternatively, subsidies could be provided for biodegradable drinking water containers, which are more costly to produce.

Figure 14: *Health effects of plastic water containers—Evidence for Ghana and Nigeria*



FINDINGS

- Notable declines for comparable measures across years
- Notable declines attributable to plastic water container use within years.

Source: *World Bank. 2023. "The Economics of Plastic Use and Cleanup Priorities for West African Coastal Countries".*

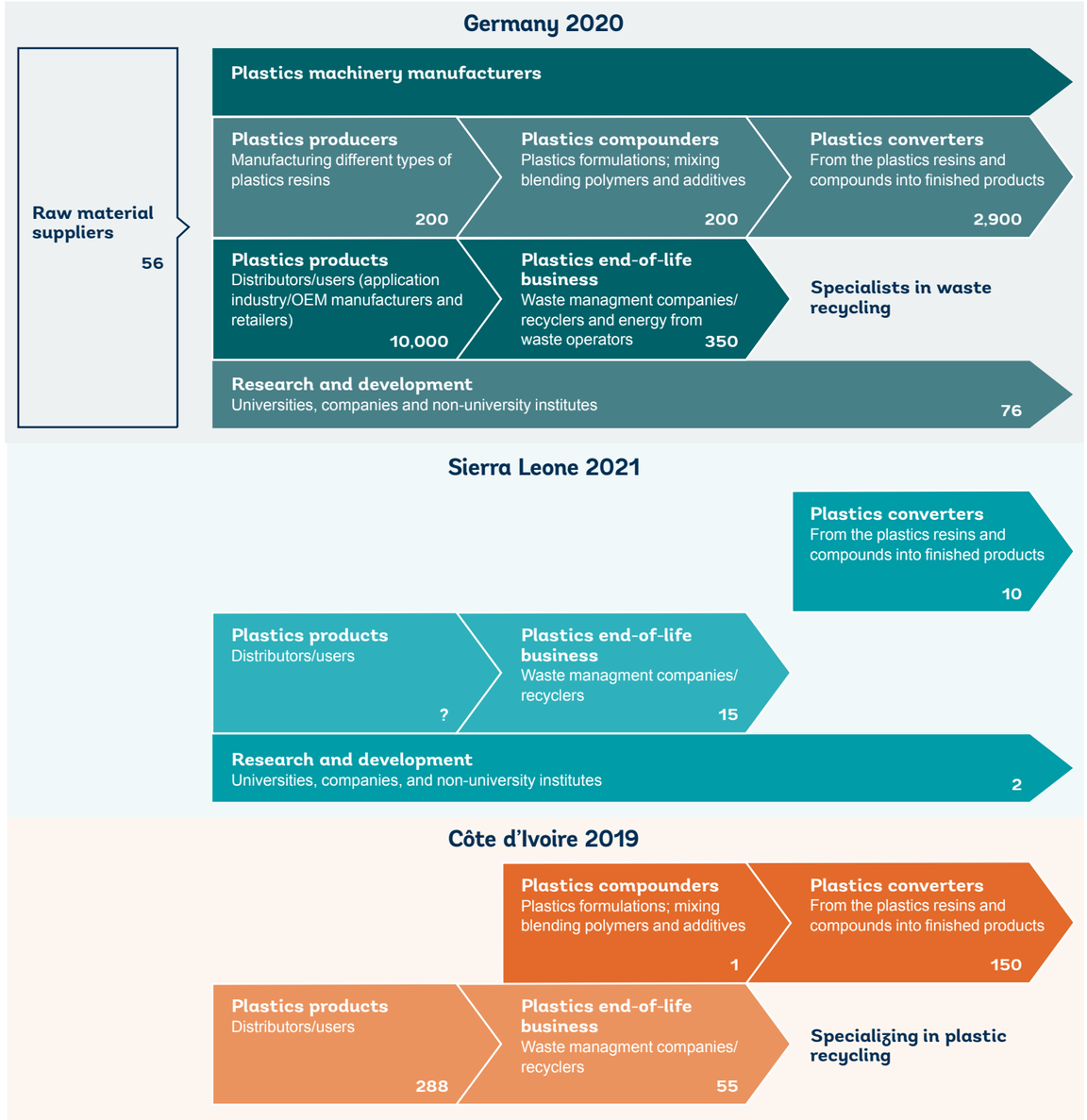
D.

Plastic value chains and market dynamic for recovered plastics

Current interest in reuse and recycling should be welcomed and encouraged. However, one should be wary of naive enthusiasm regarding their potential and feasibility. Circular supply chains for plastic waste are operationally challenging, and the costs of operations and processes can quickly exceed the achievable revenues. The true economic potential and feasibility of plastic reuse and recycling requires detailed knowledge of local costs and conditions. Potential and viability are likely to vary across locations and types of plastic waste.

The plastic value chain analysis performed in the region highlights a weak market dynamic for recovered plastics. Most West African countries have a short plastic value chain and limited capability to add value within the chain, compared to more advanced economies such as Germany, as illustrated in the figure on the next page. > page 33

Figure 15: *A comparison of the maturity of the plastic value chains in Germany, Sierra Leone, and Côte d'Ivoire.*



Sources: *Plastics Sector Competitiveness Strategy and Action Plan for Côte d'Ivoire, final report, November 2019 and "Plastic Value Chain Mapping Report", Sierra Leone Circular Economy in Plastics for Sustainable Tourism and Economic Diversification, August 2021*

Though every WACA country has uniquse market features, the plastics waste streams in many countries lack reliable domestic market demand,[15] which is a major disincentive to efficient collection of plastic waste. This significantly affects the potential for solutions downstream of the plastic value chain (recycling facilities), requiring more structured strategies to increase the demand for recycled plastics in key sectors such as packaging, construction and fisheries.

To improve the demand, governments could introduce product specifications for green procurement (construction) and imported products (packaging), regulating the content of recycled plastic (minimum quantities and origin of recycled plastic). Voluntary plastic credit schemes[16] could provide additional incentives to improve the economics of recycling facilities.

E.

Plastic policies in West African coastal countries

A wide range of instruments can be tailored to specific conditions, whether regulatory (for example, bans, standards, input thresholds, or limits) or economic (for example, taxes and fees, subsidies, extended producer responsibility, and deposit refund schemes). A review of plastic-related policies in coastal West Africa shows that lawmakers in the region have started taking action to address the issue in the 2010s. Bans and disincentives were then mainly considered to address problematic plastic waste. Mauritania was the first country to adopt such a policy. To date, 11 out of 17 WACA countries have instituted laws to eliminate the production and distribution of SUPs, such as bans on the production and use of plastic bags. However, isolated measures, combined with low enforcement, struggle to produce results on the ground. Government efforts to reduce plastic pollution through influencing plastic consumption trends, have to date had little impact in WACA countries.

