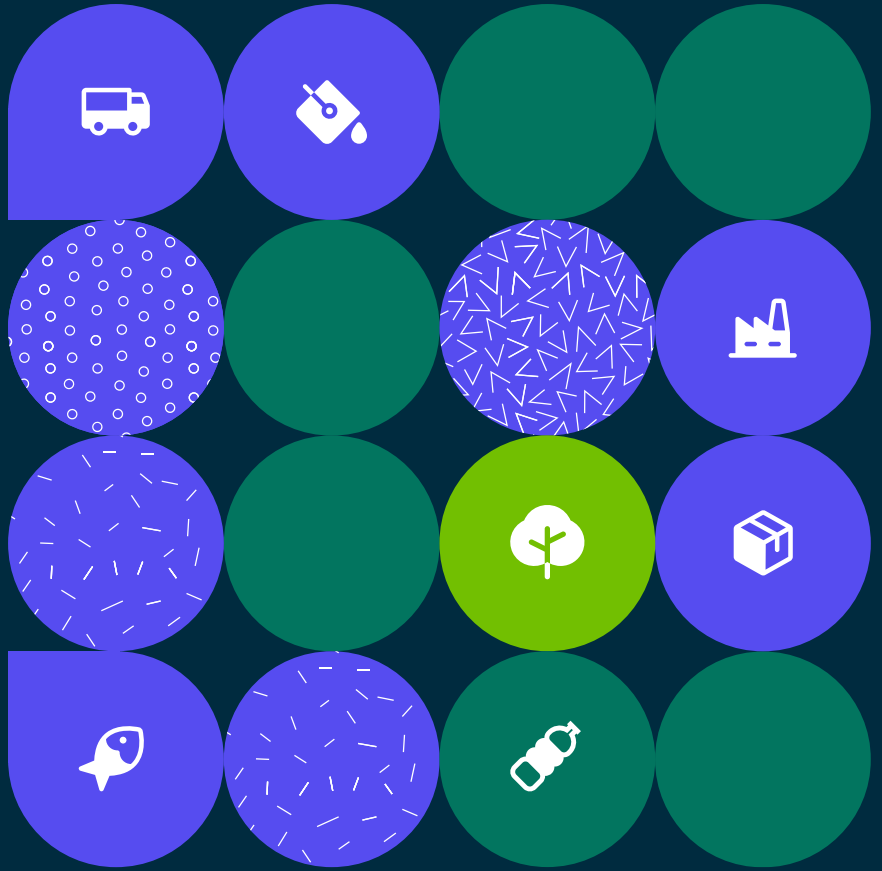
Plastic Footprint Network

Plastic Footprint Guidelines

Module on Leakage from waste exports

Version 1. November 2023



Convened by EA – Earth Action · www.plasticfootprint.earth

Introduction to the Plastic Footprint Network

Leading organizations have united within the Plastic Footprint Network to chart a new, more effective **path toward plastic pollution** mitigation.

The network's first priority was **unifying the framework** for measuring plastic leakage into a **single**, **science-based methodology** for organizations to accurately assess the environmental impact of their plastic use. Over **100 professionals** from **35 organizations** worked to establish the resulting **methodology**, which consists of **11 modules**, all optimized for usability and delivery of **actionable results**.

Objectives

Unifying the methodologies and perspectives of leading scientists, experts, and global practitioners, PFN enables organizations to understand the full impact, or footprint, from the use of plastic in their companies, products, and services.

1. Update and unify plastic footprinting methodologies
2. Ensure the methodology is used consistently by practitioners
3. Disseminate and scale the use of plastic footprinting
4. Explore link with plastic credit schemes, and how to prevent greenwashing claims

What will you find in this module?

