

# Towards Clean Oceans

Reducing plastic pollution through circular economy –  
Learning experiences of GIZ and its partners

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für Internationale  
Zusammenarbeit (GIZ) GmbH

On behalf of



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**On behalf of**

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German Federal Ministry for Economic Cooperation and Development (BMZ)  
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# Executive summary

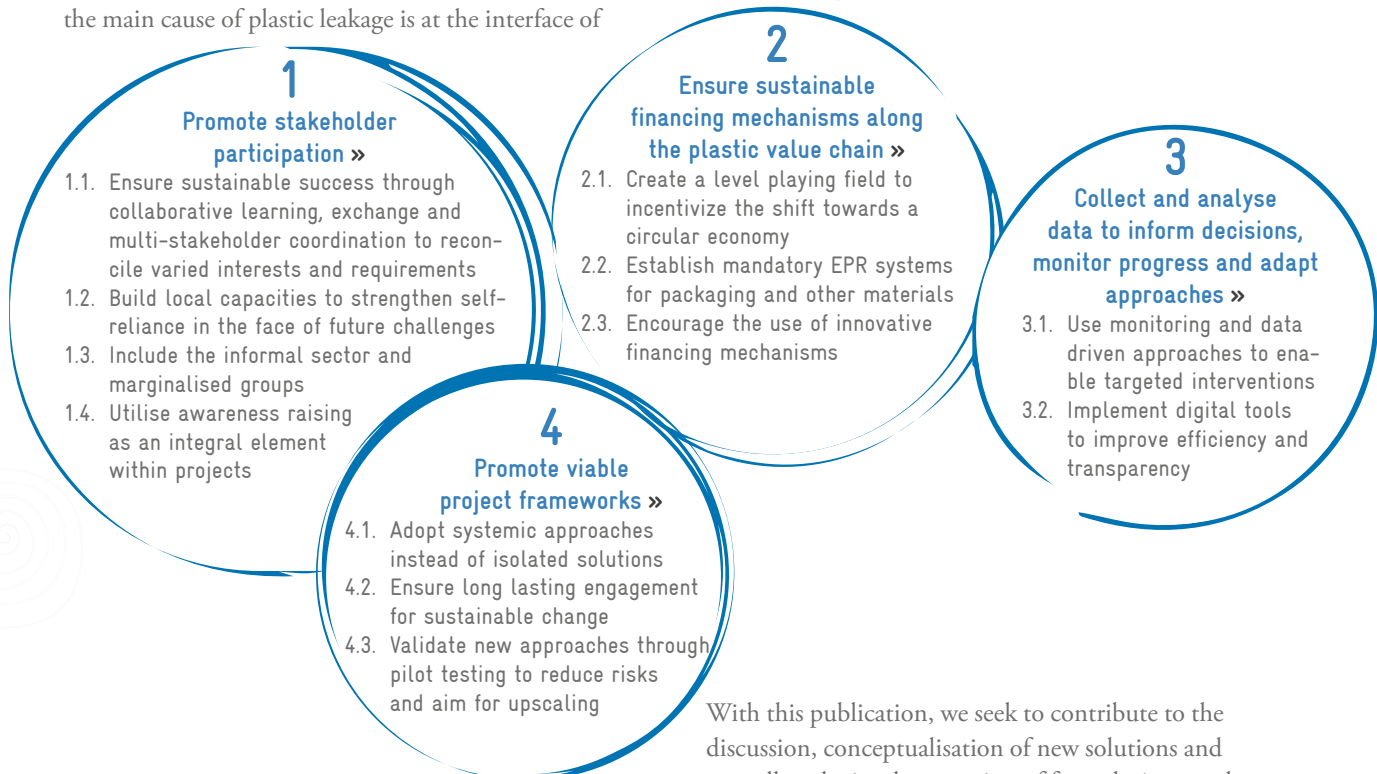
With millions of tonnes of litter entering the oceans every year, urgent action is required to prevent further harm to the marine environment. Inadequate product designs, unsustainable consumption and insufficient waste management systems cause a massive leakage of litter into the environment. About three quarters of marine litter already consist of plastic while global plastic production is constantly increasing. The international community has responded by launching intergovernmental negotiations to develop an international legally binding instrument to end global plastic pollution, commonly known as the Plastics Treaty.

GIZ has been supporting global efforts to improve waste management systems for more than 20 years. For more than 8 years, GIZ has been supporting partners to prevent marine litter and is currently implementing more than 20 projects in 20 partner countries. Based on that experience, we conclude that while the main cause of plastic leakage is at the interface of

consumption and end-of-life collection, marine litter prevention requires a holistic and global perspective on waste flows, raw materials, as well as finished products and services.

The circular economy approach offers such a perspective, encompassing all life cycle phases of materials, products and services by looking beyond mere waste management. It also addresses the respective environmental and social interdependencies and impacts. Successful interventions to reduce marine litter must consider the entire value chain of plastics, starting upstream in the product design and production, through the midstream phase of consumption and recycling to downstream waste management.

We derived the following key recommendations for the implementation of projects on marine litter prevention in developing countries:



With this publication, we seek to contribute to the discussion, conceptualisation of new solutions and over all to the implementation of fast solutions to the urgent situation of marine littering.



# List of abbreviations

3RProMar...	Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs project in the ASEAN countries	IKI .....	International Climate Initiative
AEPW .....	Alliance to End Plastic Waste	IUCN .....	International Union for Conservation of Nature
AMS .....	ASEAN Member States	KfW .....	Kreditanstalt für Wiederaufbau
ASEAN .....	Association of Southeast Asian nations of Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam	Marine:	
BMUV .....	Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection	DeFRAG.....	Marine Debris Framework – Regional hubs around the globe
BMZ .....	Federal Ministry for Economic Cooperation and Development	NBI .....	Nile Basin Initiative
CBO .....	Community-Based Organisations	NDC .....	Nationally Determined Contribution
CCP-ME .....	Cities Combatting Plastics Entering the Marine Environment	NGO .....	Non-Governmental Organisation
develoPPP	Funding programme of the German Federal Ministry for Economic Cooperation and Development (BMZ) <a href="http://www.developp.de/en">www.developp.de/en</a>	PET .....	Polyethylene terephthalate
DKTI .....	German Climate Technology Initiative	PVC .....	Polyvinyl chloride
DRS .....	Deposit Refund System	RDF .....	Refuse Derived Fuel
EPR .....	Extended Producer Responsibility	SDG .....	Sustainable Development Goal
ESO .....	Entrepreneur Support Organisations	SIDS .....	Small Island Developing States
EU .....	European Union	SIWI .....	Stockholm International Water Institute
GPML .....	Global Partnership on Marine Litter	SST .....	Sustainable Seas Trust
INC .....	Intergovernmental Negotiating Committee	SUP .....	Single-use plastics
		SWM .....	Solid Waste Management
		UN .....	United Nations
		UNEA .....	United Nations Environment Assembly
		UNEP .....	United Nations Environment Programme
		WFD .....	Waste Flow Diagram
		WtE.....	Waste-to-Energy





### Regional and bilateral projects

#### Regional projects

1	Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Kosovo	Developing capacities for preventing marine litter	BMZ
2	China, Indonesia, Philippines, Thailand	Rethinking Plastics - Circular Economy Solutions to Marine litter	EU & BMZ
3	Guatemala, Honduras, Belize, Dominican Republic, El Salvador, Mexico	Prevention of Plastic Waste in Central America and the Caribbean (Caribe Circular)	BMZ & EU
4	Indonesia, Cambodia, Philippines, Viet Nam	Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs (3RProMar)	BMZ



### Bilateral projects

Algeria	Strengthening employment promotion in the public services	BMZ
Egypt	National solid waste management programme	BMZ & EU
India	Circular Economy Solutions preventing Marine Litter in Ecosystems	BMUV
India	Cities combating plastic entering the marine environment	BMUV
Indonesia	Emissions reduction in cities through improved waste management (DKTI)	BMZ
Thailand	Marine Litter Prevention through Reduction, Sustainable Design and Recycling of Plastic Packaging (MA-RE-DESIGN)	BMUV
Brazil	Protecting Brazil's marine and coastal biodiversity (TerraMar)	BMUV
Mexico	Protecting Mexico's coastal regions and their marine ecosystems by reducing plastic waste	BMUV
Ecuador	Marine Litter Prevention in Ecuador (MARLI)	BMUV



# 1 Introduction

Plastic waste has already inundated the most remote locations on Earth, reaching as far as the **Mariana Trench** or the **Antarctic**. Between the recognition of marine macro and micro plastic as a global emerging threat and the historic UN resolution in 2022 to forge an international legally binding agreement to end plastic pollution, the global agenda on marine plastics has come a long way.



Terrestrial and marine plastic litter are widely accepted as one of the most pressing environmental challenges of our times. The increasing evidence on the sources of plastic marine litter and its ecological, social, health and economic impacts call for solutions that tackle the problem at its source: the globally growing plastic production and consumption as well as the lack of effective waste management in many countries. Without immediate action the amount of plastic leakage in the environment is expected to triple between 2016 and 2040<sup>1</sup>.

Plastic leaking into environment will triple by 2040 if we don't act



2016



2040

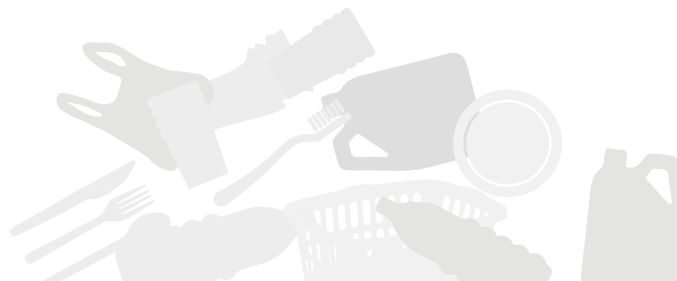
Since 2015, Germany has expanded its international cooperation on marine litter prevention by supporting the transition to a circular economy with a focus on integrated waste management approaches and promotion of knowledge exchange and partnerships with the private sector and academia. Considering the various commitments and future policy developments, this publication takes stock of the German technical development cooperation efforts implemented by GIZ, five years after the release of the first GIZ publication on marine litter prevention<sup>2</sup>. The selected project examples and knowledge products aim to show what has worked and what hasn't.



The first and second chapter outline the challenges of marine litter, the development of international commitments as well as Germany's contribution based on the technical cooperation portfolio implemented by GIZ. The third chapter introduces the circular model as a framework for various approaches on marine lit-

ter prevention, while the fourth chapter showcases key examples from GIZ project implementation. The last chapters conclude key learnings, draw recommendations and provide an outlook. The Annex provides an overview about featured projects.

Chapters »





A close-up photograph of a person's hand holding a large quantity of small, multi-colored plastic fragments (microplastics). The fragments are in various colors, including blue, green, yellow, and red, and are densely packed in the palm. The background is blurred, showing other people's hands and arms, suggesting a public demonstration or a collection of litter. The overall tone is serious and educational.

2

Marine litter pollution –  
a growing global concern

Nearly **2/3 of all plastic waste** comes from products with a **lifespans of <5 years**

**packaging (40%)  
consumer products (12%)  
and textiles (11%)**



## 2.1 Global dimensions of marine litter

Marine litter can be defined as ‘any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment’<sup>3</sup>. The widely cited study from Jambeck et al. (2015)<sup>4</sup> estimates that between 4.8 to 12.7 million tonnes of plastic entered the ocean from 192 coastal countries in 2010. Since Jambeck’s work, other estimations have been performed, suggesting that massive stocks of plastics accumulated in aquatic environments<sup>5</sup>. An analysis of 1,392 publications on the origin of marine litter<sup>6</sup> estimated that plastics comprise approx. 74 per cent of all marine litter, 80 per cent of which originates from land-based sources<sup>7</sup>. Litter released on land by human activity reaches the marine environment predominantly by water ways, surface water runoff or wind. Most plastics are very durable and take between 20 and 500+ years to disintegrate. They persist in the environment for a long time and only slowly disintegrate into microplastics<sup>8</sup>.

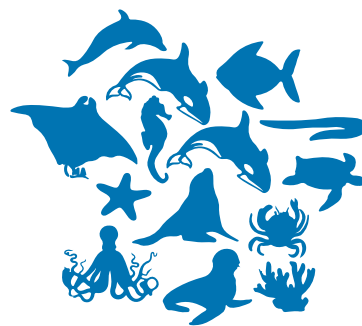
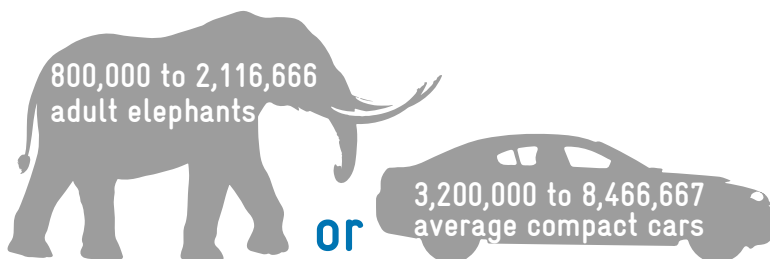
The impact of marine litter on marine biodiversity increases rapidly. Globally, plastic causes damage to marine ecosystems worth approx. EUR 13 billion per year<sup>9,10</sup>. Effects of marine litter have been documented in more than 4000 species<sup>11</sup>. Negative effects are primarily caused by physical effects through ingestion and entanglement, although there are increasing concerns about chemical contamination from macro- and microplastics<sup>12</sup>.

Plastic production multiplied by factor seven from around 50 million tonnes in the 1970’s to 367 million tonnes in 2020 and is expected to increase to almost 600 million tonnes by 2050<sup>13</sup>. A large share of plastics produced are only intended for a short single use, such as disposable products in packaging. The packaging industry is the largest plastic-producing sector, making up more than a third of the global plastic production. The total packaging quantities produced could quadruple from 78 million tonnes in 2013 to 318 million tonnes in 2050<sup>14</sup>. This growth trend has been further exacerbated by the recent COVID-19 pandemic.

Developing and emerging countries still produce less waste per capita than developed countries. However, due to inadequate waste management systems, a high share of waste produced in low- and middle-income countries remains unmanaged, contributing significantly to plastic leakage. At least two billion people worldwide lack access to solid waste collection and 3 billion people worldwide lack access to controlled waste disposal facilities<sup>15</sup>. In the absence of adequate waste management, waste is dumped in the environment or openly burnt, contributing to environmental pollution and climate change. This challenge further intensifies through growing waste generation due to higher living standards and changing consumption patterns. Municipal solid waste generation is expected to nearly triple by 2050 in Sub-Saharan Africa, and double in South Asia, the Middle East and North Africa<sup>16</sup>.

About **8 m t** of plastic entered the ocean from 192 coastal countries **in 2010 only**

That's about the weight of



Effects of **marine litter** have been documented in more than **4000 species**

Approx. **74%** of all **marine litter** is **plastic** of which **80%** originates from **land-based sources**



## 2.2 International commitments gaining momentum

Various international commitments have contributed to efforts to reduce marine litter worldwide including Sustainable Development Goal (SDG) 14 on life below water, the G7 and G20 Action Plans from 2015 and 2017 respectively, as well as the landmark UNEA-5.2 resolution adopted in March 2022 to develop an international legally binding instrument.

The issue of marine plastic pollution has been addressed to various extents under different specific global conventions. These include the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter in 1972 (London Convention) and the London Protocol adopted in 1996, the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL), the Basel Convention in 1989 and the Stockholm Convention from 2001.

The International Marine Debris Conference (IMDC) first convened by the U.S. National Oceanic and Atmospheric Administration (NOAA) in Honolulu in 1984 was the first global event dedicated to understanding and promoting action to address marine litter. The 5IMDC in 2011 catalysed the development of the Honolulu Strategy as a first comprehensive framework document for global efforts to reduce the ecological, human health, and economic impacts of marine debris.

With the Agenda 2030 and specifically SDG 14 on life below water, the international community committed in 2015 to significantly reduce marine pollution by 2025. SDGs 11 and 12 on sustainable cities and communities and responsible consumption and production further aim to prevent and better manage waste. The

Convention on Biological Diversity (CBD) from 1992 addressed the issue of prevent and mitigate impacts of marine debris with the decision Xill/10 in 2016 and lately during 15th Conference of Par-

ties to the CBD in December 2022 with the introduction of the 'Kunming-Montreal Global Biodiversity Framework' (GBF) which contains dedicated targets aiming at a) preventing environmental pollution, including reducing, and working towards eliminating plastic pollution by 2030 (GBF Target 7), and b) reducing overconsumption and waste generation (GBF Target 16).

The United Nations Environment Assembly (UNEA) has adopted a growing number of resolutions targeting the issue of marine litter: UNEA 2/11 requesting an assessment of the effectiveness of relevant governance strategies and approaches, UNEA 3/7 strengthening the capacity and activity of the United Nations Environment Programme (UNEP) on marine litter, as well as the establishment of an ad hoc open-ended expert group, requested to 'analyse the effectiveness of existing and potential response options and activities on marine litter and microplastics at all levels to determine the contribution in solving the global problem', as in UNEA 4/6. As one result of these resolutions, UNEP's Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA), launched in 1995, was strengthened and the Global Partnership on Marine Litter (GPML) was launched in 2012.

The most notable recent progress in combating plastic pollution took place at the UNEA-5.2, where environment ministers from the 193 member states agreed on the draft resolution named 'End Plastic Pollution: Towards a legally binding instrument'<sup>17</sup>, on the 2<sup>nd</sup> of March 2022, in Nairobi, Kenya. In the resolution 5/14, UNEA-5.2 requests the UNEP executive director to convene an intergovernmental negotiating committee to develop an international legally binding instrument on plastic pollution, including the marine environment, based on a comprehensive approach that addresses the full life cycle of plastic. The International Negotiating Committee (INC) leads the negotiations with the ambition of completing its task by the end of 2024. The first session of the INC took place in Punta del Este from 28 November to 2 December 2022. It is



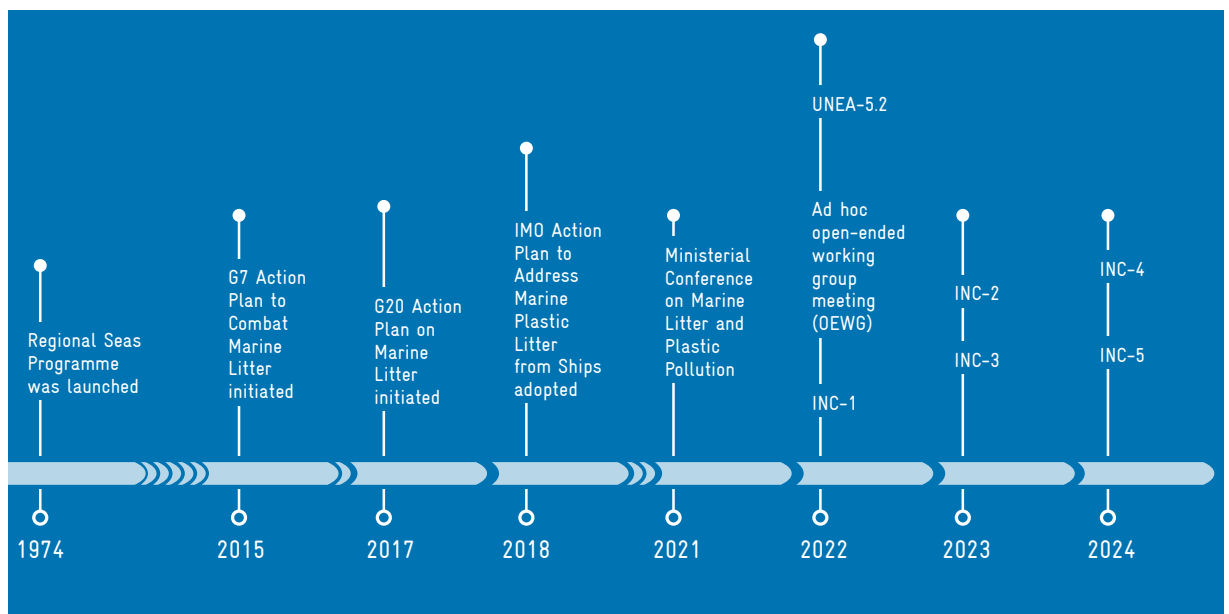
expected to present a draft for a legally binding instrument, which would reflect diverse alternatives to address the full lifecycle of plastics, the design of reusable and recyclable products and materials, and the need for enhanced international collaboration to facilitate access to technology, capacity building and scientific and technical cooperation.