Countries have more recently introduced economic measures such as fiscal policies (taxes and fees) and extended producer responsibility for some plastic products (mainly associated with e-waste), with mixed results. In Ghana, for example, the funds generated from the tax have yet to be disbursed to the local plastics recycling sector due to the absence of an approved fund management authority.

These policies must be part of broader national strategies with a comprehensive regulatory framework considering the entire plastic value chain. Some countries have begun taking this path: in October 2019, Ghana launched the National Plastic Action Partnership (NPAP) under the Global Plastic Action Partnership (GPAP) initiative and Nigeria is following suit. Senegal also adopted an ambitious plastic law in 2020 introducing regulatory measures (bans) and economic measures (taxes, extended producer responsibility, and deposit refund schemes).

Yet, without an enabling environment and consultation with the private sector, the government has encountered challenges to its implementation.

Improvements in effective monitoring systems to track formal and informal plastic product flows, and enforcement of regulations, are the most challenging activities for governments in WACA countries. However, those are critical steps for the implementation of regulations aiming to reduce plastic waste.

The introduction of green product standards could facilitate the creation of a market for recycled plastics. Except for Nigeria—which, as of 2016, introduced food-grade standards for recovered plastics—many WACA countries currently lack clear policy frameworks to incentivize or mandate the incorporation of circularity (minimum requirement of recycled plastic content) in plastics production. This has deterred investors and private enterprises from transitioning to more circular approaches to plastic product manufacturing. Hence, many manufacturers continue to rely on virgin plastic resin and produce SUP products. Similarly, few policies or certification programs are designed specifically to incentivize local manufacturers in the production of reusable or recyclable plastic products.

There is currently no regional framework on plastic waste management or plastic circular economy in West Africa. However, the West African Economic and Monetary Union (WAEMU) and the Economic Community of West African States (ECOWAS) are working jointly on the development of a regional strategy for sustainable plastic waste management. Similarly, the Abidjan Convention (Regional Sea Programme for the Atlantic Coast of the West, Central and Southern Africa Region) is engaged to provide the sub-region with a regional action plan to protect coasts and oceans from plastic pollution.

15 Many WACA countries do not generate enough recovered plastics to feed large-scale recycling facilities. The challenge pertaining to economies of scale has limited the prospects of capital-intensive investments in large-scale material recovery and recycling facilities. Moreover, private recyclers in Ghana indicated that lack of infrastructure for PET plastic waste pelletization means PET plastic recovery in the WACA countries is not as profitable as other plastic waste recovery streams. Recycling businesses cannot afford the prohibitive cost of this infrastructure without financing support. Also, since informal operators are compensated based on the weight of recovered plastics, they find PET-based products (for example, water and beverage bottles) unattractive, as they are lighter than PEHD (in other words, non-film) and PP plastic products. Because PET plastics have this low value, they constitute a considerable proportion of the plastic waste found on land and in marine environments.

16 The Plastic Waste Reduction Program (Plastic Program) enables the robust impact assessment of new or scaled-up waste collection and recycling projects. https://verra.org/programs/plastic-waste-reduction-standard/

Table 1: *Plastics related legislation across the 17 WACA countries*

	WACA countries	Legislations/Regulations
Waste management policies	Benin	Interministerial Order No. 136 / DHAB, 1995
		Law No. 98-030, 1999
		Law No. 98-005, 1999
	Cabo Verde	Decree-Law No. 56/2015 establishing the general regime for prevention, production, and management of waste, 2015
		Strategic National Plan for the Prevention and Management of Waste (PENGeR) Decree-Law No. 32/2016, 2016
		Decree-Law No. 26/2020 for urban waste management services, 2020
	Cameroon	Environmental Law 96/12, 1996
		National Strategy for Waste Management, 2007
		Decree No. 2012/2809, 2012
	Côte d'Ivoire	Framework Act 96-766 under the Environmental Code, 1996
		National Environmental Policy, 2011
	Gabon	Decree No. 000541/PR/MEFEPEPN regulating waste disposal, 2005
	The Gambia	National Environmental Management Act, 1994
		Waste Management Bill, 2007
		Anti-Littering Regulation, 2008
	Ghana	Environmental Sanitation Policy, 2009
		National Environmental Sanitation Strategy and Action Plan, 2010
	Guinea	Environmental Code, 2019
	Liberia	Environment Protection and Management Law of Liberia, 2002
	Mauritania	Law No. 2000-045
	Nigeria	National Policy on Solid Waste Management, 2020
		National Environmental Regulations (Sanitation and Wastes Control), 2009
	São Tomé and Príncipe	Environmental Law No. 10/99, 1999
	Senegal	Environmental Code 2001 (Law No. 2001-01), 2001
		Decentralization Law (Acte III de la Décentralisation) and the Local Governments Law (Code des Collectivités Territoriales).
		Law no. 2022-18 to designate SONAGED as the entity responsible for waste management throughout the national territory, 2023
	Sierra Leone	National Environmental Health and Sanitation Strategy
	Togo	Framework Law on the Environment 2008-005, 2008
National Plastic policies (including CE)	Ghana	National Plastic Management Policy, 2020
	Nigeria	National Policy on Plastic Waste Management, 2020
	Senegal	Plastic Law—Law No. 2020-04
Extended producer responsibility	Cabo Verde	Decree-Law No. 32/2016 Strategic National Plan for the Prevention and Management of Waste (PENGeR), 2016
	Côte d'Ivoire	Extended Producer Responsibility regarding plastic bags - Decree No. 2013-327, 2013
	The Gambia	EPR included in the Plastic Bag Ban, 2015
	Ghana	Extended Producer Responsibility (Hazardous and Electronic Waste Control and Management Act 217), 2016
		National Plastics Management Policy, 2020
	Nigeria	National Environmental Regulations, 2009 and 2011 (introduce EPR requirements for selected industries: food, beverages, tobacco, phar-maceuticals, soap and detergent, electricals and electronics, and plastics)
		Extended Producer Responsibility Programme, 2016
	São Tomé and Príncipe	Decree-Law No. 64/2013 on Extended Producer Responsibility, 2013
	Senegal	Plastic Law—Law No. 2020-04
Product policies/plastic bans	Benin	Plastic Ban Law No. 2017/39, 2017
	Cabo Verde	Law 99/VIII/2015 - Ban of Non-Reusable Plastic Bags for Wholesale and Retail Trade, 2015
	Cameroon	Plastic Bag Ban, 2014
	Côte d'Ivoire	Decree No. 2013-327 on the ban of the use of plastic bags, 2013
	The Gambia	Order No. 1489 / MECIT prohibiting the import and marketing of non-recyclable plastic bags, 2010
	Guinea-Bissau	Decree Law 16/2013—Plastic bag ban, 2013
	Mauritania	Decree No. 2012-157, 2012
	Nigeria	Plastic Bag Prohibition Bill, 2019
	Senegal	Plastic Law No. 2020-04, 2020
	Togo	Decree No. 2011-003-PR setting the management methods for plastic bags and packaging, 2011
		Order No. 11/13/MIZFIT/CAB setting out the management proce-dures for biodegradable plastic bags and packaging in Togo, 2013
Fiscal policies	Benin	Interministerial Decree No. 2004 N ° 077 / MEHU / MFE / DC / SG / DE / SLRCCAME / DLRE / SA, 2004
	Cabo Verde	Law No. 86/IV/93 establishing the environmental policy, 1993
	Ghana	Customs and Excise (Duties and Other Taxes) (Amendment) Act 863, 2013
		Eco-levy on imported electric and electrical goods and tires (Hazard-ous and Electronic Waste Control and Management Act 917), 2016
	Guinea	Ecotax on Electrical Equipment and Electronics and Tyres, 2019
	Senegal	Plastic Law—Law No. 2020-04

