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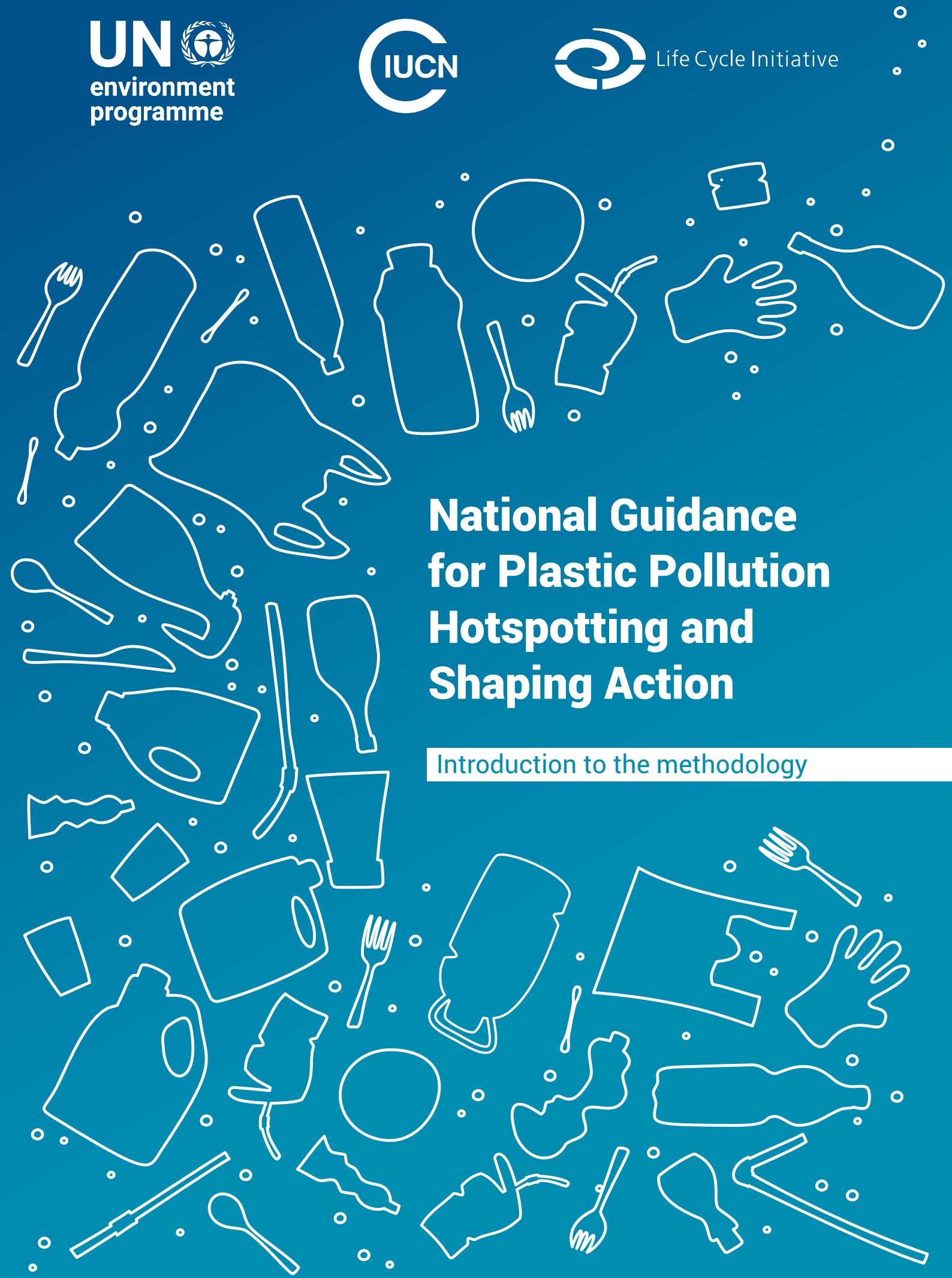

National Guidance for Plastic Pollution Hotspotting and Shaping Action

Introduction to the methodology

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Recommended citation: *United Nations Environment Programme (2020). National guidance for plastic pollution hotspotting and shaping action - Introduction report*. Boucher J.,; M. Zgola, et al. United Nations Environment Programme. Nairobi, Kenya.

Design and layout: Anna Mortreux | Anagram
Cover design: Anna Mortreux| Anagram

Printed by: UNESCO

ISBN No: 978-92-807-3793-6
Job No: DTI/2291/PA

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Introduction to the methodology

FOREWORD

Plastic pollution is a key environmental challenge that has received significant public attention in recent years. While it is often attributed to a "take-make-dispose" economic model, plastic leakage is a complex issue with multiple sources and actors involved. Addressing this challenge requires all stakeholders joining forces to intervene at various levels.

Resolution No. 6 on marine plastic litter and microplastics adopted at the Fourth Session of the UN Environment Assembly in 2019 highlighted the importance of a harmonised methodology to measure plastic flows and leakage along the value chain. However, countries and cities are still faced with a key knowledge gap in understanding the magnitude of the challenge and in need of tools to address the root sources of the problem.

Co-developed by the United Nations Environment Programme (UNEP) and the International Union for Conservation of Nature (IUCN), the National Guidance for Plastic Pollution Hotspotting and Shaping Action contributes to filling this gap. The Guidance provides a methodological framework and practical tools applicable at different geographical scales.

The Guidance also goes one step beyond the quantification and qualification of plastic pollution. It also offers an effective interface between science-based assessments and policy making. The basis of the Guidance starts with mapping plastic leakage and its impacts across the values chain by collecting and analysing relevant data on plastic production, consumption, waste management and disposal, and prioritise hotspots. The Guidance enables governments in collaboration with key stakeholders to identify and implement corresponding interventions and instruments to address the prioritised hotspots. Once decision-makers are equipped with credible knowledge on their status using the Guidance, they can set targets, agree and implement actions, and monitor progress.

The recent COVID-19 pandemic reminds us once more that we are living in a fast-changing world where emergencies and sustainability challenges are closely linked with the health of our environment and human wellbeing. This Guidance allows users to locate the most relevant hotspots in evolving circumstances in such emergencies and with updated data and analysis, help define solutions to meet new and pressing needs of a country or city. The methodology also enables the tracking of plastic consumption in various sectors such as healthcare, agriculture and food, logistics and transport, as well as in households, in order to develop corresponding solutions to reduce the adverse impacts.

We anticipate that governments, industries and other relevant stakeholders will find this Guidance useful in shaping national and local strategies to close the plastic tap and improve circularity. Building upon this Guidance, UNEP and IUCN are committed to further enhance the harmonisation of methodology at global level jointly with partners and stakeholders, while simultaneously supporting the collection and sharing of data that addresses national and local priorities. We look forward to engaging with all of you in our common fight against plastic pollution.

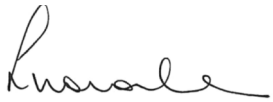

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TABLE DES MATIÈRES

EXECUTIVE SUMMARY

The attention on plastic pollution has intensified in recent years among national governments and the global community. The '**National Guidance for Plastic Pollution Hotspotting and Shaping Action**' (hereinafter referred to as '*the Guidance*') aims to provide a structure for the methods of identifying plastic leakage 'hotspots', finding their impacts along the entire plastic value chain, and then prioritising actions once these hotspots are identified. The Guidance sprung from our desire to address the challenge to define an effective strategy to address plastic pollution, in a systemic way. It is aimed at enabling countries, regions, or cities to take and use this structure, or framework, in their own environments.

Currently, a number of organisations and initiatives are looking to develop methodologies and approaches to assess the flow and leakage of plastics. They seek to address the complexity of the plastics value chain; the unquantified magnitudes of impacts on the environment, including marine ecosystems. There is a clear need for a better understanding of the origins of major plastic leakages as well as for more accurate knowledge on which actions will make the biggest impact. The Guidance attempts to address that need.

Countries, regions and cities will benefit from this more harmonised quantification of plastic leakage and impact, allowing them to establish a baseline for benchmarking and tracking the progress of interventions. As demonstrated in the Guidance, the assessment and tracking will need to be comprehensive, consistent, comparable and credible, based on a methodology which harmonises existing data, tools and resources. The Guidance takes a holistic approach, covering major types of plastic polymers and products, as well as their leakage and impacts along the full value chain. The Guidance is action oriented and supports the users with a reproducible workflow, with a set of tools and templates for data collection, analysis, diagnosis, planning and implementation.

The United Nations Environment Programme (UNEP), the International Union for Conservation of Nature (IUCN), and the Life Cycle Initiative have co-developed the Guidance: a harmonised methodological framework to be applied in the real world.

This Guidance will contribute to the achievement of Sustainable Development Goals (SDGs), in particular SDG 12 which focuses on ensuring sustainable production and consumption patterns, and SDG 14 which aims to conserve and sustainably use the services of the oceans, seas and marine resources. The Guidance will also contribute to the implementation of the resolutions adopted at the fourth session of United Nations Environment Assembly (UNEA4) in March 2019, including but not limited to the resolution on achieving sustainable production and consumption (UNEP/EA.4/Res.1), the resolution on marine plastic litter and microplastics (UNEP/EA.4/Res.6) and the resolution on addressing single-use plastic products pollution (UNEP/EA.4/Res.9).

ADDED VALUE OF THE GUIDANCE

HOLISTIC

Addresses all types of plastic leakage, including:
Mismanaged waste (single use, packaging, others)
Primary microplastics from abrasion (tyres, textiles, others) and intentionally used (cosmetics)
Accidentally lost plastics (fishing nets, primary pellets)
All plastic polymer and products (macroplastics and microplastics), and relevant sectors

SYSTEMIC

Helps key stakeholders to develop a systemic approach for solving the plastic pollution
On one hand, the granularity allows to target specific polymers or plastic applications
On the other hand, the life cycle perspective enables to encompass the full plastic value chain

ACTIONABLE

Guides the user through a reproducible workflow including data-collection, diagnostic, planning and implementation tools
Provides a clear structure to engage multiple stakeholders in a complex process
Helps prioritise the data-collection effort on what is really relevant for turning the tide on plastic pollution

TECHNICAL SUMMARY

The attention on plastic pollution has intensified in recent years among national governments and the global community. It remains a challenge to define an effective strategy to address plastic pollution in a systemic way, due to the complexity of the plastics value chain and the unquantified magnitudes of impacts on the environment, including marine ecosystems.

There is a clear need for a better understanding of the origins of major leaks of plastics as well as for more accurate knowledge on which actions will make the biggest impact. Currently, a number of organisations and initiatives are looking to develop methodologies and approaches to assess the flow and leakage of plastics. Stakeholders at national, sub-national and local levels could benefit from a more harmonised quantification of plastic leakage and impact, to establish a baseline for benchmarking and tracking progress of interventions. Such assessment and tracking will need to be consistent, comparable and credible, based on a methodology which harmonises existing tools and resources.

The United Nations Environment Programme (UNEP), the International Union for Conservation of Nature (IUCN), and the Life Cycle Initiative have co-developed a harmonised methodological framework: the '**National Guidance for Plastic Pollution Hotspotting and Shaping Action**' (hereinafter referred to as 'the Guidance'). The Guidance enables users at national, sub-national or local levels to prioritise actions through the identification of hotspots on plastic leakage and impacts along the full plastic value chain.

Key definitions

Some key terms used throughout the Guidance are defined below:

Hotspots refer to the most relevant plastic polymers, applications, industrial sectors, regions or waste management stages causing the **leakage** of plastics into the environment (including land, air, water and marine environment), as well as associated **impacts**, through the life cycle of plastic products.

Actions to address hotspots are considered in terms of interventions and instruments.

Interventions are tangible actions that can be taken to mitigate hotspots and are to be prioritised and designed to address the most influential hotspots in the plastic value chain.

Instruments are the ways an intervention may be practically implemented through specific regulatory, financial or informative measures, in light of context factors such as country dynamics and existing measures. As an illustrative example, a country may identify "mismanaged polyethylene bottles" as one of its hotspots. A relevant intervention may be an increase in bottle collection rate. A relevant instrument may be to instate a bottle return deposit scheme.

Structure of the Guidance

The Guidance is structured around nine individual modules, each with a set of supporting tools.

These modules and tools facilitate a replicable workflow that has been structured in three stages corresponding to three overarching questions:

1. **WHERE** TO ACT?
2. **WHAT** TO DO?
3. **HOW** TO DO IT?

These questions serve as a backbone for the Guidance, with the answers provided in the form of Hotspots (referring to the "*Where to act?*" question), Interventions (referring to the "*What to do?*" question), and Instruments (referring to the "*How to do it?*" question).

The workflow can also be viewed in terms of its technical component (modules T1 toT6) and strategic component (modules S1 to S3), which require contribution from both technical experts and decision makers.

STAGE 1: Hotspots | **WHERE TO ACT?**

This stage consists of three steps: data collection (modules T1 and T2), leakage and impact modelling (modules T3 to T6), and hotspots prioritisation (module S1).

1. **Data collection** (T1-T2): obtaining data and information to better understand the plastic value chain at the production, consumption and disposal stages of plastic products, as well as the waste management system. This step prepares data inputs and information for the quantitative analysis at national, sub-national or local level for hotspot identification in modules T3-T6.
2. **Leakage and impact modelling** (T3-T6): analysing the key sources of leakage and the associated potential impacts for both macroplastics and microplastics. Based on the data collected in T1-T2, modules T3-T6 yield a list of hotspots under five hotspot categories: polymer, application, industrial sector, regional, and waste management hotspots.
3. **Prioritisation of hotspots** (S1): engaging stakeholders to prioritise and formulate hotspots in a strategic and explicit way considering stakeholders' knowledge of the local policy and socio-economic context.

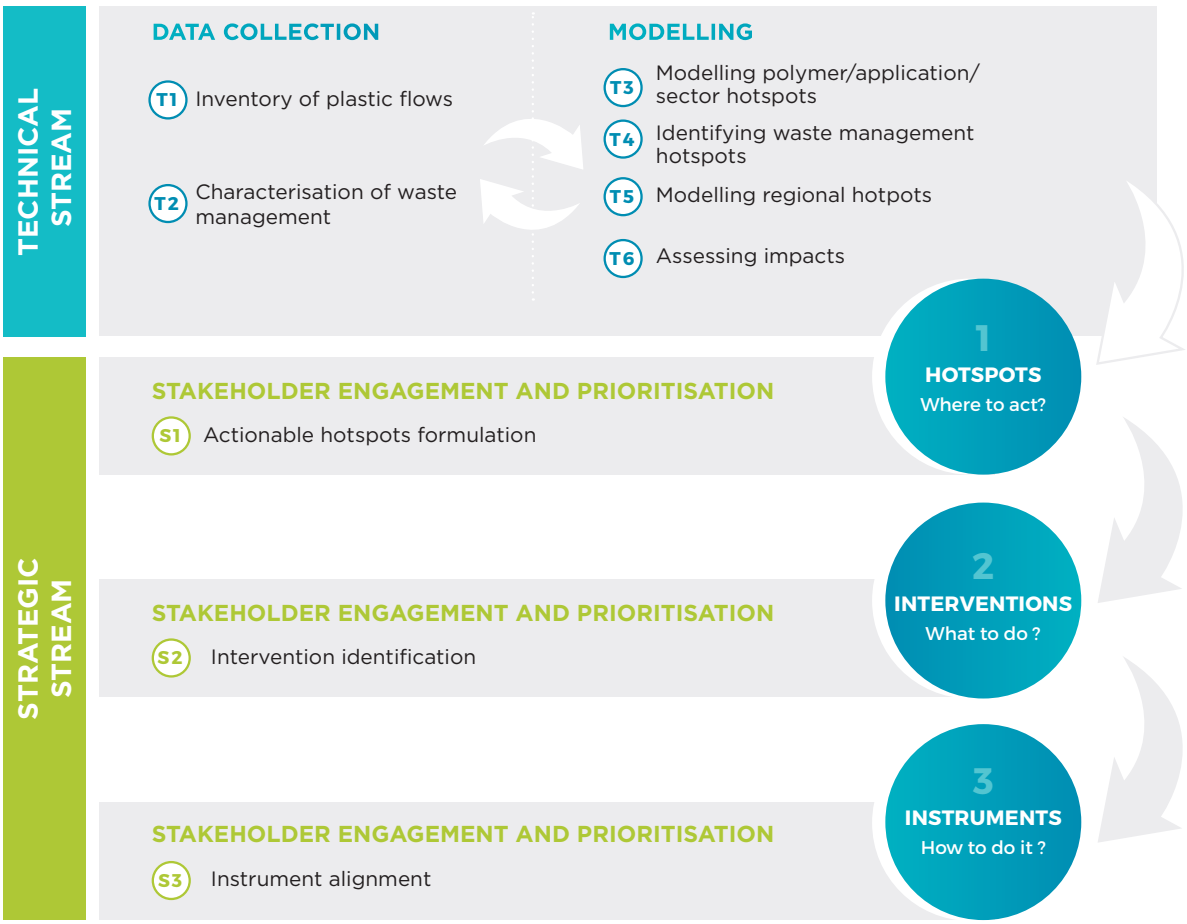
STAGE 2: Interventions | **WHAT TO DO?**

The Guidance proposes a wealth of potential interventions based on extensive research and consultations (see e.g. Wang et al., 2019), as well as a process to identify the current intervention gap, identify new interventions and prioritise actions. Be it at a national, sub-national or local level, module S2 allows to focus on relevant interventions and to tackle the full value chain in a systemic way, including the sources, the use, and/or the end-of-life of the plastics.

STAGE 3: Instruments | **HOW TO DO IT?**

Through this last stage within module S3, the Guidance offers insight on key strategies for stakeholder engagement and identification of appropriate regulatory, financial or informative measures to successfully implement the planned interventions.