A variety of action plans and other commitments were initiated at the global level, including the G20 Action Plan on Marine Litter in 2017, the G7 Action Plan to Combat Marine Litter in 2015 and the International Maritime Organisation (IMO) Action Plan to Address Marine Plastic Litter from Ships adopted in 2018. At the regional level, the Regional Seas Programme was launched in 1974 and several Regional Action Plans have been initiated. Furthermore, regional intergovernmental organisations and forums, as well as NGO initiatives are actively engaged in preventing marine plastic litter. In addition, some key private sector and multi-actor initiatives have emerged – like the Ellen Mac-

Arthur Foundation’s Plastics Pact Network, the World Economic Forum’s Global Plastic Action Partnership (GPAP) or the Alliance to End Plastic Waste (AEPW).

Leading the way on the global stage, the European Union (EU) adopted its first European Strategy for Plastics in a Circular Economy in January 2018. The strategy includes, for example, the goal of ensuring that all plastic packaging on the EU market is reusable or recyclable in a cost-effective manner by 2030. Soon after, the Single-Use Plastics Directive was proposed and adopted in 2019 to prevent and reduce the impact of certain plastic products on the environment. Amongst others, it bans certain single-use plastic items such as plates, cutlery, straws, plastic balloon sticks and oxo-degradable plastics and food containers as of 2021. In March 2020, the European Commission adopted a new Circular Economy Action Plan – one of the main blocks of the European Green Deal. The new action plan announces further comprehensive initiatives along the entire life cycle of products, including plastics.

Figure 1 Selected milestones in the international fight of marine litter and plastic pollution



Source: Own figure





### 2.3 Germany as a global advocate and partner

For nearly a decade, Germany has been active in placing the environmental challenges of marine litter and plastic pollution on the international agenda. Under Germany's presidency of the G7 in 2015 and the G20 in 2017, action plans to combat marine litter were drawn up for the first time. Under the German presidency in 2022, the G7 commitments to showing global leadership and combating marine pollution, as well as promoting circular economy and resource efficiency, were renewed through the annexed G7 Ocean Deal and Berlin Roadmap.

In 2021, Germany together with Ghana, Ecuador and Viet Nam hosted a ministerial conference to facilitate further international discussions, paving the way for the UNEA-5.2. The conference resulted in a ministerial declaration in favour of a global agreement on marine litter, which was supported by over 76 countries. Further, a draft resolution by Peru and Rwanda, co-sponsored by Germany among others, was presented for the first time and submitted to UNEA-5.2. Germany has also joined the High Ambition Coalition to drive forward the negotiations for a legally binding agreement to beat plastic pollution, which was launched after the UNEA-5.2 in August 2022.

Following the German-led initiative amongst the G7 countries to develop an 'Action Plan to Combat Marine Litter' in 2015<sup>18</sup>, the German Federal Ministry for Economic Cooperation and Development (BMZ) developed a Ten-point Plan of Action for Marine Conservation and Sustainable Fisheries<sup>19</sup> in 2016. The Ten-point Plan recognises the crucial role of oceans for the regulation of climate, the protection of biodiversity, food security, and the overall balance of the global ecosystems. Point 6 'Support the efforts of partner countries to reduce marine pollution' specifically targets marine litter. In the following years, BMZ has commissioned a growing number of according measures and projects. Marine litter prevention was also included as one of five key target areas in BMZ's Action Programme on Circular Economy endorsed in 2018.

In November 2018, the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) launched the action plan 'for less plastic and more recycling' under the programmatic title 'No to the throw-away society' comprising five main points<sup>20</sup>. While the first four aspects relate primarily to guiding principles for action within Germany, the fifth point is about 'international commitment against marine litter and for a sustainable use of plastics'. This involves supporting selected developing and emerging countries in their efforts to avoid marine litter and establish appropriate waste collection and recycling systems. For this purpose, the BMUV established the funding program 'Marine Debris Framework – Regional hubs around the globe' (Marine:DeFRAG) in 2019, which calls for and supports projects that primarily aim to prevent waste directly at the source. Other BMUV-funded initiatives, such as the International Climate Initiative (IKI) or the NAMA Facility also contribute to addressing the global issue.

Since 2015, Germany has initiated over 30 technical and financial development cooperation projects that contribute to marine litter prevention in partner countries and of which more than 10 projects exclusively address marine litter. From 2016 to 2021, Germany committed over 81 million EUR to marine litter related activities as part of its technical and financial development cooperation. In the same time frame, additional 55 million EUR were committed to different funds to address marine litter, including the multi-donor trust fund PROBLUE of the World Bank, the Sustainable Ocean Fund (by Mirova Natural Capital) and the Plastic Waste Partnership of the Secretariat of the Basel, Rotterdam and Stockholm Conventions.

In 2018, the German KfW Development Bank launched the Clean Oceans Initiative together with the European Investment Bank and the *Agence Française de Développement*. The initiative intends to make 2 billion EUR available to finance waste management and sewage treatment in developing countries and emerging economies to limit plastic leakages into rivers and seas<sup>21</sup>.

<sup>1</sup> This last aspect 'prolonging the use phase through good proper product operation and maintenance' is categorized by EMF under the 'share' aspect. However, since not only shared goods should be maintained properly, this study diverges from the original source and categorizes this aspect as 'optimise'.



### 2.4 GIZ's efforts worldwide

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH is a German federal enterprise in the field of international cooperation for sustainable development. It supports the objectives of the German Government in more than 120 countries around the globe. Through its work, GIZ assists people and societies in improving living conditions.

GIZ on behalf of the German government supports the reduction of marine litter in over 20 partner countries, in the Middle East and North Africa, Sub-Saha-

ran Africa, South-East and Eastern Europe, Asia and Latin America. As of October 2022, most of the ongoing GIZ projects are commissioned by the German government (BMZ and BMUV). The overall budget amounts to over EUR 110 million including co-financing from the EU. GIZ further supports projects that address plastic pollution in landlocked locations, as well as smaller measures in other actions areas such as governance, urban or economic development, partly on behalf of other commissioning parties. The list below provides an overview of projects with distinct focus on marine litter prevention. The selection criteria for the projects listed are available in Annex 1.

**Table 1 Ongoing GIZ projects commissioned by BMZ, BMUV and AEPW – contributing to reducing marine plastic litter with funds over 1 million EUR as of October 2022**  
(see [Annex 1](#) for criteria)

Title	Type	Countries	Donor
Concepts for sustainable solid waste management	Sectoral	Global	BMZ
Global Programme GoCircular	Global	Global with a focus on Columbia, Ghana, Viet Nam	BMZ
Global sector project to support the BMUV in implementing the Marine Debris Framework – Regional hubs around the globe	Global	Global	BMUV
Support of the BMUV export initiative for environmental technologies	Global	Thailand, Malaysia, Indonesia, Egypt, Jordan, India, Ukraine	BMUV
Integrated Waste Management and Marine Litter Prevention in the Western Balkans (MLP)	Regional	Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Kosovo	BMZ
Rethinking Plastics – Circular Economy Solutions to Marine litter	Regional	China, Indonesia, Philippines, Thailand	EU & BMZ
Prevention of Plastic Waste in Central America and the Caribbean (Caribe Circular)	Regional	Guatemala, Honduras, Belize, Dominican Republic, El Salvador, Mexico	BMZ & EU
Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs (3RproMar)	Regional	Indonesia, Cambodia, Philippines, Viet Nam	BMZ
Strengthening employment promotion in the public services	Bilateral	Algeria	BMZ
National solid waste management programme	Bilateral	Egypt	BMZ & EU
Circular Economy Solutions preventing Marine Litter in Ecosystems (CES)	Bilateral	India	BMUV
Cities combating plastic entering the marine environment (CCP-ME)	Bilateral	India	BMUV
Emissions reduction in cities through improved waste management (DKTI)	Bilateral	Indonesia	BMZ
Protecting Mexico's coastal regions and their marine ecosystems by reducing plastic waste	Bilateral	Mexico	BMUV
Marine Litter Prevention through Reduction, Sustainable Design and Recycling of Plastic Packaging (MA-RE-DESIGN)	Bilateral	Thailand	BMUV
Marine Litter Prevention in Ecuador (MARLI)	Bilateral	Ecuador	BMUV
AVIRAL – Reducing Plastic Waste in the Ganga	Private Sector	India	AEPW
JINGSU – Creating Value from Plastic Waste along the Yangtze	Private Sector	China	AEPW
Protecting Brazil's marine and coastal biodiversity (TerraMar)	Bilateral	Brazil	BMUV



GIZ has also implemented several marine litter projects in cooperation with the private sector through the BMZ's funding programme [develoPPP](#). By combining capital, expertise, and resources of both the private and

public partners, the joint projects aim to create a significant developmental impact for the local people in the project countries as well as an entrepreneurial benefit for the company partners.

**Table 2 Ongoing projects commissioned to GIZ under develoPPP programme with private partner**

Title	Country	Private Partner	Commissioned by
Smart Urban Packaging Waste Collection System	Serbia	BALL PAKOVANJA EVROPA BEOGRAD; Mercator-S; Reverse Logistics Group; SEKOPAK d.o.o. Beograd; Solagro Smart Recycling	BMZ
Source Segregation and collection of municipal solid waste in the city of Gurgaon	India	TetraPak India and Coca Cola India Pvt. Ltd.	BMZ
Developing collection infrastructure and recycling platform for plastic waste and e-waste in non-urban India	India	Karo Sambhav Private Limited	BMZ
Sino-German Project for Upgrading Plastics Management in Agriculture	China	Reifenhäuser GmbH & Co KG Maschinenfabrik; TÜV Rheinland (Shanghai) Co. Ltd.; Zhuhai Wango	BMZ
Waste to Resource: upgrading the recycling value chain of packaging waste through improving collection and recycling in China	China	Henkel AG & Co. KGaA; Nongfu Spring Co. Ltd.; Tetra Pak (Kunshan) Co., Ltd; Tomra Systems ASA; UPM Raflatac (China) Co., Ltd	BMZ
Reduction of Plastic Leakage into the Ocean	Mexico, Philippines, Egypt, Morocco and India	Geocycle/ Holcim Technology Ltd	BMZ





3

The circular economy model as an approach to the prevention of marine litter



Addressing the complex causes and impacts of marine litter and plastic pollution in a sustainable way requires a combination of approaches, combining source-to-sea management and circular economy principles. According to the waste hierarchy, waste avoidance and prevention is to be prioritised over recycling, while recycling is to be given preference over energy recovery and disposal.

The throwaway global economy is fuelling the climate crisis, with more than half a trillion tonnes of virgin materials consumed since the 2015 Paris Agreement was signed. Maintaining current levels of consumption would require the resources of 2.3 planets by 2050<sup>22</sup>.

While the main cause of plastics leaking into the environment is located at the interface between consumption and end-of-life-phases, marine litter prevention requires a holistic and global perspective on waste flows, raw materials and finished products, as well as consumption patterns and disposal behaviour.

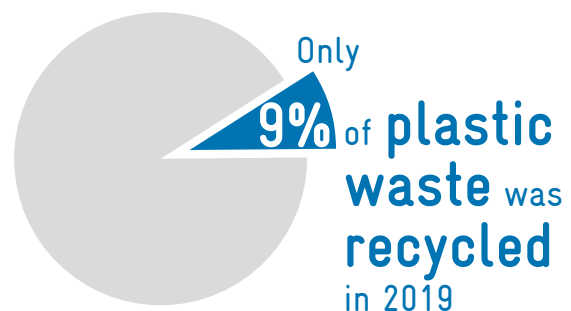
This perspective is provided by the concept of circular economy (CE), which encompasses all life cycle phases of materials and products and looks beyond a mere waste management. It also addresses the respective environmental and social interdependencies and impacts.

The circular economy is nature's equivalent of 'living within your means'; it reduces dependency on finite resources and, by doing so, it decouples economic growth from resource consumption and environmental pollution<sup>23</sup>. Products are kept at their highest value for as long as possible, and materials are treated as a valuable resource that continue to circulate in the economy. The change in production and consumption patterns supports change in supply chain structures, with consumption becoming benefit-oriented instead of product-oriented. Circular economy approaches reduce dependency on raw material price fluctuations and supply chain bottlenecks and offer opportunities for innovative climate and environmentally friendly business models.

About **3%** of global greenhouse gas emissions derive from the fossil plastics lifecycle in 2019

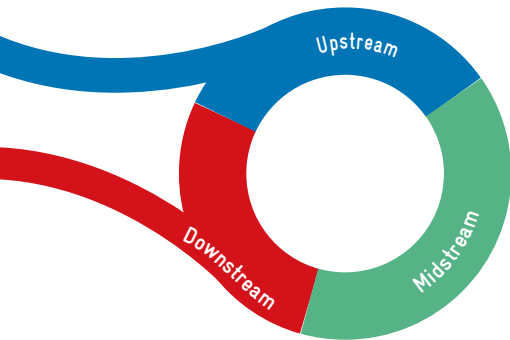


The resource-inefficient, linear, **take → make → waste** plastic economy is at the heart of the **plastic pollution crisis**



Following the concept of circular economy, interventions are possible

- © during the development, design prior production phase of a product or service (**Upstream**),
- © during the consumption phase of a product or service (**Midstream**)
- © as well as after the end of its consumption (**Downstream**).



According to the circular economy concept, measures can be taken at all stages of the life cycle of a product or service. **Upstream** measures include the preparation of secondary raw materials and replacement of disposable products and the promotion of secondary markets. **Midstream** measures take place during the design and consumption phase of a product or service, while **downstream** measures apply after consumption (end-of-life) and include waste separation, collection and treatment. Recycling closes the loop towards upstream and starts a new life cycle<sup>24</sup>.

Circular economy requires a multidimensional approach with intervention in all three segments of a product's or service's life cycle, coordinated by and embedded in an overarching institutional framework (**Overarching Framework**). Leakage from any phase of a product's or service's life cycle into the environment must be eliminated through accompanying containment measures along the whole lifespan of a product or service (**Pollution Containment**).

The circular model of marine litter prevention approaches, which builds on several publications<sup>25,26,27,28</sup>, connects interventions along the cycle and is presented in Figure 2:

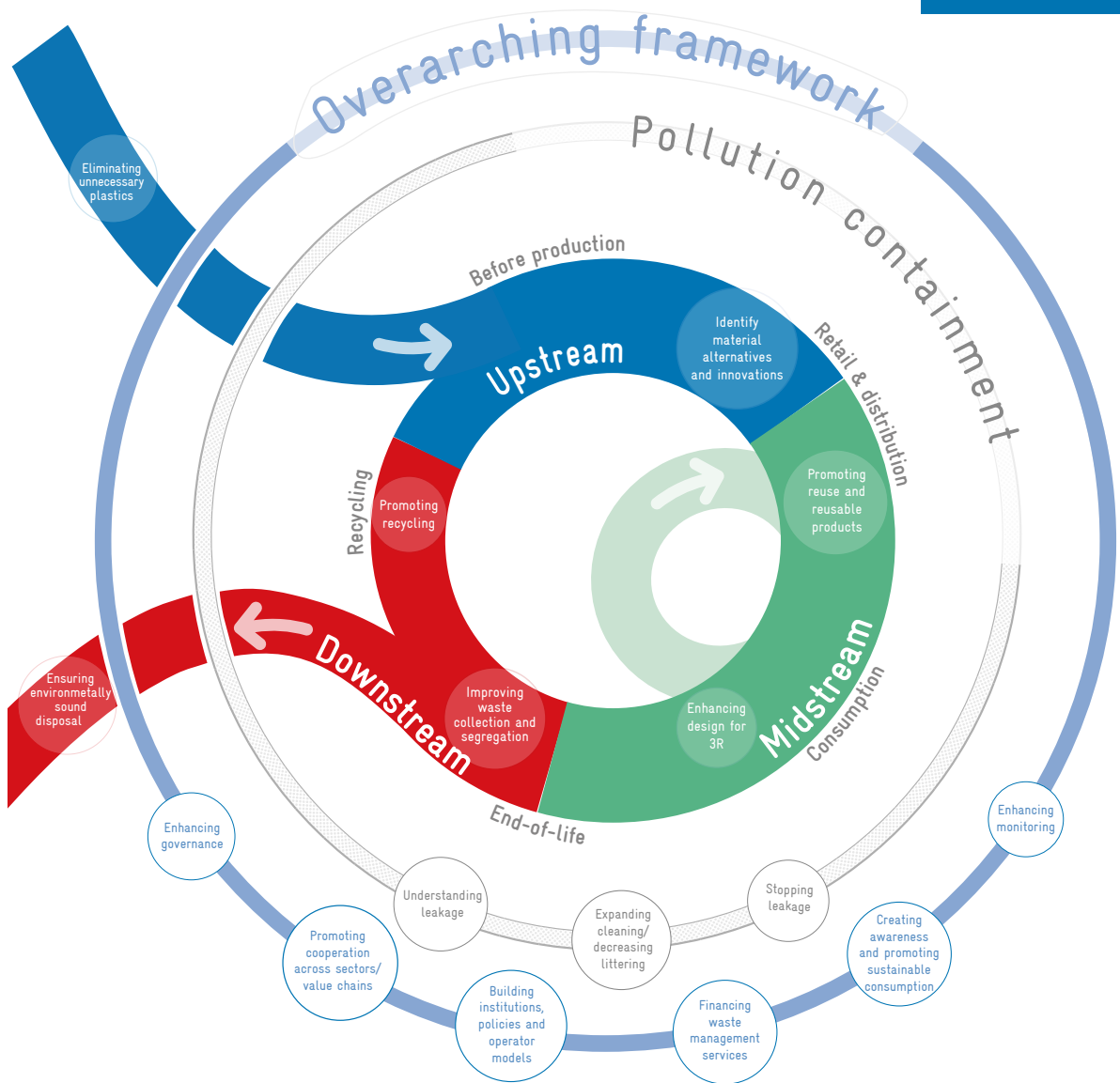






Figure 2 Circular approaches to marine litter prevention (see individual interventions presented in Chapter 4)

Click on the chapters and sub-chapters on the graphic to access them.



Source: Own figure



4

# Approaches in action





Within this report, selected examples from GIZ’s global intervention portfolio are presented to illustrate the five intervention types described in Chapter 3 (i.e., Upstream, Midstream, Downstream, Overarching Framework, Pollution Containment). These examples represent an excerpt of the respective projects and do not strive to provide a comprehensive and holistic project description.