The objective of this module is to provide a harmonized approach for assessing the impact of plastic waste exports on mismanaged waste and the resulting leakage in the oceans. To achieve this goal, we will address the following three key questions:

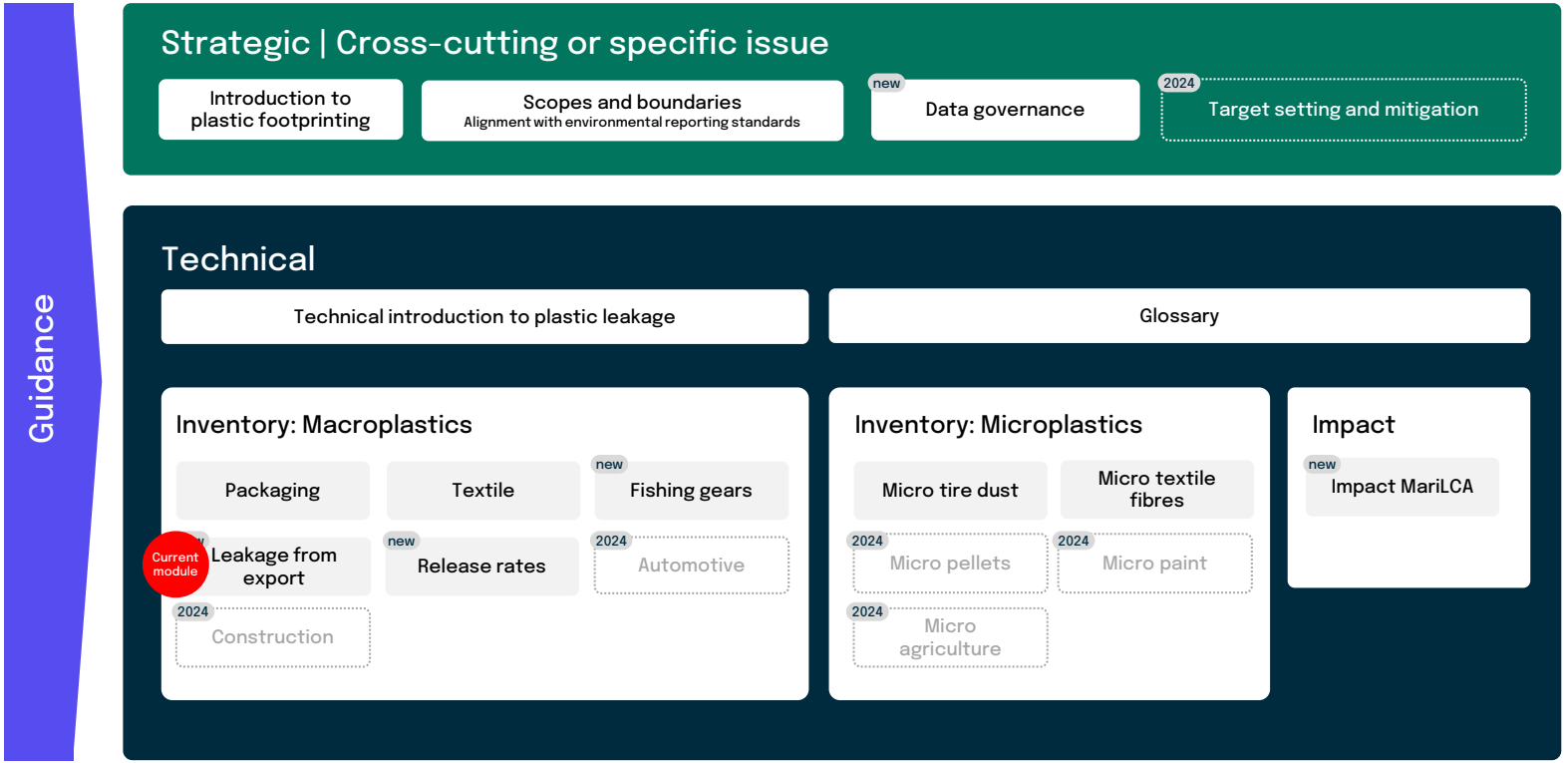
1. What is the scope of the overview and methodology for assessing a plastic footprint with a focus on exported waste and leakage?