III.

A CIRCULAR ECONOMY APPROACH TO MANAGING PLASTICS

©Mel D. Cole for World Bank

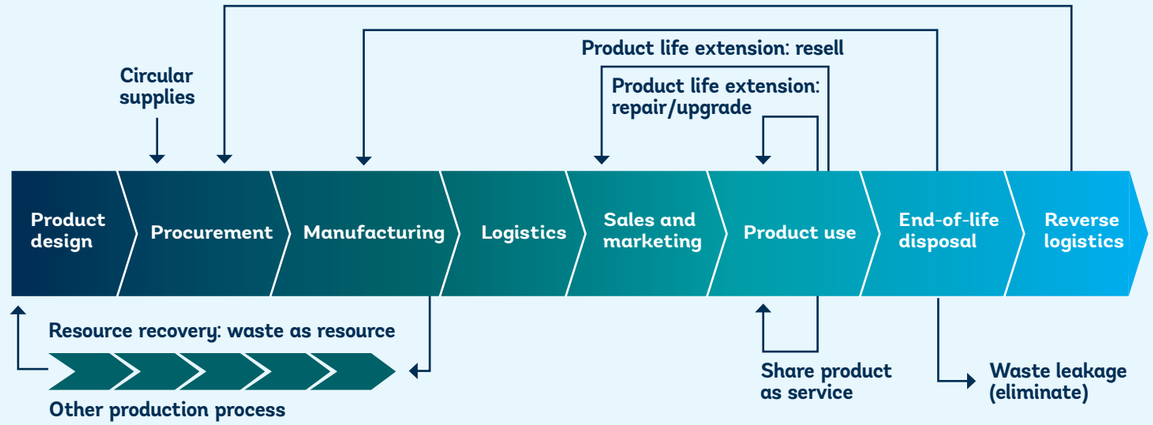
A.

Embracing a circular economy approach

As stated above, there are significant needs in the solid waste management sector in West Africa. However, addressing plastic pollution does not rely exclusively on improvement of the solid waste management system (the downstream sector); it also requires more responsible production and consumption patterns with regard to plastic products (the upstream sector). From this perspective, the role of the private sector is critical to ensure the development of sustainable value chains able to improve the use of untapped resources and minimize the generation of waste to landfill.

Circular economy is an umbrella concept that aims to decrease material inputs and minimize waste generation.[17] Over the past decades, circular economy has emerged as a paradigm that promotes more responsible production and consumption patterns. The accelerated global consumption of goods has resulted in over-exploitation of natural resources. The concept of circular economy therefore arises in response to the need to reduce environmental pressure from economic growth by consolidating a system focused on reduction, reuse, recycling, and recovery of materials in the processes of production, distribution, and consumption.[18]

Figure 16: *Circular economy opportunities across the product life cycle*



Source: *World Bank. 2022. "Squaring the Circle: Policies from Europe's Circular Economy Transition." Adapted from Bani and Blom. 2020. " Rethinking the Road to the Circular Economy." https://think.ing.com/uploads/ reports/Rethinking_the_road_to_the_circular_economy_FINAL_RB1.pdf.*

17 Moraga, Gustavo, Sophie Huysveld, Fabrice Mathieux, Gian Blengini, Luc Alaerts, Karel Van Acker, Steven De Meester, and Jo Dewulf. (2019). "Circular economy indicators: What do they measure?" Resources Conservation and Recycling. 146. 452-461. 10.1016/j.resconrec.2019.03.045.

18 Negrete-Cardoso, Mariana, Genoveva Rosano-Ortega, Erick Alvarez-Aros, Maria Tavera Cortés, Carlos Vega-Lebrún, and Francisco Sanchez-Ruiz. (2022). "Circular economy strategy and waste management: a bibliometric analysis in its contribution to sustainable development, toward a post-COVID-19 era." Environmental Science and Pollution Research. 29. 10.1007/s11356-022-18703-3.

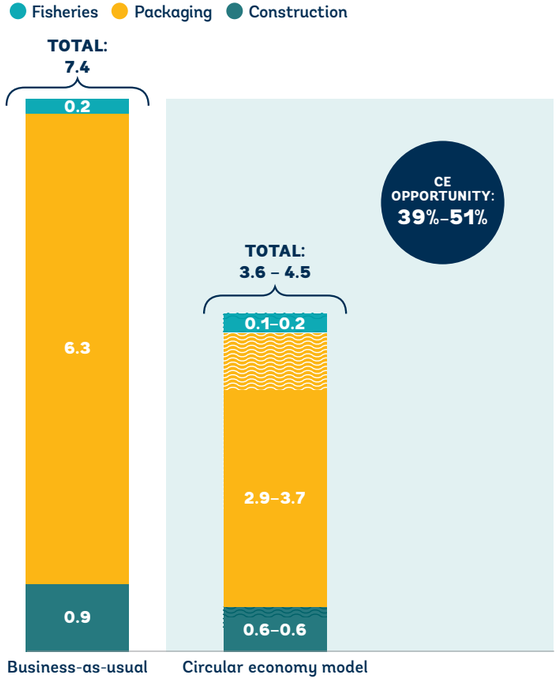
B.

Circular economy scenarios

The assessment of three key sectors—packaging, construction, and fisheries—in coastal West Africa looked at the potential for reducing (in particular marine) plastic waste in the region through a circular economy model at the 2026 horizon.