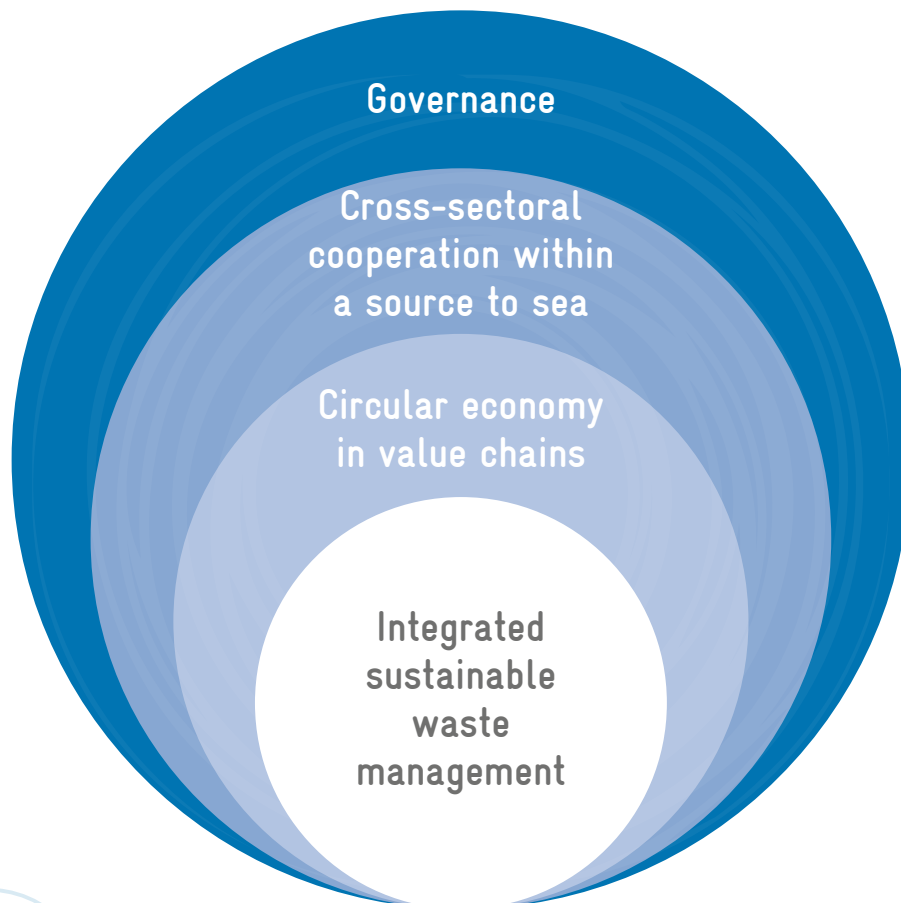
The character of projects varies depending on implementation partners, level of intervention, reach and resources of the project and specific targets and objectives of the projects. Building on the 2018 GIZ Marine Litter Prevention publication<sup>29</sup>, which describes approaches for marine litter prevention on a more generic level, this section focuses on examples of how these ap-

proaches have since been operationalised in GIZ projects around the globe.

### 4.1 Overarching framework

Addressing the issues of marine litter and plastic pollution requires a close coordination of policies and actions, reaching from the local to the global level as well as across sectors along different value chains<sup>30</sup>. Cross-disciplinary collaboration enables new holistic solutions to tackle marine litter<sup>31</sup>. The first intervention cluster **overarching frameworks** spans across all stages of a product’s lifetime and dimensions and spheres of development action against marine litter.

Figure 3 Conceptual dimensions for preventing plastic leakage into waterways and the sea<sup>32</sup>



Source: GIZ (2018)



### 4.1.1 Enhancing Governance

To develop appropriate and creative solutions that are tailored to the local context, governance approaches must link global, national and local stakeholders. Global targets need to be translated into national action plans and further into concrete local measures and vice versa. Action plans and local measures can be ambitious but realistic with respect to the specific local conditions. Approaches on the local level can be supported through agreements on global standards and procedures. For instance, regional coherence on banning certain unnecessary plastics can strengthen implementation by preventing illegal transboundary movements of these plastics.

A key success factor for governance is stakeholder inclusion. Stakeholders with various levels of influence

must be identified and included at the local and national level, ranging from policymakers, independent agencies (civil society, NGOs, networks, media), and operators (private companies, service providers, financing agencies), to service users (residents, tourists, industries)<sup>33</sup>. Stakeholder participation enriches policy processes, for example by soliciting technical knowledge and advice and contributing valuable local perspectives. Furthermore, a trans-national approach to address marine litter is needed. Countries should be enabled to exchange on experiences in plastic waste management and join forces to respond to transboundary pollution. To do so, the private sector has a specific relevance, given its role on international markets and in developing and funding innovations. A dialogue between the government and private sector actors facilitates an exchange of best practices and catalyses the implementation of suitable solutions at the local level.

Project box



Knowledge box



## Project box 1

### Strengthening regional cooperation with Indian Ocean Rim Association



The BMUV Support Project Marine Litter cooperates with regional, national, and local actors to implement small scale activities and pilots. In partnership with the Indian Ocean Rim Association (IORA) and other partners, the project conducted a series of workshops for IORA Member States to exchange on current national marine litter strategies in the respective member states and discuss opportunities for cooperation. A common strategic framework has been developed to serve as a basis for national and regional action plans. Further cooperation exists e.g., with the Nile Basin Initiative (NBI) or the Abidjan Convention.

>> [www.giz.de/en/worldwide/93799.html](http://www.giz.de/en/worldwide/93799.html)



*In-person workshop in Bali in September 2022 to finalise the draft IORA Strategic Framework of Action on Marine Litter in the Indian Ocean. Photo: © GIZ/Giang*



## Project box 2

### Fostering regional cooperation for local impact with ASEAN



The project 3RproMar aims to support the ASEAN Member States (AMS) in the improvement of implementation capacities for reducing land-based waste leakage to protect the marine environment. It strengthens the exchange through the technical working groups of ASEAN on the topic of marine litter and provides technical assistance to four AMS in developing regional and local action plans. While considerable knowledge exists on the topic, yet a lot of institutions work locally or nationally without using knowledge effectively. With 3RproMar's Regional Knowledge Partnership to Combat Marine Litter in ASEAN, the project aims to break silos and find synergies across borders and topics. The partnership will be launched at the beginning of 2023.

» [Project 'Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs' \(3RproMar\)](#)



Virtual presentation 3RproMar Knowledge Partnership.  
Photo: © tbc.

## Knowledge box 1

### Challenges and opportunities of a plastic agreement on plastic pollution for SIDS



#### Voicing Small Island Developing States (SIDS) interests

While (marine) plastic pollution is a serious and increasing threat to many countries around the world, small island developing states are particularly affected by it and deserve special attention in a global agreement on plastics. Against this background, the study analyses the challenges, needs and opportunities of SIDS in the context of a global agreement on plastic pollution.

» [www.giz.de/de/downloads/giz2022-en-sids-plastic-pollution.pdf](http://www.giz.de/de/downloads/giz2022-en-sids-plastic-pollution.pdf)



### 4.1.2 Promoting cooperation across sectors and value chains

Circular economy relies on organisations cooperating across sectors and along value chains. For instance, improving solid waste management requires the coordination of public and private actors in the waste sector and the participation of waste generators. Circling plastics back into production requires consumers to segregate

recyclables, recyclers to provide transparent evidence on the quality of the recycled material, and producers to design products in a way that allow both the use of recycled material as well as the recycling of the product. Cooperation ecosystems enable new innovations, such as plastic credits or digital markets for recycled plastics. By this, cooperation goes beyond traditional boundaries of communication and establishes new opportunities and market realities.

## Project box 3

### PREVENT Waste Alliance – together for a circular economy



As a 'Think and Do Tank' for circular economy, the PREVENT Waste Alliance brings together organisations from the private sector, academia, civil society, and public institutions worldwide. It was launched in May 2019 under leadership of the German Federal Ministry for Economic Cooperation and Development (BMZ). Since then, 400 member organisations from more than 50 countries have joined. They contribute to minimising waste, eliminating pollutants, and reutilising resources by connecting different perspectives, developing tools and piloting scalable circular economy solutions worldwide.

Internationally recognised recommendations such as EPR toolbox and various discussion papers – for example on Plastic Credits or the implementation of the Basel Convention have been developed in the working groups. Eight pilot projects have been implemented in 15 countries and three innovation programmes have been conducted to prevent waste, which will be featured later in this publication.

» [prevent-waste.net/en](https://prevent-waste.net/en)



*Celebrating circular economy during the PREVENT Circular Solutions Festival organised in September 2022 in Berlin.  
Photo: © GIZ | Florian Gaertner*

# Project box 4

## Source to Sea approach with SIWI

### Acting against plastic pollution from Source to Sea in Viet Nam

The Stockholm International Water Institute (SIWI) implemented the project design and accountability for Source-to-Sea (S2S) action on plastic, which focused on supporting local authorities and stakeholders in Hoi An, Viet Nam, in developing a five-year environmental strategy on behalf of GIZ. This resulted in:

- Deeper understanding of the need for and benefits of the S2S approach in strategy design and its relevance in environmental management.
- Identification of the role of stakeholders along the plastic waste chain in preventing plastic pollution and recognition of the interdependencies between actors.
- An accountability framework for preventing plastic pollution and acceptance of shared responsibilities.

>> [siwi.org/design-and-accountability-for-source-to-sea-action-on-plastic](https://siwi.org/design-and-accountability-for-source-to-sea-action-on-plastic)



Stakeholder exchange to develop a five-year environment strategy for Hoi-An. Photo: ©SIWI | José Pablo Murillo



### 4.1.3 Building institutions, policies and operator models

A strong institutional framework for SWM forms the basis for providing sustainable interventions and services by promoting effective organisation, planning, and management<sup>34</sup>. Institutions need to be empowered and regulated at the same time. ‘Sound institutions and proactive policies’ is one of three governance aspects that support the technical delivery of the SWM services<sup>35</sup>. The Wasteware Benchmark Indicators<sup>36</sup> assess the performance of municipal solid waste institutions both at national and local level.

The criteria to assess the national framework are<sup>37</sup>:

1. Basic legislation and implementing regulations
2. Approved and recent national strategy and clear policies
3. Guidelines for local government on implementation

4. Designation and capacity for a single national responsible authority for SWM
5. Environmental regulatory agency responsible for enforcement
6. Use of extended producer responsibility policy instruments

At the local level, institutional capacity influences the effectiveness of the planning process (considering priorities and actions for efficient delivery of SWM services and operations), the responsibility of operators to deliver the services, and the ability of the local authority to ensure cost-recovery and sustainable financing of the SWM activities. Above all, accountability for each service, and the distribution of roles and responsibilities should be clearly defined between all stakeholders and institutions involved. In the operator models, the contractual relationships between the operator, the customer and the fee collector are explained in more detail.



## Project box 5 Improving waste management in Egypt



The National Solid Waste Management Programme is supporting the establishment of the Egyptian Waste Management Regulatory Authority (WMRA) at national level, which provides new services for the waste sector in cooperation with existing actors. These include policy and strategy development, support for and supervision of the governorates, and the creation of sustainable financing models. The effort made a significant contribution by providing the framework for a nationwide implementation of the National Waste Management Program in the Governorates.

In 2022, the EU Green Project was initiated and GIZ was entrusted with its implementation under the component of the National Solid Waste Management Programme (NSWMP). The NSWMP has been running for many years through cooperation between the Ministry of Environment (MoE) and GIZ and is guided by the principles of integrated waste management and circular economy.

» [www.giz.de/en/worldwide/22230.html](http://www.giz.de/en/worldwide/22230.html)



Separating bins for the waste to be used in line with the 'Prepare for Green' initiative launched by the MoE. Photo: © GIZ, Tarek Saleh

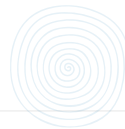
## Project box 6

### Qualifying actors from municipalities and young entrepreneurs in Algeria

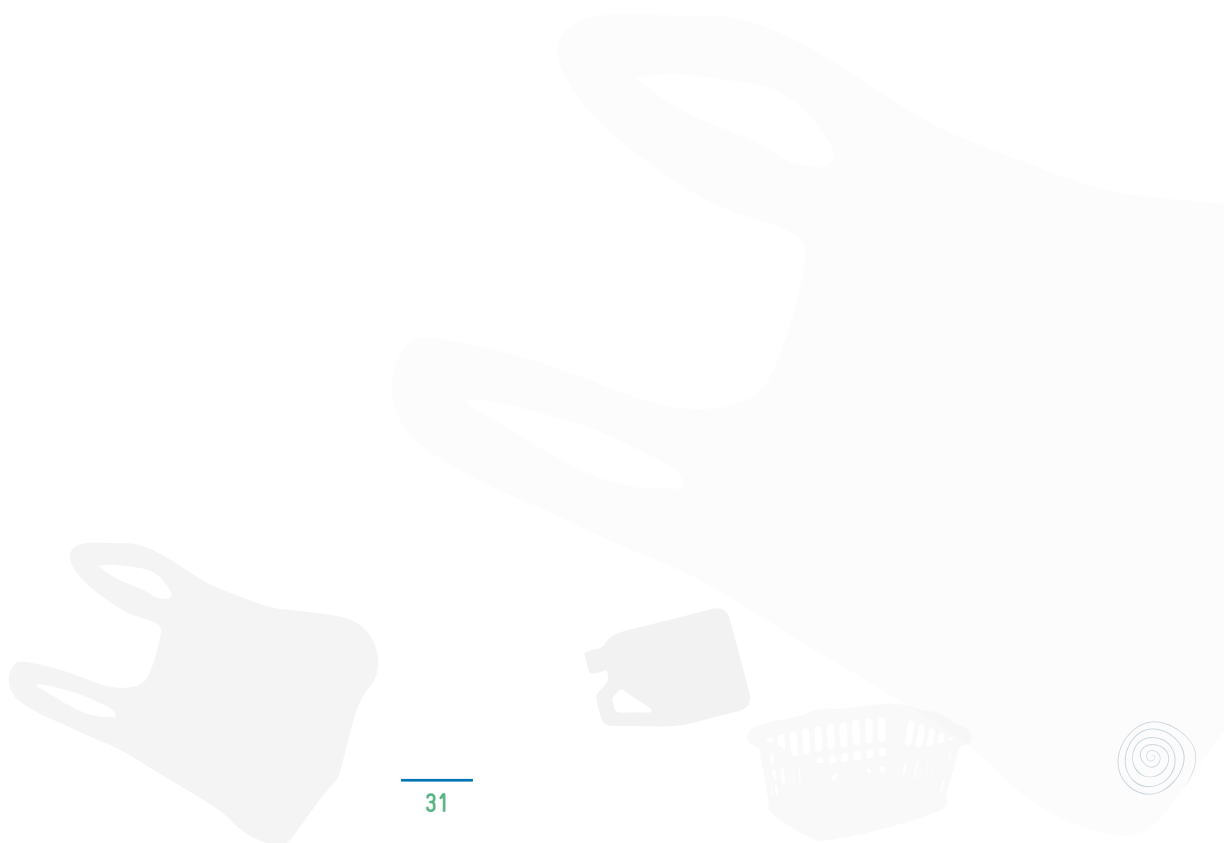


The Algerian Government has decided to privatise the municipal waste disposal to external service providers for an improved service delivery. With the project 'Strengthening employment promotion in the public services', GIZ supports this process on behalf of BMZ. The project enhances the Algerian municipalities' capability to monitor quality when awarding contracts and outsourcing services by specifying standards. GIZ and its partners further empowers the local youth to seek employment and entrepreneurship opportunities in the waste sector by offering courses with vocational colleges. This has led to the creation of businesses in Tlemcen in northern Algeria, Jijel, El Milia and Maghna, for example. The micro companies have been commissioned to take care of collecting, cleaning and disposing of waste.

» [www.giz.de/en/worldwide/73009.html](http://www.giz.de/en/worldwide/73009.html)



*Waste workers in Algeria have been equipped with additional gear during the COVID pandemic. Photo: © GIZ*





#### 4.1.4 Financing waste management services

The quality of the SWM services widely depends on the financial capacity of the local authority maintaining it. In most developing countries, municipalities struggle with low levels of cost coverage from service fees or other revenue streams. A dedicated budget line for SWM activities is either inexistent or severely underfunded. Ideally, the SWM budget line should be split into individual budget for SWM services including disposal. Further, collected revenues are often insufficient. SWM service charges are commonly set well below the needed level of cost coverage, either so as not to affect the affordability or willingness of residents to pay, or because the mechanisms for collecting the revenues are inefficient. Other challenges include requirements to pass on

revenues to regional or national authorities, the lack of activity-based accounting capturing the full costs of the SWM activities, and a lack of effective financial management systems and resources.

Achieving financial sustainability requires municipalities to make significant efforts. Extended Producer Responsibility (EPR) can partly relieve municipalities of their burden. EPR is an environmental policy approach, based on the 'polluter-pays' principle, in which whoever introduces a product to the market is responsible for the financial cost of the treatment of the product at the end of its life. Although complex to set-up, EPR is widely accepted as a key approach to provide funding for the management of mostly packaging waste, but also for other material streams<sup>38</sup> like e-waste.

## Knowledge box 2

### Extended Producer Responsibility toolbox for packaging waste

#### Promoting international knowledge exchange on EPR

The EPR toolbox is a collection of internationally relevant knowledge on the topic of Extended Producer Responsibility (EPR) for packaging. It was developed by the PREVENT Waste Alliance on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). It aims to promote knowledge exchange and enhance development of EPR systems worldwide. The EPR toolbox contains factsheets, country examples and a set of FAQs. The toolbox was created in consultation with international practitioners, and has been translated into various languages incl. Chinese and Vietnamese. It has been integrated into various online training courses such as WWF's online course 'Going Circular – The EPR Guide'.

» [EPR toolbox – PREVENT Waste Alliance \(prevent-waste.net\)](https://prevent-waste.net)





## Knowledge box 3

Knowledge

### Assessing the role and impact of EPR in the prevention of marine plastic packaging litter

This report critically assesses how EPR affects marine plastic (packaging) litter generation and how EPR schemes can be adapted to increase their respective mitigation effect in the future. To provide such insights, this study highlights the role of EPR within the broader waste management structures and policies in which EPR is embedded, as well as its unique characteristics, and examines what factors impact marine plastic litter. These include a) EPR must be mandatory to create a measurable impact b) effective monitoring is a key element for the successful operationalisation and c) all relevant stakeholders need to be included, especially the informal sector.

» [www.giz.de/de/downloads/giz2022-en-epr-plastic-packaging-litter.pdf](http://www.giz.de/de/downloads/giz2022-en-epr-plastic-packaging-litter.pdf)



Assessing the role and impact of EPR in the prevention of marine Plastic Packaging Litter

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## Project box 7

Project

### Improved waste management in Indonesia

As part of the German Climate Technology Initiative (DKTI), the project develops planning instruments and technical capacities in the Indonesian partner cities and partner agency, to improve the conditions for the initiation of measures towards climate-friendly integrated waste management. These will enable the long-term adoption of feasible financing mechanisms for waste management services by combining planning instruments, the allocation of local budgets and waste fee systems (incl. EPR) to cover operating costs. In sum, these measures will provide the foundation for effective waste management policies that increase the liveability of the urban areas and its residents by improving public services, reducing emissions and mitigating climate impacts.

» [www.giz.de/en/worldwide/104173.html](http://www.giz.de/en/worldwide/104173.html)



Waste handling in Indonesia. © GIZ/DKTI



# Project box 8



## Supporting the development of EPR systems in East and Southeast Asia

One of the Rethinking Plastics key topics was the management of plastic waste according to the waste hierarchy in China, Indonesia, Philippines, Thailand, and Viet Nam. It mainly covered approaches for waste segregation at source, collection, sorting and recycling through advisory services and pilot projects. A specific focus lied on EPR for packaging and its introduction or development in the different project countries.

Particularly in Viet Nam, the project significantly contributed to the elaboration of an EPR scheme. The team advised stakeholders on national level who elaborated the EPR Decree that was issued in January 2022 and provided a Q&A document, especially addressing the private sector, that serves as guideline for implementing the new decree. In addition, the team published a policy brief on EPR, outlining the key elements and options for introducing EPR for packaging based on its current situation. It translated the EPR Toolbox, originally published by the PREVENT Waste Alliance, into Vietnamese and adapted the content to local conditions. Together with the Academy of Managers for Construction and Cities (AMC), Rethinking Plastics organised four training of trainer courses on the EPR toolbox application.

» [rethinkingplastics.eu/downloads/174-epr-in-east-and-southeast-asia-observations-and-lessons-learnt](https://rethinkingplastics.eu/downloads/174-epr-in-east-and-southeast-asia-observations-and-lessons-learnt)



Picture: Elena Rabbow

Building an EPR system is a rather complex mechanism that can take years if not decades to be established. As a short-term remedy for underfinanced waste management systems, plastic credit schemes are emerging as a potential transitional finance approach. Similar to carbon credits (i.e., tradable certificates or permits to offset greenhouse gas emissions), plastic credits can be understood as transferable units representing a specific quantity of plastic waste that has been collected from the environment and which is subsequently recycled or safely disposed. In the last two years, numerous systems, platforms and standards for plastic credits have been established by companies and NGOs. However, the market continues to be highly dynamic. As of now, there is no commonly agreed definition of plastic credits yet, as it entails many complex considerations. The vari-

ous schemes differ greatly with respect to their standards and processes, making it a very convoluted market. Without transparent and stringent monitoring of the entire plastic credit generation process (i.e., collection, sorting, transportation, recycling and selling), there is uncertainty about the actual impact of plastic credits, potentially opening the door for greenwashing. Supporting plastic credits bears the risk of undermining efforts towards obligatory EPR systems. With plastic credits, producers and sellers may argue that they already fulfil their responsibility by buying plastic credits. Plastic credits could further result in a systemic competition for collected and recycled plastic waste amounts. The given uncertainty led to major criticism of plastic credits by leading NGOs in 2021<sup>39</sup>.

There is a trade-off between strong quality criteria and compliance and the practicability of generating plastic credits from small-scale waste projects and initiatives which would and should benefit most from it. GIZ will continue to prioritise obligatory and governmental EPR over voluntary and private plastic credit schemes. In countries where EPR systems are already on

the way (e.g., Indonesia, Jordan or Viet Nam), discussions on alternative options should not undermine the ongoing political process. Plastic credits can represent a transitional alternative, if producers can demonstrate their willingness to take responsibility, provide funding for projects while no other funding mechanisms are in place<sup>40</sup>.

### The following criteria and recommendations can provide orientation for both advising partners and designing project measures

**EPR complementarity** – Plastic credit schemes should not undermine an EPR scheme or the development of such, but rather aid its development or be additional. Specifically, plastic credit schemes should not offer credits that are cheaper than EPR obligations for the same material. Credits should reflect the cost of the environmental service of waste management rather than the material value. At best, a plastic credit scheme should contribute to infrastructure investments in close collaboration with local decision makers. Finally, EPR complementarity should be ideally ensured through a regulation of plastic credits as part of the national waste management policy.

**Real and transparent impact** – Plastic credits should only be issued for units of plastic waste that would otherwise have ended up in the environment. The programme should use a relevant and consistent methodology for measuring impact claims beyond existing baseline efforts (Additionality) – ideally differentiating plastic types according to their environmental impact. Double counting in different schemes or with existing EPR systems must not be possible. Further, revenues should be used to pay a fair living wage to waste workers – at best benefitting informal waste workers. The impact claim should be verified by an independent third-party auditing organisation and ideally openly reported.

**Waste hierarchy** – Plastic credit schemes and standards should adhere to the principle of the waste hierarchy. They should exploit options of reuse and recycling before incineration and disposal for waste at stake. In order to promote waste prevention, plastic credits should only be sold to organisations that can sufficiently prove that they explored and at best implemented all available options for waste prevention. Offsetting should be transparently reported against the volumes of plastic materials put on the market by the buying companies. This is even more important if schemes provide plastic neutrality certificates to their buyers.

**Governance and harmonisation** – Plastic credit initiatives should have a clear governance scheme that involves external stakeholders from various sector in its continuous development. They should seek alignment with other established claims, programmes or standards. In particular a commonly agreed definition is central for better transparency.



# Project box 9



## Generating inclusive and transparent plastic credits

The pilot project Plastic Credits for Inclusive and Transparent Circularity by the PREVENT Waste Alliance aimed to generate financing for waste management workers through plastic credits in India, Mexico, Viet Nam, and Brazil. In 2021 and 2022, the project financed the collection of more than 1,000 tonnes of low-value plastics in rural regions in Maharashtra, Goa and Kerala in India, engaged 10 waste collector cooperatives in Brazil to help 250 waste pickers collect over 1,500 tonnes of plastic waste, and diverted nearly 1,700 tonnes of plastic waste from landfills through a collection system ran by eight independent collectors in Mexico. The ValuCred standardised process model (SPM) for plastic credits has been developed and tested in Viet Nam and India.

» [Plastic Credits for inclusive & transparent circularity - PREVENT Waste Alliance \(prevent-waste.net\)](https://prevent-waste.net)



*Entreamigos delivers the first Credits from the PREVENT pilot project to waste collectors in Mexico. Photo: ©Entreamigos*

Addressing financing more generally, the GIZ publication 'Financing Circular Economy – Insights for Practitioners' examines suitable financial instruments to promote circular economy, highlights existing best practices, and analyses barriers and potentials for circu-

lar economy approaches. The study identifies promising interventions and financing instruments as possible starting points. The geographical focus of the study is on Albania, Colombia, Dominican Republic, Rwanda, and Viet Nam<sup>41</sup>.

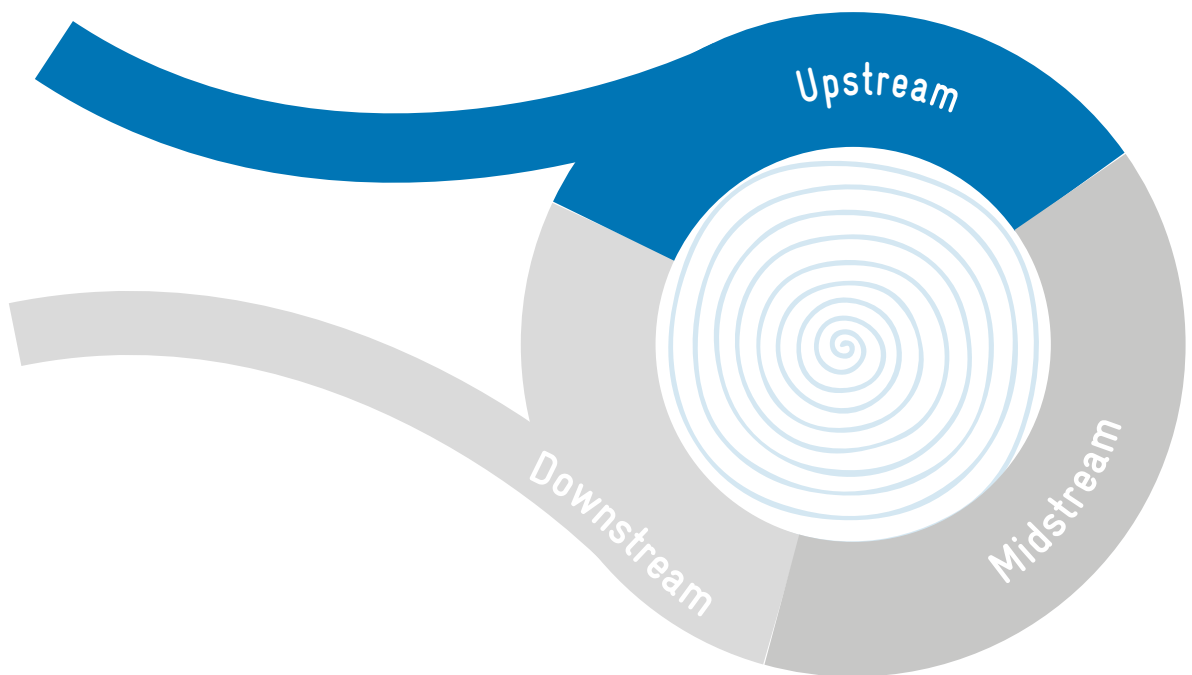
## 4.2 Upstream interventions

Upstream measures include the preparation of secondary raw materials and replacement of disposable products and the promotion of secondary markets.

This field of intervention encompasses the development and design phases of products and services (e.g., food delivery with reusable packaging) and includes production and retail. The choice of materials as well as its reusability, repairability and recyclability determine the way the products are used, collected, transformed, recycled, and eventually disposed. New approaches to

the design and delivery of services, such as reuse systems or product-as-a-service, can improve the resource efficiency of certain values and services.

Upstream approaches address the root cause of plastic pollution. Tackling marine litter at source is more effective and much cheaper compared to reducing pollution in downstream stages of collection and recycling, which requires additional infrastructure and labour costs<sup>42</sup>. For this reason, preventive rather than reactive measures are best suited to tackle marine plastic pollution at source<sup>43</sup>.



#### 4.2.1 Eliminating unnecessary plastics

Eliminating unnecessary plastics is a key prevention approach to phase out problematic plastics. Unnecessary plastics refer to plastic items that are not critical for the delivery of the intended product or service, and where alternative and/or reusable options are easily available

and affordable. For a plastic item to be considered necessary, the benefits of its use must outweigh the impact<sup>44</sup>. Globally, targets and directives often focus on single-use plastics (SUPs), which includes most plastic packaging, as the main problematic plastics.



## Knowledge box 4

### Gathering experiences with banning Single Use Plastics

This report summarises the experiences with implementing the EU Directive on Single-Use Plastics in three EU Member States: Sweden, Germany, and Greece. It describes in detail the content of the Directive, how it was elaborated and summarises how each of the case studies has handled the implementation of the Directive so far. The following success factors have been identified:

- Action already taken against SUPs by EU member states on national level,
- Harmonisation of the SUP Directive with other relevant legislation on regional level,
- Public acknowledgement of the need for action against plastic pollution, and
- Already existing and functioning recycling systems with large capacity in place.

The report was discussed with public project stakeholders in the partner countries and provided guidance for ongoing developments in the Southeast Asian Region. Lessons were presented and discussed in several events on SUP prevention in regional and national contexts.

This publication was produced by the 'Rethinking Plastics' project.

» [Rethinking Plastic – Report: 'Experiences with implementing the EU Directive on Single-Use Plastics' \(rethinkingplastics.eu\)](https://rethinkingplastics.eu)







## 4.2.2 Developing and utilising material alternatives and innovations

Developing and identifying suitable material alternatives is a complementary approach to promoting the application of reusable packaging, eliminating unnecessary plastics, and enhancing design for reduction, reuse and recycling. A growing number of start-ups as well as larger established companies and research institutions contribute innovations.

The difficulty in promoting more environmentally friendly alternatives – such as biodegradable plastics made from corn or cotton – resides in the justification of their environmental benefits. The general risk lies in ‘shifting the pollution burden’; while biodegradable plastics do not contribute to pollution generated from mining and processing of fossil fuels to create them,

they may have a negative impact through the sourcing of renewable feedstock<sup>45</sup>, the displacement of food production, or the distortion of recycling processes. Recently, many studies have been published trying to use Life-Cycle Assessments to compare the environmental impacts of products made from main plastic types and from biodegradable alternatives<sup>46 47 48 49</sup>. Therefore, GIZ projects do not currently promote the use of biodegradable plastic or packaging material.

The use and development of alternative materials can be promoted in many ways: They can be encouraged for use in areas of high SUP consumption, public funds can be mobilized for specific alternatives, legal instruments can be sought to promote the consumption of environmentally friendly products, or certifications can be created for companies that use suitable alternatives.

## box 5

### Knowledge

## Providing comprehensive know-how on re-use in the food sector

The project ‘Rethinking Plastics’ encouraged exchange and pilot activities on reuse approaches in the food and beverage sector. Based on examples from Asia and Europe, the guide ‘How to Promote Reusable Packaging in Food Delivery and Takeaway’ provides orientation and practical examples for businesses and policymakers on how reusable packaging can celebrate its come-back and contribute to cost savings, waste prevention and healthier air, soil, water, and marine environments. Part 1 offers insights into business models and practices while part 2 summarises public policies and includes a list of recommendations as well as policy examples from different countries in Asia and Europe.

» [rethinkingplastics.eu/downloads/177-guide-and-recommendations-how-to-promote-reusable-packaging-in-food-delivery-and-takeaway](https://rethinkingplastics.eu/downloads/177-guide-and-recommendations-how-to-promote-reusable-packaging-in-food-delivery-and-takeaway)



A Practical Guide for Businesses and Concrete Recommendations for Policymakers

giz



## Project box 12

### Introducing biodegradable film in Chinese agriculture

With the Sino-German Project for Upgrading Plastics Management in Agriculture, the GIZ and private partners Reifenhäuser, TÜV Rheinland and Zhuhai WANGO cooperate through the develoPPP programme funded by BMZ to pilot the application of biodegradable mulch film. Biodegradable film is applied while its impact is closely monitored in various pilot locations: in Heilongjiang province for rice, in inner Mongolia for potato and in Beijing for strawberry cultivation. In parallel, the project contributes to the elaboration of biodegradable film application specifications for different crops and conditions as well as laboratory testing methodology and certification criteria for biodegradable film.

» Sino-German Project for Upgrading Plastics Management in Agriculture: [transition-china.org/environment\\_and\\_circular\\_economy/projects/sino-german-project-for-upgrading-plastics-management-in-agriculture](https://transition-china.org/environment_and_circular_economy/projects/sino-german-project-for-upgrading-plastics-management-in-agriculture)



Strawberry field with biodegradable mulch film in Beijing.  
© GIZ/Jingyue Hou



## Project box 13

### Introducing zero waste solutions in the Philippines: Wala Usik – nothing is wasted

The Philippine Reef and Rainforest Conservation Foundation, Inc. (PRRCFI), funded by the Rethinking Plastics project, launched the initiative 'Wala Usik', a native phrase meaning 'nothing is wasted', adapting the principles of zero-waste and circular economy in the local context of Negros Island in the Philippines. Through consultations and roundtables, business development support and design thinking, two virtual hackathons brought together 11 micro, small and medium enterprises and 18 business start-ups which developed 15 waste reducing packaging designs. This project iterated and enhanced the Wala Usik business model, addressing gaps and limitations from previous prototyping cycles, by improving and scaling deeper systems such as deposit-return schemes, dispensing technologies, distribution/delivery mechanisms, and circular packaging. Outputs from this pilot will support future iterations of circular economy interventions, such as: a technical paper on how the local circular business innovations performed, a toolkit for micro, small, and medium enterprises implementing circular business ideas, and a magazine-catalogue of circular packaging design ideas.

» Rethinking Plastic – Wala Usik – Nothing is wasted: [rethinkingplastics.eu/pilot-projects-en/91-wala-usik-economy-nothing-is-wasted](https://rethinkingplastics.eu/pilot-projects-en/91-wala-usik-economy-nothing-is-wasted)



Applying zero waste packaging in local businesses.  
Photo: © Philippine Reef and Rainforest Conservation Foundation, Inc. (PRRCFI)



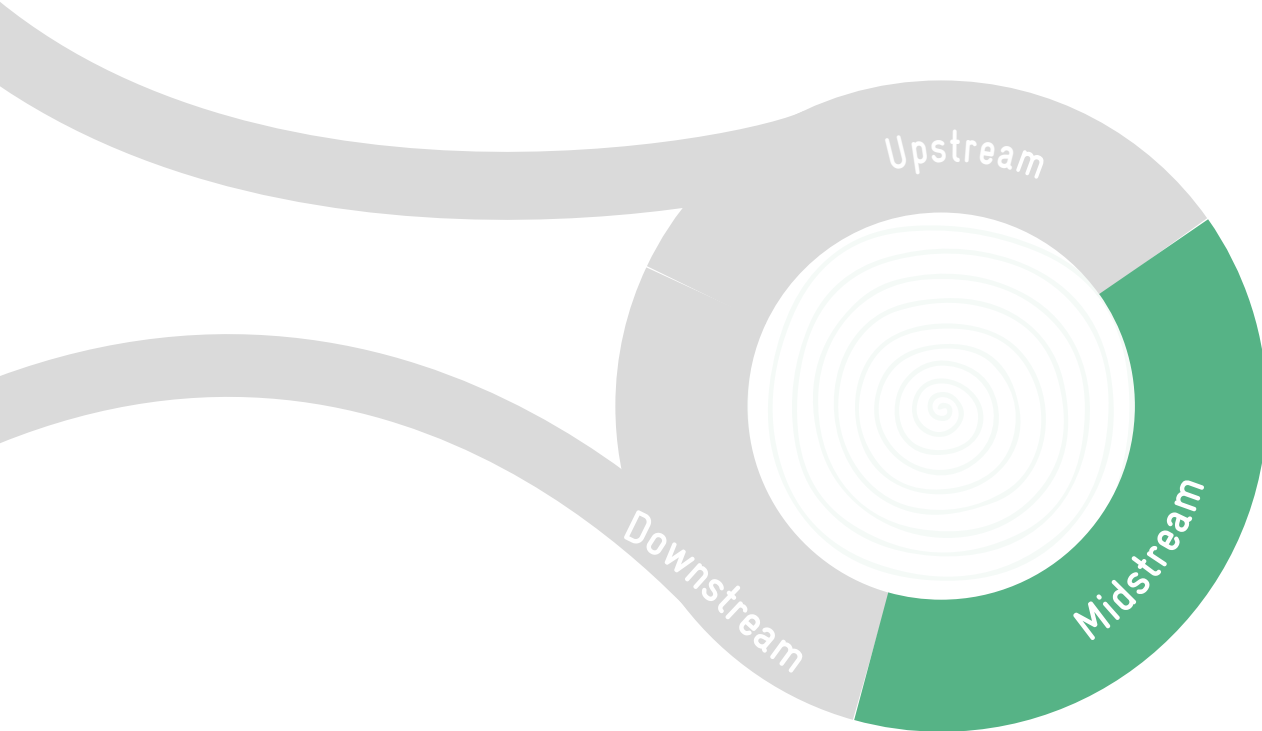
### 4.3 Midstream interventions promoting reusable packaging and products

Midstream measures take place during the design and consumption phase of a product or service.

#### 4.3.1 Promoting reusable packaging and products

Promoting upstream measures for the reuse of packaging products prevents recyclable plastics to end up in a landfill, supports the reduction of plastic production growth, eventually reducing the environmental impact of packaged plastic products.

The Sustainable Packaging Coalition defines reusable packaging as ‘packaging that allows either the business or the consumer to put the same type of purchased product back into the original packaging, is designed to be returnable and/or refillable, is free of chemicals of concern, and accomplishes a minimum number of reuses’<sup>50</sup> that outweighs its higher environmental footprint compared to the footprint of SUPs. Reusable packaging for beverages has been on the market for decades, but only recently has there been a broader approach to apply reusable packaging to food services, consumer packaged goods, and others. Nevertheless, it is essential to accelerate progress towards global targets for reuse, flexible packaging and decoupling economic growth from packaging consumption<sup>51</sup>.



## Project box 14

### Developing solutions to prevent plastic waste – The SUP challenge



The PREVENT Waste Alliance and The Incubation Network launched The SUP Challenge. The ten-month cohort-based program supported and scaled high-potential start-ups tackling single-use plastics in the food and beverage sector. Eight Entrepreneur Support Organisations (ESO) assisted 76 start-ups across India, Indonesia, the Philippines, Thailand, and Viet Nam in total piloting 91 alternative packaging solutions. This supported market entry, acceleration, and adoption of upstream alternatives to SUPs, while generating insight and data to assess the impact and potential for growth of these solutions.

Based on the learnings, an insights report, a life cycle assessment and technical playbook were developed. The playbook 'Accelerating Circular Solutions to Single-Use Plastics' outlines a set of activities and considerations that should be undertaken to support interventions between companies developing and offering circular solutions and companies that are their target customers.

» [prevent-waste.net/en/insights-from-the-single-use-plastics-sup-challenge](https://prevent-waste.net/en/insights-from-the-single-use-plastics-sup-challenge)



*A Cohort Booklet gives an overview of the selected ESOs and start-ups. Photo: ©The Incubation Network*

## Project box 15

### Introducing reusable diapers in East Java



Common Seas Indonesia identified single-use diapers as the most prolific plastic waste item in the river in East Java. As a result, Common Seas Indonesia focused on radically reducing the use of single-use diapers across the region by shifting its use toward reusables, through on the ground awareness programs, and by creating a reusable diaper brand that is easy to use and affordable.

The project has been part of the BE.Innovative contest conducted by the PREVENT Waste Alliance and Rare's Center for Behaviour & the Environment. After the programme, 90% of reached households became active users of reusable diapers.

» [commonseas.com/countries/clean-blue-east-java](https://commonseas.com/countries/clean-blue-east-java)



*Producing reusable diapers to prevent polluting the Brantas river. Photo: ©Common Seas Indonesia*

### 4.3.2 Enhancing design for reduction, reuse and recycling

The design stage determines the fate of a product, as the choice and complexity of materials and functionality influence how easily it can be reused, repaired and recycled, and eventually how easily it can be retained in the economy<sup>52</sup>.

Under the network of the Global Commitment and Plastic Pact, about 1,000 businesses, governments, and other organisations have aligned behind a common vision of a circular economy, committing themselves to tackle plastic pollution and ensuring that packaging

is reusable, recyclable or compostable<sup>53</sup>. Despite progress being made, the key 2025 targets are expected to be missed. To accelerate progress, it is particularly important to promote the reuse and recycling of flexible packaging and to decouple business growth from packaging consumption. Immediate actions to accelerate progress include working together with industry associations. Supportive legislation enabling market access for new business models and financial incentives, or public procurement rules are key levers for the private sector to develop new products and services GIZ (2021) Comparative Analysis Japan-EU: Circular Economy and Green Public Procurement<sup>54</sup>.





## Knowledge box 6

### Knowledge generation and standardisation on designing circular plastics in Thailand



As part of the project 'Collaborative Actions for Single-Use Plastic Prevention in Southeast Asia (CAP-SEA)' (as part of the global project 'Export Initiative Environmental Protection' funded by BMUV) GIZ and Öko-Institut published six short studies addressing upstream approaches for single-use plastic and packaging waste prevention. These reports address technical and regulatory aspects such as material choices for environmental-friendly packaging design, design for recycling and recycled content in plastic production, as well as economic measures for packaging waste prevention. They helped stakeholders build up technical know-how and facilitate the introduction of upstream solutions to plastic pollution and culminated in the Development of Design for Recycling (D4R) guidelines by the Thailand Industrial Standards Institutes (TISI) for PET bottles, HDPE containers and PP bottles and cups. After stakeholder consultations in 2022, TISI adopted the industry standard. Besides, the Division of Industrial Product Standards of TISI considers making some aspects of the guideline mandatory by including them in their technical specifications.

- » [CAP-SEA is a component of the Publications | Knowledge Hub for Green Technologies \(greentechknowledgehub.de\)](#)
- » [Project website: https://www.giz.de/en/world-wide/115063.html](https://www.giz.de/en/world-wide/115063.html)

*Separating bins for the waste to be used in line with the 'Prepare for Green' initiative launched by the MoE. Photo: © GIZ, Tarek Saleh*



The PREVENT Waste Alliance published the study 'Achieving More Circularity in the Future Global Plastics Agreement'<sup>55</sup> that identified key design principles for packaging globally based on the assessment of over 100 sets of guidelines on product and packaging design that aim to promote recyclability and circularity. These include: reducing size of sleeves on bottles and opaque

PET; ensuring separability of components; keeping labels as small as possible; phasing out PVC labels; prioritising mono-materials and simple, transparent or only lightly coloured packaging design; using water-soluble inks and adhesives.



## box 7

Knowledge

### Achieving more circularity in the future global plastics agreement: Common criteria to improve packaging design

This report reviews existing standards for the recyclability of plastic packaging and analyses their suitability in a global context. A design matrix shows the generally applicable packaging design options for the most common fillings.

» [prevent-waste.net/en/report-achieving-more-circularity-through-improved-packaging-design/](https://prevent-waste.net/en/report-achieving-more-circularity-through-improved-packaging-design/)



## box 8

Knowledge

### Japan-EU: Circular economy and green public procurement policies

This report provides a comparative analysis of circular approaches to plastics in Japan and the European Union (EU), covering measures for plastic reduction, reuse, recycling and sustainable alternatives (part 1). It also compares their respective green public procurement (GPP) policies, looking at how these can be leveraged for realising a circular loop of plastics and reducing pollution (part 2). Areas for information sharing and mutual learning to inform future Japan-EU exchanges are suggested throughout the report.

» [Rethinking Plastic – Comparative Analysis Japan-EU: Circular Economy and Green Public Procurement Policies \(rethinkingplastics.eu\)](https://rethinkingplastics.eu)



### 4.4 Downstream interventions

Downstream measures apply after consumption (end-of-life) and include waste separation, collection and treatment. Recycling closes the loop towards upstream and starts a new

life cycle. Globally, two billion people still lack access to regular waste collection, and three billion people do not have access to controlled, environmentally sound disposal<sup>56</sup>. Next to rapidly increasing plastic production worldwide, lacking and insufficient solid waste management is one of the key causes for marine litter. Solid waste management is a utility service, essential to guarantee public health and environmental protection. According to the Global Waste Management Outlook published by UNEP in 2015<sup>57</sup>, sound SWM could contribute to over half of the SDGs in the 2030 Agenda.

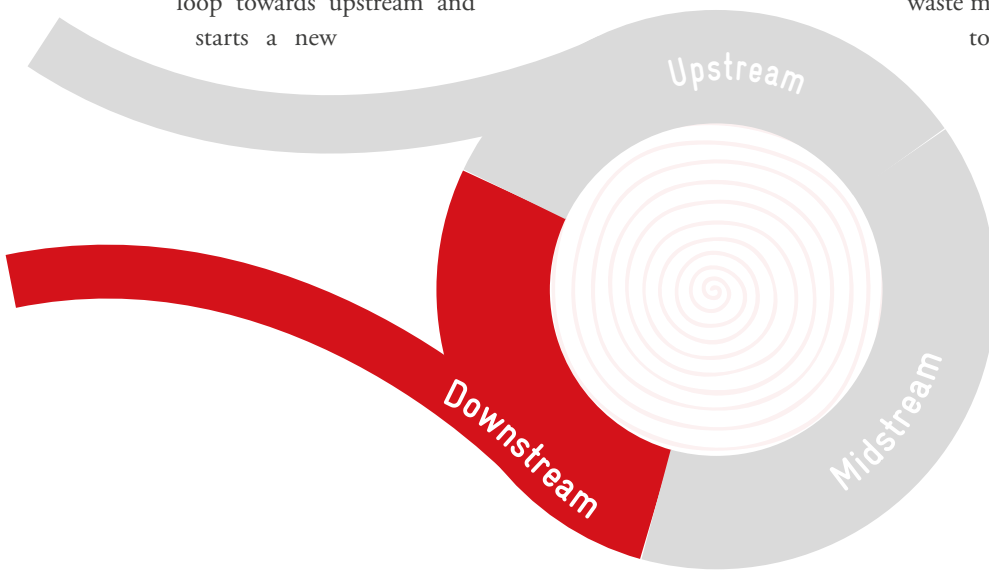
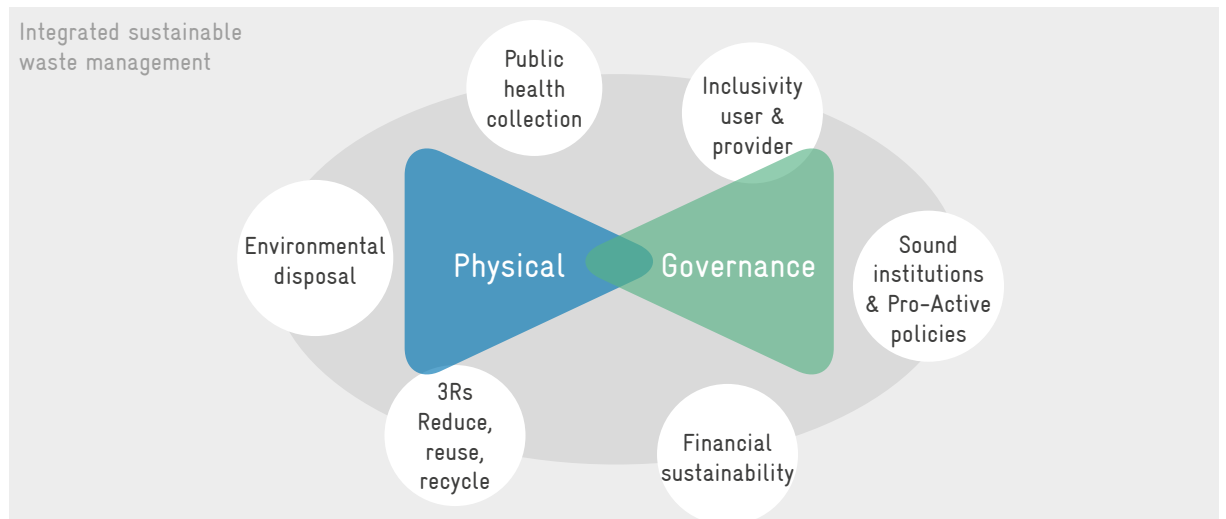


Figure 4 The ‘two triangles’ of the integrated solid waste management concept<sup>58</sup>



#### 4.4.1 Improving waste collection and segregation

Expanding collection services must be a priority for municipalities to reduce open burning and littering. If the municipality does not have the capability to provide the service itself, other operator models can be considered that involve the private sector, NGOs or Community-Based Organisations (CBO). It is generally most difficult to expand collection services to densely populated urban and semi-urban areas (e.g. slums), partly because of the lack of road infrastructure for larger trucks and the lack of cost recovery for the municipality. The analytical framework of the '9 Development Bands'<sup>59</sup> highlights that the introduction of collection systems and the expansion of the service are the most common challenges for countries that are still at an early stage of waste and resource management system development.

To move from the current linear to a circular model, a systemic approach to SWM separating waste at source is necessary<sup>60</sup>. Separate waste collection, if implemented properly, can increase the material recovery rates of a city. Collecting dry recyclables (e.g., plastics, metals, paper and glass) and organic fractions enhances the possibilities for high quality outputs from recycling, composting, and potential energy recovery from residual materials. Ensuring higher quality outputs contributes to higher revenues for operators. Separate waste collection will be most successful if other SWM priorities have been already addressed, like a high collection coverage, an established value chain and markets for the resale of recyclables. The design of the source separation scheme must be financially affordable and technically applicable. Legal and economic factors such as EPR and Deposit Refund System (DRS) can help boost separation at source.

## Project box 16

### Waste segregating at source for a greener Gurugram, India



Although there has been a law on waste separation in India since 2016, many people still do not separate their waste. Under the develoPPP programme, the packaging manufacturer Tetra Pak and Coca-Cola worked with GIZ to pilot separation at source and improve collection and recycling for packaging waste in the satellite town of Gurugram outside of Delhi. Between 2016 and 2019, 100,000 people were educated about waste segregation through various awareness campaigns. 500 informal waste collectors benefitted from trainings, improved working conditions as well as integration into an improved municipal waste management system with better structures, financing and operational models. The model approach is now being upscaled through the Action Alliance for Recycling Beverage Cartons in Delhi.

- » [alagkaro.com/index.php](http://alagkaro.com/index.php)
- » [www.developpp.de/en/projects-success-stories/sustainable-waste-management-raising-awareness-of-and-developing-expertise-in-waste-separation-and-recycling](http://www.developpp.de/en/projects-success-stories/sustainable-waste-management-raising-awareness-of-and-developing-expertise-in-waste-separation-and-recycling)



Local residents and waste collectors work together to keep waste segregated for improved recycling in Gurugram. Photo: © develoPPP

## Project box 17

### Improving plastic waste management practices in China, Thailand, Philippines, Viet Nam, and Indonesia



A total of 24 pilot projects were implemented under Rethinking Plastics, eight of which focused on improving waste management practices, such as household waste segregation and plastic waste management in coastal communities and urban areas. The achievements and learnings are presented below:

» [rethinkingplastics.eu/key-areas/waste-management](https://rethinkingplastics.eu/key-areas/waste-management)

*Waste collection services in Indonesia. © GIZ/Dwi Chandra*



## Project box 18

### Less marine litter in the Indian Ocean



The 'Circular Economy Solutions Preventing Marine Litter in Ecosystems' (CES) project demonstrates technological approaches to tracking and monitoring plastic litter in marine ecosystems. The project works on ways to support the implementation of the national Extended Producer Responsibility (EPR) framework and India's Single-Use Plastic (SUP) ban to reduce, reuse and recycle plastics under the participation of private sector players, as well as informal waste workers with pilot projects in three states: Uttar Pradesh, and ecosystems/ coastal areas of Kerala and Tamil Nadu. The project is supporting the development of the nationwide EPR Portal for Plastic Packaging that will help improve accountability, traceability and transparency in meeting EPR commitments.

» [www.z-u-g.org/en/marine-litter/project/weniger-meeresmuell-im-indischen-ozean](https://www.z-u-g.org/en/marine-litter/project/weniger-meeresmuell-im-indischen-ozean)

*Awareness Workshop on Plastic Waste Management in association with Prayagraj Nagar Nigam. Photo: © Karo Sambhav*





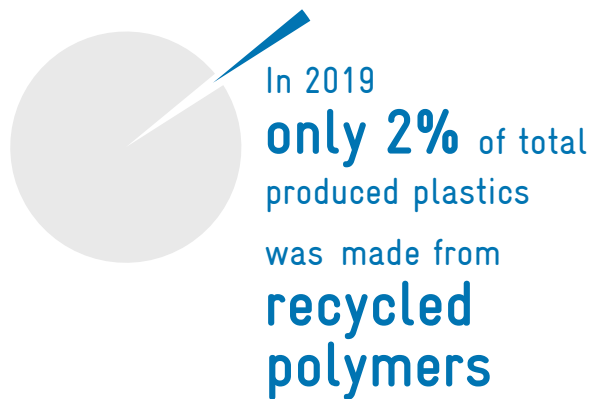
#### 4.4.2 Promoting plastic recycling

In 2019, recycled polymers accounted for only 2% of the total output production of plastics<sup>61</sup>. At the same time, total packaging quantities produced could quadruple from 78 million tonnes in 2013 to 318 million tonnes in 2050<sup>62</sup>. If the quantities of recycled plastic are not increased, the sector will continue to increase the amounts of virgin plastic. This, however, requires significant investment in the recycling/recovery sector to increase recycling capacities<sup>63</sup>.

To increase recycling rates and prepare the implementation of EPR schemes, recycling targets are usually implemented to improve the demand for recycled materials. For example, the Packaging Waste Directive<sup>64</sup> increased EU targets for recycling plastic packaging waste from 22.5% in 2008 to 50% by 2025 and 55% by 2030. Furthermore, the recycled contents for beverage containers made from PET is set to reach 25% by 2025, and 30% by 2030. In developing countries,

promoting circular economy approaches through plastic recycling should be a gradual process. While the expansion of collection coverage to higher levels (above 90 percent) is the first step to enable industrialized recycling, institutional and technical support to the informal collection and recovery sectors are also important. Adopting tailored measures and targets at the local level from global commitments is also a key step.

Chemical recycling processes, including pyrolysis, are not yet considered to have reached the required level of maturity necessary for a safe technology transfer to developing countries and are partly not yet scaled solutions in industrialised countries. GIZ continuously monitors chemical recycling and other new technology developments and evaluates them with regard to their ecological impact, cost-effectiveness, operational requirements and suitability for GIZ's work in developing and emerging countries.



Total packaging quantities produced could **quadruple** from ▶

78 million tonnes in 2013



**to 318 million tonnes in 2050**



## Project box 19

### Ramping up recycling rates in Albania



A majority of household waste in Albania still ends up in illegal landfills. The project introduces a modern, climate-friendly waste management in line with EU standards since 2016. Among others, the municipalities of Himara, Peqin and Rogozhina were supported in implementing their municipal waste management strategies. Thanks to public awareness campaigns, digital applications, better cooperation with the private sector and informal waste collectors, valuable resources like metal, paper or plastic are collected separately and are recycled. In Himara and Sarandra, resource centres were constructed and operationalised. As a result, local recycling rates have increased by about 35 percent after some months already.

» [www.bmz.de/en/issues/climate-change-and-development/cities-and-climate/97156-97156](http://www.bmz.de/en/issues/climate-change-and-development/cities-and-climate/97156-97156)

*The German Ambassador Peter Zingraf and the Mayor of the municipality Adrian Gurma visit the resource centre in Sarandra. Photo: © GIZ/ DKT*



## Project box 20

### Creating value in plastics through digital technology in Indonesia



The aim of the pilot project 'Creating value in plastics through digital technology' by the the PREVENT Waste Alliance was to establish a digital recycling value chain for plastics – from local households to the global market. For this, digital technologies, including a blockchain app for collection and a global online marketplace for recycled plastics, were adapted to the Indonesian context. In 18 months, 900 households, 22 waste banks and 2 recycling enterprises were trained on the use of these digital tools. These interventions led to an improved traceability of both material and financial flows. About 10 tonnes of plastic were collected, treated and are now offered on the marketplace. Additionally, the working conditions of the waste workers were improved by providing insurances, higher salaries and safety equipment.

» [Creating value in plastics Indonesia - PREVENT Waste Alliance \(prevent-waste.net\)](http://prevent-waste.net)

*Material Recycling Facility of the PREVENT pilot project partner Waste4Change. Photo: © GIZ/Maren Jäger*



### 4.4.3 Ensuring environmentally safe disposal of waste

Although GIZ is guided in its work by the principles of the waste hierarchy (avoid, recycle, dispose), the situation in many partner countries shows that more extensive recycling processes are often neither the most economical nor a financially viable solution. Thus, environmentally sound disposal of these wastes needs to be guaranteed as a last resort to protect the environment and humans from soil, water, and air pollution. In the absence of safe disposal options, open burning and dumping are widespread practices in many low- and middle-income countries. Open burning was acknowledged as a major contributor to climate change at the COP26 held in Glasgow in November 2021<sup>65</sup>, while also causing serious human health impacts.

In addition to posing a threat to the environment and public health, uncontrolled landfills can be a major land-based source for marine litter, specifically when they are located close to riverbanks or coastlines. The lack of daily covering and compaction of the waste can contribute to plastic leakages through wind, storm or rain. Open dump sites can represent a key leakage point with plastic waste being carried away through wind, water streams, and animals.

In many countries in the global south, the transition from open dumping to engineered landfills is a problem. However, options exist to rehabilitate such sites

for future use or to close them, and solutions may not be as costly as anticipated<sup>66,67</sup>. The priorities lie in leachate and gas collection, as well as landfill covers.

Furthermore, polymer structures degrade during mechanical recycling and exposure to temperature, oxygen and UV radiation, resulting in a limited amount of mechanical recycling cycles before its disposal. At least for a transitional period to a full circular economy, processes for non-recyclable waste need to be established. According to the waste hierarchy of the EU, energy recovery is preferable to landfilling. In order to guide partners and decision makers in establishing integrated waste management systems, approaches to establish environmentally sound energy recovery systems in line with the waste hierarchy are provided.

Although sometimes marketed as a panacea for municipal waste management, Waste-to-Energy (WtE) solutions are characterised by its high technological complexity. Framework conditions in most developing and emerging countries are essentially different to those in industrialised countries, where utility size WtE plants are increasingly common. Even if almost anything is possible from a technological point of view, this does not mean that every technology can be adapted to local conditions. The overall picture must be considered when deciding on applicability and suitability in a given context. Advice must go beyond mere technical aspects.



## Knowledge box 9

### Guiding informed decisions at bottom of the waste hierarchy

To provide guidance to decision-makers on appropriate Waste to Energy as well as pre- and co-processing applications, GIZ initiated the development of guidelines for Waste to Energy and co-processing technologies.

**Waste-to-Energy Options in Municipal Solid Waste Management – A Guide for Decision Makers in Developing and Emerging Countries** assists decision makers and their advisors in assessing the opportunities, limits and risks of the various WtE technologies for effective planning and efficient investments in waste management.

» [www.giz.de/en/downloads/GIZ\\_WasteToEnergy\\_Guidelines\\_2017.pdf](http://www.giz.de/en/downloads/GIZ_WasteToEnergy_Guidelines_2017.pdf)

The document **Guidelines on Pre- and Co-processing of waste in cement Production** offers updated and objective information about pre- and co-processing of waste in the cement industry and contains knowhow and practical experiences gained in implementing pre- and co-processing since the first edition, which served as a reference document in international agreements and adaptation of various national guidelines.

» [mia.giz.de/qlinkdb/cat/ID=247843000](http://mia.giz.de/qlinkdb/cat/ID=247843000)



*Guidelines for pre- and co-processing of waste in cement industry*

## Project box 21

### Enabling the establishment of sanitary landfills in Indonesia



Indonesia's solid waste management infrastructure cannot keep up with the country's socio-economic development and rising waste generation. As part of the Indonesian-German Green Infrastructure Initiative (GII), GIZ supports national and sub-national actors in selecting and prioritising infrastructure projects and preparing them for financing from KfW. Among other things, the actors conducted 18 pre-feasibility studies, which often include proposals for the construction of landfills and waste disposal sites. One of the studies explores waste management sites in Central Java with the potential to apply RDF technology and state-of-the-art sealing of old landfills that have reached their capacity.

» [gii.maritim.go.id](http://gii.maritim.go.id)

**The Modernised, Climate-friendly Integrated Waste and Recycling Management** project in Albania contributed to upgrading 6 uncontrolled dumpsites to transitional landfills while making budgetary and infrastructure improvements. Operation manuals for their use were also developed.



*Coordinating Ministry for Maritime Affairs and Investment Discusses Proposed Solid Waste Management Projects in Four Provinces in Green Infrastructure Initiative Workshop. Photo: © GIZ/GII*



## 4.5 Pollution containment

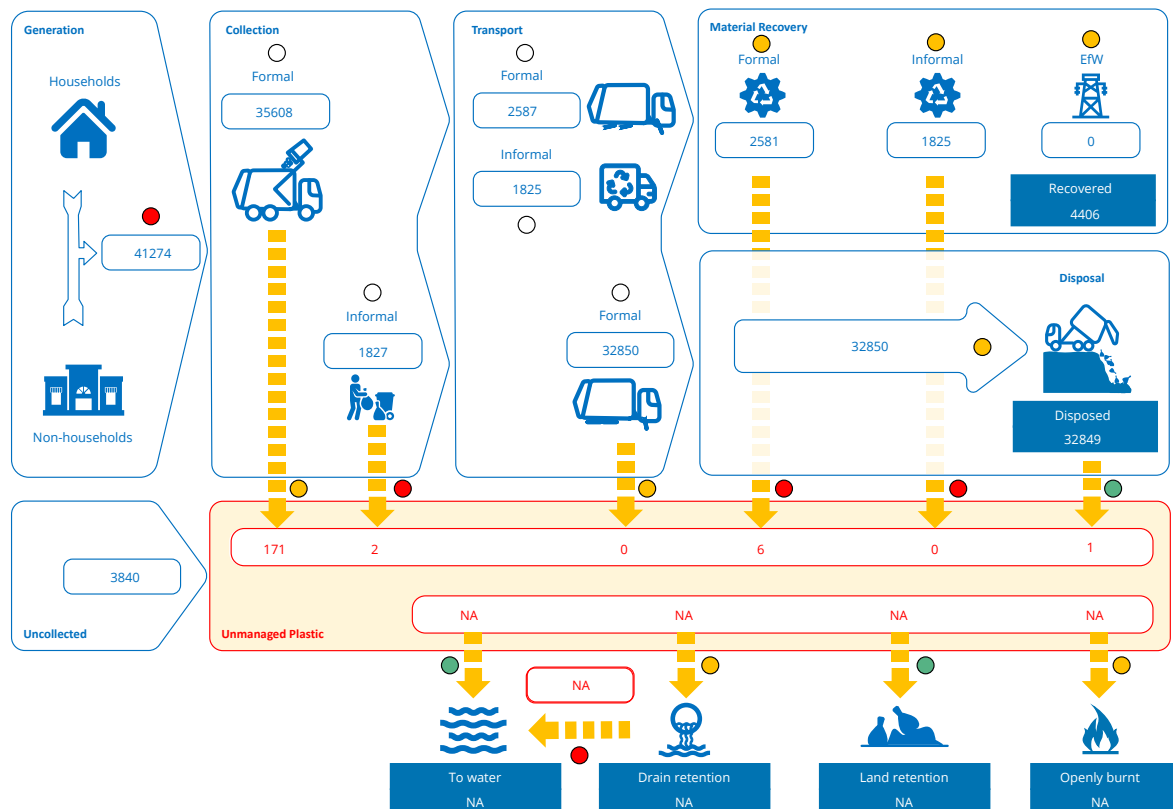
Inadequate sanitation systems and socio-economic as well as cultural and behavioural factors cause waste to leak into the environment resulting from anthropogenic activities. Plastic leakage in this context is defined as plastics entering the environment from controlled systems such as supply/value chains or a waste management system. Leakages can occur along the whole life-cycle of products, but predominantly appears after end-of-life stages as discarded waste or escapes from waste systems during collection, transport, sorting, recovery or disposal of waste. Also, littering activities contribute to this. Experience suggests that measures closer to the source or point of release are more efficient than measures further downstream. Understanding leakage pathways is therefore crucial to counteract.

### 4.5.1 Enhancing plastic flow assessment and monitoring

Reduction strategies are developed and evaluated through assessment and monitoring. A good understanding of the weaknesses and leakages in value chains and waste management system is required.

Several methodologies and tools exist to assess plastic flow and leakage into the environment. These vary in scope, geographical coverage, approach/methodology and required resources necessary for their application. The Waste Flow Diagram (WFD) – a rapid assessment tool for mapping waste flows and plastic leakage is such a tool and has been used in several GIZ projects. It is a proven tool that is suitable for many purposes, especially for understanding waste streams and plastic leakage pathways and developing appropriate measures to address leakage. Lessons learned from the application of and studies on the WFD can be found on the [Waste Flow Diagram Online Portal](#). An overview on a broader range of tools is available in the benchmarking study of plastic leakage tools<sup>68</sup>.

Figure 5 Waste flow diagram



Source: WFD

## Knowledge box 10



### Allowing a rapid assessment of municipal waste management flows and plastic leakage

The Waste Flow Diagram is an open-source toolkit that enables a rapid assessment of a city's municipal solid waste flows. It maps and visualises the material flows within a municipal solid waste management system, and quantifies the amounts, sources, and fates of plastic leakage into the environment. A scenario function simulates how improved waste management could reduce pollution and prevent marine litter. It is complementary to and harmonized with the SDG Indicator 11.6.1 (proportion of municipal solid waste collected and managed in controlled facilities).

Since its launch in 2020, GIZ and other actors have applied it in over 100 cities worldwide. It has been proven to be a pragmatic tool that suits many purposes, including baselining, benchmarking, and scaling up to national leakage assessments. Lastly, it helps to develop effective local waste management solutions and track their progress, while being easy to handle. Recently, an online portal has been set up to facilitate its use and improve data analysis and sharing. Dedicated training such as a [training of trainers course](#) improve the quality of the WFD applications.

- » [www.giz.de/wasteflowdiagram](http://www.giz.de/wasteflowdiagram)
- » link to online portal: [wfd.rwm.global](http://wfd.rwm.global)



## Knowledge box 11



### Benchmarking plastic hotspotting methodologies

The study 'Benchmark of Plastic Hotspotting Methodologies – Quick guide and review of existing plastic material flow and leakage methodologies' conducts a review of selected methodologies and tools to assess plastic flows and leakages. It gives an overview of the features of each methodology, contextualising the application for which each method is best suited. This study is part of the GIZ Support Project Marine Litter, which supports the BMUV in the implementation of the funding program 'Marine Debris Framework – regional hubs around the globe' (Marine:DeFRAG).

- » [www.giz.de/de/downloads/giz2022-en-benchmark-of-plastic-hotspotting-methodologies.pdf](http://www.giz.de/de/downloads/giz2022-en-benchmark-of-plastic-hotspotting-methodologies.pdf)



Benchmark of Plastic Hotspotting Methodologies  
October 2022

Quick guide and review of existing plastic material flow and leakage methodologies  
© GIZ  
giz

## Project box 22

### Mobilising action and collecting data in Brazil

In Brazil, the project TerraMar organised about 50 beach and mangrove clean-ups to mobilise volunteers and raise awareness about the adequate disposal of waste. The information from the cleaning task forces was systematized and made available on the Result Panel of Cleaning Task Forces (protocols)<sup>69</sup> and combating marine litter<sup>70</sup>. This helped develop a national protocol to monitor marine litter on beaches, riverbanks and mangroves and improve information on the amount and types of marine litter in Brazil. A [practical guide](#) for beach, river and mangrove clean-ups helps other institutions to organise clean-ups.

» [www.giz.de/en/worldwide/40145.html](http://www.giz.de/en/worldwide/40145.html)

*Mangrove cleaning event in Tarmandaré in Pernambuco. Photo: © Pedro Caldas/ SemasPE*



## Project box 23

### Locating litter leakage hotspots in India

As part of the project "Cities Combating Plastic entering Marine Environment" (CCP-ME) the WFD has been applied in Kochi, Kanpur and Port Blair in India to establish a dialogue with partners on the sources of waste leakage into the environment. The assessment was important to demonstrate the need to collect reliable data in order to implement appropriate corrective measures. As a follow up, all cities agreed to conduct exercises on waste classification to identify the urban waste generation and the current quantity and characteristics of waste reaching material recovery facilities and landfills. Additionally, the results were presented to the National Ministry of Housing and Urban Affairs, which was interested to transferring them to the national level.

» [CCP-ME \(urban-industrial.in/ccpme\)](http://urban-industrial.in/ccpme)

*Plastic waste leakage into drain in Kanpur, Uttar Pradesh. Photo: © GIZ/CP-ME*



#### 4.5.2 Expanding cleaning and decreasing littering

Plastics can reach the coastal environment from many sources. While uncollected plastic waste and plastic waste leaking from waste management systems are found to be the key sources of marine litter<sup>71</sup>, direct littering by individuals in streets, in the environment and on beaches also contributes to the problem.

With an ever- ever-increasing population in urban settlements and the associated increase in waste generation, street sweeping in addition to waste collection is fundamental to clean the streets and public spaces of open litter. If waste has already entered the drainage systems and reached the riverine and marine environment, clean-up campaigns targeting littering hotspots such as beaches and riverbanks are among the short-term solutions to remove some of the plastic pollution from the environment. Technical clean-up measures include the installation of debris rakes and other retention devices in irrigation and wastewater canals. However, exist-

ing clean-up systems can only capture a part of the plastic litter in the water bodies, with a significant amount of litter remaining in the environment. Coastal woodlands, especially mangroves can retain marine debris as part of an ecosystem approach and make collection and return possible. Clean-ups by themselves cannot sustainably solve the problem. They should be considered as part of broader behaviour change strategies and target all possible pathways of pollution.

Decreasing littering complements cleaning activities. It requires the involvement of stakeholders from several sectors. The municipalities have the responsibility to ensure their SWM systems treat the generated waste safely. Especially in tourist areas, this is a major challenge. With the influx of tourists, the waste quantities increase significantly. Interventions include beach clean-ups, targeted awareness-raising activities on the negative impacts of marine litter, voluntary agreements with touristic establishments to reduce the use of SUPs, the documentation of good practices and others<sup>72</sup>.

## Project box 24

### Game-changing: Triggering behaviour change in the Caribbean



In Mexico, the project Caribe Circular supports the use of games for raising awareness on the impacts of marine litter for inspiring behaviour change with good practices. "La Fuga" (spanish for "the escape") is a didactic game that addresses two environmental challenges: our consumption habits and the excessive use of plastics that leaks into ecosystems. Young people of St. John's College, accompanied by the Secretary of Ecology and Environment of Quintana Roo (SEMA), started a campaign in March 2022 to solve solid waste problems, carry out school mappings, trainings and circular economy games such as "La Fuga" with the intention of forming circular schools. The game "Circular Lottery", meant for children, is based on the Mexican lottery. The traditional cards were changed to include concepts and ideas related to waste management and circular economy. The games were replicated for Honduras, Guatemala and the Dominican Republic and are available in digital format.

» [Preventing plastic waste in Central America and the Caribbean \(giz.de\)](https://www.giz.de)



Young people playing FUGA in Quintana Roo. Photo: © SEMA

## Project box 25

### Changing behaviour following human centered design



PREVENT Waste Alliance organizations partnered with Rare's Center for Behavior & the Environment to design and implement behavioural-based programmes for sustainable waste management and circular economy. Approx. 100 PREVENT members enrolled in a behavioural design course that provided a structured and methodological process to address waste challenges through behavioural solutions and ensured that decisions are based on best practices and real-world evidence. 10 selected organisations improved their approaches undergoing a rigorous design process and achieved tangible results, such as the above featured Common Seas diaper project

Resources on behaviour-centred design from Rare's Center for Behavior & the Environment:

- » [behavior.rare.org](http://behavior.rare.org)
- » More info on PREVENT BE.innovative contest: [prevent-waste.net/en/innovate-prevent-contest-on-behaviour-centred-design-enters-next-phase](http://prevent-waste.net/en/innovate-prevent-contest-on-behaviour-centred-design-enters-next-phase)



Behavior influencing factors. Figure: © Rare

#### 4.5.3 Stopping leakages in agriculture and shipping

Plastics are widely used in agriculture, fishery and the shipping industry. These sectors perform their activities within the natural environment, especially in the sea. As a result, the risk of plastic leakage through degradation, discarding or dumping is high for these activities.

Agricultural plastic products such as silage and mulch films reduce water and chemical use while controlling crop quality. In 2019, agricultural value chains used 12.5 million tonnes of plastic products in plant and animal production. The demand for mulching and silage films is expecting to double by 2030. The crop production and livestock sectors are the largest users, accounting for 10 million tonnes per year collectively, followed

by fisheries and aquaculture with 2.1 million tonnes<sup>73</sup>. The majority of fishing gears are made of plastic.

GIZ supports its partners in collecting and recycling fishing gears and ship-generated waste. For waste management on ships, it supports the establishment of adequate registration and acceptance procedures in ports as well as associated recycling and recovery systems. GIZ contributes to the implementation of international agreements and guidelines such as the International Convention for the Prevention of Pollution from Ships. Port state controls, as established by the FAO Port State Measures Agreement (PSMA), are important to prevent illegal, unreported, and unregulated (IUU) fishing that results in abandoned, lost, and discarded fishing gear (ALDFG). The collection and recycling of these fishing tools is also supported by GIZ.





## Project box 26

### Project Reducing marine litter from sea-based sources in Viet Nam

The Rethinking Plastics project helped to improve the management of ship-generated waste in ports in East and Southeast Asian countries to prevent ships from illegally dumping their waste at sea. Four pilot projects on improved ship waste management in selected ports were identified through a dialogue with relevant stakeholders. The project prepared legal reviews in the countries and worked on updating or developing ship waste manuals in ports, developing and integrating advanced (online) waste notification systems, assessing options for cost recovery systems (waste fees), and providing information and trainings for staff and stakeholders.

» [Rethinking Plastic - Ports & Fisheries \(rethinkingplastics.eu\)](https://rethinkingplastics.eu)



*Enhancing ship waste management at Cat Lai port in Viet Nam. Photo: © GIZ/Rethinking Plastics*

## Project box 27

### Project Collecting and recycling broken fish nets in India



The project "Cities Combating Plastic entering Marine Environment" (CCP-ME) has partnered with the fish landing facility in Port Blair, to provide a location for collection of broken fish nets brought by fisherman. Additionally, the collection of these materials is guaranteed by a partner material recovery facility, which includes the ghost nets and broken fishing nets in its business model of separation and commercialisation. Possible compensations to fisherman delivering the ghost nets with the recycling industry are still under discussion.

» [CCP-ME \(urban-industrial.in/ccpme\)](https://urban-industrial.in/ccpme)



*Mangrove cleaning event in Tarmandaré in Pernambuco. Photo: © Pedro Caldas/SemasPE*

## Project box 28

### Tracking plastic in agriculture with digital passports in China



As part of the develoPPP cooperation of the Sino-German Project for Upgrading Plastics Management in Agriculture, the film extrusion machine manufacturer Reifenhäuser and GIZ have launched a pilot project to ensure a safe removal and disposal of mulch film residues in China. For this purpose, around 450,000 square meters of PE mulch film were produced in Germany and subsequently laid out on a test maize field in 2021 and 2022. The QR code links the recycling-relevant production data to a digital passport via the R-Cycle data platform. The pilot was able to demonstrate that the marking can withstand the effects of the weather so far. Therefore, the QR code and digital passport can be used to track whether mulch film is collected and disposed after use.

» [Sino-German Project for Upgrading Plastics Management in Agriculture - SUSTAINABLE TRANSITION CHINA \(transition-china.org\)](https://transition-china.org)



*A farmer is applying the PE mulch film on the test field in Gansu province. Photo: © GIZ/Jingyue Hou*

## Project box 29

### Bubble barrier for river clean-up in India



In joint effort, GIZ and Geocycle piloted the Bubble Barrier technology at Mantola drain in the city of Agra, India which is of historic importance and whose most significant landmark is the Taj Mahal.

The innovative 'bubble curtain' technology stops plastic from entering the Yamuna River which flows into the Ganges. It is a non-invasive technology that removes plastics using the 'bubble curtain' technology, developed in partnership with the company Canadian Pond. Boats and fish can pass through the air bubbles, but plastic is stopped as the bubbles float the waste to the surface. From there, it is channelled to the riverbank and collected. In a 12-month test-run, 480 tonnes of wet waste were collected, which relates to about 50 tonnes of non-recyclable plastic. The technology has proven to effectively remove plastic and other waste items from a stream. It requires, however, considerable technical expertise as well as significant investment and operating costs. It can therefore be considered a 'bridging technology' on the way to a situation where the main leakage pathways are closed. Above all, the economic challenges limit its wider application in GIZ projects. However, the private partner plans to explore the potential of this technology at selected project sites.

» [www.geocycle.com/yamuna-get-bubble-curtain-stop-plastic-entering-river](https://www.geocycle.com/yamuna-get-bubble-curtain-stop-plastic-entering-river)



*Bubble barrier in Agra, India. Photo: © Geocycle*



# 5

## Key findings and recommendations



The following chapter draws conclusions and recommendations for the international discussion as well as for implementing development cooperation projects and supporting partner countries on their way to break free from plastic pollution.

### 5.1 Promote stakeholder participation

#### 5.1.1 Collaborative learning, exchange and multi-stakeholder coordination, are required for sustainable success

Challenges on a global scale can only be addressed through collaborative action. Marine litter, and its global impacts requiring a joint and harmonised approach, is a perfect example for this. Through a strong network and collaboration, stakeholders can share their experiences and learnings from different approaches to addressing marine litter, enabling them to choose the most appropriate interventions and ensure timely impacts.

Across GIZ projects, stakeholders have been involved through global (e.g. PREVENT) and regional networks (e.g., ASEAN) or local networks. Local ownership often starts by developing a common understanding of a problem and creating a joint vision and mission to address it.

#### 5.1.2 Strong local capacities enable independent management of future challenges

While seeking ambitious targets, implementation capacities of the respective countries need to be assessed and supported by financial and technical assistance. The technical expertise and advice provided by GIZ projects aims to strengthen the capacity of regional, national and local institutions. This includes personnel and organisational capacities, professional knowledge and expertise, as well as enabling framework conditions. Capacity-building programmes are offered to support partners' ability to identify challenges and take appropriate action. Furthermore, an institutionalised capacity-building roadmap ensures that capacities continuously develop beyond the project's completion.

#### 5.1.3 Inclusion of the informal waste sector is a key element to reduce waste leakage

In many countries, informal waste workers, aggregators and recyclers are established actors in the local waste markets and make recycling happen. However, they are often less consulted in decision-making, despite working in more difficult conditions: They are exposed to health risks, have low health or social security coverage, low occupational health and safety standards, uncertain and irregular wages, and are highly dependent on actors higher up the value chain. To successfully address these challenges, interventions for new waste management systems should consider their engagement, experience and networks in the recycling sector, while also lifting their living and working conditions to national standards and above. A simple inclusion of informal workers is often not feasible due to varying views and expectations from stakeholders. Flexible contractual models, trust building between informal and public actors, the formation of independent informal workers 'self-help groups', as well as a close exchange with informal workers for the development of new systems are essential for their participation. Successful mechanisms to integrate the informal sector have already been applied in various countries. However, as the dynamics of the informal sector vary from one context to another, approaches must be adapted to local situation. Common good practices of inclusive planning rely on mutual benefits must be clear to all stakeholders. They include wider stakeholder consultation and engagement, transparent communication, cultural and gender sensitivity and simply being prepared to accept a 'no'.

#### 5.1.4 Litter reduction requires a broad public participation and awareness

The success of waste prevention depends heavily on the participation and awareness of citizens. Technical, economic and policy interventions are ineffective without taking into account the human dimension and increasing engagement from those who generate waste. To that end, awareness-raising activities should aim to increase citizen's understanding not just about the negative impacts of plastic waste, but also address attitudes, provide incentives and options to act differently. Moreover, consumption behaviour affects the entire supply and value chain, including retail and distribution strategies. It is complex to measure change in behaviour and its contribution to marine litter prevention, requiring collaboration with research and private sector partners.



## 5.2 Enable sustainable financing mechanisms along the plastic value chain

### 5.2.1 A level playing field incentivises the shift towards a circular economy

Access to finance and the low competitiveness of the circular economy as opposed to conventional systems are two of the biggest challenges for a global transition to the circular economy. Externalities of harmful practices, for example through open dumping or littering of waste, are rarely quantified or internalised. Even though circular economy offers more sustainable and environmentally friendly practices, comparatively high capital and operation expenses of circular technologies impede investments towards circularity. Financial support mechanisms can bridge the viability gap and ensure the financial sustainability of circular economy measures, that in turn lead to a reduction of plastic leakage. Financial mechanisms with steering function, such as Extended Producer Responsibility (EPR), create a level playing field for circular economy and incentivize waste prevention and reduction through market drivers.

### 5.2.2 Mandatory EPR systems are required for packaging and other materials

There is no single setup that is most suitable for preventing marine litter through EPR systems. However, if properly designed and enforced, mandatory national-wide EPR systems can make a significant contribution. Voluntary actions alone have so far failed to deliver noticeable results in preventing plastic leakage and marine litter. All relevant stakeholders need to be included, particularly the informal sector in countries where it plays a strong role. Effective monitoring has been identified as key element for the successful operationalisation of EPR systems. If suitable for the country's context, Deposit Refund Systems can be particularly impactful. The development of EPR schemes has become central to most GIZ projects as financial instrument to cover collection and recycling expenses of products. The implementation of EPR usually requires a long-term planning and implementation process. Basic interventions to support the introduction of EPR systems include promoting common understanding and definitions, providing technical support to policy makers and the private sector, and creating an institutional framework and building an EPR community.

### 5.2.3 Innovative financing mechanism can enable the transition

For countries that do not yet have EPR systems in place, transitional financing mechanisms could bring about an initial improvement and pave the way for permanent systems. One transitional financing mechanism is plastic credits. Plastic credits can provide funding for projects where no other funding mechanisms are in place. Plastic credit schemes should not undermine an EPR scheme or the development of such, but rather aid its development.

## 5.3 Collect and analyse data to inform decisions, monitor progress and adapt approaches

### 5.3.1 Monitoring and data driven approaches enable targeted interventions and maximise impact

Data driven approaches and structured plastic leakage assessments help to create a shared understanding of a problem, thereby providing the basis for effective solutions. Moreover, these assessments can identify the most significant leakage sources, allowing targeted interventions that result in greater impact. Additionally, they can help to evaluate the effectiveness of specific interventions and inform the development of future strategies.

The interlinkages and interoperability between local data collection and quantification methodologies should be strengthened to develop an accepted framework that allows for accurate and reliable assessments in accordance with international efforts to reduce plastic pollution. This, in turn, is useful for data sharing, better decision making and providing compliance.

### 5.3.2 Digital approaches improve efficiencies and transparency

Digitalisation of processes along the value chain of plastics can lead to several benefits, such as lower expenses due to optimized waste collection routes, or matching demand and supply of secondary raw materials. It can also greatly improve communication with all kinds of stakeholders and foster access to improved waste management services. Moreover, digitalisation



can create transparency in an EPR system, for example, and thus improve governance and stakeholder acceptance. It has the potential to improve convenience and simplify the compliance processes for stakeholders.

Digitalisation often also leads to an increased collection of data and lower error rate. Accurate, up-to-date, and relevant data sets are the foundation for quantitative and qualitative analyses and enhance transparency and traceability.

### 5.4 Promote viable project frameworks

#### 5.4.1 Long-lasting systems require systemic approaches instead of isolated solutions

Focusing solely on waste management as an end-of-pipe solution will not lead to a long-lasting improvement of environmental conditions. Achieving a lasting reduction of plastic pollution and marine litter requires interventions along the entire plastic value chain. Integrated waste management must be linked with sustainable consumption and production in a circular economy. Plastic waste generation needs to be reduced, most effectively by preventing unnecessary plastic in the first place and keeping the material in the cycle as long as possible. At the end of a plastic product's lifetime, it should be recycled as often as possible, and only afterwards treated and disposed in an environmentally sound manner.

In order to effectively reduce marine litter, there is no one solution or technology that fits all circumstances. Each location requires a tailored multidimensional approach which must critically assess technical solutions and alternative materials before they are introduced. Biobased or biodegradable plastics, chemical recycling, waste-to-energy technologies and other proposed solutions must be evaluated in light of local conditions, life-cycle impacts, and the potential lock-in-effects they create.

Technical interventions and innovations require a transparent and stable policy framework with specific targets and timelines so that public actors, investors, other stakeholders and citizens can join forces and take action. Since marine plastic moves through rivers and oceans independently of jurisdictional boundaries, solutions need to be developed in close coordination with partners and networks to maximize synergies and enable a lasting and transformational change.

#### 5.4.2 Sustainable change requires long-term engagement

In international projects, it is essential to balance the demand for quick results with that for long-term impact. Interventions should aim to achieve results and visible impacts within the regular project implementation period, while also laying the groundwork for long-term developments in a complex multi-actor environment. For a successful shift towards circular economy, countless actors need to be involved, existing production and consumption patterns must be changed, and existing path dependencies must be overcome. Given the limited time and resource availability of development projects, they can only partially contribute to the transition and country specific setup. To ensure a sustainability transition beyond the project duration, beneficial framework conditions need to be developed and capacity building needs to be supported. Partner-centred and programmatic approaches that accompany transformation processes over several project periods and a well-defined capacity development strategy have been proven to be highly successful.

#### 5.4.3 Pilot testing validates new approaches, reduces risks and is a cornerstone for upscaling

Pilot projects are an essential element in developing and validating suitable approaches. Pilots strive to generate learnings in a new environment to further adjust the intervention to the respective local setting, while minimising the financial impact and risk of failure. This careful testing and analysis of different approaches allows decision-makers to identify the most viable option for scaling up. To ensure the success of pilot projects, subsequent strategies for scaling and utilizing results should be incorporated in their development process. When successful, pilots can serve as practical basis to initiate upscaling approaches through local partners while allocating the required resources.

GIZ-led initiatives strive to be replicable in other regions and countries, where similar challenges are observed, even with different institutional, cultural, economic, and political contexts. The Waste Flow Diagram, for instance, can be used to support plastic leakage assessment at the municipal level throughout the world.

It has to be noticed that pilot projects often serve as a source of inspiration, as their replication is not always possible due to often complex and rapidly changing project environments.

# 6

## Outlook



Through an analysis of our ongoing cooperation projects, we have identified various approaches to marine litter prevention and clustered them along the value chain. This has helped us to gain a better understanding of our marine litter prevention portfolio and the respective requirements of our partners, as well as to identify suitable approaches. Moreover, the structured approach and engagement with colleagues has enabled us to foster internal knowledge-sharing and develop lessons that are being incorporated into our project appraisal, planning and implementation processes. These learning loops are an ongoing activity, and the list of approaches and lessons will be expanded over time.

Some of our larger regional programmes are still in the midst of implementation and we are looking forward for further approaches and lessons learned, that come along the project implementation.

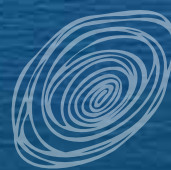
The link between the plastics and the climate debate is not yet fully understood, but emissions from plastics production and use are significant and industry players have started to develop mitigation and decarbonisation roadmaps that could contribute to a more circular plastics economy and less marine litter.

We hope that the conclusions and recommendations drawn from this study will help to improve the efficiency and responsiveness of development projects, stimulate the discussion on higher ambition and commitment levels among all actors involved, and, most importantly, support our partner countries in their efforts to tackle plastic pollution.

Finally, we encourage project implementers to discuss findings and lessons, approach us and contribute to elaboration of successful approaches and success factors for effective marine litter prevention. No more plastic in the ocean – let's follow this aim together!



# Annex





# Annex 1

## Criteria for project relevance for marine litter prevention

Since 2021, GIZ uses the following framework to assess whether projects of Germany's financial and technical development cooperation on waste management and circular economy contribute to marine litter prevention.

Activities that fulfil the following criteria are considered as contributing to marine litter prevention:

- ⊙ [Geography] with island states, activities near the coast (~80km; incl. smaller and inland seas for which there are Regional Sea Programmes<sup>1</sup>) administered under UNEP, such as the Black Sea and Caspian Sea); along the 20 rivers that particularly contribute to marine litter<sup>2</sup>) (also landlocked countries, e.g. Laos);
- ⊙ [Material flow] with a focus on solid waste/material flows: municipal, plastic and also metal waste or substances (according to the UNEP definition of marine litter<sup>3</sup>), but not with an exclusive focus on organic waste;
- ⊙ [Approach] that contribute to reducing the input of the materials described above into the environ-

ment (via both waste management and prevention); micro-, meso- and macro-level approaches count equally; including improving municipal waste management (e.g. improved collection, landfilling (but not landfill gas management), increasing recycling rates; resource-efficient production or product design, national legislation on extended producer responsibility, and awareness and education measures.

1. <https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/regional-seas-programme>
2. Yangtze, Ganges, Xi, Huangpu, Cross, Brantas, Amazon, Pasig, Irrawaddy, Solo, Mekong, Imo, Dong, Serayu, Magdalena, Tamsui, Zhujiang, Hanjiang, Progo & Kwa Ibo (<https://www.nature.com/articles/ncomms15611/tables/1>)
3. United Nations Environment Programme and National Ocean and Atmospheric Administration (2011). The Honolulu Strategy. A global framework for prevention and management of marine debris.



# Annex 2

## Selected project profiles





## Go Circular – for climate and clean oceans

Worldwide and in Columbia, Ghana & Viet Nam



Photo: © GIZ / Daniel Hinchliffe



Photo: © GIZ / Daniel Hinchliffe

### Objective

Circular economy approaches are widespread on a global scale and in selected countries.

### Context

A circular economy aims to preserve the value of products, materials and resources for as long as possible. The circular economy conserves natural resources, reduces the amount of waste entering the environment and oceans and makes a significant contribution to achieving climate goals. At the same time, new, sustainable business sectors and trade flows as well as green jobs are created within the circular economy. Worldwide, various approaches to achieving a circular economy already exist but further development and scaling of these is needed.

### Approach

- @ **Promote innovation:** It advises public institutions, associations and companies on innovative technologies and business models, for example, to use more recycled materials or to switch from disposable to reusable packaging in the food service industry. Innovation competitions promote new approaches and ideas.
- @ **Scale solutions:** By working together with business and government, the project shares proven solutions and adapts them to local contexts. These include extended producer responsibility (EPR) systems and business models for avoiding packaging materials, recycling batteries or processing organic waste.
- @ **Work in global alliances:** The project works closely with international initiatives and organisations. These include the United Nations Environment Programme or the NDC Partnership. It also hosts the secretariat for the PREVENT Waste Alliance.

Project name	Go Circular – for climate and clean oceans
Project website	<a href="https://www.giz.de/en/establish-a-circular-economy-protect-the-climate-and-oceans">Establish a circular economy – conserve resources, protect the climate and oceans (giz.de)</a>
Commissioned by	German Federal Ministry for Economic Cooperation and Development (BMZ)
Project region	Worldwide and in Columbia, Ghana & Viet Nam
Partners	Viet Nam » Ministry of Planning and Investment (MPI) Ghana » Environment Protection Agency (EPA) Colombia » Ministry of Environment and Sustainable Development (Minambiente)
Duration	07/2022 – 06/2024
Budget	EUR 7 million

# Global sector project to support the BMUV in implementing the Marine Debris Framework – Regional hubs around the globe

## Worldwide



Photo: © MRC Secretariat Kongmeng Ly



Photo: © MRC Secretariat Kongmeng Ly

### Objective

Selected developing and emerging countries develop successfully effective measures for a better management of plastic waste and prevention of marine litter.

### Context

Considering marine littering a global problem and following Germany's commitment, the BMUV Support Project Marine Litter is supporting the engagement of the German Government to tackle plastic waste leakage at its source.

### Approach

To achieve this, the project activities are divided into three areas of action:

- © Technical and conceptual support to the BMUV through demand-oriented technical advice and support regarding the international commitment of the BMUV to combat marine litter as well as the design of the funding program.

- © Strengthening the international exchange of experiences. In coordination with the BMUV and in cooperation with national and international partners, the project supports events for international dialogue and exchange of experience. For this purpose, the project prepares relevant inputs and knowledge on defined key topics and makes it publicly accessible.

- © Initiation of first measures in selected partner countries and regions. The project provides selective technical consultancy and policy advice to partner countries to facilitate dialogues among stakeholders and the development of strategic options. In addition, small-scale measures with innovative and transferable solutions are supported financially and with advice.

Some project results can be found among others here [giz2022-en-marine-litter-bmuv.pdf](#)

Project name	Global sector project to support the BMUV in implementing the Marine Debris Framework – Regional hubs around the globe
Project website	<a href="#">The fight against marine litter (giz.de)</a>
Commissioned by	German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer protection (BMUV)
Project region	Worldwide
Partners	Abidjan Convention, Costa Rica, Indian Ocean Rim Association (IORA), Koh Rong/Cambodia, Mekong River Commission (MRC), Nile Basin Initiative (NBI)
Duration	06/2020 – 12/2023
Budget	EUR 2.5 million

# Integrated waste management and marine litter prevention

## Western Balkans (Albania, Bosnia and Herzegovina, Kosovo, and Montenegro)

### Objective

Part I: The capacities of local and national stakeholders in waste management and circular economy to reduce waste leakage to waterways and the Adriatic Sea are improved.

Part II: The implementation of coordinated strategies to reduce the input of plastic waste into the Adriatic Sea is improved in the four partner countries.



Photo: © GIZ / Daniel Hinchliffe

### Context

90 percent of the marine litter in the Adriatic Sea is composed of plastics. The abundance of plastic pollution on the coastline of the Western Balkans threatens economic activities, tourism, and health of locals and guests. This project supports Albania, Bosnia and Herzegovina, Kosovo, and Montenegro to reduce plastic discharge into the Adriatic Sea through improved regional cooperation coordination, and knowledge exchange between institutions and the private sector.

### Approach

#### Part I

- ④ Enhance regional cooperation and knowledge transfer between municipalities,
- ④ companies and partner ministries.
- ④ Provide infrastructure support for improvement of waste management services as well as introduction of separation at source for plastic waste.
- ④ Prepare legal instruments and guidelines on Extended Producer Responsibility (EPR).
- ④ Enhance monitoring through Waste Flow Diagram (WFD) and UNEP MAP reporting.
- ④ Support awareness raising campaigns and activities on marine litter prevention.

### Achieved results – Part I

- ④ Two declarations signed among partner municipalities on taking common measures against marine debris.
- ④ Waste Flow Diagram (WFD) applied along two transboundary rivers and agreed among partner ministries as a common method to monitor waste leakages from the management system.
- ④ Three legal instruments and 5 roadmaps developed and accepted by the line Ministry in MNE; Plastic bags ban law approved in Albania.
- ④ More than 350.000 people reached in three countries, through awareness campaigns on marine litter prevention, improved waste management services with provision of bins and waste trucks in 5 municipalities, etc.

### Approach – part II

- ④ Enhance regional cooperation and knowledge transfer between government, civil society, and private sector in four partner countries.
- ④ Provide technical and methodological advice on the monitoring of plastic waste, pollution prevention and reduction of single used plastic items.

Project name	Integrated Waste Management and Marine Litter Prevention
Project website	<a href="https://www.giz.de/en/projects/preventing-marine-litter-in-the-western-balkans">Preventing marine litter in the Western Balkans (giz.de)</a>
Commissioned by	German Federal Ministry for Economic Cooperation and Development (BMZ)
Project region	Western Balkans (Albania, Bosnia and Herzegovina, Kosovo, and Montenegro)
Duration	06/2018 – 05/2022
Budget	EUR 3.5 million

## Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs (3RproMar) with Southeast Asian Nations (Cambodia, Indonesia, the Philippines, Viet Nam)



Photo: © MRC Secretariat Kongmeng Ly

### Objective

Support the ASEAN member states in the improvement of implementation capacities for reducing land-based waste leakage to protect the marine environment.

### Context

As Southeast Asia emerged as one of the most important plastic pollution hotspots globally, the ASEAN countries recognise the need to take joint action to combat marine litter. Creating framework conditions to promote initiatives involving the public and private sectors is at the core of the 3RPoMar Project. Regional

cooperation and knowledge exchange is accompanied by support to local authorities to translate regional and national action plans into key interventions. A holistic approach to tackling marine litter is implemented; integrated SWM measures are promoted, awareness raising activities are organised, and cooperation across sectors are encouraged.

### Approach

- ④ Enhance the regional cooperation and knowledge management among the ASEAN working groups.
- ④ Develop national measures for waste leakage reduction within the focal ASEAN member states as well as their transmission to strategies on local level.
- ④ Involve the private sector to develop approaches for waste leakage reduction and waste generation along the value chain.
- ④ Design and implement pilot projects along the value chain from sustainable consumption to enhanced waste collection and recycling in selected municipalities.

Project name	Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs (3RproMar)
Project website	<a href="https://www.giz.de/en/stories/3R-pro-mar">Strengthening reduce, reuse, recycle (3R) to preserve marine biodiversity (giz.de)</a>
Commissioned by	German Federal Ministry for Economic Cooperation and Development (BMZ)
Project region	Cambodia, Indonesia, the Philippines and Viet Nam
Partners	Cambodia, Indonesia, the Philippines and Viet Nam
Duration	07/2020 – 06/2025
Budget	EUR 16 million



# Rethinking Plastics – Circular Economy Solutions to Marine Litter East and Southeast Asia



## Objective

The overall objective of the action is to support the international aspects of the EU Plastic Strategy in East and Southeast Asia, thereby contributing to strengthening EU cooperation with countries in the region.

## Context

To tackle marine litter in East and Southeast Asia and strengthen cooperation between the region and the European Union (EU), the EU-German Government funded 'Rethinking Plastics – Circular Economy Solutions to Marine Litter' project implemented activities and pilot projects covering the management of plastic waste, sustainable consumption and production of plastic as well as the reduction of litter from sea-based sources. With these, the project supported the transition towards a circular economy for plastics es between 2019 and 2022.

## Approach

- ③ Fostering regional exchange, knowledge sharing and policy dialogues in East and Southeast Asia and with the EU
- ③ Providing technical assistance and policy advice at national and local level
- ③ Supporting pilot projects financially and technically, with a close link to ongoing policy dialogues and processes
- ③ Implementing awareness raising campaigns and communication

## Results:

- ③ The project conducted more than 90 dialogue and technical exchange events with over 5.000 direct participants in total (pilot project activities not included).
- ③ Valuable interventions for the development of Extended Producer Responsibility (EPR) for plastic packaging as a key policy focus in the area of waste reduction in Viet Nam, Indonesia, Thailand, and the Philippines were contributed.
- ③ 24 pilot projects with various partner organisations in five countries were implemented and provided valuable on-ground experiences and practices, as well as upscaling potentials.
- ③ The pilot projects improved waste management directly and indirectly for more than 128,000 people while more than 1,200 people got directly involved in planning, consultation or decision-making processes related to waste collection, sorting and recycling, and plastic waste reduction (e.g. development of local action plans).
- ③ The project cooperated with over 70 small entrepreneurs and worked with over 640 market vendors on the reduction of (single-use) plastics.
- ③ 290 people increased their income or received additional income due to the project activities, 105 people benefitted from improved working conditions.
- ③ The pilots on ship waste management in ports improved cost-structures and notification standards to increase ship waste delivery to ports.
- ③ The activities on 'fishing for litter' engaged more than 150 fishing boats.
- ③ Over 23 tonnes of plastic were collected during fishing for litter and educational beach clean-up activities.
- ③ Around 50.000 people were involved in campaign activities and more than 5 million were reached via social media.
- ③ Over 23 tonnes of plastic were collected during fishing for litter and educational beach clean-up activities.

Project name	Rethinking plastics
Project website	<a href="https://rethinkingplastics.eu">Rethinking Plastic - Home (rethinkingplastics.eu)</a>
Commissioned by	German Federal Ministry for Economic Cooperation and Development (BMZ), co-funded with the EU
Partner countries	China, Indonesia, Japan, The Philippines, Singapore, Thailand, Viet Nam
Implementation Partners	Expertise France
Duration	05/2019 – 10/2022
Budget	EUR 9.96 million

## Prevention of plastic waste in Central America and the Caribbean (Caribe Circular) in Belize, Guatemala, Honduras, México, Dominican Republic



Photo: © MRC Secretariat Kongmeng Ly



### Objective

The framework conditions for preventing plastic waste from entering the Caribbean Sea have improved.

### Context

Plastic waste pollution in the Caribbean is destroying the Mesoamerican reef. To preserve the second largest coral reef and its associated ecosystems, the regional project Caribe Circular seeks to prevent the use of plastics and avoid their discharge into the sea by improving the framework conditions for the prevention of plastic waste in the Caribbean.

### Approach

- ③ Promote regional exchange and legal regulation, by strengthening the regional dialogue among the member countries through a technical committee working on the harmonization of legislation, extended producers' responsibility, and circular economy, and by establishing cross-sectoral initiatives and regional partnerships, e.g. in tourism.
- ③ Strengthen the private sector and value chains by developing business models for plastic alternatives and recycled plastic with different industries and providing capacity building for companies to identify and deploy innovative solutions.
- ③ Implement pilot projects in five countries with concrete actions to improve solid waste management and prevent, reuse, and recycle plastic with multi-stakeholders on all levels, and promote participatory planning and monitoring of the waste flow with key actors.
- ③ Raise awareness among the population and the private sector by implementing local education programs and regional awareness campaigns.
- ③ Promote the use of digital tools to encourage and facilitate zero waste and circular economy actions such as with the app E-Coins to promote a sustainable system of materials and consumption recovery.



Project name	Prevention of plastic waste in Central America and the Caribbean (Caribe Circular)
Project website	<a href="http://www.giz.de/en/worldwide/92233.html">www.giz.de/en/worldwide/92233.html</a>
Commissioned by	German Federal Ministry for Economic Cooperation and Development (BMZ), Co-Financed by the European Union (EU)
Project region	Belize, Guatemala, Honduras, México, Dominican Republic
Partners	Central American Commission for Environment and Development (CCAD) of the Central American Integration System (SICA) Secretariat of Ecology and Environment (SEMA) of the State of Quintana Roo, México
Duration	10/2020 - 06/2024
Budget	EUR 10 million

## Circular Economy Solutions (CES) preventing marine litter in ecosystems India



Photo: © GIZ India / CES Project

### Objective

Prevent marine litter through the demonstration of technological approaches to track and monitor litter in marine ecosystems and support the implementation of Extended Producer Responsibility (EPR).

### Context

The CES Project is a sister project to the CCP-ME project. Contributing to SDG targets 8.2 (technical upgrading and innovation) and 12.5 (reduce waste generation through the 3Rs), the CES project focus-

es on upstream initiatives to tackle marine litter. Interventions involve multi-stakeholder consultations to find technological solutions to reduce, reuse and/or recycle plastics, track and monitor plastic leakages of marine litter, develop digital tools to enhance data collection, sharing and management, to eventually target key interventions.

### Approach

- ③ Establish tracking, monitoring, and reporting of leakages of marine litter (focusing on plastics) through piloting in selected states.
- ③ Demonstrate technological solutions to reduce, reuse and/or recycle plastics with producers and recyclers in selected ecosystems.
- ③ Implement the national framework for Extended Producer Responsibility (EPR).
- ③ Initiate sustainable packaging and eco-design activities.

Project name	Circular Economy Solutions (CES) Preventing Marine Litter in Ecosystems
Project website	<a href="http://www.giz.de/en/worldwide/118706.html">www.giz.de/en/worldwide/118706.html</a>
Commissioned by	German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer protection (BMUV)
Project region	India
National partner / Partner states / partner cities	Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India / Kerala, Tamil Nadu and Uttar Pradesh / Thiruvananthapuram, Chennai, Agra, Lucknow, Prayagraj and Varanasi
Duration	08/2020 – 12/2023
Budget	EUR 5 million

# Cities Combatting Plastic entering the Marine Environment (CCP-ME)

## India



Photo: © GIZ CCP-ME



### Objective

Enhanced practices (incl. digital tools) to prevent plastic entering the marine environment are established in selected cities, states and at national level.

### Context

The signature in November 2019 of the Joint Declaration of Intent between the Indian Ministry of Housing and Urban Affairs (MoHUA) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany has led to the design and implementation of the CCP-ME project, launched in August 2020. The project activities include issues of segregation at source, quality control of compost, testing, and linking with markets in urban and peri-urban areas, implemented at the city, state, and national level.

### Approach

© Improve procedures for collection, segregation and recycling of plastic in three pilot cities. This includes planning and implementing demonstration projects

to prevent plastic disposal to open water bodies and setting up material recovery facilities (MRF) in each city and supporting cities in the implementation of activities related to extended producer responsibility (EPR) and reduced plastic usage.

- © Strengthen capacities for managing plastic and knowledge exchange at state level by developing or adapting state-level guidelines for plastic waste management, facilitating the implementation of state government policies to reduce plastic waste such as deposit refund and buy back systems, and disseminating case studies from city-level demonstration projects as well as success stories and failures related to the management of non-recyclable waste throughout states.
- © Strengthen the national framework for plastic waste management by developing a standardised mechanism for cities and states to report to the national level on the amounts of plastic waste recycled/reused and establish links between MoHUA and other relevant ministries and agencies to initiate a dialogue on plastic waste management.

Project name	Cities Combatting Plastic entering the Marine Environment (CCP-ME)
Project website	<a href="http://www.z-u-g.org/en/marine-litter/project/ccp-weniger-meeresmuell-im-indischen-ozean">www.z-u-g.org/en/marine-litter/project/ccp-weniger-meeresmuell-im-indischen-ozean</a>
Commissioned by	German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer protection (BMUV)
Project region	India
Duration	08/2020 – 12/2023
Budget	EUR 5.8 million

# National Solid Waste Management Programme

## Egypt

### Objective

Part I: Restructure the waste sector at the national, regional, and local level. Establish an independent central entity to regulate the management of the MSW system, and waste management units in four governorates.

Part II: The population of Egypt benefits from improvements in the waste management system. The private sector is involved in the relevant processes. Protection of resources, water bodies and climate has improved.

### Context

Egypt's SWM services and infrastructure face many challenges, including low collection coverages, widespread uncontrolled disposal, high plastic leakages into the environment, and the inability to keep up with the estimated 3.4 percent increase per year of waste generation. Since 2012, GIZ and its partners have worked to strengthen the institutional framework and governance for SWM, including the setup of a centralised Egyptian Waste Management Regulatory Authority to promote cooperation between stakeholders, and SWM unit in four governorates to improve local collection and recycling rates.

### Approach

- At the macro level, WMRA and the Egyptian Environment Affairs Agency (EEAA) are assisted in institutional development and in implementing their

strategies. For example, WMRA intends to launch a regulation for Extended Producer Responsibility. Together with EEAA, a circular economy strategy needs to be defined and formulated, and priorities have to be set.

- At the meso level, the capacities of the Ministry of Environment staff will be further improved. In addition, the scope of the project has been expanded through European Union co-financing to support green entrepreneurs and civil society organisations in implementing climate-sensitive circular economy initiatives.

### Results

- Dedicated waste management departments have been set up and staffed in the four governorates. Over 29,000 households are benefiting from improved waste collection and recycling.
- To promote exchange beyond networking events, the Waste Portal Egypt virtual platform was established.
- Investment opportunities in the waste sector have been identified and included in the investment map of the Egyptian Ministry of Investment and International Cooperation.
- Fifteen small and medium-sized enterprises (SMEs) in the waste sector have participated in a growth development programme: Improving waste management in Egypt.
- Circular Economy approaches will be implemented together with partners. Also, the climate impact will be better measurable through improved and a digitalised monitoring, reporting and verification system. The NSWMP/EU Green contributes to improving the conditions for the involvement and engagement of Green Entrepreneurs at the national and governorate level.

Project name	National Solid Waste Management Programme
Project website	<a href="http://www.giz.de/en/worldwide/22230.html">www.giz.de/en/worldwide/22230.html</a>
Commissioned by	German Federal Ministry for Economic Cooperation and Development (BMZ), Part I co-financed by Egyptian Government, EU and SECO / Part II co-financed by EU
Project region	Egypt
Partners	Ministry of Environment
Duration	Part I: 2012 – 2022/ Part II: 2019 – 2022 2022 – 2026
Budget	Part I: EUR 71.9 million / Part II: EUR 20 million



# Reduction of Plastic Leakage into Ocean

## Philippines, Mexico, India, Egypt and Morocco

### Objective

To initiate environmentally and socially sound solutions for reducing plastic leakage into the ocean in four urban areas.

### Context

The project supported selected local mainly coastal municipalities in Egypt, Mexico, Morocco, Philippines and India in applying environmentally and socially sound waste management solutions.

The project is an example of successful cooperation between the German development cooperation and the private sector. It is a developPPP.de project, in which both sides combine their strengths to create a win-win situation for all parties involved.

### Approach

The project supported selected local mainly coastal municipalities in Egypt, Mexico, Morocco, Philippines and India in applying environmentally and socially sound waste management solutions. Thereby the project focussed on a data driven and integrated approach. Local partners have been supported in understanding the pathways of plastic leakage and develop effective solutions integrating social aspects while respecting the waste management hierarchy: prevent, reduce, recycle materials before recovering waste. A global component complemented activities to reduce plastic pollution in the countries with conceptual work.

### Selected results

The project has shown how data driven and inclusive approaches improve solid waste management system. It has demonstrated successful small steps at local level towards preventing plastics reaching the ocean and established effective partnerships which are important working towards a global problem with local solutions. It is notable that this was achieved during difficult times of COVID lock downs.

To guide the development of effective waste management systems, the project updated the Guidelines for pre- and co-processing of waste in the cement industry: [www.giz.de/en/downloads/giz-2020\\_en\\_guidelines-pre-coprocessing.pdf](http://www.giz.de/en/downloads/giz-2020_en_guidelines-pre-coprocessing.pdf)

### Further results

- ④ 11 Measures initiated to improve waste management services and prevent plastic entering the oceans
- ④ 7 urban areas in 5 countries applied the Waste Flow Diagram and used data for prevention of marine litter
- ④ 274 informal waste workers participated in formal waste value chains
- ④ 120'000 people have better waste services
- ④ 500'00 people have increased awareness
- ④ 183 jobs created
- ④ 1,000 tons of plastic leakage prevented from entering the oceans
- ④ 12,000 tons of CO2 emissions mitigated

Project name	Reduction of Plastic Leakage into Ocean
Project website	<a href="http://www.giz.de/en/worldwide/89696.html">www.giz.de/en/worldwide/89696.html</a>
Commissioned by	BMZ and private partners Holcim/geocycle
Project region	Philippines, Mexico, India, Egypt and Morocco
Partners	Holcim
Duration	01/2018 – 06/2022
Budget	EUR 2.1 million

## The partners

Holcim is the leading global building materials and solutions company. The Group provides innovative products and building solutions with a clear commitment to social and environmental sustainability. Holcim provided the technical expertise and co-processing capacities in the four countries in order to be part of a sustainable local solution for preventing marine littering.

Geocycle is a leading provider of tailor-made waste management solutions. Part of the Holcim Group, Geocycle provides industrial, municipal and agricultural waste management services to more than 10,000 customers in over 50 countries. In this partnership, Geocycle provided the waste management services and expertise necessary to handle, pre- and co-process waste from non-recyclable fractions.

GIZ established policy dialogues and ensured that regulatory frameworks are implemented together with local partners. With regard to social aspects, GIZ ensured that informal waste workers have been involved and enhanced their working conditions. Particular attention was on female waste workers since they are often taking care of waste management in households and represent the majority of informal waste pickers.





# Endnotes

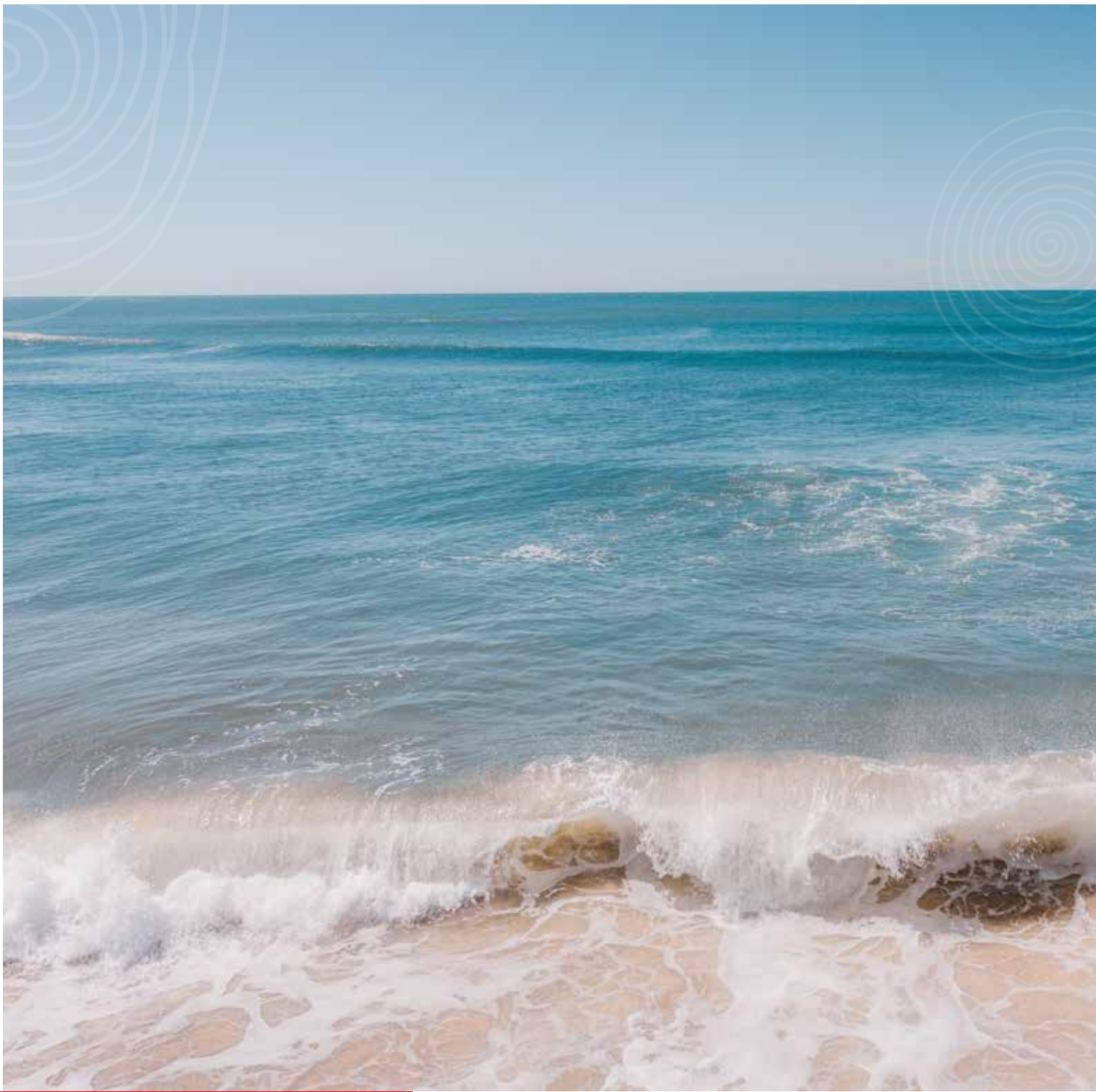
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