2. How can a well-structured methodology be effectively applied to assess the impact of exported waste contributing to the plastic footprint?

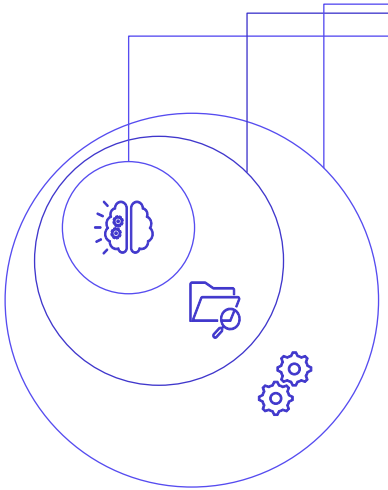
3. What are the primary and secondary data required to perform the calculations?

At the end of this module, the users should know how to include the export of plastic waste in their plastic footprint assessment.

Where does this module fit in the PFN landscape?



Structure of each technical module



1 Methodological choice

High level overview and different methodologies available at the moment, which one(s) to use and when.

Target audience: busy reader, scientific journalist

2 System map and calculation routes

- The different elements to take into account during a plastic footprint.
- How these elements interact.
- The calculation routes to follow.

Target audience: scientist, experts

3 Key data & background assumptions

The secondary data needed to perform the assessment and the main assumptions for the modeling.

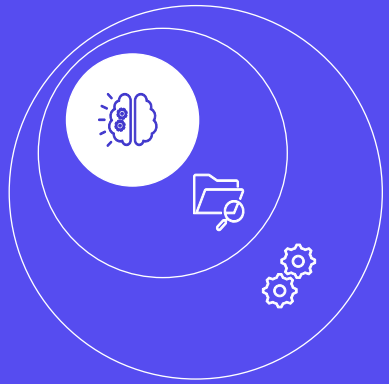
Target audience: scientist aiming at performing a plastic footprint.

Reading keys: Main take away | Supporting information | Key warning

Part. 1

Methodological choice

The different methodologies available at the moment, which one(s) to use and when.



An overview on leakage from export

Overview of trade of plastic waste

Over the past 30 years, international trade of plastic waste has become widespread.

This practice is typically characterized by mixed plastic waste being exported from high-income countries to low-income countries with limited waste collection and high leakage rates, particularly in Asia.

Unfortunately, between 5-20% of this waste is estimated to be low-quality plastics, which are often mismanaged rather than recycled. Additionally, the remaining waste, even when of suitable quality, cannot all be recycled due to the lack of adequate recycling infrastructure.

As of 2016, the international trade of plastic waste was estimated to be 3.5 million metric tons per year. Similarly, in 2017, Europe exported one-sixth of its plastic waste, mostly in Asia.

Context of challenges in addressing the fate of exported plastic

The exact impact of exports on plastic pollution in the oceans is hard to quantify because there is little evidence on the fate of the plastic exported.

It is evident that the export of plastic waste leads to challenges in accurately calculating mismanaged waste in both exporting and importing countries, as well as in assessing plastic footprints.

Different approaches exist for addressing this topic, but they frequently lack consistency with one another. Therefore, it is crucial to establish a harmonized methodology and to ensure alignment among the main stakeholders involved in the PFN.

Sources: The Pew Charitable Trusts & Systemiq (2020), Breaking the Plastic Wave and World Bank Group (2018) and What a Waste 2.0

Possible approaches

Optimistic

- Consider all export as recycled by default
- Currently used in Eurostat database and PLP

Realistic

- Intend to represent the real fate of the export and assess real leakage by considering the mismanaged waste index of the importer country(ies) .
- Ideal for Life Cycle Assessments, Narrative & Claims

Conservative

- Consider all export as mismanaged by default
- Ideal for Mitigation Strategies, Credits

Approach	Short Description	Motivations	Implementation simplicity	Data needed	Indirect Leakage from Export
Optimistic	100% Recycled	Eurostat, PLP		•Export shares	No
Realistic	Based on the MWI of the importers	Life Cycle Assessments, Narrative & Claims		•Export shares •MWI of importers •RR in importers	Yes
Conservative	100% Mismanaged	Mitigation Strategies, Credits		•Export shares •RR in importers	Yes

Sources: Eurostat Database: https://ec.europa.eu/eurostat/ and Quantis & EA (2020), The Plastic Leak Project

Recommended methodological approach

Methodology to apply for calculating the leakage from export

Steps:

1. Consider the amount of plastic of interest.
2. Apply the export share of the country(ies) in which the plastic becomes waste.
3. Trace the destination country(ies) to which the plastic waste (or a fraction of it) is exported.

For mitigation Strategies, Credits:

4. This quantity constitutes, by default, the mismanaged waste from export.*

5. Estimate the leakage from export by applying a suitable release rate (RR).

For Life Cycle Assessments, Narrative & Claims:

4. Consider the mismanaged waste index (MWI) of the importer country(ies) and use this share to quantify the mismanaged waste from export.*

5. Estimate the leakage from export by applying a suitable release rate (RR).

If possible to certify the fate of the export, then, instead of step 4), we recommend assigning the exported plastic waste to the corresponding fate (e.g., incineration, sanitary landfill, recycling, etc.). In this way, only the share of the waste which has been actually mismanaged will feed the mismanaged waste from export.

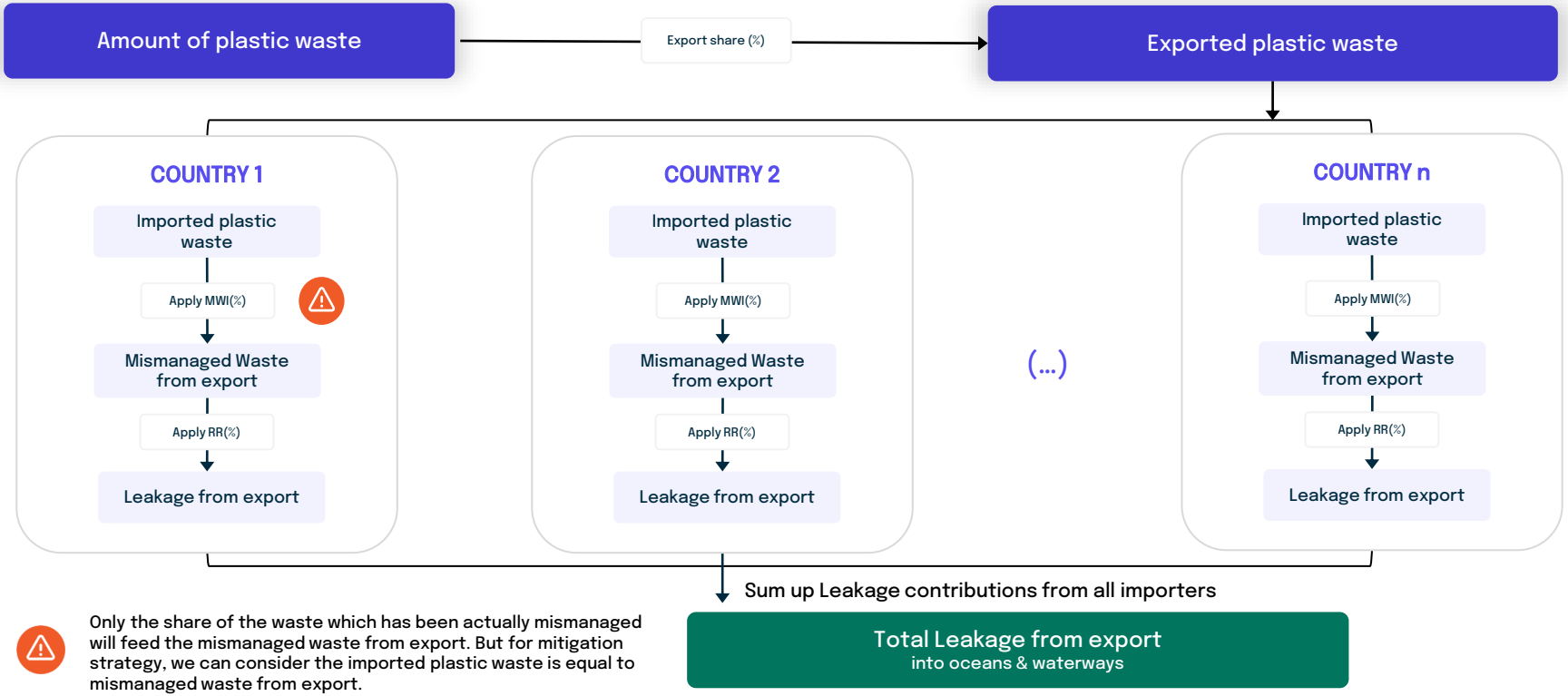
Part. 2

System map & calculation routes

The different elements to take into account during a plastic footprint. How these elements interact? Which calculation routes to follow?

System map

The path of exported plastic waste



Only the share of the waste which has been actually mismanaged will feed the mismanaged waste from export. But for mitigation strategy, we can consider the imported plastic waste is equal to mismanaged waste from export.

The leakage from export calculation routes

$$\text{Leak from export}_{\text{compartment}}(t) = \sum_{\text{Importer Countries}} \text{Mass of plastic waste } (t) * \text{Exp\_share}_{\text{importer country}}(\%) * \text{MWI}_{\text{importer country}}(\%) * \text{RR}_{\text{compartement}}(\%)$$

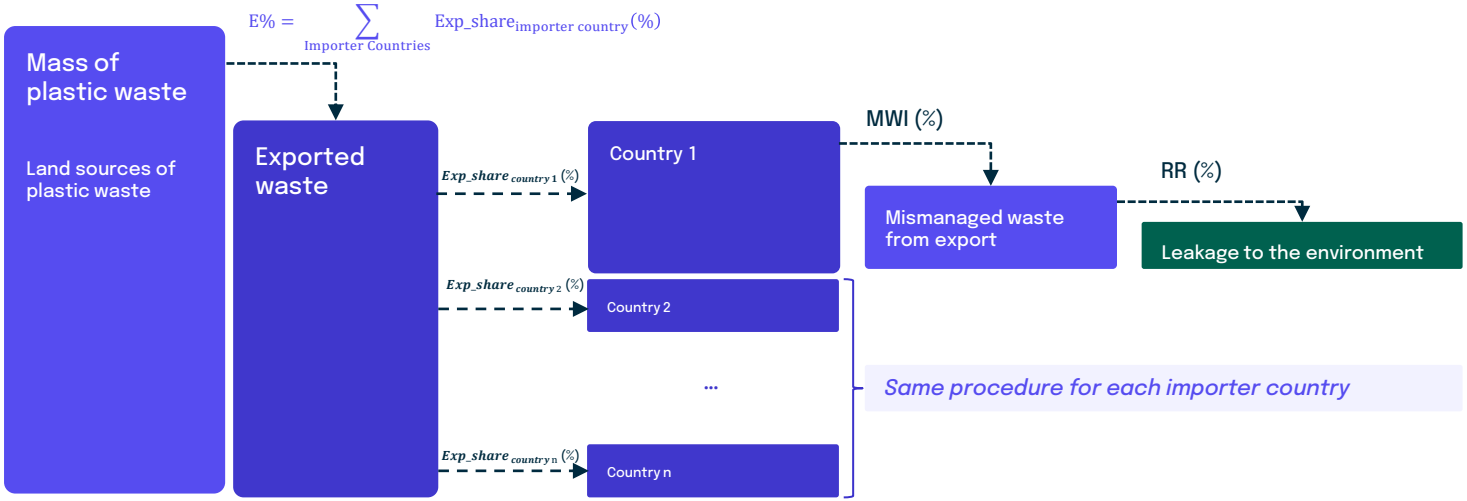
where compartment = ocean, land

Symbol	Description	Unit	Value	Reference	Additional comments
$\text{Mass of plastic waste}$	Mass of plastic waste produced	Tonnes	From primary data		
$\text{Exp\_share}_{\text{importer country}}$	Share of plastic that is exported to the importer country	%	From primary data		
$\text{MWI}_{\text{imported country}}$	Mismanaged Waste Index of the corresponding importer country	%	From external module ---	Country specific data available, either from PLASTEAX or based on World Bank What a Waste database, improved version by EA.	
$\text{RR}_{\text{compartement}}$	Release rate to natural compartment	%	From external module ---		To be aligned with module on RR.
$\text{Leak from export}_{\text{compartment}}$	Quantity released to ocean or land from export	Tonnes	Calculated		

The leakage from export pathway

$$\text{Leak from export}_{\text{compartment}}(t) = \sum_{\text{Importer Countries}} \text{Mass of plastic waste (t)} * \text{Exp\_share}_{\text{importer country}}(\%) * \text{MWI}_{\text{importer country}}(\%) * \text{RR}_{\text{compartement}}(\%)$$

where compartment = ocean, land



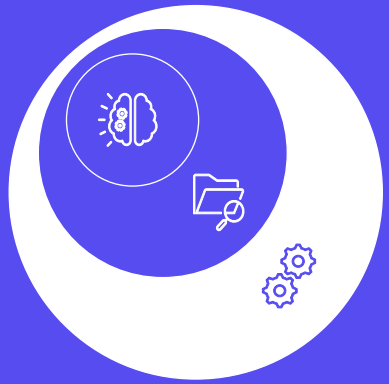
Focus on one importer country at a time

Sum up the contributions to leakage of each importer

Part. 3

Data

The secondary data needed to perform the assessment.



Overview from PLP

The methods to acquire this data from publicly available sources.

Data needed:

- Mismanaged Waste Index: Users can access data to calculate export leakage within the external tool. The generic dataset PLASTEAX (www.plasteax.earth) and dataset What a Waste (dataset on Municipal Solid Waste) are provided.
- Trade flows of plastic waste: Users can find trade data in database Comtrade (https://comtradeplus.un.org/) and BACI (http://www.cepii.fr/)
- Release Rate: Users can access data in the external tool.

RELEASE RATE MATRIX	Ocean ($RelR_{ocean}$) and freshwater ($RelR_{frw}$)	Terrestrial environment ($RelR_{terenv}$)	Ocean ($RelR_{ocean}$) and freshwater ($RelR_{frw}$)	Terrestrial environment ($RelR_{terenv}$)	Ocean ($RelR_{ocean}$) and freshwater ($RelR_{frw}$)	Terrestrial environment ($RelR_{terenv}$)
	Small Size (<5cm)		Medium Size (5-25cm)		Large Size (>25cm)	
Low residual value	40%	60%	25%	75%	5%	95%
Medium residual value	25%	75%	15%	85%	5%	95%
High residual value	15%	15%	10%	5%	1%	1%

To update, more granularity will be discussed in the module Release Rates

Packaging waste management

The user can find data that can be used for calculating leakage from export in the tool.
The generic dataset PLASTEAX (www.plasteax.earth) and dataset What a Waste (dataset on Municipal Solid Waste) are provided for all fates of plastic packaging. For the MWI (Mismanaged Waste Index), data from PLASTEAX for the categories flexible and rigid packaging are also available.

Waste Management Flexible and Rigid Packaging

From PLASTEAX database, MWI and Leakage for flexible and rigid packaging.
More detailed and polymer/category specific data are available in PLASTEAX database.

Country	ISO	Category	MWI Mismanaged (incl. Littering)	LR Leakage rate to Ocean and Waterways	Year
Argentina	ARG	Flexible all polymer	45%	6%	2019
Australia	AUS	Flexible all polymer	9%	1%	2019
Austria	AUT	Flexible all polymer	4%	0%	2019
Bangladesh	BGD	Flexible all polymer	97%	14%	2019
Bulgaria	BGR	Flexible all polymer	58%	6%	2019
Brazil	BRA	Flexible all polymer	49%	7%	2019
Canada	CAN	Flexible all polymer	6%	1%	2019
Switzerland	CHE	Flexible all polymer	6%	1%	2019
Chile	CHL	Flexible all polymer	28%	4%	2019
China	CHN	Flexible all polymer	38%	5%	2019
Colombia	COL	Flexible all polymer	29%	4%	2019
Cyprus	CYP	Flexible all polymer	9%	1%	2019
Czech Republic	CZE	Flexible all polymer	7%	1%	2019
Germany	DEU	Flexible all polymer	4%	0%	2019
Denmark	DNK	Flexible all polymer	5%	0%	2019
Ecuador	ECU	Flexible all polymer	62%	8%	2019
Egypt	EGY	Flexible all polymer	94%	13%	2019
Spain	ESP	Flexible all polymer	14%	1%	2019
Estonia	EST	Flexible all polymer	14%	1%	2019
Finland	FIN	Flexible all polymer	4%	0%	2019
France	FRA	Flexible all polymer	4%	0%	2019
United Kingdom	GBR	Flexible all polymer	4%	0%	2019

Data with greater granularity can be accessed within the PLASTEAX database.

It's important to note that the minimum granularity required for this data in order to be valuable is country level. However, including additional granularity such as the type of polymer, application, or type of plastic product can greatly enhance the value of the data.

Our commitment to continuous improvement

The Plastic Footprint Network's successful collaboration is built on pillars of:

- Open
- Non-competitive and productive dialog
- Leveraging science and supporting ongoing research
- Broadly empowering global stakeholders (product manufactuers, brand owners, treaty negotiators, regulators, consultants, NGOs, etc) to effectively do their part to address the plastic pollution crisis.

Given corresponding commitments to transparency and continuous improvement, we welcome and encourage your feedback and input on this document so that the methodology can continue to be enhanced and refined.

Thank you for supporting the work of the Plastic Footprint Network.

Contact us at: contact@plasticfootprint.earth

Our mission is to continuously advance Plastic Footprint Methodology, ensuring it remains at the forefront of sustainable practices and promoting its widespread adoption. By empowering companies to rigorously assess, enhance, and transparently report their plastic footprints, we aim to make significant strides in mitigating the plastic pollution crisis.

Plastic Footprint Network

The Plastic Footprint Network is convened by EA - Earth Action

This working group was led by:

earth action

With the participation from:

south pole

PFN secretariat is led by

earth action & south pole

2023 members

amplifi, Anthesis, CleanHub, ClimeCo, CIRAIG, ConsultantSeas, DECATHLON, earth action, evea, EVALUESERVE, GDFA, MarILCA, MARS, Minderoo Foundation, P&G, Polytechnique Montréal, Plastic Credit Exchange, Quantis, Removall, rePurpose, 2° Life, Seven Clean Seas, south pole, sympatex, SYSTEMIQ, Thai Union, THE OCEAN RACE, VERRA, WBCSD, WWF, ZERO PLASTIC OCEANS

Scientific Committee

Anthesis, earth action, SYSTEMIQ, Quantis, south pole, MarILCA, CIRAIG, Polytechnique Montréal, Minderoo Foundation, WWF

Illustrations by German Kopytkov

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