Results highlight the strong potential for reducing plastic waste, and associated $C0_2$ emissions, through a circular economy model. Under the pragmatic circular economy scenario, 39 to 51 percent less plastic would be lost to the environment (end as waste) compared to the linear economy model (business-as-usual).

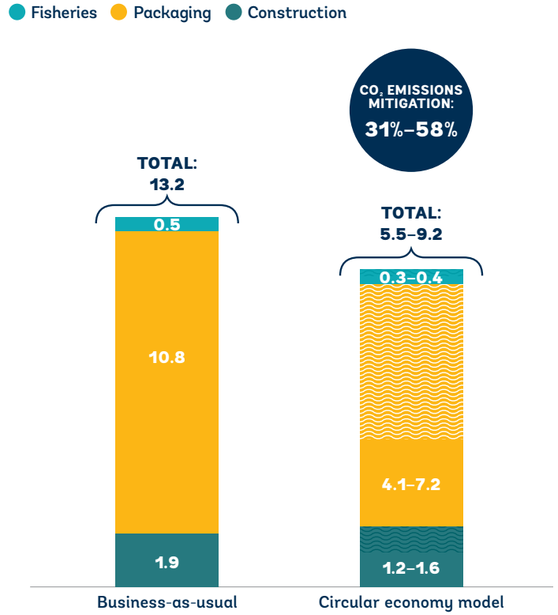
Figure 17: *Plastic resource loss mitigation based on a pragmatic circular economy scenario in 2026 (million tons)*



Source: *World Bank. 2023. "West Africa Circular Economy: Realizing the Potential of Plastics. A Regional Gap Analysis."*

Based on a linear economy model, the three economic sectors covered in this study (construction, fisheries, and packaging[4]) represent a resource loss scenario of 13.2 million tons CO_2 by 2026. However, if a pragmatic scenario is applied, the estimate for emission reductions is estimated to be in a range between 5.5 and 9.2 million tons CO_2.

Figure 18: *CO_2 emissions mitigation based on a pragmatic circular economy scenario in 2026 (million tons CO_2 emissions)*



Polymer based emissions factor – kg CO_2 emission per kg of plastic			
	Lower end	Higher end	Average
Polyethylene	1.1	2.1	1.6
Polypropylene	1.1	2.0	1.6
Polystyrene	2.8	3.5	3.2
polyvinyl chloride	1.9	2.5	2.2
Others	1.7	2.4	2.0

Source: *World Bank. 2023. "West Africa Circular Economy: Realizing the Potential of Plastics. A Regional Gap Analysis."*

In the plastic packaging sector, adopting a pragmatic circular scenario (through avoidance/reuse/recycling) will reduce plastic waste by 2.2 and 4 million tons, equivalent to CO_2 emission reductions between 3.6 and 6.7 million tons.

C.

Circular economy gap analysis

The challenges raised in the gap analysis can be presented and addressed through the prism of the circular economy model, considering the general motivations and phases involved in an effective circular economy scenario. Success relies on fulfilling a market need with a cost-effective solution (products and/or services) that can be commercialized with consistent front-end sourcing and back-end processing.

Table 2 presents and summarizes the current difficulties encountered in the plastic circular economy model in the WACA countries. It also identifies enabling conditions and recommends tools in each phase to bridge the gaps toward stimulating a sustainable, reliable, and cost-effective plastic circular economy in the region.

Table 2: *Challenges and leverages to implement a plastic circular economy in the WACA countries*

Business case for a plastic circular economy model	Challenges for a plastic circular economy model in WACA	Leverages
Market need	Three key sectors still in need of plastic products	• Ban certain single-use plastics, with control and enforcement • Promote and incentivize "reuse, repurpose, recycle" solutions and use of alternative materials
Consumers' demand	Expectations regarding food secu-rity and water quality	• Introduce biodegradable materials substitutes
Cost competitivity	• Virgin plastic cheap in comparison to recovered plastic • Cost of R&D and capital investment	• Ban and/or tax virgin plastic • Redirect public and private financing toward recovered plastic • Impose and enforce standards in plastic compositions • Emphasize CO_2 credit benefits
Main phases in a CE model		
Design and process	• No substitute for some plastic products • No recycling options for some varieties of plastic	• Identify main contributors and promote solutions through "reuse, repurpose, recycle" innovations and initiatives
Energy	• Energy cost and availability	• Evaluate waste to energy opportunities
Material input	• Low value of virgin resin • Low quality of recovered plastic • Insufficient volume of recovered plastic	• Tax virgin plastic (imported and domestic) • Incentivize recovered plastic • Develop regional organization and trade for consistent recovered plastic flow • Improve and specify raw material quality for recovered plastic
Infrastructure and workforce (production)	• Few manufacturing facilities • Low recycling capacity	• Secure finance for infrastructure and capital investment • Create private sector investment incentives • Seek public funding or offer tax rebates
Use	Low awareness and sensitization of users: (i) against littering; (ii) for sorting; and (iii) for recovered plastic or alternative plastic products	Educate and sensitize general population and stakeholders
Collect/remove	• Insufficient means • Informal practice	• Increase means and workforce for collection, sorting and cleaning • Implement extended producer responsibilities (EPR) schemes • Organize a reliable and consistent recovered plastic flow • Engage informal reclaimers (with plastic credit schemes)
Recycle	• Few recycling facilities • Low value of recycled plastic	Fund capital investment through: • Private sector investment incentives • Public funding or tax rebates • Implementation of EPR schemes • Request for CO_2 credit benefits
Dispose	• Lack of formal and effective disposal sites • Leakage of sanitary landfills	• Improve infrastructure • Launch clean-up campaigns in hotspots in the relevant season

D.

Four tracks to get to a circular economy

The potential roadmap to facilitate a transition from a linear to a circular economy in the WACA countries requires a combination of top-down and bottom-up approaches. Governments need to set in place regulations to enable private sector investment and the creation of a dynamic market for recycled plastics and alternative plastics products. The private sector needs to identify opportunities to invest in resource efficiency and industrial symbiosis to improve the recovery of plastics, change the design of the products to include more recycled plastic content, and develop alternative products/services for non-recoverable plastics. The challenges and benefits of different strategies can be summarized as follows:

- Targeted plastic product bans, especially in scenarios where affordable and regionally sourced alternatives are available, could influence the market demand toward a plastic circular economy model. The quest for viable alternatives in the WACA countries must be contingent on support for research and development partnerships with research institutions that are testing potential plastic substitutes.
- Nonetheless, in the short- to medium-term, it is very likely that the WACA countries will still be a largely import-based market for plastic products and other goods with embedded plastic. Hence, governments will need to introduce circular-economy-based specifications for plastic-related imports, such as setting a minimum content percentage of recycled plastics within an imported plastic-based product.
- Additionally, extended producer responsibility (EPR) policies can address funding gaps and cost-effectiveness in the recovery of plastic waste and non-plastic packaging alternatives, with well-thought-out systems of taxes, rebates, and other fiscal policy measures. Those EPR tools can also be used to shape manufacturing sector trends and consumer behavior toward maximizing plastic waste prevention, plastic product reuse, and plastic recycling.
- Both government and private sector stakeholders will need to facilitate the development of data collection systems that track the flow of plastics across the value chain. This will enable the orientation and prioritization of strategies and policies suited to specific regional and local situations.
- Governments, the private sector, and academia should work on programs to facilitate the use of new technologies to recover plastics; create alternative plastic products; and/or develop common synergies to foster innovation, adopt new solutions, and exchange best practices to improve the plastic footprint of the region.

Several initiatives across the three economic sectors presented earlier have been identified and recommended (Table 3).

©Mel D. Cole for World Bank

Table 3: *Recommendations for initiatives across three sectors in the WACA countries*

	Across sectors	Construction	Packaging plastics	Fisheries
New business models	• Regulatory initiatives including bans, EPR policies • R&D partnerships with research institutions to develop alternatives to plastic • Propose regulations that promote imports of products containing a set minimum % of recycled plastics	• Adopt green construction approach including use of metals, bamboo, and composites • Adopt use of similar Building Information modeling (BIM) technology currently used in Europe by Sanda Hus to reduce plastics use in the industry	• Support increased use of bio-based plastics through import subsidies and investment in production technology • Support research and implementation of new bio-material mycelium-based packaging as compostable alternative to plastics • Institute and encourage like-for-like exchange programs, especially for replacing PET bottles with glass/wood/metal alternatives	• Mandate and promote "in coordination with industry associations" the use of natural fibers for fishing nets and plastic lines • Use technology, including RFID tags, to create inventory of commercial shipping nets in the region to reduce new ghost gear
Extend lifespan	• Regulatory policies defining industry product content standards • Employ fiscal policy measures including spending, taxes and rebates to shape industry and consumer behaviour	• Select reused or higher recycled content products and materials (e.g., plastic recycled content blocks, reclaimed bricks, locally recycled aggregates) • Modify the specification for building elements (e.g., lower- weight roof design, water pipe material)	• Invest in plastic repair/ welding technology as a means of prolonging use of existing plastics • Promote transfer/ installation technology. For example, Notpla company helped to find a biodegradable solution to plastic packaging for water sachets • Enact policies that encourage mono-color use of PET bottles (white) for enhancing recycled PET resin availability	• Promote policies encouraging use of second-hand/discarded fishing "equipment" especially nets, "ropes" and crates • Work with research institutions to develop seaweed/algae-based and commercially viable plastic for use in fishing industry
Use materials	• Development of targeted waste management policies • Launch government, private sector and NGO awareness and participation campaigns	• In coordination with industry associations, mandate use of non-plastic material for packaging of building materials • Support public entities in developing tender requirements for affordable housing and infrastructure • Align industry associations and waste management bodies with cement industry to ensure MSW (municipal solid waste) stream for alternative fuels	• In coordination with industry associations and research institutions evaluate increased possibilities of chemical recycling • Promote segregation and collection of plastics by type, including bottle deposit schemes • Invest in plastic waste recycling technology similar to TECO, which transforms waste into usable roofs, furniture and school benches • Invest in collection centers in urban centers, as most plastic waste is concentrated in cities rather than rural areas	• Support policies that encourage collection of marine plastic waste and ghost gear by fishermen by providing rebates on purchase of new gear • Enact policies "in coordination with industry associations" that provide subsidies and or tax breaks for exchange of plastic fishing equipment for other materials • Support programs that enable exchange of lost fishing gear for vouchers for food or school supplies

Source: *World Bank. 2023. "West Africa Circular Economy: Realizing the Potential of Plastics. A Regional Gap Analysis"countries*

BUILDING ON THE RECOMMENDATIONS FROM TABLE 3, THE MOVE TO A CIRCULAR ECONOMY FOR PLASTICS IN COASTAL WEST AFRICA COULD BE ACTIONED IN FOUR PARALLEL TRACKS, AS FOLLOWS:

TRACK 1
Influence the market demand/offer toward a plastic circular economy model

The role of the private sector is critical for the implementation of a circular economy strategy. By promoting circular innovations and associated research and development towards new product designs in the field of polymers for packaging, governments can stimulate market acceptance of circular-economy-related products. They can also facilitate international partnerships with leading global universities researching new and innovative packaging materials made from sustainable sources (including new resins and bio-polyethylene).

The development and promotion of alternative or reusable products requires planning well in advance of implementing plastic-reduction policies. The jobs created in the alternative sectors can also mitigate opposition arising from potential loss of employment in the plastics industry. Taking the extra time for advance planning and publicity can help both the plastics industry and the public to adjust to a scenario with lower plastic usage.

RECOMMENDATIONS ACROSS THE THREE SECTORS ARE TO:

- Adopt new business models, such as a green construction approach (including, for instance, the use of metals, bamboo, and composites).
- Increase use of bio-based plastics and investment in production technology (packaging).
- Use new geo-tags technology on nets to reduce fishing ghost gear, and renew the inventory of commercial shipping nets.
- Extend the lifetime of products, including through their reuse and the production of materials with higher recycled content.
- Implement policies that encourage the use of mono-color PET bottles, and develop seaweed- or algae-based, biodegradable plastic for use in the fishing industry.

Ban, limit, control, and enforce regulation

Global experience indicates that both bans and price-based strategies can be effective ways to reduce plastic waste. Experience shows that people are more likely to accept a ban or price-based strategy if they have access to suitable, environmentally friendly alternatives that are reasonably priced.

Eleven out of 17 WACA countries have instituted bans on SUP bags, with various levels of enforcement and success. For example, Nigeria (the region's sole producer of plastics and its largest consumer) instituted a ban on plastic bags in 2014. In 2019 the government strengthened the legislation by instituting a N500,000 fine or a three-year jail sentence. However, as there is inadequate municipal infrastructure to address drinking water or waste management requirements, enforcement remains a point of concern.

Command-and-control approaches minimize the external costs generated by plastic products by banning their use through regulation and enforcement.

Introduce taxes and economic incentives

Incentive-based approaches include levying production excise taxes or import duties on raw materials, or taxing plastic products at the point of sale.

As practical tools for promoting alternatives to plastics and circular economy approaches to plastics recovery, governments in the WACA countries can consider the introduction of fiscal policies and price-based systems such as tax breaks, levies, and deposit-refund schemes. The removal of import tariffs for plastic recycling equipment, and the introduction of tax breaks for local manufacturers of alternatives to SUP packaging, are a few examples of fiscal policy initiatives that could be explored. To determine the most appropriate approach, governments would do well to prioritize consultation with manufacturers and other relevant stakeholders in the design of fiscal policies.

The establishment of such fiscal initiatives can lay the foundation for the development of a viable EPR scheme, coupled with networks of satellite plastic buy-back centers.

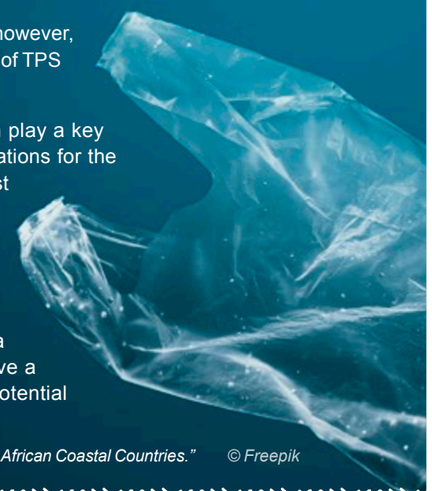
CASE STUDY 3

Import taxes on thin polyethylene sheets

In West African coastal countries, all single-use plastic (SUP) sachets, bags, and other containers are fabricated from thin polyethylene sheet (TPS), virtually all of which is imported.

One appealing policy would directly target bulk imports of polyethylene; however, evaluating this policy also requires understanding the expected response of TPS imports to the imposition of tariffs.

A specific study showed that import taxes on polyethylene sheets can play a key role in reducing SUP waste but understanding the distributional implications for the poor is critical. Taxation of the imported polyethylene that comprises most of the production feedstock for SUP in West Africa is a potentially effective price-based policy, with relatively low administrative costs. Plastic demand exhibits a very elastic response to changes in the price of imported polyethylene. Import taxes have a potentially major cost advantage over directly targeted measures, since the former can be administered at relatively few entry points while the latter require a widely distributed cadre of enforcement agents. Since a tariff may have a disproportionate impact on the poor, policymakers should consider potential distributional implications before implementing a tariff on polyethylene.



Source: *World Bank. 2023. "The Economics of Plastic Use and Cleanup Priorities for West African Coastal Countries."* © Freepik

Define and implement harmonized standards and green procurement specifications

An important hindrance highlighted by private sector interviewees in Nigeria and Ghana, is the prevailing weak policy landscape for promoting circularity in plastics production through recycled content standards. Introducing a green taxonomy and setting a minimum percentage of recycled plastic content in plastic products could facilitate private sector investment in material recovery facilities and recycling units.

Governments in the WACA countries must work toward introducing policies that incentivize (i) standards for recycled content; (ii) production of reusable products; and (iii) use of recovered plastics as a substitute for virgin plastics in the production of plastic products. These could include mandating a defined percentage of recycled plastic in all PET bottles, or elaboration of import standards for plastic packaging content. (These standards would need to be formulated on a regional basis to carry weight with importers.) Standards for the use of recovered plastics can attract more investment into the market. For example, the recent introduction of standards for food-grade applications of recovered polyethylene terephthalate (rPET) in Nigeria has contributed to increased interest from private investors and expansion of potential off-takers of recyclable plastic materials.

According to private recyclers in Nigeria, entrepreneurs pursuing circular economy initiatives would benefit from the harmonization of standards for recovered plastics. The African Circular Economy Alliance considers the African Free Trade Agreement as a tool for promoting circular economy in the management of plastics, especially when it comes to the harmonization of regulation and standards for plastics recycling. To realize the Agreement's potential to increase intra-African trade, it is important to develop standards that regulate the reuse, recycling, and disposal of plastics. Hence, the African Development Bank collaborates with the World Economic Forum and African Standardization Organization to enable greater levels of trade in plastic polymers, and to provide technical assistance for the development of harmonized, continental standards for PET plastics.

State agencies responsible for public works and other critical infrastructural investments can consider introducing mandates for contractors to incorporate specifications advocating for a circular economy model. For instance, construction inputs could be required to be entirely or partially made from recovered plastics. Road construction works are a particularly advantageous context for application of such initiatives. Backed by the relevant policy framework, such green procurement policies can facilitate the creation of a stable demand market.

Implement extended producer responsibility for packaging

Extended producer responsibility (EPR) schemes aim to reduce the environmental and economic burdens of waste management for municipalities by extending producer responsibility to the end-of-life stage. Globally, the trend has been for EPR schemes to evolve from partial to full-cost coverage, with producers more commonly now responsible for the entire net operational costs of the packaging they put on the market. This means that producers are typically required to cover not only the administrative costs for the EPR program but the management costs of packaging waste—including collection, sorting, and recycling.

The introduction of EPR schemes is pivotal to entrenching circular economy solutions in the WACA countries. These schemes must include all businesses involved in the introduction of plastic and plastic-based products into consumer markets. This will require an effective system of identifying and tracking the activities of the relevant stakeholders, particularly water sachet producers and importers of finished plastic products. Also, the funds raised through the scheme should be ring-fenced and managed transparently to engender continued participation on the part of all stakeholders.

EPR schemes should be linked to effective systems for plastic waste recovery, including deposit return schemes and a network of buy-back centers. Those policies will support a cleaner and more reliable supply of recovered plastics by directly incentivizing plastics consumers and waste collectors to increase the capture of recovered plastics.

Furthermore, governments in the WACA countries must implement EPR schemes to aid the development of effective traceability and duty-of-care systems for tracking the flow of products across the plastic value chain.

Though EPR policies would facilitate effective collection of plastic waste, governments in the WACA countries must be cautious of replicating the EPR systems that have been developed in advanced economies. They are unlikely to be appropriate for the African context, particularly due to the predominance of informal waste collectors and low-income consumption of plastics.

Educate and sensitize consumers and stakeholders

Consultations with stakeholders in the WACA countries highlighted the need for stronger joint efforts between public, private, civil society, and NGO stakeholders on plastic management sensitization.

Indeed, greater collaboration on education campaigns and adequate labeling can inculcate proper packaging, waste disposal, and recycling practices. A joint effort towards sensitization will facilitate the provision of consistent messaging, as well as increase the efficiency of resource allocation and targeting of different communities.

Such educational programs—particularly those that emphasize the negative environmental implications of improper plastic waste disposal and highlight practical approaches to behavioral change and sustainable consumption—are vital to strengthen the foundation for circularity in WACA countries.

©Mel D. Cole for World Bank

CASE STUDY 4

Producer responsibility organizations to manage polyethylene terephthalate bottles in Senegal

Establishing an eco-organization (or producer responsibility organization (PRO) in Senegal, as envisaged in the 2020 Plastic Law, could achieve significant results in tackling plastic bottle pollution, as it already does in other African and European countries.

Polyethylene terephthalate (PET) use for bottling in Senegal represents about 38,000 tonnes every year and accounts for 15 to 16 percent of plastic waste generated in the country. Unlike other plastic polymers, like PEHD or PP, there is so far little collection and recycling of PET taking place in Senegal. Only two plants that produce PET pellets for export are in operation and the price for collected PET is too low to encourage collection beyond the immediate vicinity of these two plants.

The Senegal Technical Report shows that an eco-organization focused on PET could go a long way toward cleaning up the country. An eco-organization is a form of extended producer responsibility through which producers and importers can join forces to manage waste like PET or packaging. This collective effort helps reach economic efficiency and scale (as opposed to individual corporate social responsibility-like programs). It also helps address competitiveness issues between national producers and importers, and helps monitor more closely and accurately the volume of waste produced and its fate.

Analysis developed for this report shows the large potential of an eco-organization in Senegal, which could progressively gain in scale (that is, outside the Dakar conurbation) and momentum (in other words, targeting other types of wastes, like plastic film, packaging, and so on). Building on the existing network of informal waste reclaimers and the establishment of collection points (37) and pellet plants (4) in strategic regions, an eco-organization could help tackle 50 percent of PET pollution in Senegal within two to three years. With eco-contributions ranging from 1 to 5 F.CFA per bottle or container (and in line with current plastic taxation levels), the eco-organization would be able to support collection prices up to 150 F.CFA per kg (or twice the current level in local initiatives), thereby encouraging collection and improving livelihood and income for a vast number of people. It is thus estimated that the eco-organization could generate about 3,000 full-time jobs with decent remuneration.

There is already considerable experience with designing and operating eco-organizations on the African continent and in Europe, which could inform any action in Senegal. The main bottleneck currently is the existence of a plastic tax, whose revenue is not directed towards managing plastic. Double taxation is a strong disincentive for industrialists. For a broad adhesion to the eco-organization, the tax (on PET) should be transformed into some form of eco-contribution, which would support the functioning of the eco-organization.


©Mel D. Cole for World Bank

TRACK 2
Consolidate infrastructure, logistics, workforce, and supply chain

Improve solid waste management as well as plastic manufacturing and recycling infrastructures

According to public and private stakeholders, logistical challenges mean that many formal waste collection operators are unable to engage in segregated plastic waste collection. This contributes to the disposal of plastic waste at landfills. These firms need dedicated recyclable waste collection vehicles, as well as the associated waste transfer stations required to accommodate multiple waste streams. Also, increased space for collaboration with informal operators, and fast-tracked government efforts to include informal operations, would contribute to limiting the common mixing of waste collection from residential and commercial sources.

Those difficulties—as well as lack of infrastructure and means—need to be solved, both to reduce the level of plastic waste and to improve the quantity and quality of recovered plastic.

Furthermore, there is a direct relationship between plastic manufacturing infrastructure and plastic circularity in the WACA countries. Amid the region's low level of plastic manufacturing infrastructure, there are limited opportunities for the incorporation of upstream circular economy initiatives for plastics (such as designing reusable and easily recyclable products). For example, interviews with public sector stakeholders in Liberia revealed that, like many economies in the WACA countries, Liberia has a minuscule plastics manufacturing sector and subsequently relies heavily on imports of manufactured plastic products. This imported plastic could be an untapped resource for the private sector to consider for regional recycled plastic trade.

Countries in the region with economies of scale, such as Ghana, could thus benefit from increased investment in industrial recycling infrastructure.

Organize recovered plastic sourcing

Plastic recyclers noted the inconsistent supply of recovered plastics among both formal and informal waste collection operators as another factor responsible for low demand—including from plastic manufacturers with lower quality thresholds. Hence, even though there are regional manufacturers interested in using recycled plastics in the production of packaging, there are concerns over predictability of supply and contamination of raw products. These challenges eventually stifle attempts by manufacturers to pursue plastic-packaging-related recycling and sustainability targets.

Similarly, expert interviews with private stakeholders in Ghana and Nigeria highlighted that the dominance of virgin plastic resin use was partly driven by concerns that recovered plastics obtained by informal operators from nonsegregated sources—such as landfills—were potentially polluted and unsuitable for recycling. The use of recovered plastics for the manufacture of new plastic products (especially for food and beverage packaging) could therefore be increased with improved cleanliness and compliance with quality threshold requirements.

To address the supply risks of manufacturers, governments must consider appropriate incentive schemes for greater collaboration between formal and informal waste operators. This will increase the volume and quality of recovered plastics, thereby increasing domestic and regional demand.

Increased intraregional collaboration on plastic waste management among the WACA countries, and trade between them in recovered plastics, could help achieve economies of scale in smaller markets such as those of Liberia, Sierra Leone, and The Gambia. It is essential to assess and develop political solutions to the implications of such trade in relation to the Basel Convention. Intraregional collaboration could also benefit these smaller economies around knowledge and technology transfer, and awareness-creation on circular economy and plastics. These could provide enabling conditions for the private sector to invest in material recovery facilities or recycling plants. The local recycled plastics could also be used in other domestic products, if the quality of recyclates is comparable to that of virgin plastics.

TRACK 3
Improve cost-effectiveness of alternative and circular plastic products

Funding and incentive fiscal tools

One of the main efforts of governments is to identify opportunities to reduce or eliminate the extra cost of managing end-of-life of plastic products. As a general and indicative evaluation, the cost of reducing plastic pollution has been assessed and would fall within the range of the estimated external plastic costs in the WACA economy presented above. In practice, this would mean that direct or indirect subsidies, coming from public funds, could be provided to encourage the use of biodegradable and circular economy plastic products, compensating for their higher production cost, in addition to their development cost and associated capital investment.

The study considered three main approaches for reducing plastic pollution: (i) incentives; (ii) command and control; and (iii) removal of plastic waste through cleaning, recycling, and safe disposal.

Incentive-based approaches include levying production excise taxes or import duties on raw materials, or taxing plastic products at the point of sale. Command-and-control approaches minimize the external costs generated by plastic products by banning their use through regulation and enforcement. In principle, both incentive-based and command-and-control approaches can reduce the use of many plastic products. However, complete elimination may not be feasible for some, in which case the removal of plastic waste through cleaning, recycling, or safe disposal will be beneficial. These three approaches are not mutually exclusive. Rather, they can be tailored to a particular country's local economic and political conditions to achieve the most cost-effective mix.

Valorization of circular economy benefit, CO_2 and plastic credit

Switching from imported virgin plastics to domestic secondary plastics creates an opportunity to build domestic value chains and increase employment in the WACA countries. This benefit has not been estimated but could justify public or development funding and grants for supporting circular economy initiatives.

With respect to CO_2 credit benefits, a study has estimated that in 2021 plastic consumption will generate environmental impacts of between 7.9 and 11.1 million tons of CO_2, growing between 12 and 16.9 million tons by 2026 if the linear business model does not progress to a pragmatic circular economy model. However, if a pragmatic scenario is applied, the emission reduction by 2026 will be between 5.5 and 9.2 million tons CO_2. Depending on different price scenarios and their underlying drivers, if the WACA countries move towards a circular economy pragmatic model, this will generate a possible purchasing of carbon credits of between US$ 30 million and US$ 58 million.

Finally, the introduction of plastic credit systems could also benefit companies' and informal sector plastic recovery. As plastic waste recovery in the WACA countries is driven by the informal sector, the introduction of credible plastic credit schemes has the potential to contribute toward safeguarding the livelihood of—often poorly paid— informal waste operators. The plastic credit system aims to enable companies with plastic footprints to pay for plastic waste recovery equivalent in volume to their plastic production. According to a waste management company with operations in Ghana and Côte d'Ivoire (Coliba) the incorporation of plastic credits in its operations helped subsidize waste purchases from the informal waste sector. In addition, plastic credits provided an earnings buffer for informal operators during episodes of oil price falls, and the associated decline in the demand for recovered plastics.

Financing and financial services facilitation

Sustained investment in innovation, infrastructure, and logistics is required to create a circular economy, based on refilling, use of alternative materials (including bioplastics), and recycling. However, plastic industry stakeholders identified that countries are struggling to secure funding for recycling infrastructure, largely because of the relatively low profitability.

Development partners have an important role to play in supporting the growth of circular economy solutions for plastics management. As an example, the African Development Bank addresses the challenge small and medium-sized enterprises (SMEs) face in securing private sector financing by providing de-risking financial instruments for small private entities like start-ups and SMEs. These include grants and credit guarantees given directly to regional credit unions and commercial banks, such as Ecobank. Additionally, the African Development Bank aims to operationalize a financing vehicle (the African Circular Economy Facility) to facilitate the disbursement of funds for investment in circular-economy-based solutions.

The financing of plastics recovery should be primarily driven by market dynamics (aided by governments creating a conducive business environment). However, governments can also provide small allocations of capital to informal waste operators to encourage greater levels of plastic collection. It is important to ensure that such investments are allocated to the appropriate recipients, to maximize the benefits accrued.

Given the critical importance of financial incentives for informal operators, coupled with the fact that many informal operators lack access to bank accounts, mobile money technology offers a means of facilitating access to financial services. Commercialization of circular economy business models within a smaller production environment is a challenge faced by stakeholders in the largest economies of the WACA countries. However, this hurdle can be minimized by using well-established tools—such as mobile technology—to significantly improve the efficiency of value-chain transactions.


©Mel D. Cole for World Bank


©Mel D. Cole for World Bank

©Mel D. Cole for World Bank

19 World Bank. 2023. "The Economics of Plastic Use and Cleanup Priorities for West African Coastal Countries."

20 Carbon credits (often referred to as "offsets") have an important dual role to play in the battle against climate change. They enable companies to support decarbonization beyond their own carbon footprint, thus accelerating the broader transition to a lower-carbon future. They also help finance projects for removal of carbon dioxide from the atmosphere—delivering negative emissions, which will be needed to neutralize residual emissions that will persist even under the most optimistic scenarios for decarbonization. (McKinsey Sustainability 2020)

21 According to Oil Price Information Service (OPIS), the average price of voluntary carbon credits—frequently sold, premier forestry offsets—is about US$ 7.50 per ton CO_2 over the last 12 months in 2022 (IHS Markit Energy Expert 2022).

TRACK 4
Manage the change towards circular economy

Engage stakeholders in policies and strategies

All stakeholders of the plastic value-chain should be engaged in the design and implementation of policies and strategies. These include: government ministries and agencies; private businesses; industry associations; plastic producers/convertors; the major plastic packaging users (PET bottles, high-density polyethylene [PEHD] water-sachet manufacturers); municipal solid waste (MSW) departments; plastic waste segregators (including informal waste reclaimers); resin producers; and civil society organizations, including consumer associations.

Greater levels of collaboration between public, private, informal, and development stakeholders would harness the individual strengths of each in addressing challenges in the region's plastics sector. For example, strategic engagements with the informal sector can expand efforts to increase access to segregated plastic waste collection. Likewise, collaboration can facilitate effective behavioral change campaigns.

Collect more location-specific knowledge (plastic flow analysis; waste-induced losses; remediation effectiveness)

Private-sector stakeholders in Ghana and Nigeria highlighted the general absence of high-quality data on plastic products and waste flows in the WACA countries, particularly regarding the activities of informal operators. This hampers efforts to promote effective national strategies for plastic waste recovery.

More local case studies on sector-specific losses from plastic waste are needed in West African coastal countries. At present, the WACA countries do not have sufficient data for estimating country- and sector-specific costs. Better data on waste plastic externalities can play a key role in assessing the benefits and costs of policy options for plastic waste remediation.

A cost-effective mix of approaches

Location-specific analyses are needed to determine the most cost-effective policy mix for plastic waste remediation in each country. West African coastal countries require urgent intervention because mismanaged plastic waste in the marine environment will continue to increase at high rates. However, there is no one-size-fits-all solution. As options for plastic waste management improve, the most practical policy solutions will likely entail a balance of cleanup strategies and some combination of innovative, quantity- and price-based approaches. Determining the most cost-effective policy mix for each country should involve location-specific analyses.

Creating new markets

Governments should cooperate with the private sector to identify effective enabling conditions to attract investments, or to develop public-private partnership projects for new infrastructures that aim to recover untapped resources and generate new markets. Countries that import plastic products should design trade strategies to impose more stringent requirements for imported products, requiring higher content of recyclable/recoverable plastic materials. At the same time, they should work with the private sector to facilitate the necessary investment to recover these materials and to help establish local supply chains for them—for example, by engaging with the main plastic product exporters in the region to foster foreign direct investment opportunities.

©Mel D. Cole for World Bank

www.wacaprogram.org | waca@worldbank.org