SCHEMATIC OF THE GUIDANCE: WORKFLOW, KEY ACTIVITIES AND MAIN DELIVERABLES



Users of the Guidance

The primary users of the Guidance are governments. They can use the results of the analysis to design, plan and implement policy instruments and actions to reduce plastic pollution. The Guidance is designed to be used primarily at national level, but the approach can be adapted to accommodate policy makers at sub-national and local levels , as well as stakeholders from the private sector, academia, and NGOs.

To apply the Guidance three teams are needed:

- → **A coordinator team** to manage and coordinate the project; it typically consists of regional agencies, governmental bodies and a NGOs.
- → **A technical team** to specialise in the research and analytical aspects; it typically consists of research institutes, universities, consultancy firms and experts from the above mentioned institutions.
- → **An enabler group** of relevant stakeholders to provide decision-making support to the Technical and Coordinator teams. It should typically include members from the government, NGOs, representatives of the private sector, local plastic industry and waste management associations.

Three separate documents relate to the Guidance

The Guidance consists of three documents:

1. **Introduction to the Guidance** *(this document)*: This document presents an overview of the methodological framework, its structure and workflow, serving as a manual and quick reference for users.
2. **Modules**: The nine modules (T1-T6 and S1-S3) provide detailed scoping and definitions, data collection instructions, and modelling approaches on the three overarching questions addressed by the methodological framework (i.e. "*Where to act?*", "*What to do?*", and "*How to do it?*"). They are designed to provide technical experts with thorough explanation of the detailed modelling steps, mathematical formulas and parameters of the methodology. The modules are provided in the format of Microsoft PowerPoint documents.
3. **Data-collection and modelling spreadsheets and templates**: These spreadsheets and templates serve as practical tools to guide the user in the project. Three types of tools are proposed: (1) Input tools with data collection templates and generic data libraries, (2) Assessment tools to carry out the necessary modelling and calculations, and (3) Output tools that generate graphs with results and support the user in drawing conclusions.

The modules, spreadsheets and templates are subject to change over time to accommodate improvements and enrichments to the methodology, improved from the learnings of pilot projects and further applications in countries. The development of this Guidance has been carried out through a comprehensive desktop study of existing methodologies and tools, consultation from stakeholders and experts, and preliminary pilot testing. The latest version of the modules and tools will be made available on the website of the Life Cycle Initiative (https://plastichotspotting.lifecycleinitiative.org/).

Structure of the Introduction to the Guidance (this document)

This introductory document presents a high-level overview of the "*National guidance for plastic pollution hotspotting and shaping action*". It provides the reader with an overview of the nine modules. The report is structured as follows:

SECTION 1
introduces the knowledge gaps to address plastic pollution, and provides context for and objectives of the Guidance.

SECTION 2
provides an overview of the Guidance with its structure and workflow.

SECTION 3
explains the key elements of the hotspot analysis.

SECTION 4
focuses on the prioritisation of interventions.

SECTION 5
introduces the process for developing instruments.

SECTION 6
offers practical tips for applying the Guidance at the national, sub-national or local level.

SECTION 7
consists of a glossary of the key terms used.

INTRODUCTION

1.1 Background

Addressing plastic pollution is an urgent need, considering the rising level of plastics ending up in the environment (i.e. the "leakage") and the effects on ecosystems as well as on human health (i.e. the "impacts"). There is no single solution to plastic pollution. Plastic pollution and related solutions to address this issue can be profiled as follow:

By **plastic leakage** we refer to a quantity of plastic entering the oceans as well as other environmental compartments (e.g. rivers, soil, air).

By **plastic impact** we refer to a potential effect the leaked plastic may have on ecosystems and/or human health.

1. NUANCED

solutions to this problem will require multifaceted efforts and collaboration among stakeholders across the value chain, including both upstream and downstream.

2. SPECIFIC

plastic is used in different forms (polymers) and for many different applications[1] with different leakage rates and impacts.

3. CONTEXTUALISED

plastic pollution is a locality-specific issue. Topography, climate conditions, local regulations, infrastructure in place and cultural behaviours are all key determinants of plastic leakage and associated impacts.

Plastic pollution is transboundary and cross-cutting, and it requires systemic solutions covering policy, technology, management, financing, knowledge and research, awareness raising and behaviour change (UNEP, 2019). Given the growing awareness on plastics pollution and the urgency to address it, stakeholders across governments, the private sector, civil society and academia need to act quickly but effectively, often with only limited resources available.

However, gaps in addressing plastic pollution still exist in knowledge, policy, technology, awareness and financing (UNEP, 2019). In terms of knowledge, specific gaps subsist regarding stocks, flows and pathways of plastic into the environment, while the biggest gap of knowledge concerns the impacts resulting from the leaked plastic (Boucher et al., 2019).

Many governments, NGOs and private entities have either expressed interest and committed to act or have taken different types of action, from eco-design efforts, to bans or beach-cleanups. A methodology to help prioritise actions and identify potential burden shifting from one problem to another would support decision makers to target the most effective actions. In this regard, UNEP, IUCN and the Life Cycle Initiative have partnered to develop this 'National Guidance for Plastic Pollution Hotspotting and Shaping Action', which aims to address this knowledge and solution gap by identifying hotspots and shaping corresponding actions built on the existing knowledge and available data.

1.2 Overall goal of the Guidance

The Guidance aims to provide a publicly available and harmonised methodological framework to facilitate the prioritisation of solutions. Stakeholders at national, sub-national and local levels will be equipped with a prioritisation tool to identify key hotspots and drive sound actions to "close the plastic tap"[2]. It will allow consistent national and sub-national baselines on marine plastics and plastic waste to be developed, for the monitoring and evaluation of interventions.

The Guidance is built on existing efforts to develop methodologies for mapping and quantifying plastic flows, leakage and impacts, including the UNEP publication (UNEP, 2018), the recent IUCN publication (Boucher et al., 2019) and the

The **Guidance** introduces a clear and simple science-based workflow to support the development of key interventions and instruments at the national, sub-national or local levels, to help turning the tide on plastic pollution.

1. Applications are products or packaging items that contain plastic.
2. The expression "close the plastic tap" is used here to refer to alleviating the leakage, analogous to turn off a leaking faucet.

Plastic Leak Project (PLP, 2019). This Guidance also builds upon preliminary work for the assessment of plastic leakage at national or supply chain levels, such as the PiPro Sea project[3] for data collection, other IUCN projects and reports[4] , and the Plastic Leak Project[5].

Alongside the methodological development at the modelling level, the Guidance is also tested in several countries and geographies during 2019 and 2020, including Cyprus, Kenya, Mauritius, Menorca (Spain), Mozambique, South Africa, Thailand, and Vietnam. The process of data collection, stakeholder interviews and engagement at the local level provides rich and first-hand experience, for the further improvement of the Guidance.

The primary users of the Guidance are public and private stakeholders at national level, but the approach can be adapted to accommodate sub-national and local users.

This Guidance will contribute to the achievement of Sustainable Development Goals (SDGs), in particular SDG 12 which focuses on ensuring sustainable production and consumption patterns, and SDG 14 which aims to conserve and sustainably use the services of marine resources. The Guidance will also contribute to the implementation of the resolutions adopted at the fourth session of United Nations Environment Assembly (UNEA4) in March 2019, including but not limited to the resolution on achieving sustainable production and consumption (UNEP/EA.4/Res.1), the resolution on marine plastic litter and microplastics (UNEP/EA.4/Res.6) and the resolution on addressing single-use plastic products pollution (UNEP/EA.4/Res.9).

1.3 Objectives and added value of the Guidance

The Guidance leverages existing materials, resources and learned experiences to bridge knowledge gaps and ultimately contributes to preventing leakage of plastics to the environment and subsequent impacts.

More specifically, the Guidance provides a methodological framework to answer three questions intended to remediate plastic pollution:

1. WHERE TO ACT?

→ Identify which type of leakage and impact is predominant along the plastic value chain (see section 3.2.1)

→ Identify where the leakage is occurring at national, sub-national and local levels (see section 3.2.2)

→ Identify what is the key driver of the leakage along the waste management system (see section 3.2.3)

2. WHAT TO DO?

→ Prioritise interventions and assess their influence on reducing plastic leakage and impacts, while also considering potential environmental or socio-economic trade-offs (see section 4)

3. HOW TO DO IT?

→ Implement relevant interventions via effective instruments (see section 5)

Key added value of the Guidance is summarised in **Figure 1**.

FIGURE 1

ADDED VALUE OF THE GUIDANCE

HOLISTIC

Addresses all types of plastic leakage, including:
Mismanaged waste (single use, packaging, others)
Primary microplastics from abrasion (tyres, textiles, others) and intentionally used (cosmetics)
Accidentally lost plastics (fishing nets, primary pellets)
All plastic polymer and products (macroplastics and microplastics), and relevant sectors

SYSTEMIC

Helps key stakeholders to develop a systemic approach for solving the plastic pollution
On one hand, the granularity allows to target specific polymers or plastic applications
On the other hand, the life cycle perspective enables to encompass the full plastic value chain

ACTIONABLE

Guides the user through a reproducible workflow including data-collection, diagnostic, planning and implementation tools
Provides a clear structure to engage multiple stakeholders in a complex process
Helps prioritise the data-collection effort on what is really relevant for turning the tide on plastic pollution

3. Pioneer project SEA (PiPro SEA): PiPro SEA is a cross value chain collaboration led by Nestlé and facilitated by the Ellen MacArthur Foundations. PiPro SEA aimed to develop a standardised approach for quantifying plastic packaging flows throughout the plastic value chain within a specific geography in the form of an Assessment Framework (AF). The AF was piloted in Indonesia and in India.
4. https://www.iucn.org/theme/marine-and-polar/our-work/close-plastic-tap-programme
5. https://quantis-intl.com/metrics/initiatives/plastic-leak-project/

THE STRUCTURE OF THE GUIDANCE

2.1 Three overarching questions as the backbone of the workflow

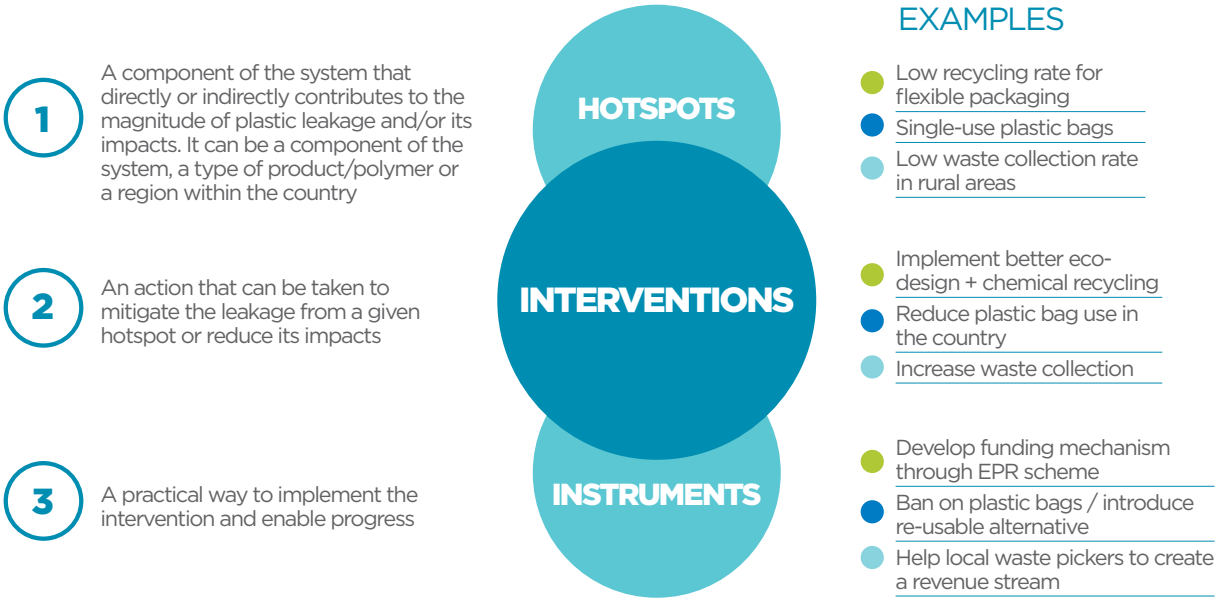
As stated in section 1.3, the Guidance aims to support stakeholders at national, sub-national and local levels to answer three overarching questions related to plastic pollution:

- **WHERE** TO ACT?
- **WHAT** TO DO?
- **HOW** TO DO IT?

These questions serve as a backbone for the Guidance, with the answers provided in the form of HOTSPOTS (referring to the "*Where to act?*" question), INTERVENTIONS (referring to the "*What to do?*" question), and INSTRUMENTS (referring to the "*How to do it?*" question).

The relationship among these three components is shown in **Figure 2**.

FIGURE 2:
Relationship between hotspots, interventions and instruments



At the heart of the methodology is the identification of relevant and beneficial interventions that are supported and will be implemented by stakeholders. Such interventions are identified based on the key hotspots identified at a national, sub-national or local level. And to carry out an intervention, appropriate and actionable instruments must be identified.

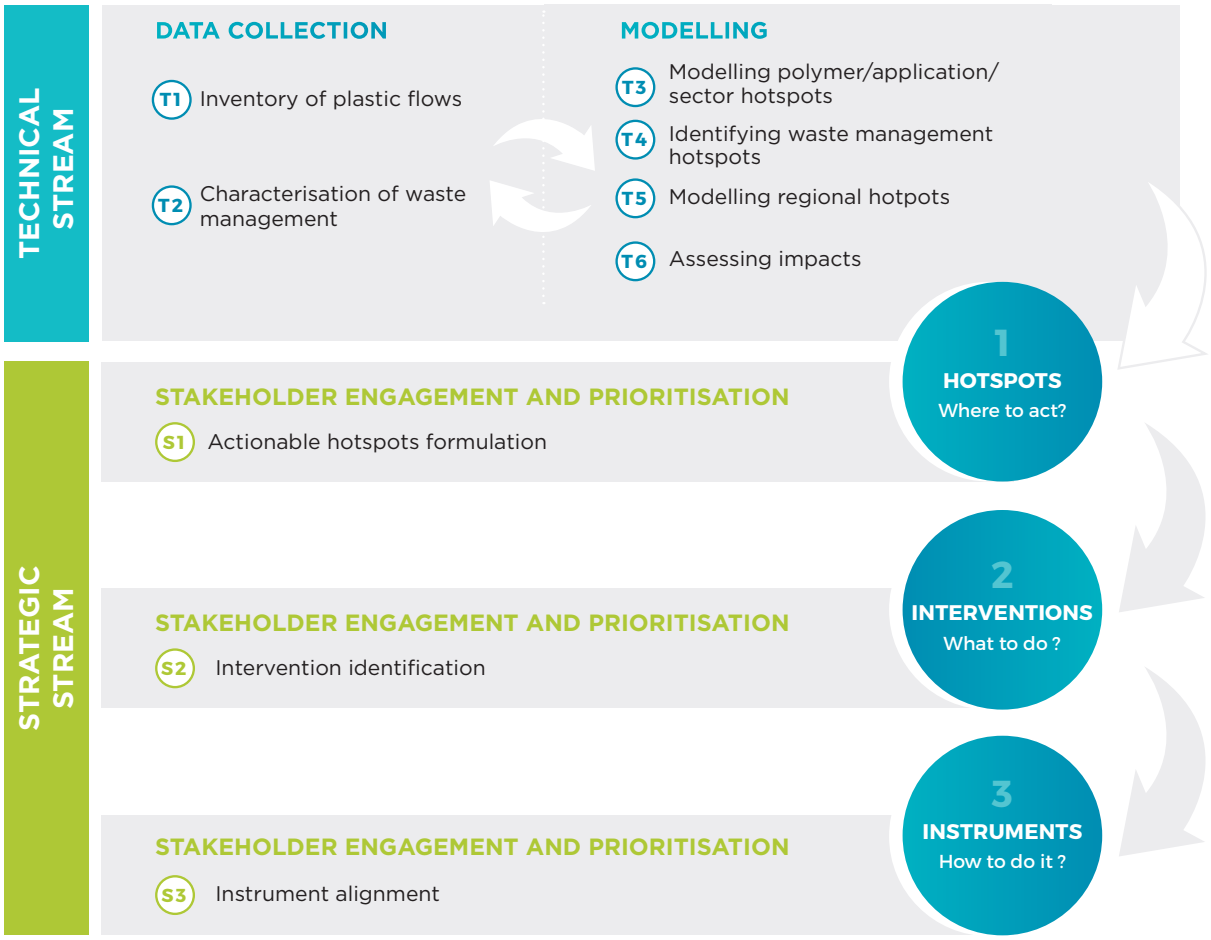
Following this logic, the tools provided to the users are organised in a series of nine modules that are divided in a technical stream (modules T1 to T6) and a strategic stream (modules S1 to S3), as illustrated in **Figure 3**.

The approach is designed with a user-centric lens, i.e. it aims to provide relevant information and motivation to relevant stakeholders to make environmentally conscious decisions (Boucher et al., 2018). Based on these principles, this Guidance therefore addresses not only the technical aspects of the problem, but also the strategic and organisational steps needed to develop and converge on an actionable plan to tackle the most relevant hotspots identified.

The identification of hotspots is intended to be a standardised and replicable process. Given similar data inputs, the technical modules - even when used by different users - should generate a highly similar set of potential hotspots.

The process of identifying interventions is intended to be more subjective, which will be conducted through stakeholder consultation and validation. The Guidance

FIGURE 3:
The three key stages of the Guidance (Hotspots/Interventions/Instruments), comprised of nine modules split into technical and strategic streams



and its modules provide a list of non-exhaustive and potential interventions by default, corresponding to broad categories of leakage and/or impacts. However, the final decision on which interventions to focus on rests with the user of the Guidance and relevant stakeholders.

The evaluation and selection of appropriate instruments and the development of an action plan are organised as a decision-making process by a group of public and private sector stakeholders, with consideration of country-specific dynamics. Over time, the methodology can be used to establish a baseline, set targets and regularly assess progress and achievement.

2.2 The nine technical and strategic modules

To help users answer the three overarching questions, the Guidance consists of a series of modules with logical connections, each of them including a coherent set of tools (templates and spreadsheets) and tutorials (slide decks).

The application of these modules is to be carried out by three teams: a Technical Team specialised in research and analytical aspects; a Coordinator Team to manage the project and guide the other teams; and an Enabler Group of relevant stakeholders to provide crucial input and advice to the technical and coordinator teams. More guidance on these teams is provided in **section 6**.

A hotspot is defined as a component of the system that directly or indirectly contributes to plastic leakage and its associated impacts, and that can be acted upon to mitigate this leakage.

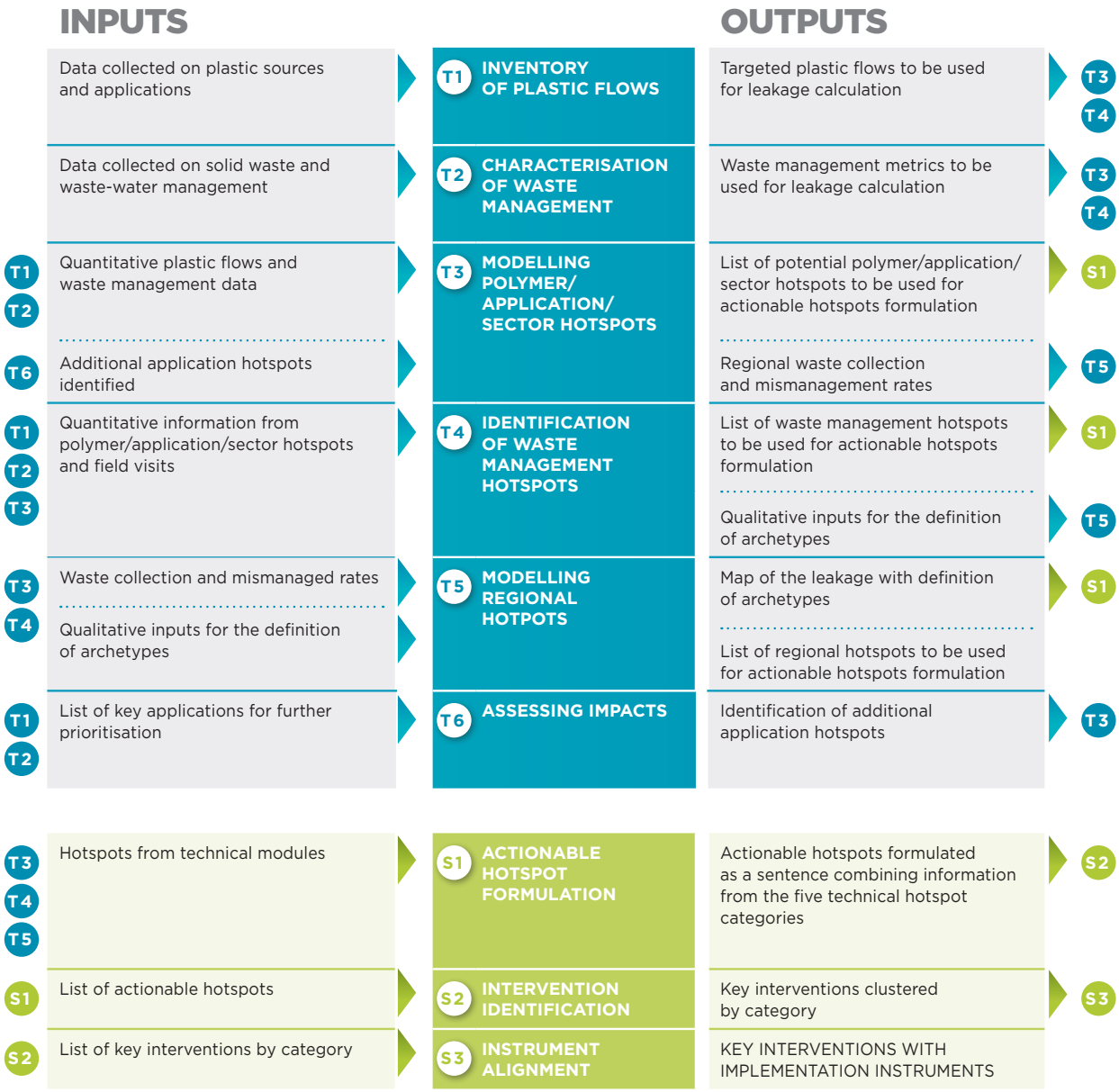
An intervention is defined as a tangible action that can be taken to mitigate the leakage from a given hotspot or reduce its impacts.

An instrument is defined as a practical way to implement an intervention and enable progress through specific regulatory, financial or informative measures.

The logic underpinning the Guidance ensures that each module contributes to providing information to the other modules, hence building a consistent thread of information along the workflow. Key inputs and outputs for each module are illustrated in **Figure 4**.

This modular approach will allow in the future to update the Guidance as a better understanding of the assessment of plastic leakage and impacts becomes available and the list of interventions is enriched. Each module can be updated or improved without altering the whole logic and value of the Guidance.

FIGURE 4:
Key inputs and outputs per module



WHERE TO ACT?
IDENTIFICATION OF HOTSPOTS

3.1 The hotspotting rationale and process

Hotspots are identified through the data-collection and modelling phases of the Guidance, by way of six technical modules (T1 to T6), and prioritised by applying strategic module 1 (S1) as illustrated in **Figure 5**.

Hotspot identification is a core element of the Guidance and the most technical part of the workflow. **A hotspot is regarded as a component of the system that directly or indirectly contributes to plastic leakage and its associated impacts, and that can be acted upon to mitigate this leakage.** A hotspot can either be a geographic location in the country or an element of the plastic value chain.

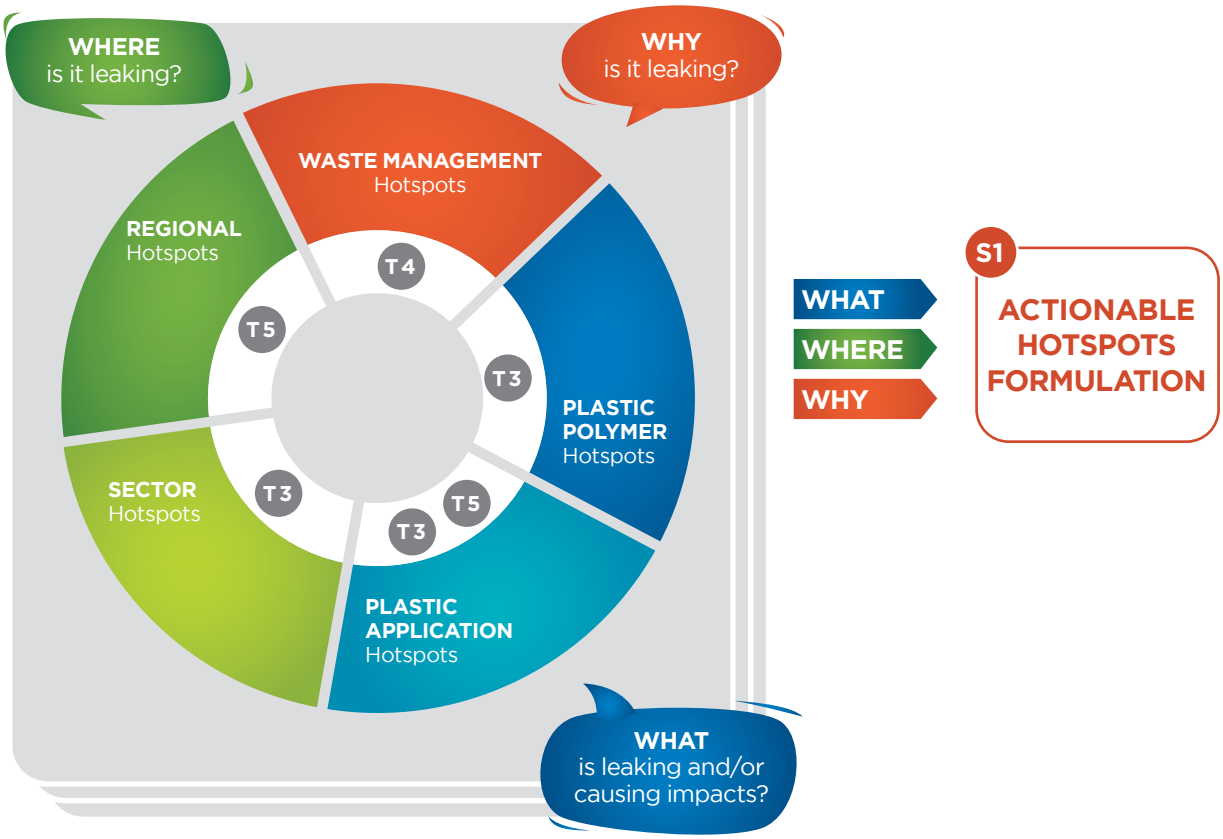
Identifying hotspots provides the answer to the question **"Where to act?"**. In the context of plastic leakage, this question can be split in three sub-questions:

WHAT IS LEAKING AND/OR CAUSING IMPACTS?
(i.e., which polymer and/or application)

WHERE IS IT LEAKING?
(i.e., in which location or from which industrial sector)

WHY IS IT LEAKING?
(i.e., what aspect of our technosphere[6] is in disrepair)

FIGURE 5:
Hotspots categorisation in this Guidance



6. Technosphere is considered the part of the environment built by and for humans.

Comprehensive answers to these three questions are essential to generate actionable information and to identify relevant interventions and instruments.

Firstly, results for each hotspot category are generated by aggregating available data and modelling where relevant information is missing to yield potential hotspots. For each hotspot type, **the prioritisation is based on criteria considering leakage magnitude and potential environmental impacts.** Prioritisation allows to focus on the most relevant hotspots/interventions/instruments.

Secondly, the five categories provide a systemic view of plastic leakage and associated impacts to identify key hotspots at a national, sub-national or local level. When working at national level, it is encouraged to increase the granularity of the analysis by defining several archetypes to reflect different contexts potentially calling for different solutions. **An archetype is defined as a category of areas within the country where the waste generation rate and the waste management infrastructure are considered homogeneous**. Urban areas, rural areas and coastal areas could be considered examples of archetypes.

Lastly, a final step of reformulation is necessary to yield a list of explicit and actionable hotspots that can be easily communicated.

The following sections delve deeper into each step of the hotspotting process. Section 3.2 introduces each hotspot category by describing how modules are used to build hotspot information; section 3.3 explains how archetypes are defined, and eventually section 3.4 specifies the approach to come up with reformulated actionable hotspots.

3.2 The five categories of hotspots

In this section, hotspot categories are described further, by classification of the hotspot as either a plastic mass balance assessment (polymer, application and sector hotspot) (section 3.2.1), a geographic assessment (regional hotspots) (section 3.2.2), or a qualitative assessment of waste management practices (waste management hotspots) (section 3.2.3).

3.2.1 Polymer, application and sector hotspots

What key information are we looking for?
Polymer, application and sector hotspots intend to answer the question "what is leaking and/or causing impacts?". Each of these hotspot categories is described below.

Polymers hotspots - The plastic polymer hotspot category accounts for polymers involved in plastic leakage through an assessment of plastic flows at the polymer level, by way of technical module T3. This quantitative analysis covers common polymers (PP, PET, PS, PVC, HDPE, LDPE, polyester and synthetic rubber) and clusters other polymer types in a category labelled "other". This polymer hotspot information could typically inform and help prioritise the improvement of the waste collection and management at a national, sub-national or local level, including recycling strategies.

Application hotspots - The plastic application hotspot category accounts for plastic applications that are most likely to increase plastic leakage into oceans or other environmental compartments and/or are suspected of generating environmental or human health impacts from the leakage. Plastic application refers to a product or packaging partially or completely made of plastic. Common examples of applications include straws, grocery bags, beverage bottles, and fishing nets. An inventory of plastic applications is defined in module T1, and their associated leakage is calculated in module T3. For application hotspots, a qualitative assessment of the potential environmental impacts is also proposed, as described in module T6. The outputs of the application hotspots are intended to raise awareness among decision makers, producers, retailers and final users on uses that are most prone to leakage, as well as to flag specific applications that are suspected of causing environmental impacts (e.g., loss of marine biodiversity generated through entanglement or suffocation in marine environment). This application hotspot information could typically help prioritise regulations and incentives on specific products (e.g. the ban on specific plastic applications, or the implementation of deposit schemes).

Sector hotspots - The sector hotspot category accounts for industrial sectors with the highest contribution to plastic leakage, either in absolute quantity or relative to the plastic waste generated within the sector. The sector hotspot supplements the polymer and application hotspots with several attributes:

1. It does not only account for the leakage in the form of macroplastics but also in the form of microplastics;
2. It provides by sector a split between short lasting (< 1-year lifetime) and long lasting (> 1 year lifetime) products embedding or made of plastic;
3. It also encompasses industrial waste management, to complement the information about household waste management.

The intention of the sector hotspots is to provide industries with useful information to help them act together with value chain partners. Sector hotspot category includes by default ten sectors, but can be complemented

with additional sectors based on user need and data availability. The sectors used by default are: Packaging, Automotive & Transportation, Construction, Electrical & Electronics, Medical, Fishing, Agriculture, Textiles, Tourism and Others.

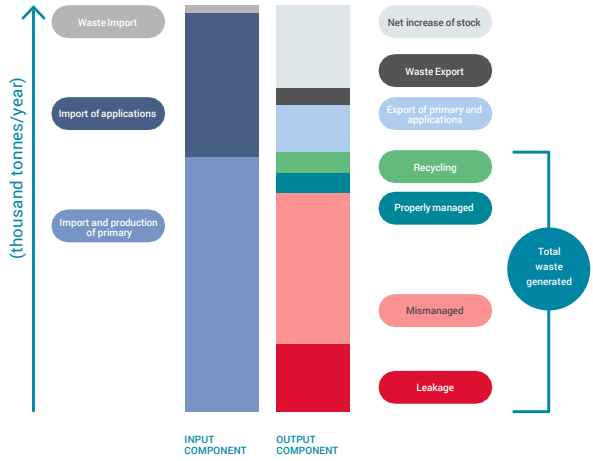
A default list of the components covered by each of the categories cited above is provided in **Table 1**. This list is non-exhaustive and may change over time.

TABLE 1:
Default list of components in each hotspot category

HOTSPOT CATEGORY	DEFAULT LIST OF COMPONENTS
POLYMERS	PP, PET, PS, PVC, HDPE, LDPE, Polyester, Synthetic rubber, and Others
APPLICATIONS	Bags, Bottles, Lids & caps, Crates & boxes, Cups, Cutlery, Straws, Food packaging, Film & packaging containing non-food products, Household/hygienic articles, Fishing nets, and Others[7]
SECTORS	Packaging, Automotive & Transportation, Construction, Electrical & Electronics, Medical, Fishing, Agriculture, Textiles, Tourism, and Others

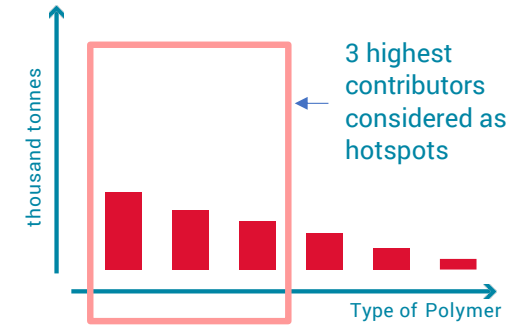
How are hotspots modelled and prioritised?

Although polymer, application and sector hotspot categories convey quite different pieces of information, they rely on the same mass balance approach. Consequently, they share a common data structure and follow the same hotspot prioritisation procedure, which is described hereafter.



DATA STRUCTURE AND LEAKAGE CALCULATION

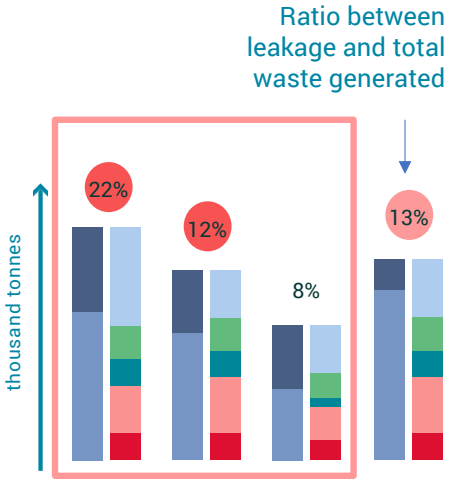
For each element of the hotspot category (a specific polymer, application or industrial sector), we establish a mass balance between plastic inputs and outputs. Generally, inputs include production and imports of all kinds, while outputs encompass waste generation and export of all kinds. Outputs also include the quantity of plastics that is leaking in the environment. This leakage is derived from the total waste generated by first applying a loss rate to assess the quantity of plastic lost along the waste management system, to which we then apply a release rate in order to estimate the quantity of plastic leaking to the environment. More details about this calculation process are available in the practical tools supplied within the Guidance and in the PLP guide[8].



FIRST HOTSPOTTING STAGE BY ABSOLUTE QUANTITY OF LEAKAGE

Once plastic material flows are established for all elements in a hotspot category, results are ranked based on their leakage in absolute quantity. At this stage, the three highest contributors are considered as hotspots[9].

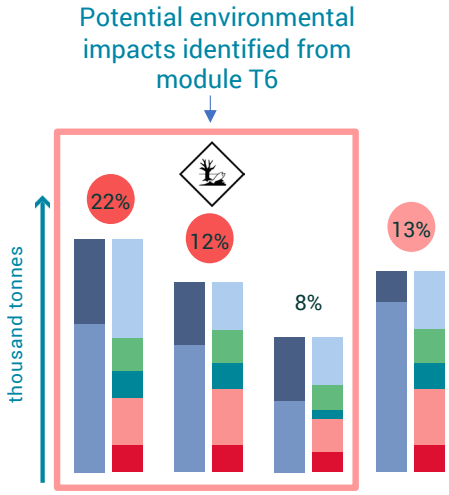
7. This list is indicative and will be adjusted based on the context of the area under study.
8. https://quantis-intl.com/report/the-plastic-leak-project-guidelines/
9. This is an arbitrary number chosen to yield a manageable number of hotspots; it can be increased based on user preference.



SECOND HOTSPOTTING STAGE BY RELATIVE AMOUNT OF LEAKAGE

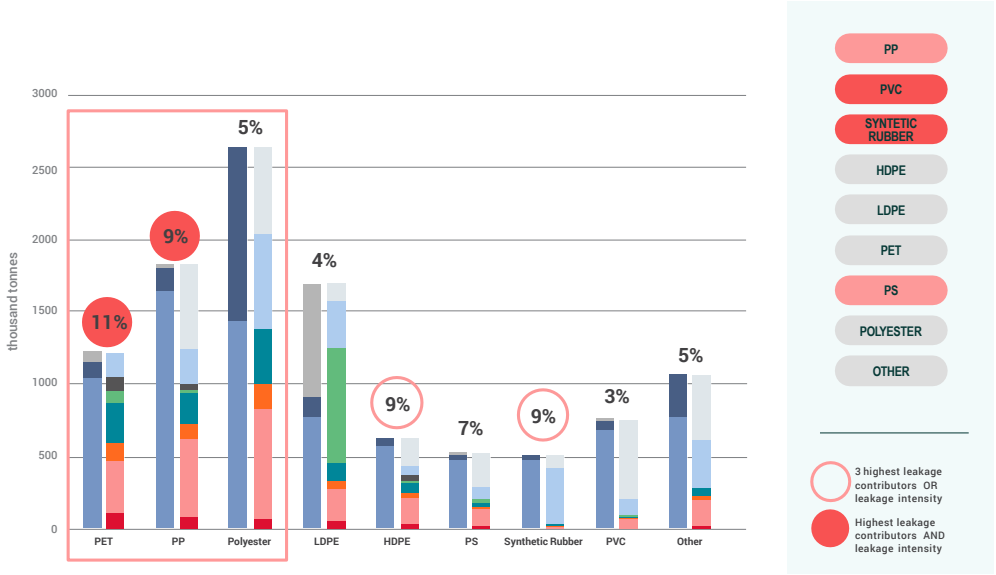
Each element is then evaluated on its relative leakage rate, defined as the ratio between leakage and total waste generated. The three highest contributors in relative terms are also considered as hotspots.

The combination of a ranking based on the leakage in absolute and relative value allows to further prioritise the hotspots: a hotspot ranking among the top three contributors both in absolute AND relative terms should be regarded as crucial.



THIRD HOTSPOTTING STAGE BY POTENTIAL IMPACTS

Specifically, for application hotspots, a third prioritisation approach is used to determine if a plastic application is liable to generate severe environmental impacts (e.g., plastic commonly found on beaches and/or prone to entanglement). A symbol is then stamped next to hotspots that are most harmful to the environment. A tool for the assessment of these impacts is provided in module T6.



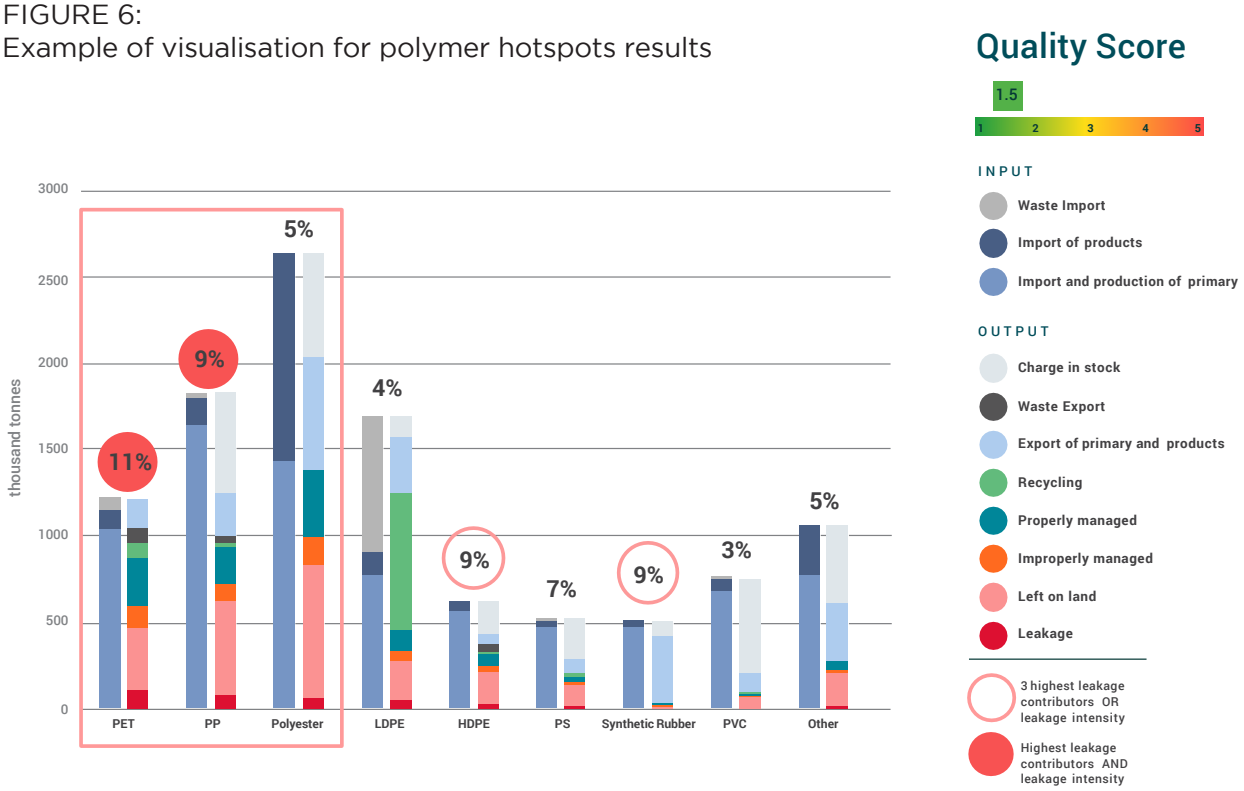
HOTSPOTS SUMMARY

Hotspots are eventually summarised in a list where they are highlighted by colours in accordance with level of priority. The selected hotspots (highlighted in light or dark pink on the figure) are retained for the next stages of hotspot formulation (module S1) and intervention identification (module S2).

Visualisation and critical appraisal of hotspot results

The final visualisation of hotspot results is illustrated in **Figure 6**, by taking polymer hotspots as an example.

FIGURE 6:
Example of visualisation for polymer hotspots results



In addition to providing a clear overview of hotspots within a category, the visualisation of results covers information that is useful to understand the characteristics of plastic value chain be it a polymer, an application or plastic originating from a specific industrial sector. Furthermore, a "**hotspot quality score**" is indicated to evaluate the reliability of hotspot analysis prior to identifying appropriate interventions. A hotspot quality score below 3 indicates that hotspot results are robust enough to support decisions about relevant interventions, while a hotspot quality score above 3 suggests the data sources or the modelling approach used to generate the results may require improvements prior to any meaningful decision on interventions. More details on the scoring methodology are provided in Section 3.5.

In the example given in **Figure 6**, PP and LDPE are considered crucial hotspots since they rank among the top three leakage contributors in terms of absolute value and relative leakage rate, while HDPE and Polyester are considered hotspots with regards to their contribution to leakage in either absolute or relative terms. In this case, the hotspot quality score, which is above 3, indicates that data sources or modelling require improvements prior to any decision on possible interventions.

3.2.2 Regional hotspots

What key information are we looking for?

The regional hotspot category identifies geographical areas with the highest leakage potential within a country. The regional hotspots identification, which is performed in module T5, relies on Geographic Information System (GIS) tools and depends on several variables including population density, waste generation rates, waste collection rates, share of plastic in the waste stream, distance to shore and main rivers, catchment run-off, as well as topographic patterns, location of touristic areas, informal settlements, dumpsites and fishing harbours when available. The aim of this category is to provide governments with valuable geographical information on plastic leakage in terms of locality or watershed of origin.

How are hotspots modelled and prioritised?

The regional hotspots are prioritised based on leakage intensity and are represented on a map. The hotspots are a combination of critical variables including surface runoff intensity in a watershed, population density inside districts or localities and their distance to shore, that ultimately form archetypes. The hotspots are prioritised based on the leakage quantity.

Visualisation and critical appraisal of hotspot results

Figure 7 illustrates the final visualisation for regional hotspots. The hotspots are displayed with a colour intensity scheme as a function of leakage quantity.

FIGURE 7:
Example of regional hotspots visualisation

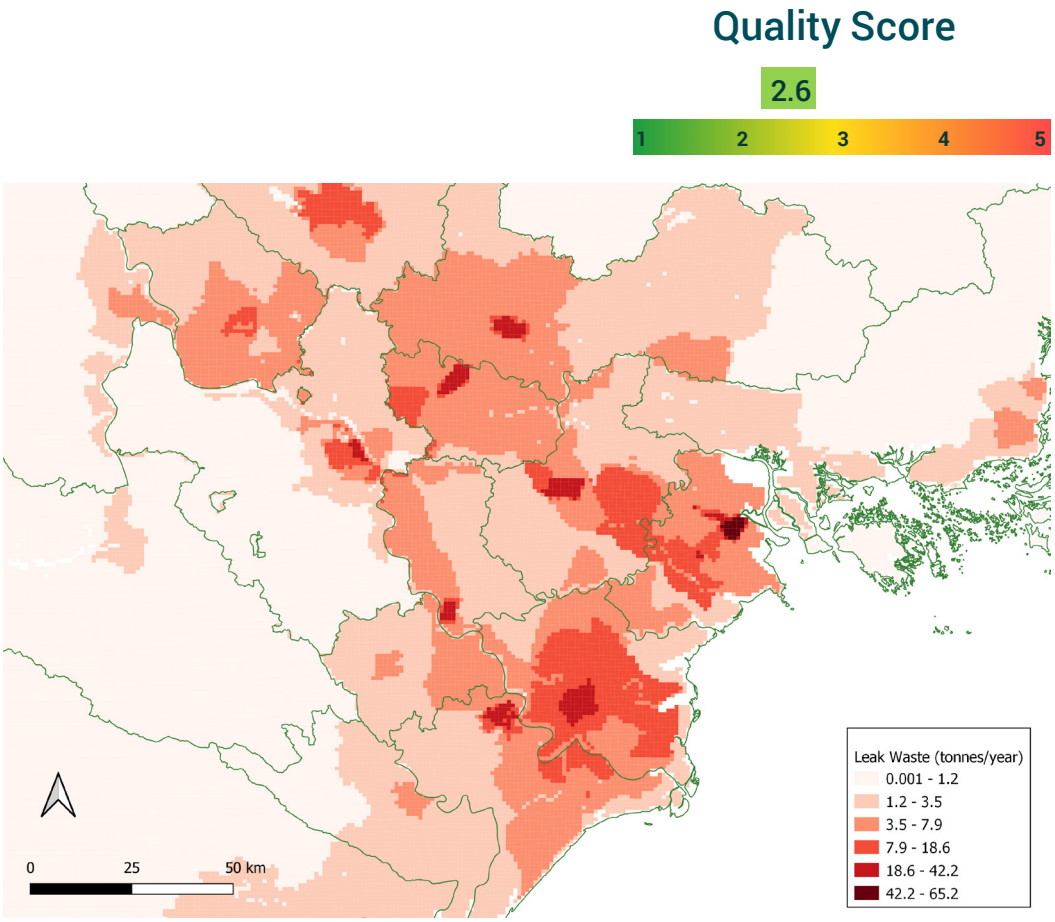
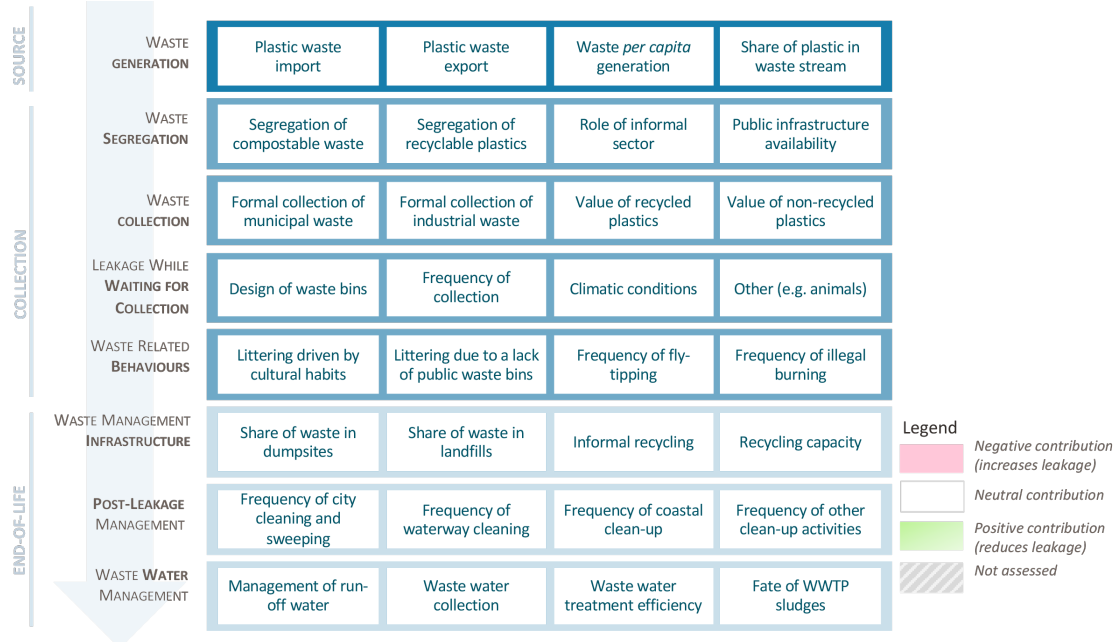


FIGURE 8:
Example of waste management hotspot representation



A hotspot quality score is also applied to this category of hotspots to determine if the results can be used to prioritise interventions. Once it is established that the results are consistent with the actual situation, a list of the localities contributing the most to plastic leakage can be derived from regional hotspots to yield targeted interventions in those localities.

3.2.3 Waste management hotspots

What key information are we looking for?

The waste management hotspot category aims at identifying elements within the waste management and infrastructure chain that have critical influence on plastic leakage. These elements can fall into different sections of the waste management system including **waste generation, waste segregation, waste collection, waste management behaviours, waste management infrastructure, post leakage management and waste water management**. They may contribute positively (i.e., a component of the waste management system that given the context mainly contributes to mitigating the plastic leakage and impacts), negatively (i.e., a component of the waste management system that given the context mainly contributes to worsening the plastic leakage), or neutrally.

The waste management hotspot identification intends to illustrate the key drivers of the leakage and answer the question "why is it leaking?".

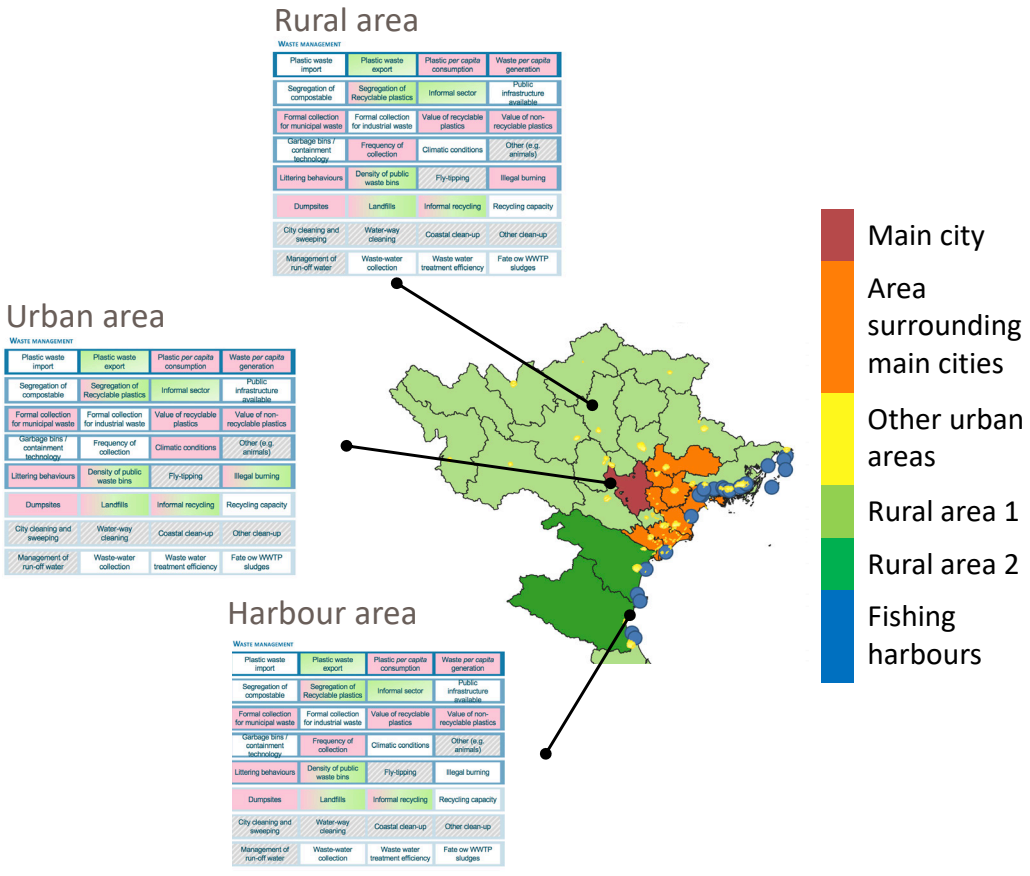
How are hotspots modelled and prioritised?

Waste management hotspots are identified throughout the technical modules and also from the experience of the practitioner on the field. The intention of the waste management hotspots is to provide a clear overview of what can be improved along the waste management system to reduce or avoid plastic leakage.

Visualisation and critical appraisal of hotspots results

The hotspots are represented in a matrix as shown in **Figure 8**, with each individual box corresponding to one element of the waste management system. The determination of whether each box constitutes a hotspot can be based on a quantitative or qualitative assessment. Each element (one box of the matrix) is considered as a hotspot if it is identified as contributing to the leakage. For example, an element of the waste management (e.g. plastic per capita consumption) is considered as a hotspot when its corresponding metric value goes beyond a specific threshold, be it qualitative or quantitative (e.g. average plastic per capita consumption for countries of similar income level).

FIGURE 9:
Example of representation of the hotspots for different archetypes



3.3 DEFINITION OF ARCHETYPES

As plastic use, waste generation rates and waste management practices can vary widely within a country, it is highly recommended to increase the granularity of the analysis and define archetypes. Each archetype is then summarised within a dashboard which includes a concise representation of the results from each hotspot category. At this stage, hotspots are highlighted according to their contribution (either in absolute or relative terms) to leakage.

Figure 9 shows a representation of this archetype analysis presenting a summary of the different hotspots for different archetypes.

This archetype view is the last stage of the technical stream, displaying the information generated across the five plastic hotspot categories in a synthesised way. However, information at this stage is not yet easily actionable since results are scattered across different graphs and figures without clear connection from one hotspot type to the other. The following section, hotspot formulation, is intended to make the hotspot list more actionable.

3.4 Formulation of actionable hotspots

Actionable hotspots formulation corresponds to the first stage of the strategic stream (module S1) as it relies on user interpretation of the hotspots in the 5 categories identified in modules T3 to T6. The list of actionable hotspots should provide a comprehensive view of the hotspots across the plastic value chain and within the country. It is highly encouraged to proceed to this formulation stage in an iterative way by engaging stakeholders from the enabler group to eventually reach a consensus.

The objective is to provide a limited number of actionable hotspots (between approximately 10 and 30), which then can be used to feed the intervention identification process.

Each actionable hotspot should consist of one simple sentence clarifying what type of plastic is concerned (e.g., a polymer type or an application), where the leakage is expected to come from (either in terms of a geographical region or from different industrial sectors) and why the leakage happens, by pinpointing possible key drivers across the waste management system. **Figure 10** illustrates how an actionable hotspot name is compiled based on that information, highlighting with a colour code the core elements of the sentence. The question of what is leaking can include information on the magnitude of leakage and the environmental impacts associated with this leakage.

Once actionable hotspots have been formulated and named, they are numbered and organised into a table (see example in **Table 2**)

Actionable hotspots are then clustered into a framework to characterise whether the hotspot is generic or specific, and identify the key driver along the plastic value chain (at source, collection or end-of-life stage). The clustering logic is presented in **Figure 11**.

An archetype is an area within the country where the plastic use, the waste generation rate and the waste management infrastructure are considered homogeneous

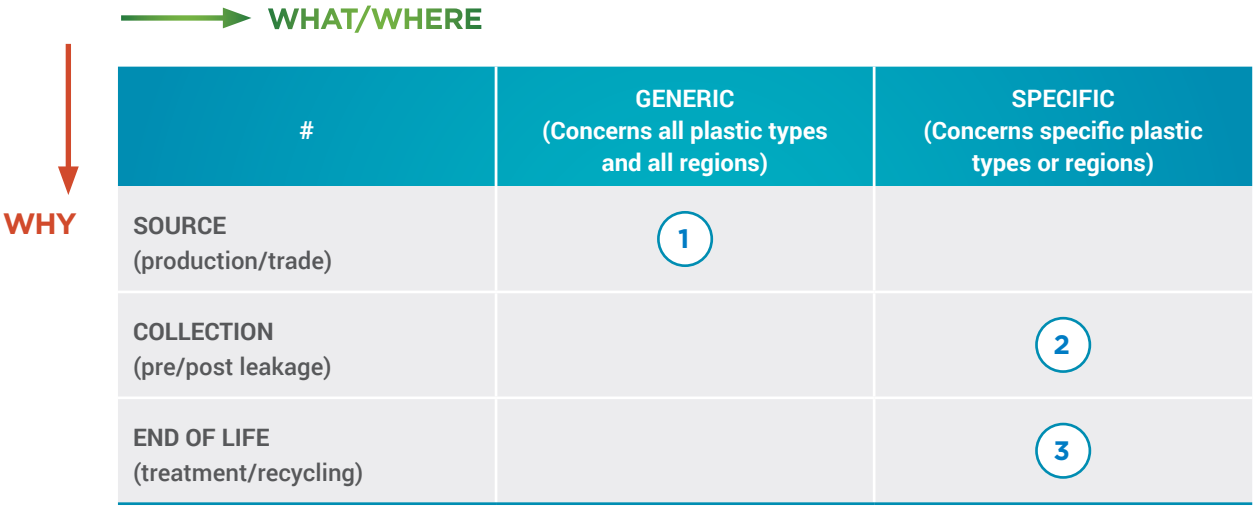
FIGURE 10:
Describing and naming of an actionable hotspot

10. https://www.ecoinvent.org/files/2014_-_muller_et_al_-_ijlca_-_pedigree_approach_in_ecoinvent_3.pdf

TABLE 2:
Excerpt of table listing actionable hotspots

#	Actionable hotspot
1	PP and Polyester are the most used and wasted polymers in the country, and are not recycled
2	LDPE is consumed in high quantity by households in the country, while the recycling capacity for this polymer is dedicated to imported and industrial LDPE only
3	Plastic bag is widely used in the country as a result of the take-away culture and lack of recycling for this type of application

FIGURE 11:
Clustering of actionable hotspots



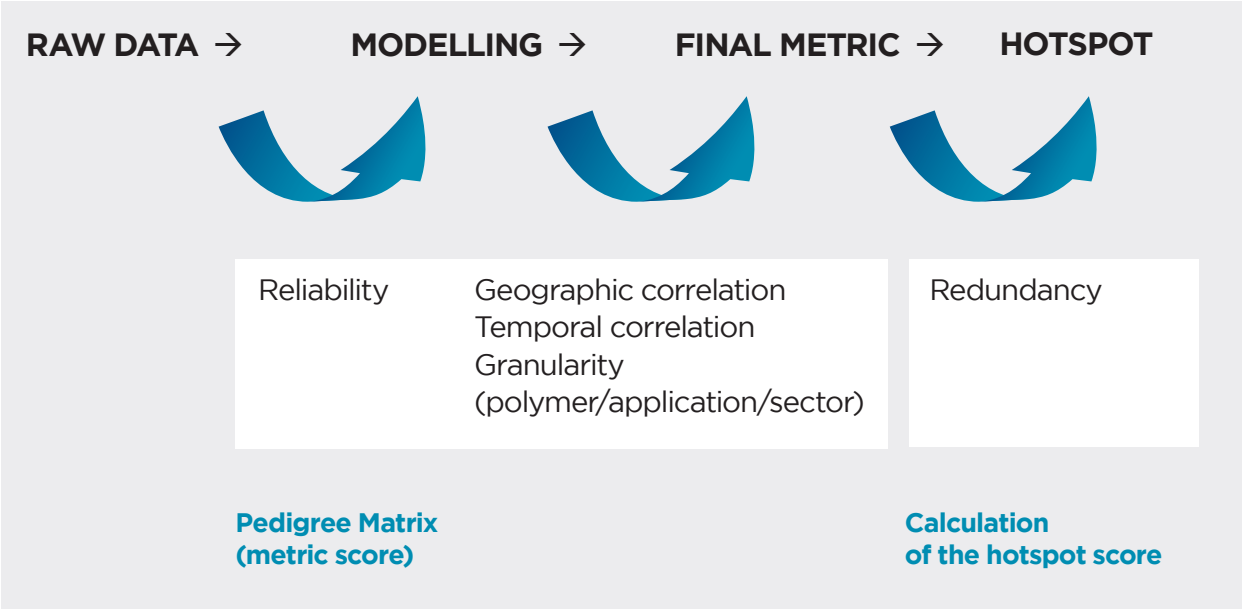
3.5 Hotspotting quality assessment

In order to draw conclusions from the identified plastic leakage hotspots and eventually suggest meaningful interventions to national authorities, it is crucial to ensure that hotspot results are robust, reliable and actionable.

This section provides guidance to support a quality assessment procedure and help the user define if the data quality is sufficient to support the needed conclusions and to precisely identify which data must be improved. This quality assessment concerns both the data-collection phase (T1-T2) as well as the modelling of leakage and impact hotspots (T3-T6), and is based on a pedigree approach inspired by Life cycle inventories databases[10].

This approach uses a combination of multiple criteria which are specifically applied at different process stages, including data collection, modelling of individual metrics and aggregation of these metrics within the hotspot graph, as illustrated in **Figure 12.**

FIGURE 12:
Overview of the quality assessment procedure



Based on a pedigree matrix (**Figure 13**), a first set of criteria applied at different levels determines an uncertainty score when converting raw data into final metrics, called the metric score. These criteria include:

- Reliability – relates to the level of trust one can have in the data source, based on acquisition methods and verification procedures used to obtain the data.
- Temporal correlation – represents the difference between the year of study and the year of obtained data.
- Geographic correlation – represents the geographical discrepancies between the area of study and the obtained data.
- Granularity – relates to differences in granularity between data needed and the obtained data.

Each of these criteria is rated from 1 to 5; 1 meaning that the data is of high quality regarding this specific criterion, and 5 suggesting that the data is of very poor quality.

The redundancy criterion, which assesses if data for a given final metric can be obtained via distinct calculation routes and remain coherent, is eventually combined with the previously established metric score to yield a hotspot quality score. A score below 3 implies that the hotspot results are reliable enough to derive meaningful interventions towards plastic leakage abatement. Otherwise, a hotspot score equal to or above 3 signals the need to improve the hotspot model either by collecting better data or by using a different modelling approach. The hotspot quality scores are used to ascertain which data require further investigation on the field, and eventually engage stakeholders with clear requests on data improvement.

FIGURE 13:
Detailed pedigree matrix

	1 BEST	2 GOOD	3 AVERAGE	4 BAD	5 WORST
RELIABILITY	Verified (e.g. peer-reviewed or highly trustable source) data based on measurements, multiple sources showing coherent values	Verified data based on calculation, multiple sources showing coherent values	Unverified data from measurement or calculation and/ or from single source	Documented estimate	Undocumented estimate
TEMPORAL CORRELATION	Less than 3 years of difference with date of study	Adapted to the year of reference based on clear population or GDP correlation	Adapted to the year of reference based on unclear population or GDP correlation	Not adapted to the year of reference (< 10 years old data)	Not adapted to the year of reference (> 10 years old data)
GEOGRAPHICAL CORRELATION	Data is complete and representative of the area of study	Data extrapolated to the area of study based on weighted average (multiple archetypes)	Data extrapolated to the area of study assuming homogeneous conditions	Data extrapolated to the area of study in spite of un-homogeneous conditions	Data from unknown area or with very different conditions
GRANULARITY	Data is complete and representative of the polymer/ application/sector of interest	Modelling based on allocation rules (comprehensive and specific)	Modelling based on allocation rules (non comprehensive or unspecific)	Modelling based on global average	Modelling based on estimates

WHAT TO DO?
PRIORITISATION OF INTERVENTIONS

Interventions are tangible actions that can be taken to reduce plastic leakage or its impacts. By tangible, we mean that interventions are actions that directly affect physical flows in the system (mainly related to material flows and/or infrastructure). As a consequence, the outcomes of interventions should be easily measurable; this has to be kept in mind when framing and phrasing interventions.

Prioritisation of interventions is based on a three-step process.

(1) **Match** the hotspots with interventions by selecting relevant interventions from a repository of generic interventions gathered from previous works and literature review.

(2) **Specify** the interventions to the national context by refining the existing interventions and designing new ones when needed.

(3) **Prioritise** the interventions based on a two dimension map picturing on one axis their plastic leakage mitigation potential, and on the other axis the presence/absence of any suspected unintended consequences.

4.1 Match hotspots with generic interventions

The Guidance provides a repository of common interventions based on experience from previous work, literature review and learnings from the piloting of the Guidance in several countries. This preliminary list of interventions aims at facilitating the brainstorming phase of the strategic workshop on defining key areas of interventions connected to actionable hotspots.

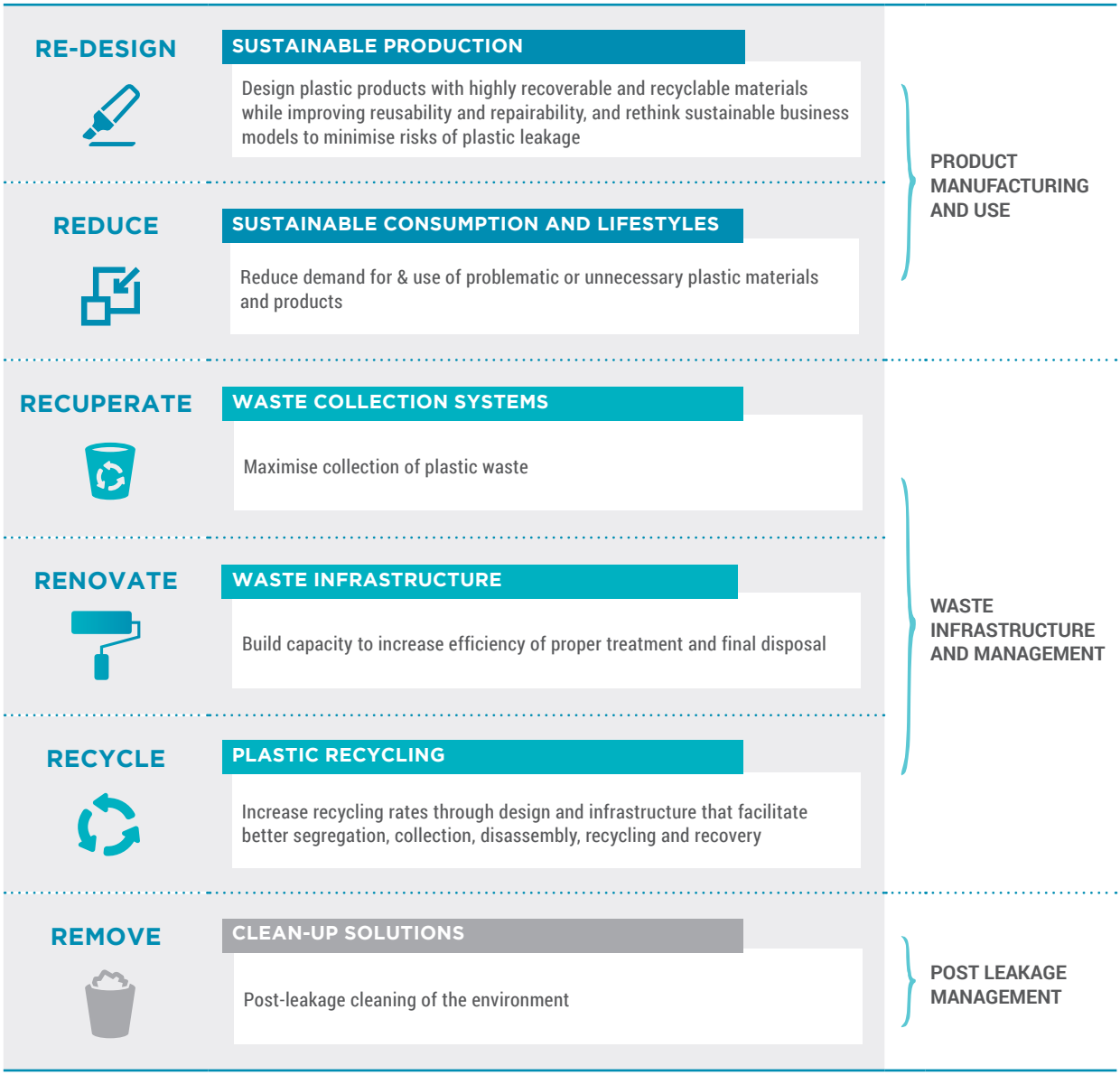
A core philosophy underpinning the Guidance is that potential interventions may target all relevant stages of the value chain and need actions from relevant stakeholders: from producer to retailer and consumer; from what is provided to consumers to lifestyle changes among plastic users; from polymer manufacturing to post-leakage clean-up. To reduce plastic leakage and remediate the environment, a blend of interventions along the value chain will be needed to address hotspots with a holistic approach. For this reason, the key interventions identified within the methodology are presented in six main categories.

The categories of interventions are summarised in **Figure 14**. They follow a 6Rs structure that encapsulate the entire plastic value chain and can be divided into:

- **Interventions at product manufacturing and use phases**, aiming at **Re-designing** products through eco-design to reduce or substitute the amount of embedded plastic and **Reducing** the quantities of plastic used through lifestyle change and shifting from single-use to reuse model;
- **Interventions on waste infrastructure and management,** mainly aiming at **Recuperating** plastic waste through improved collection systems, **Renovating** waste infrastructures by refurbishing existing facilities or building new ones and increasing **Recycling** through better product design that facilitates disassembly;
- **Interventions at the post-leakage stage,** mainly aiming at **Removing** plastic from the environment through clean-up operations.

The repository of interventions is then enriched with new interventions when the context calls for different actions to address specific hotspots. This procedure is described in section 4.2.

FIGURE 14:
Clusterisation of the different categories of interventions

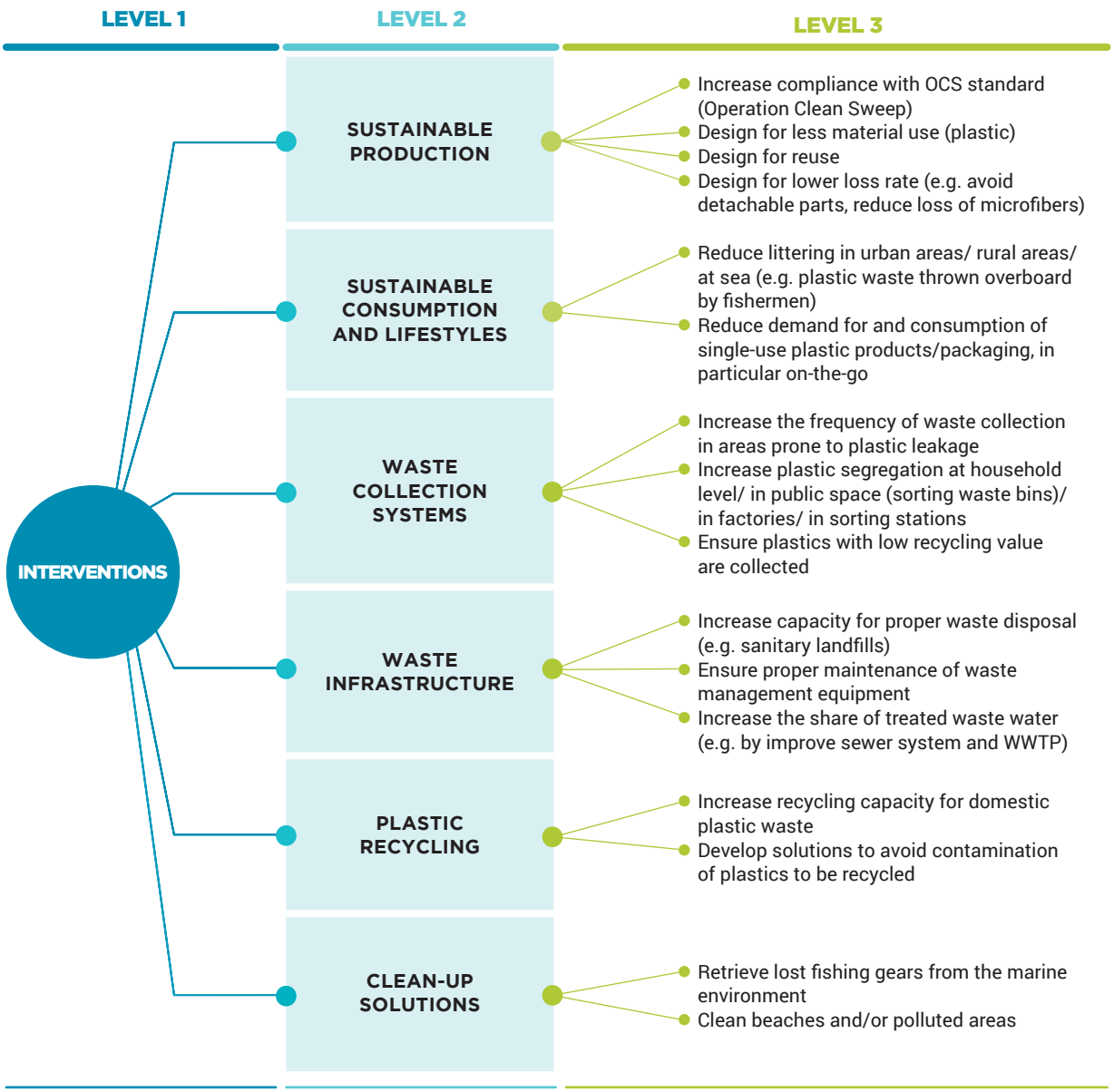


4.2 Specify and balance the interventions

Even though the modelling component of the Guidance (i.e., T3-T6) follows a structured and replicable approach, the identification of solutions to a highly interconnected and systemic issue cannot be automated and user interpretation of the hotpots is needed. For this reason, this stage is part of the strategic stream of the Guidance and should include the involvement of a wide variety of stakeholders within the "enabler group" and by performing iterative brainstorming sessions (refer to section 6). As explained in section 4.1, the Guidance facilitates this process by providing a list of predefined interventions to help users launch the brainstorming phase. However, this list must be supplemented with additional interventions when no action from the predefined set of interventions can be taken to tackle a specific hotspot. While each hotspot requires a dedicated action, a single intervention can mitigate multiple hotspots.

While fleshing out the list of interventions, one should aim for a balanced subset of interventions across the different categories described in **Figure 14**. Indeed, focusing only on technology-driven solutions would fall short of solving the issue if not followed by systemic and organisational changes. Table 3 illustrates a non-exhaustive list of interventions.

TABLE 3:
Non-exhaustive list of interventions



4.3 Prioritise the interventions

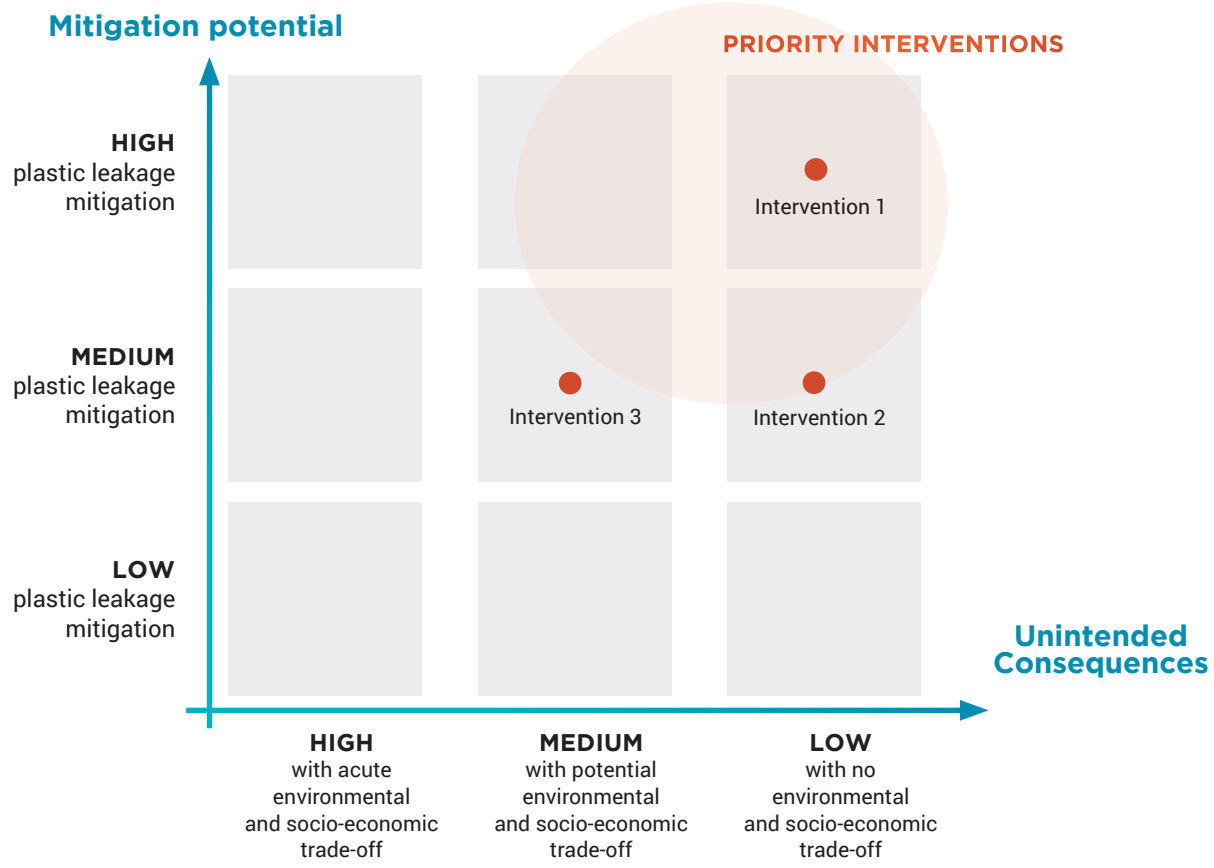
Once a thorough list of interventions has been identified, a prioritisation stage is proposed in order to identify the most relevant ones. As presented in **Figure 15**, a simple framework is proposed to prioritise ideas, and further guidance on this assessment is provided in module S2. In short, the prioritisation considers two criteria:

- **Mitigation potential**: high mitigation potential actions are those that contribute to meaningful reductions of plastic leakage and impacts.
- **Unintended consequences:** highly consequential actions are those most likely to generate unintended environmental or socio-economic trade-offs (e.g., substitution from plastic to another material may generate additional environmental impacts such as GHG emissions).

It is expected that this approach allows for prioritising a specific subset of interventions and achieve consensus among stakeholders.

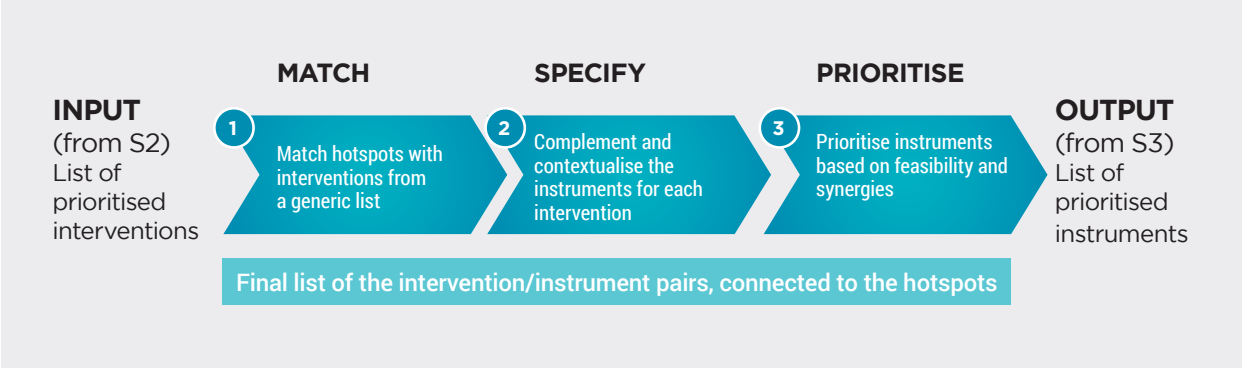
The next stage of the Guidance is geared toward helping stakeholders converge on the most efficient instruments to implement the prioritised interventions.

FIGURE 15:
Framework for the prioritisation of interventions



HOW TO DO IT?
CONVERGING ON INSTRUMENTS

An instrument is defined as a practical way of implementing an intervention and monitoring progress. This can be achieved through specific regulatory, financial or informative measures.The process of converging on key instruments is based on 3 steps:



(1) Match the interventions with instruments by selecting relevant instruments from a repository of generic instruments gathered from previous works and literature review.

(2) Specify the instruments to the national context by refining the existing instruments and designing new ones when needed.

(3) Prioritise the instruments based on a two dimension map picturing on one axis their feasibility and on the other axis the potential for synergies (i.e. when one instrument serves multiple interventions and harmonises well with instruments already in place).

A last stage is then needed to aggregate all information from priority interventions (module S2) and instruments (module S3) to create a list of prioritised intervention/instrument pairs that consist of the final outcome of the Guidance.

5.1 Match interventions and instruments

Once interventions have been identified and prioritised in module S2, the coordinator team may proceed to the final stage of the workflow, which is to identify relevant instruments to carry out the interventions. This is a highly strategic step that is intended to be undertaken with a strong engagement from the enabler group.

Six main categories of instruments are foreseen as described in **Figure 16**.

These categories include action-oriented instruments such as guiding field data collection for knowledge creation, promoting education and environmental campaigns on plastic pollution for awareness raising, building targeted training programs for capacity building, developing technological solutions to remove plastic waste from the environment for technology innovation, introducing taxes on specific plastic products for economic tools, enforcing bans on specific plastic products for policy tools.

FIGURE 16:
Six types of instruments

5.2 Specify instruments

Instruments identified in the first step should be refined and contextualised when needed by re-phrasing and providing a better description. If needed and when interventions are not covered by any existing instrument, new instruments should be designed.

Similarly to the specification of interventions (Section 4.2), the identification of appropriate instruments to a highly interconnected and systemic issue cannot be automated and user interpretation of the interventions is needed. For this reason, this stage should involve once more a wide variety of stakeholders within the "enabler group" by performing iterative brainstorming sessions (refer to section 6).

While out of the scope of the Guidance, this process should be complemented with extensive policy analysis to map existing and already planned instruments to address plastic pollution.

5.3 Prioritise the instruments

For each intervention proposed in module S2, the core team (Coordinator Team and Technical Team) will identify possible instruments to enable the practical implementation of the action. These ideas will then be further assessed with the support of the Enabler group.

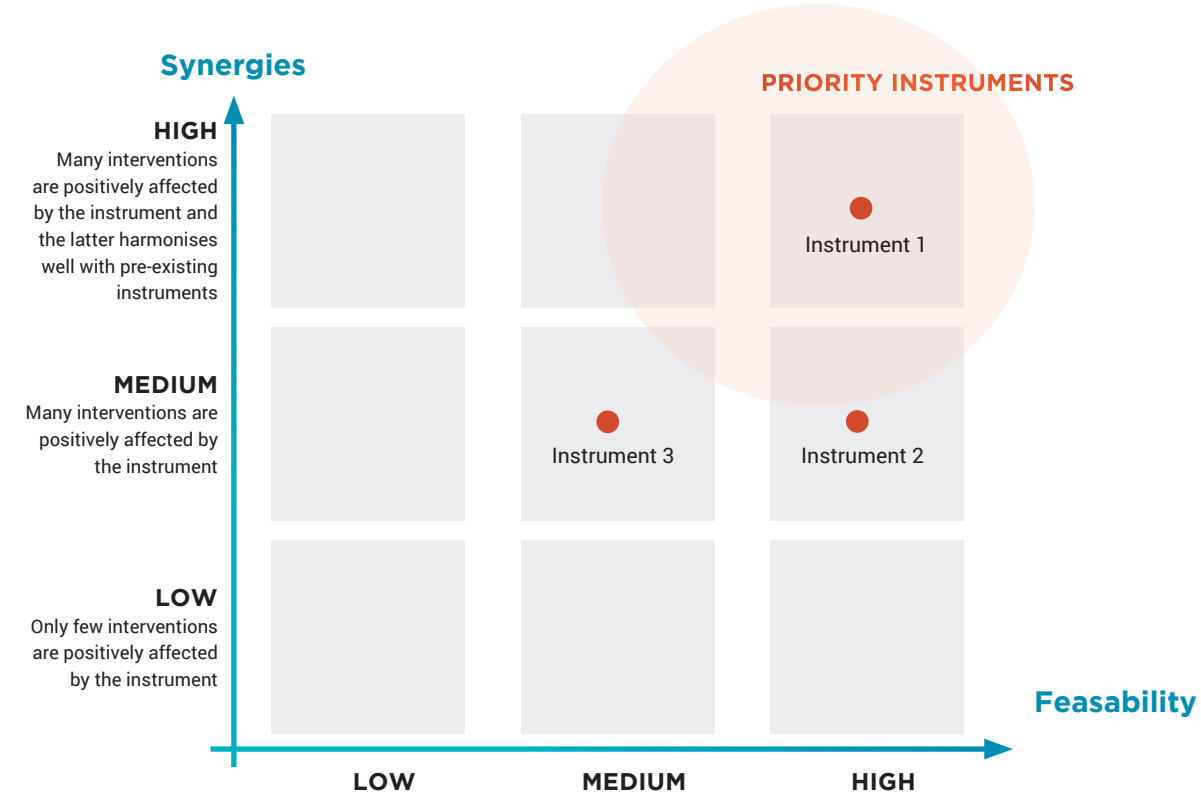
Module S3 supports the planning and proposed implementation of the selected interventions through a guided process intended to help the relevant actors to converge on appropriate instruments and eventually take actions.

Once a thorough list of instruments has been identified and each intervention is covered, a prioritisation stage is required in order to identify the most relevant ones. As presented in **Figure 17**, a simple framework is proposed to prioritise ideas, and further guidance on this assessment is provided in module S3. In short, the prioritisation considers two criteria:

- **Feasibility**: technical and socio-economic assessment of each instrument should be performed. We do not assert a method to perform the assessment as this is beyond the scope of the Guidance. The user can decide on the method to use based on resources available. A by default qualitative assessment with three levels is suggested.
- **Synergies:** Some instruments may be beneficial to multiple interventions, thus creating a positive synergetic effect. This criterion does not only evaluate the number of suggested interventions benefitting from an instrument, but also assess if the proposed instrument harmonises well with instruments already in place.

Based on the analysis carried out in modules S2 and S3, respectively yielding the most relevant interventions and instruments, a list of the most promising pairs of intervention/instrument is then derived. This list consists of the final output of the Guidance and is intended to be communicated to decisions makers with the support of the enabler group.

FIGURE 17:
Framework for the prioritisation of instruments



DESCRIPTION OF THE MODULES, TOOLS AND PROJECT ORGANISATION

6.1 Description of the modules and tools available

The Guidance consists of a set of nine modules, including six technical modules and three strategic modules; modules and tools are accessible through the website of the Life Cycle Initiative (https://plastichotspotting.lifecycleinitiative.org/).

The modules have a common structure, including:

Overarching question of module T1

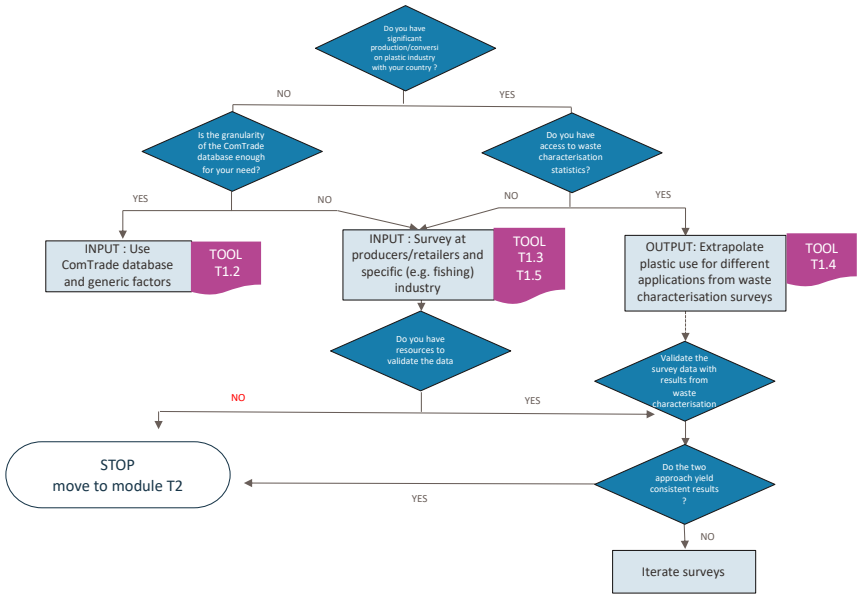
What are the generic plastic value chain and potential hotspots in the country?

- Production (total, per capita or per GDP)
- Consumption (total, per capita or per GDP)
- Waste generation (total, per capita or per GDP)
- Import and Export dependency
- Initial and ending stock
- Annual growth rate of plastic supply and use
- Sector distribution and value added
- Classification: Short lived vs long lived; basic vs converted; direct vs embodied

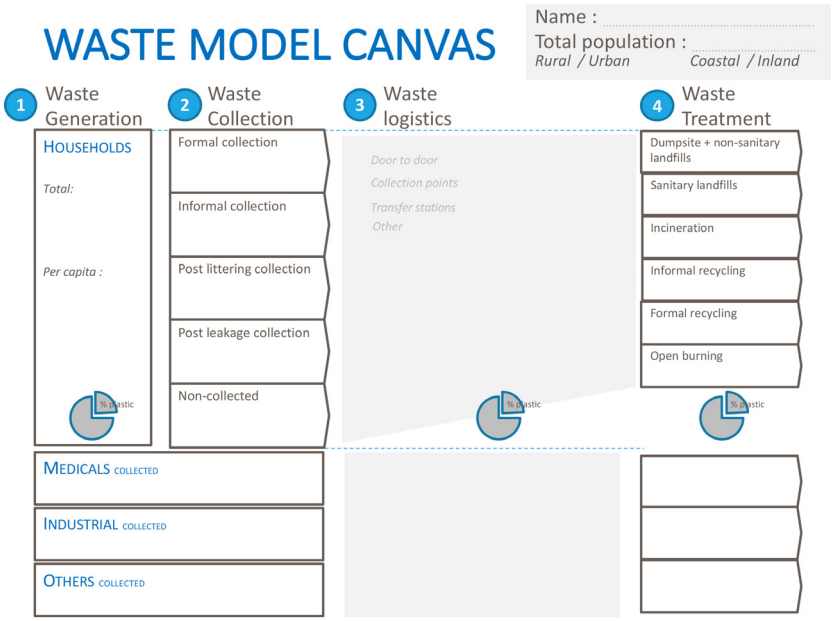
How much plastic is used and discarded for the key plastic applications and polymers within the country ?

- Targeted plastic supply and use

A set of introductive slides are provided to explain the module's objectives and relation to other modules. Most importantly one slide summarises the key overarching questions of the module and intended output.



Logical workflow diagrams are provided to guide the user through a clear process.



Data-collection templates are offered to structure and guide the data-collection process. Different templates are proposed for the different topics covered by the Guidance.

Estimation of Total Domestic Plastic Discarded (DPD)

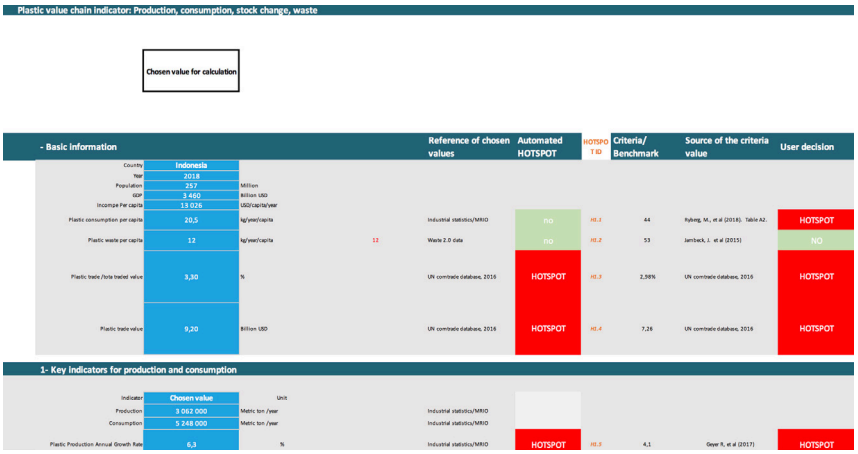
Total plastic waste generated in the country (tons)

Total Municipal solid waste (tons)

$$PW = MSW * ShareP$$

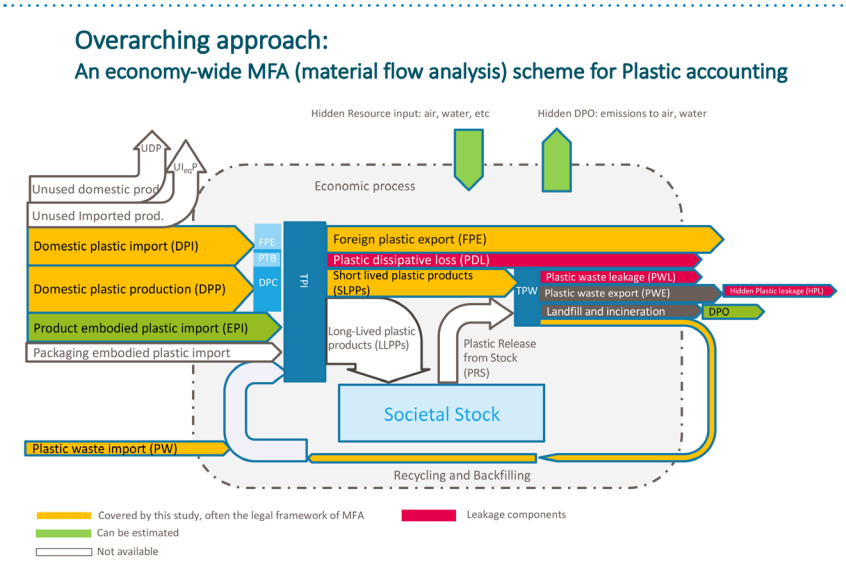
Share of plastic in the waste stream (%)

Calculation equations and explanatory schemes are presented as the core of the Guidance.



Spreadsheets are provided as a guide for performing calculation required for hotspotting.

Also, the Guidance includes three main types of colour coded slides.



Core information, logical diagrams, key figures, references to the tools or equations

Spirit and challenges of Module T1

- **The main objectives of this module are to**
  1. **To identify potential "plastic value chain hotspots"**
  2. **to yield the quantities of plastic used and discarded in the country, for different applications, thus generating a list of "targeted plastic applications"**
- **"plastic value chain hotspots"** refer to different global aspect of the plastic value chain (e.g. that are not specific to a particular plastic application), such as rate of plastic production, import or per capita use.
- **"Targeted plastic applications"**: plastic use by different plastic applications is not an information that is readily available in any databases, at least not in the form of a exhaustive or coherent data-set. We thus propose an approach to reconstruct the data, and yield the information required to proceed with the next stages of this guidance (hotspotting).
- The challenges encountered here arise from the fact that different databases may have different focusses and granularity :
  - Industry sector focus (MRIO) / Polymer type focus (Plastic statistics from industry associations) / Product focus (Trade data-bases)
  - High granularity but no comprehensiveness (Import-export from trade data-bases) / full production consumption datasets but with low level of granularity for plastics (MRIO tables)
  - The focus on plastic products as labelled in databases may exclude some key plastic flows in the economy, such as plastic embodied in non plastic products or the plastic packaging associated with products
- Details on these 2 approaches a provided on the next slide

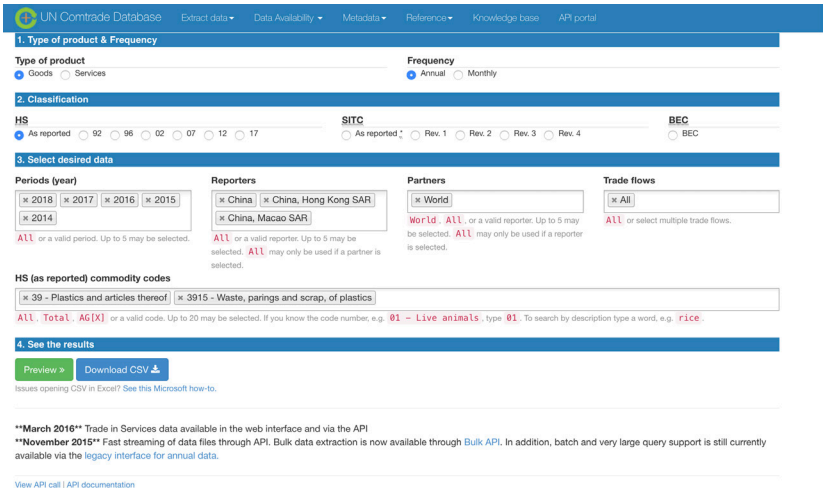
1. Plastic value chain analysis for the Country and key metrics

2. Targeted Plastic Applications

Description, definitions and explanation in text format

Data source for trade flow: UN comtrade database

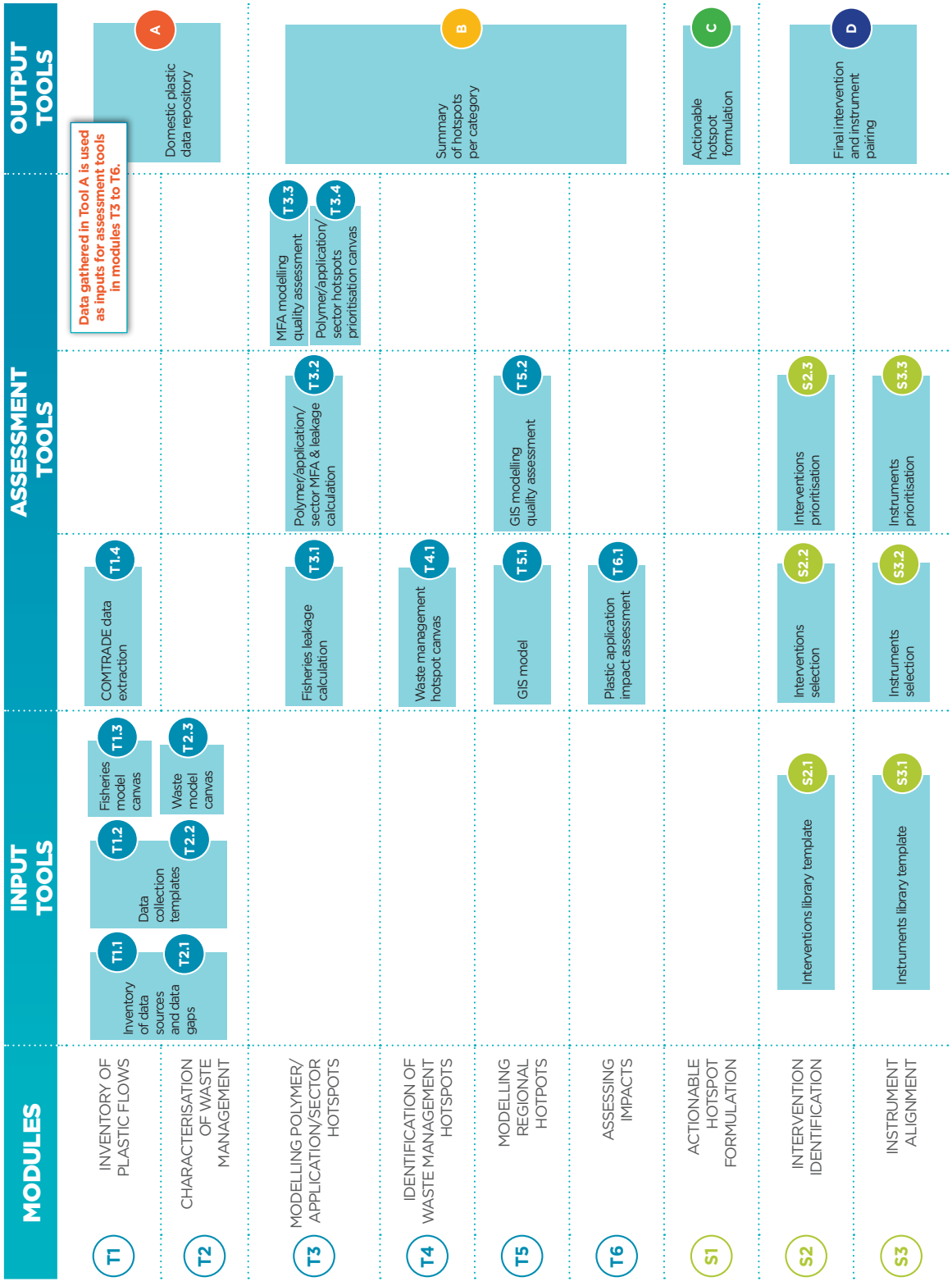
TOOL T1.2



Supporting or illustrative information / results or data-sources

Each module includes one or several tools designed to support the user in fulfilling the goal of the module. These can be either input tools, assessment tools or output tools.[10] The connection between tools and modules is illustrated in **Figure 18**. A detailed description of the tools is available below.

FIGURE 18: connection between modules and tools



11. Input tools include data collection templates and generic data libraries. Assessment tools help carry out the necessary modelling and calculations. Output tools allow to generate result and graphs, as well as support the user in drawing conclusions.

TOOL N°	TOOL NAME	TOOL TYPE	OBJECTIVE
T1.1	Inventory of data sources and data gaps	Input tool	List data sources and identify data gaps on plastic flows
T1.2	Data collection template	Input tool	Support data collection on topics related to domestic plastic use and plastic flows
T1.3	Fisheries model canvas	Input tool	Support data collection on topics related to fishing activities
T2.1	Inventory of data sources and data gaps	Input tool	List data sources and identify data gaps on waste management
T2.2	Data collection template	Input tool	Support quantitative data collection on topics related to waste management at country level (waste collection, plastic waste recycling, etc.)
T2.3	Waste model canvas	Input tool	Canvas for guiding interviews with municipalities or waste management organisation (waste collection, plastic waste recycling, etc.)
S2.1	Intervention library template	Input tool	Provide a default list of interventions as well as empty slots to insert additional interventions relevant for the project.
S3.1	Instrument library template	Input tool	Provide a default list of instruments as well as empty slots to insert additional instruments relevant for the project.
T1.4	COMTRADE data extraction	Assessment tool	Extract and organise relevant figures from COMTRADE database to be used in the modelling process
T3.1	Fisheries leakage calculation	Assessment tool	Estimate plastic weights by type of fishing gear and calculate plastic leakage from the fishing sector
T3.2	Polymer/application/sector MFA & leakage calculation	Assessment tool	Compute mass balance and plastic leakage for polymer/application/ sector hotspots categories
T3.3	MFA modelling quality assessment	Assessment tool	Assess the quality of hotspot results based on source reliability and modelling criteria
T3.4	Hotspot prioritisation canvas	Assessment tool	Prioritise hotspots based on absolute leakage quantities as well as relative leakage rates
T4.1	Waste management hotspot canvas	Assessment tool	Build a waste management dashboard highlighting components of the waste management system that contributes either positively or negatively to plastic leakage mitigation
T5.1	GIS model	Assessment tool	Provide the user with a pre-computed GIS model to facilitate the generation of relevant maps as an illustration of geographical results
T5.2	GIS modelling quality assessment	Assessment tool	Assess the quality of hotspot results based on source reliability and modelling criteria
T6.1	Plastic application impact assessment	Assessment tool	Impact assessment of plastic applications, to complement the analysis in Module T3
S2.2	Interventions selection	Assessment tool	Select relevant interventions for each actionable hotspot defined in module S1
S2.3	Interventions prioritisation	Assessment tool	Prioritise and visualise key interventions based on the full list of interventions
S3.2	Instruments selection	Assessment tool	Select relevant instruments for priority interventions as defined in module S2
S3.3	Instruments prioritisation	Assessment tool	Prioritise and visualise key instruments based on the full list of selected instruments
A	Domestic plastic data repository	Output tool	Gather all relevant data from T1 and T2as an input to the following modules for modelling and assessment
B	Summary of hotspots per category	Output tool	Summarise all hotspots by category resulting from T3 to T6
C	Actionable hotspot formulation	Output tool	Define actionable hotspots in straightforward sentences stating what is leaking, where the leakage occurs, and why the leakage happens
D	Final intervention/instrument pairing	Output tool	Final list of paired interventions and instruments, including supporting information and context

6.2 How to set up a project at national, sub-national or local level?

The methodology can be implemented at different levels from national, sub-national to local level. In the case of sub-national or local level, national data need to be downscaled using *per-capita* allocation.

The Guidance can be applied in a modular manner if the user wants to focus on specific questions:

- Modules **T1** (Plastic Inputs and Outputs) and **T2** (Waste management) can be run independently from other modules when only pursuing the goal of inventorying plastic inputs and outputs and/or mapping the waste management pathways.
- Module **T3** (Hotspotting based on mass balanced and leakage modelling) can be run independently when only aiming to assess leakage in the forms of macroplastics or microplastics for key polymers/ applications/industries.
- Module **T4** (Waste management hotspots) can be used in a stand-alone mode when only attempting to perform a qualitative assessment of the waste management in place at a national, sub-national or local level.
- Module **T5** (Regional mapping) relies on the information gathered in module T3 and is based on GIS analysis.
- Module **T6** (Assessing impacts) can be run as a complement to the application hotspotting performed in module T3.
- Module **S1** (Hotspot formulation) prioritises and formulates actionable hotspots, and relies on user interpretation of the hotspots in the 5 categories identified in modules T3-T5.
- Modules **S2** (Interventions) and **S3** (Instruments) can also be used independently as a guiding structure to identify interventions and instruments, and facilitate stakeholder discussion.

However, **it is strongly encouraged to run the methodology as a whole and follow the sequence of modules**. As stressed in section 3.2, the hotspotting technical stream can be accomplished at different levels of data granularity, depending on data availability.

While setting up a project using this Guidance, key stakeholders and milestones should be considered as described respectively in **Figure 19** and **Figure 20**.

1. The Technical team is mainly responsible for data collection and hotspotting. Data collection can be performed remotely (desktop research and surveys) or on the field through interviews, workshops and site visits. Hotspotting requires basic skills in Material Flow Analysis (MFA), Life Cycle Assessment (LCA) and Geographic Information System (GIS). The technical team typically consists of:
   - Consultants,
   - Academics,
   - Experts from regional or governmental agencies.
2. The Coordinator team may include the technical team as well as project leaders. Coordinator team members are responsible for managing the project, liaising with external public and private stakeholders, providing the technical team with key resources and contacts. The coordinator team typically consists of:
   - Regional agencies,
   - NGOs,
   - Governmental bodies.
3. The Enabler group is comprised of external stakeholders representing the target country or region of interest. Such stakeholders may include policy makers, influential public and private decision makers, and any others whose participation may contribute to the successful development and implementation of the action plan to be developed based on the results from the Guidance piloting. The enabler group typically consists of:
   - Members from the government,
   - NGOs,
   - Representatives of the private sector,
   - Local plastic and waste management associations.

FIGURE 19:
Key teams and stakeholders involved in the project

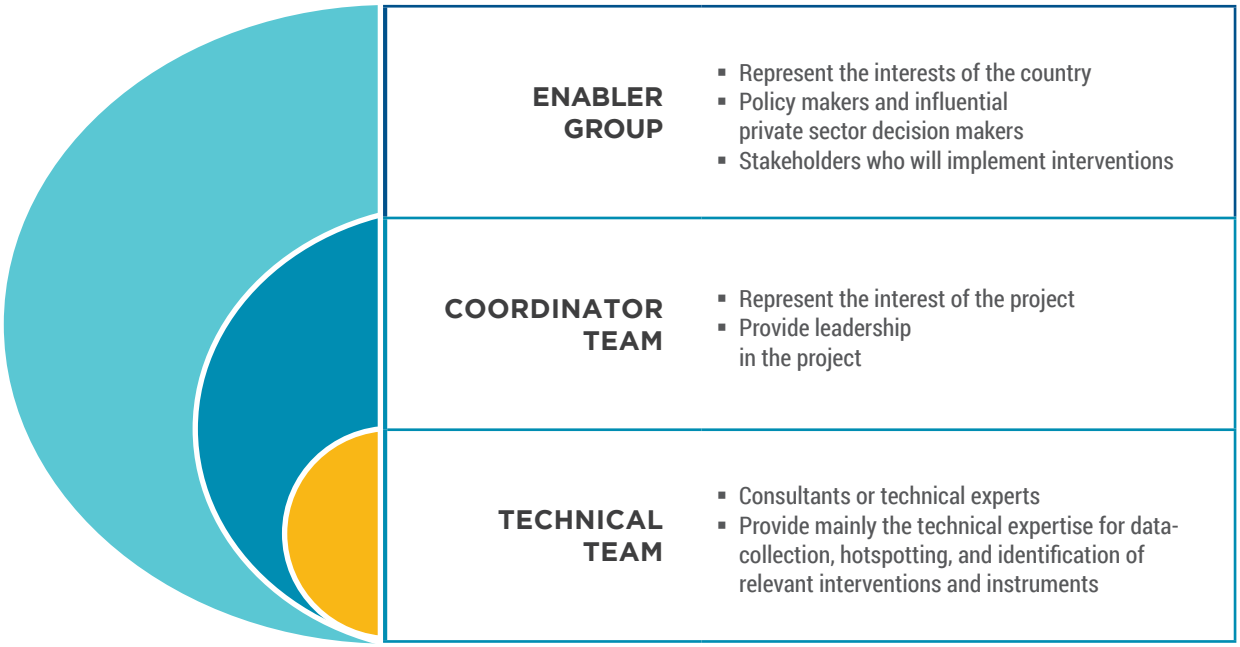
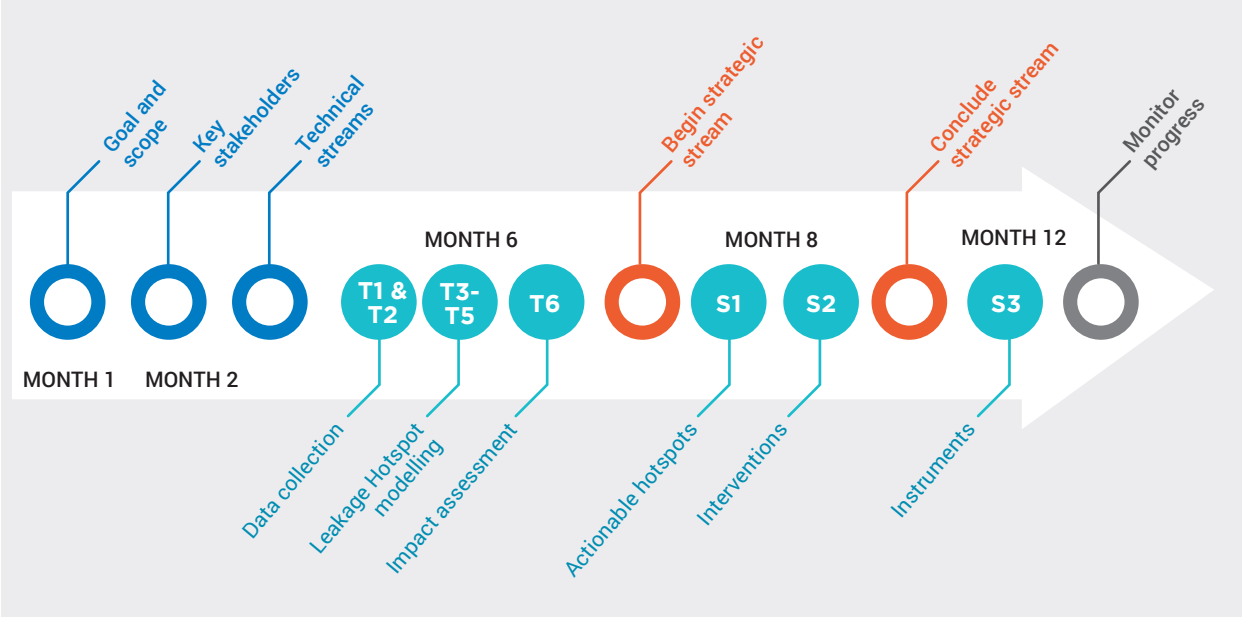


FIGURE 20:
Key milestones for the project



To launch a project, five main stages should be followed as described and illustrated below. This proposed project structure has proven successful in the piloting phase but can be adapted by users to best suit their needs and context specificities. The expected time frame for a project from inception to completion is one year.

1. **ESTABLISH** THE GOAL AND SCOPE OF THE PROJECT

- → Choose the geographical scope (national, sub-national or local);
- → Establish the level of ambition and resources (which will determine the workload on data-collection);
- → Benchmark with other country and regional projects and identify possible synergies;
- → Conduct strategy and goal setting.

2. **IDENTIFY** KEY STAKEHOLDERS

- → Include formal and informal sector stakeholders, as multi-stakeholder engagement and collaboration is key to the success of the project;
- → Map stakeholders and detail their potential role;
- → Develop a project plan once the key stakeholders are mapped. For additional information, please see modules S1 to S3.

3. **CONDUCT** THE TECHNICAL STREAM (T1-T6)

→ **PREPARE**

- Start with the Technical and Coordinator teams, organise an inception workshop to introduce the project and engage identified key stakeholders (i.e., Enabler group members).
- Map data-sources, including potentially unknown sources.
- Identify key stakeholders to be involved in data-collection. If field work will be performed, identify and hire local experts.

→ **DO**

- Perform data-collection and complete Module **T1** (Plastic Inputs and Outputs) and **T2** (Waste management).
- Run other technical modules related to leakage and impacts i.e., **T3** (polymer/application/sector hotspots), **T4** (waste management hotspots), **T5** (Regional hotspots) and **T6** (Impacts).

→ **FINALISE**

- Summarise results in a report and prepare a workshop with the Coordinator team to start the strategic stream.

4. **BEGIN** THE STRATEGIC STREAM (S1 & S2)

- → Organise a first workshop with the Coordinator team to prioritise hotspots (**S1**) and the key areas of intervention (**S2**) by leveraging the hotspot-intervention matrix, which will be provided in the supporting spreadsheet of **S2**.
- → Organise a second workshop with Enabler group members as well as a wide consultation to refine the prioritisation of hotspots as well as the key areas of interventions.

5. **CONCLUDE** THE STRATEGIC STREAM (S3)

- → Organise a strategic workshop with the Enabler group to discuss and converge on the most efficient instruments to implement the interventions. Consider synergies among possible interventions and conditions needed to enable success.
- → Develop an action plan through wide consultation and assign responsibility to relevant stakeholders for its implementation. Identify concrete goals and milestones for each task.
- → Identify a process to monitor progress through key performance indicators (KPIs). Technical stream provides a series of metrics (e.g. leakage per application) that can be used to re-assess the situation over-time and monitor progress. Other KPIs can be defined by the Coordinator Team and Coordinator Team of the project.

GLOSSARY

This glossary is an abbreviated version of a more comprehensive glossary, and it only includes the relevant terms for the Guidance. The comprehensive glossary is the result of an iterative consultation process that began during an expert workshop organised by IUCN in June 2018 and continued throughout the development of the current publication. Definitions were reviewed and fine-tuned through the Plastic Leak Project (2019), incorporating feedback from a panel of more than 30 experts.

Circular economy

A circular economy is a global economic model that aims to decouple economic growth and development from the consumption of finite resources.

Source: https://www.ellenmacarthurfoundation.org

A circular economy is a proposed alternative to the traditional linear economy in which products are made, used and disposed of at the end of their use. The circular economy model aims to keep resources in use for as long as possible to extract the maximum value from them. This involves recovery and regeneration of products and materials at the end of each product's life.

Source: http://www.wrap.org.uk/about-us/about/wrap-and-circular-economy

Circularity

Material circularity is a concept embedded within the circular economy framework. Circularity is not an assessment method but often associated with metrics based on the recycling or reuse rates for different materials.

Dumping

Dumping is the deliberate disposal of large quantities of litter in a particular area, that is not controlled. Dumping can be the result of the formal or informal collection sector. This could be anything from a single bag of rubbish to a large sofa to a broken refrigerator.

Source: http://speedy-waste.co.uk/news/whats-the-difference-between-littering-and-fly-tipping

Effect

The effect of a chemical is determined by the sensitivity of a species to that chemical, among other factors, and is often derived from experimental toxicity data. For example, for human toxicity, it corresponds to the link between the quantity taken in via a given exposure route by a population to the adverse effects (or potential risk) generated by the chemical and the severity of disabilities caused by a disease in terms of affected life years.

Environmental fate

The environmental fate of a chemical describes the proportion of chemical that is transferred to the environment, and the length of time the chemical stays in the various environmental media.

Source: Suciu, N., et al., 2012. Environmental Fate Models. In: Bilitewski B., Darbra R., Barceló D. (eds) Global Risk-Based Management of Chemical Additives II. The Handbook of Environmental Chemistry, vol 23. Springer, Berlin, Heidelberg. https://doi.org/10.1007/698_2012_177

Environmental footprint

A total product environmental footprint is a measure of the pollutant emissions associated with all activities in the product's life cycle. Products are defined as either goods or services. ISO 14044 defines a footprint as, "metric(s) used to report life cycle assessment results addressing an area of concern" and defines area of concern as an "aspect of the natural environment, human health or resources of interest to society".

The direct footprint measures specific impacts created by the firm or any company-owned and company-controlled activities or products. A comprehensive study of all relevant impacts needs the assessment of several impacts, for instance with an LCA. The indirect footprint measures the impact of many other activities related to the company or product but controlled by third parties. A comprehensive environmental assessment is based on a cradle-to-grave approach and considers upstream (i.e., suppliers) and downstream (i.e., customers) activities of a company.

Source: https://www.lifecycleinitiative.org/starting-life-cycle-thinking/life-cycle-approaches/carbon-footprint/ International Organisation for Standardisation (2006). 14044:2006 Environmental management -- Life cycle assessment -- Requirements and guidelines

Environmental impact

Changes in environmental conditions lead to impacts on the social and economic functions of the environment, such as the provision of adequate conditions for health, resources availability, and biodiversity. Impacts often occur in a sequence: for example, GHG emissions cause global warming (i.e., primary effect), which causes an increase in temperature (i.e., secondary effect), leading to a rise of sea level (i.e., tertiary effect), finally leading to loss of biodiversity.

Source: https://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/envti-0413167enn_002.pdf

Chemical exposure

A "chemical exposure" can be defined as the measurement of both the amount of, and the frequency with which, a substance comes into contact with a person or the environment.

Various species in an ecosystem can be exposed to chemicals through different uptake routes, such as inhalation of polluted air or ingestion of polluted water. For example, for human toxicity, exposure can be distinguished between direct intake (e.g., by breathing air and drinking water), indirect intake through bioconcentration processes in animal tissues (e.g., meat, milk and fish) and intake by dermal contact. The fate and exposure of chemicals are generally modelled with multimedia fate and exposure models.

Fly tipping

Fly-tipping is the deliberate disposal of large quantities of litter in the environment without any specific location. This could be anything from a single bag of rubbish to a large sofa to a broken refrigerator (e.g. accumulating on the roadside or remote places).

Source: http://speedy-waste.co.uk/news/whats-the-difference-between-littering-and-fly-tipping

Hotspot

Either a component of the system that directly or indirectly contributes to plastic leakage and impact, or that can be acted upon to mitigate this leakage or the resulting impacts.

Instrument

A practical way to implement the intervention and enable progress (e.g., regulate, raise awareness)

Intervention

An action that can be taken to mitigate the leakage from a given hotspot or reduce its impacts.

Leakage, loss and release

The generic term leakage is defined here as the combination of losses and releases.

The loss is the quantity of plastics that leaves a properly managed product or waste management system, as the fraction of materials that is detached from the plastic product during manufacturing, use or transport for microplastics or as mismanaged waste for macroplastics. We define a properly managed waste management system as a system where no leakage is expected to occur such as recycling, incineration or properly managed sanitary landfills. Losses are specific to various sources and activities (e.g., the processes of losing all types of plastics into the environment through abrasion, weathering or unintentional spills during production, transport, use, maintenance or recycling of products containing plastics, littered plastic packaging).

The releases are the fractions of the loss that are ultimately released into different environmental compartments. The following release pathways are considered throughout this methodology:

(i) **Releases to waterways and oceans** represent the plastics released to rivers, lakes or directly to oceans.

(ii) **Releases to soils** represent the plastics released to either the soil surface or to deep soil, such as plastics leaching from waste dumps to shallow or deep soils.

(iii) **Releases to terrestrial environment** represent the plastics released to terrestrial environment other than soils, such as plastics deposited and stored in dumpsites, plastics deposited on buildings or trees, or littered plastic packaging.

(iv) **Releases to air** represent the plastic released to air, such as plastic micro-fibers emitted when synthetic textiles are worn.

Sources: Boucher, J., Friot, D., 2017. Primary Microplastics in the Oceans: a Global Evaluation of Sources. IUCN

Life cycle

Consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposal.

Source: ISO 14040

Life cycle assessment (LCA)

Life cycle assessment (LCA) is an environmental assessment method based on an inventory of potential flow of pollutants entering different compartments of the environment (e.g. air, water, soil) and the assessment of associated environmental impacts of a product system throughout its life cycle.

Source: ISO 14040

Littering

Littering is the incorrect disposal of small, one-off items, such as: throwing a cigarette, dropping a crisp packet, or a drink cup. Most of the time these items end-up on the road or side-ways. They may or may not be collected by municipal street cleaning.

Source: http://speedy-waste.co.uk/news/whats-the-difference-between-littering-and-fly-tipping

Macroplastic

Macroplastics are large plastic waste readily visible and with dimensions larger than 5 mm, typically plastic packaging, plastic infrastructure or fishing nets.

Source: Boucher, J., Friot, D., 2017. Primary Microplastics in the Oceans: a Global Evaluation of Sources. IUCN

Microplastic

Microplastics are small plastic particulates below 5 mm in size and above 1 μm. Two types of microplastics are contaminating the world's oceans: primary and secondary microplastics.

Source: GESAMP 2019 Guidelines for the monitoring & assessment of plastic litter in the ocean

Nanoplastic

The term nanoplastics is still under debate, and some authors set the upper size limit at 1000 nm while others at 100 nm. Gigault et al. (2018) define nanoplastics as particles within a size ranging from 1 to 1000 nm resulting from the degradation of industrial plastic objects and can exhibit a colloidal behaviour.

Sources: Lambert, S., Wagner, M., 2016. Characterisation of nanoplastics during the degradation of polystyrene. Chemosphere 145, 265–268. http://dx.doi.org/10.1016/j.chemosphere.2015.11.078

Koelmans A.A., Besseling E., Shim W.J., 2015. