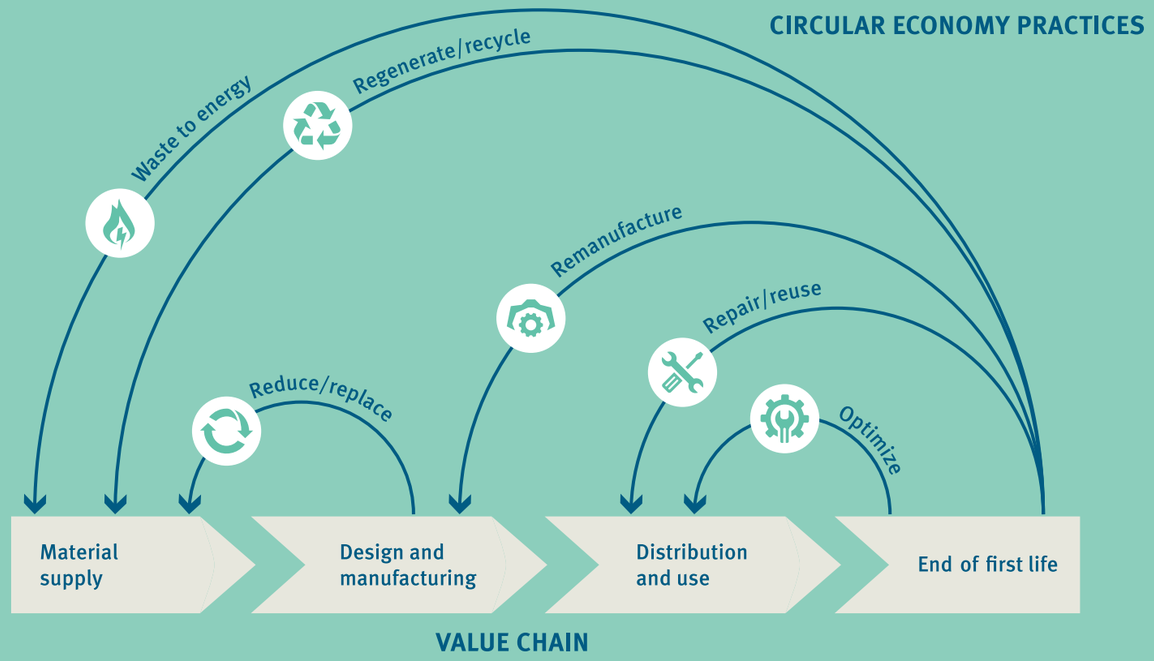
PARTNERING FOR AFRICA'S CHALLENGE ON PLASTIC POLLUTION

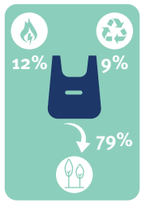
2022

UNIDO PLASTIC CIRCULAR ECONOMY MODEL



Background

Each year, an estimated 8 million metric tons (Mt) of plastic waste leak into marine environments around the world[1], adding to the existing 83 million Mt of plastic that already pollute our seas. This litter derives largely from land-based sources and includes plastic packaging, single-use consumer products, products containing microbeads and synthetic clothing. With global production of plastics expected to grow rapidly in the coming years, immediate action is essential.



In 2015, it was estimated that only 9% of all plastic ever manufactured has been recycled. 12% is incinerated and the remaining 79% ends up in landfill or in the natural environment[2]. Clearly, there is enormous scope to improve these numbers. There are many ways to do this. For example, implementing circular economy practices will help keep plastics out of the ocean while turning waste plastics into a reusable resource. Reinventing the way we treat plastics, especially packaging and single-use plastics, can optimise recycling and help retain and prolong the service life of products that would otherwise be in landfills. Therefore, many of these measures also result in financial benefits, and increase employment opportunities for those in informal waste management sectors across Africa.

[1] J. Jambeck et al, *Challenges and emerging solutions to the land-based plastic waste issue in Africa*, Marine Policy vol 96, October 2018.
[2] Geyer, R., Jambeck, J. R., & Law, K. L. (2017). *Production, use, and fate of all plastics ever made*. Science Advances, 3(7), e1700782, 19 July. ‹http://advances.sciencemag.org/content/3/7/e1700782›

The measures to reduce the impact of plastic waste must not be restricted to interventions at the end of the service life of the plastic products. It is more important to look at the entire life cycle of plastic items, starting with design and manufacturing. Unnecessary plastic products should not be manufactured in the first place, while problematic plastic products must be redesigned to be less problematic.

Optimizing plastic collection and recycling efforts requires an understanding of what plastic material consists of. For instance, using single polymers or a small number of polymers facilitates easier recycling. The use of recycled materials must be encouraged, as well as replacing conventional plastic with biodegradable or compostable alternative materials, if feasible. It is crucial to promote sustainable practices in design and manufacturing. Designing products that consume less materials decreases both the volume of input materials and waste, and using additives that are not toxic – or at least less toxic – is essential for plastic packaging and single-use plastic products.

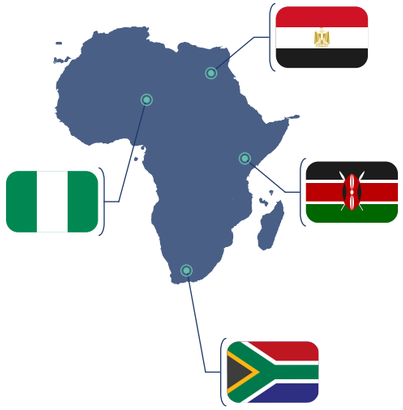
Circular economy practices need to be incentivised by policy measures. In this way, both the supply side and the demand side can trigger demand. Examples of this include the creation and strengthening of markets for recycled plastics, bio-based plastics and reuse business models; differentiated taxes on virgin and recycled plastics; introduction of standards for recycled content; improving transparency and information about the materials used in products as part of educational campaigns for consumers. In addition, development of efficient infrastructure for collection, separation and proper end-of-life management of plastic waste is essential in promoting a circular economy.

UNIDO and Japan

The Osaka Blue Ocean Vision is a commitment agreed by the G20 nations under Japan's presidency in 2019. It aims to reduce additional pollution by marine plastic litter to zero by 2050. To this end, the government of Japan has launched the 'MARINE Initiative' to advance effective actions to combat marine plastic litter at a global scale, with particular focus on management of waste, recovery of marine litter, innovation, and empowerment.

UNIDO, as a leading UN agency to promote circular economy practices in industry, is implementing a number of projects that aim to work towards these goals under the MARINE Initiative.

There are several projects in Africa, with different components and aims that are tailored for local requirements. The project in South Africa began in 2019 and is due to conclude in 2023. It has already achieved notable successes, which are outlined below. The projects in Egypt and Nigeria are beginning in 2022 and are expected to run for several years.



Africa regional study project

Two study streams were conducted.

1. Identification of sustainable alternative materials to plastics, and innovative packaging and recycling technologies;
2. Plastics value chain in the target countries (Egypt, Kenya, and Nigeria) and their regulatory frameworks.

They merge into one at country levels and identify gaps between needs and supplies as well as opportunities and challenges in the target countries. It is expected to contribute to providing an overview of available technology options appropriate for local contexts and needs to reduce plastic pollution.

Major findings from the study per country follow next.

PROJECT 190137

REGION
Africa

BUDGET
EUR 350,000

STARTING DATE
July 2019

DONOR
Japan

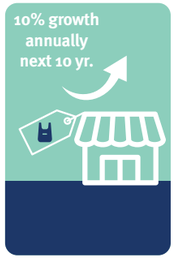
DURATION
30 months

More info

AT A GLANCE

Egypt

The study on 'Plastic Value Chain in Egypt'[3] shows that the plastics market in Egypt is expected to grow at a rate of 10% annually in the next ten years alone, which will place Egypt as the largest consumer of plastics in Africa. Single-use plastics currently represent 36% of the plastics market. Here are some key findings from the study:



- It is crucial to focus efforts on reducing the consumption of the single-use products with the highest consumption: packaging film products and agriculture products.
- Plastic manufacturing is improving and moving towards a higher value-added business, which encourages local manufacturing.
- The plastic waste sector suffers from a lack of links between the various stakeholders in the industry. This includes links between manufacturers and R&D, as well as links between the supply side and the recycling side. Maintenance and testing services for equipment are also weak.
- Waste management services would benefit from greater regulation. The informal waste collection sector provides an essential service, but needs to be carefully formalised. Separation of waste needs to be enforced with government regulation, and the government also could increase support for alternative materials.

[3] Plastic Value Chain in Egypt: ‹https://open.unido.org/api/documents/24063209/download/Country%20report%20-%20Plastic%20value%20chain%20in%20Egypt.pdf›

Nigeria

Of the 32 million tons of solid waste that Nigeria generates annually, 2.5 million tons are plastic waste. Over 200,000 Mt of plastic waste generated on land end up in the Atlantic Ocean every year. Solid waste management services in Nigeria are non-existent in many areas of the country, and irregular and sporadic in others. Despite this, recent policy changes suggest Nigeria is becoming better equipped to tackle the issue of plastic litter. These policies should help nurture circular economy practices in industries and create green jobs. The 'Study on Plastics Value-Chain in Nigeria' identified some key areas of focus:

- The Nigerian government recently adopted several ambitious policies on solid and plastic waste, which will help to treat waste as a resource to promote economic growth. Regulations to implement these policies are in development.
- Awareness of plastic alternatives is growing but must be improved. There is particularly low awareness of the threat posed by marine plastic litter, making education on the hazards of plastic waste in the environment essential.
- Nigeria's solid waste management systems need to be strengthened. Currently less than 20% of solid waste generated is collected through a formal system[4].
- Recycling technology should be promoted to facilitate a circular economy. This would also reduce the amount of waste entering Nigeria's dumping sites.

[4] Federal Republic of Nigeria (2018), *National Policy on Solid Waste Management.*

Kenya

While Kenya attracted international attention in 2017 for its stringent ban on plastic bags, progress has not kept pace with international approaches to curbing plastic waste. The current waste management system is developing and needs concerted action from different government levels, private companies and civil society. The 'Study on Plastic Value Chain in Kenya'[5] highlights the role played by the Kenya Extended Producer Organization (KEPRO), an initiative that brings together players in the waste value chain to address post-consumer waste and promote a circular economy in Kenya. KEPRO can play a vital part in improving Kenya's plastic waste situation by:

- Identifying ways to reach the targets set by the Kenyan government and raising necessary funds from its members;
- Subsidising areas of recycling that currently lack economic viability to create economic incentives to recycle;
- Fostering better plastic waste management through the value chain, with modulated fees to incentivise design changes for substitution and better recyclability.

[5] <https://open.unido.org/api/documents/23915514/download/Country%20report%20-%20Plastic%20value%20chain%20in%20Kenya.pdf>

The project is funded by the government of Japan and is implemented through the United Nations Industrial Development Organisation (UNIDO) in cooperation with the South African Council of Scientific and Industrial Research (CSIR) and the University of the Witwatersrand in South Africa.

The project consists of two components. The first aims to identify opportunities to promote and implement the use of sustainable alternative materials, including biodegradable plastics. The second component supports recycling by integrating the informal waste management sector into the waste collection, sorting, and recycling industry, thereby providing financial stability and increased security for workers across the continent while simultaneously strengthening recycling capacities and fostering greater awareness among consumers.

As part of the first component, a Life Cycle assessment (LCA) study[6] was carried out to determine the performance of various materials used in take-away food packaging across a variety of criteria, from the impacts of raw material extraction to disposal to persistence in the environment and material pollution indicators, amongst others. Single-use plastic items are increasingly being found in the environment, contributing to the growing problem of marine litter. The study aimed to determine which materials performed best from a circular economy perspective, with the knowledge that materials that participate in a circular economy will contribute to reducing plastic material use and therefore reduce the generation of plastic waste.

[6] Life Cycle Sustainability Assessment (LCSA) of material alternatives for take-out containers.

PROJECT 190110

PARTNER AGENCY
The Council for Scientific and Industrial Research (CSIR)
Department of Science and Innovation (DSI)

COUNTRIES
South Africa

BUDGET
USD 1,805,650

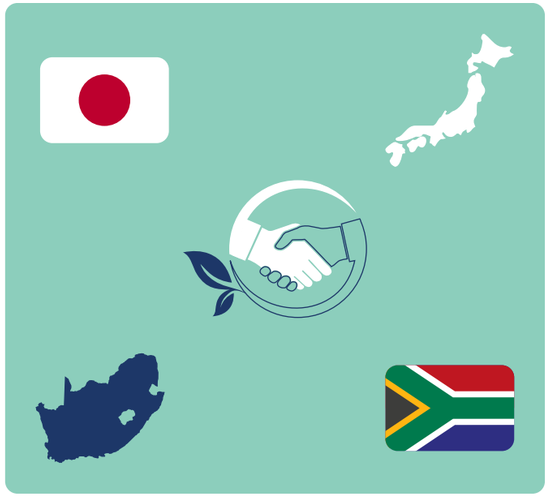
STARTING DATE
July 2019

DONOR
Japan

DURATION
46 months

More info

AT A GLANCE



> This facility has really enhanced our capacity to support the transition of the industry from the conventional way of doing things to more sustainable materials by giving us the ability to test different polymer materials that are claimed to be biodegradable or compostable.
>
> **Dr Vincent Ojijo, Principal Researcher at CSIR**

> How the truck is going to support reclaimers, the opportunities are endless. From making sure that elderly women don't travel kilometres a day to be able to get materials, to being able to access areas where reclaimers don't normally have access to.
>
> **Luyanda Hlatshwayo, ARO**

CSIR
Touching lives through innovation

It discovered that while polystyrene was the best option from a Life Cycle perspective, its low intrinsic value means that it is rarely disposed of properly, with the result that it performs at least 400 times worse in terms of material pollution when compared to paper/cardboard alternatives. From a marine litter perspective, the high probability of polystyrene leaking into marine environments comes with an additional problem: its leachate is toxic to aquatic invertebrates. Bagasse materials performed well, particularly from an industrial composting perspective when coated with materials other than polyethylene. Moving away from plastic coating would improve the biodegradability of bagasse containers and would therefore reduce persistence and material pollution and increase its participation in a circular economy.

CSIR plays an important role in the development of a circular economy in South Africa. In addition to producing prototypes, such as 3D-printed PHBH™[7] containers (a 100% bio-based, biodegradable material) and bagasse-reinforced PHBH containers, it carries out tests of biodegradability using laboratory equipment procured for CSIR under the project. CSIR staff have also received training as part of CSIR's application for ISO accreditation. Once accredited, the CSIR will host the first certified biodegradability testing laboratory in South Africa and, as an independent entity, it will be in a position to test claims made by the industry related to biodegradability.

[7] P-Hydroxy-Benzoate Hydroxylase (PHBH).

The knowledge derived from the LCA study was invaluable when combined with the knowledge gained from the second component of the project. South Africa has a unique waste management landscape. Formal waste collection services are provided by the municipalities. Most municipalities do not have official recycling systems and the collection of recyclable materials is instead done by informal waste collectors also known as 'waste pickers' or 'reclaimers', who earn an income through the sale of the collected recyclable materials to the recycling industry. Remarkably, South Africa maintains recycling rates comparable to Europe for some materials thanks to the work done by these 'reclaimers'. This highlights the importance of ensuring that waste pickers know how to treat new materials and can identify the correct waste stream to ensure materials are processed correctly.

At the same time, municipal officers also need to know how to connect the materials to the appropriate value chains. UNIDO organised a series of training sessions for municipal officers to highlight the essential work performed by the informal waste collection sector, to emphasise their value and dignity as people, and to provide information on how to integrate the activities of these workers into a well-functioning waste management system. This training can easily be replicated or self-taught using available training materials (including materials developed under this project) on the website: wastepickerintegration.org

Reclaim Revalue Reframe
training programme
Building Capacity for Waste Picker Integration

The project collaborates with many entities, from government departments to private sector organisations to individuals.

- The District Development Model (DDM) pilot is a collaboration between the UN and South Africa's Department of Cooperative Governance and Traditional Affairs (COGTA). It aims to provide government officials with training to promote waste picker integration.
- The project supports the work of the African Reclaimers Organisation (ARO) in establishing a Suburb Recycling Hub. Private sector cooperation is also essential in this area, including work with Unilever.
- The Department of Trade and Industry's (DTI) Plastics Masterplan is given support in the form of access to CSIR's laboratory testing capacities to verify the compostability and biodegradability claims of imported materials and to support local producers of bio-based and biodegradable plastics. The project-funded laboratory equipment was installed at CSIR's Centre for Nanostructures and Advanced Materials (CeNAM). This laboratory performs biodegradation testing and contributes to the establishment of appropriate standards for alternative materials. It also ensures that claims for biodegradable materials and products can be validated against international norms and standards, i.e. OECD, ASTM, ISO and EN regulations and carries out testing for a large number of local clients.
- CSIR is developing a Waste Picker Registration System for South Africa, funded by the National Treasury. As part of its training and capacity-building activities, the project team is facilitating stakeholder input and the piloting of the system.

As part of the project, ARO and South African Waste Pickers Association (SAWPA) workers were provided with PPE and uniforms to improve their working conditions. The uniform allows them to be recognised as important waste management workers, while the PPE has contributed to improving work safety, particularly in light of the COVID-19 pandemic. A representative of SAWPA said that the donation of PPE has brought dignity to waste pickers, who now have the respect of their communities as recognized workers in the waste recycling system.

The project also purchased two waste collection trucks each for the ARO and SAWPA. With them, waste pickers can increase collection rates of better-quality recyclable materials, access new areas and reduce the physical

burden of the work as well as reduce the risk of injuries or accidents associated with pulling a trolley, particularly for elderly and female workers. Luyanda Hlatshwayo of the ARO said: “How the truck is going to support reclaimers, the opportunities are endless. From making sure that elderly women don’t travel kilometres a day to be able to get materials, to being able to access areas where reclaimers don’t normally have access to.”

Crucially, the project recognised that workers in the informal recycling sector had a wealth of expertise, experience and networks accumulated over decades of work. The project succeeded because it acknowledged the existing workers and sought to empower them. With greater economic opportunities and safer working environments for workers came greater efficiency, and with improved communications between the various stakeholders – workers, residents, municipalities and industries – came better cohesion between different communities, as well as frameworks to grow and develop these integrated models of waste management even further.

UNIDO's support for the promotion of circular economy practices on single-use plastic value chain in Egypt

In recent years, Egypt's plastic industry has made significant contributions to the country's economic development, but at a high cost to the environment. This project provides an overview of available technical and technological options to support the government of Egypt's initiative to reduce the amount of plastic waste leaking into the environment. The project looks into Egypt's growing plastics manufacturing industry, and identifies gaps in necessary standards and specifications for products across the supply chain. There is a strong need to promote alternative approaches to the production and consumption of single-use plastics. Starting with the product design phase, the project encourages circular economy practices throughout the production process. The project will improve the know-how of value chain players, and increase overall awareness in effective production and usage of alternative materials. The project will also look at the policies, regulations and economic tools that can be utilised to save the environment from further burdens, while minimising any adverse impact on the country's growing industry.

Project 190152

Countries
Africa

Budget
Est. USD 3,240,000

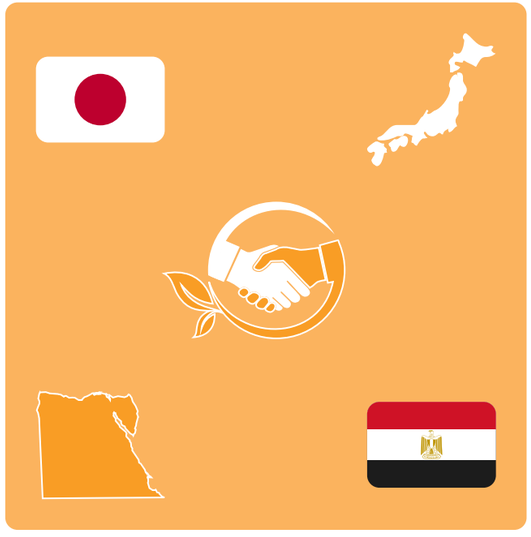
More info

Starting date
2021

Donor
Japan

Duration
36 Months

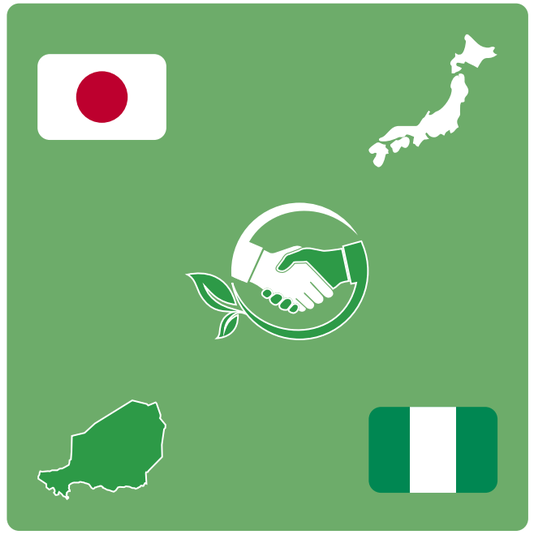
AT A GLANCE



UNIDO's promotion of sustainable plastic value chains through circular economy practices in Nigeria

The plastic industry is very important to the Nigerian economy and employs thousands of people. However, the misuse of plastic and poor management of plastic waste poses great dangers to health and the environment. This project contributes to Nigeria's efforts in actively positioning itself to deal with the challenges of managing plastic and other solid waste materials. Building on the results of UNIDO's 2021 Study on Plastics Value-Chain in Nigeria, the three-year project will promote circular economy principles and practices, strengthen plastic value chains, especially the plastic recycling sector, and will showcase the benefits of resource-efficient and cleaner production. The project will take a multi-level approach with a wide range of stakeholders and is expected to ensure inclusive and participatory plastic waste management in Nigeria. Specifically, the three interacting lines of activity are:

1. Support for the development of implementation guidelines for the national policy on plastic waste management;
2. Support for strengthening recycling capacity by reinforcing the value chain system, including provision of equipment and pilot implementation of guidelines on plastic waste management;
3. Demonstration of circular economy and resource efficiency practices at pilot companies or institutions to showcase their benefits.



Project 210184

Countries
Africa

Budget
Est. USD 2,900,000

More info

Starting date
2022

Donor
Japan

Duration
36 Months

AT A GLANCE

UNIDO's REPORTS ON TECHNOLOGY AND PLASTIC VALUE CHAINS

www.unido.org/marine-plastic-litter

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Marine plastic litter

UNIDO, as a leading UN agency promoting circular economies and resource efficiency in industry, supports African countries' efforts to deal with plastic waste leaking into the environment.

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INDUSTRIAL DEVELOPMENT ORGANIZATION

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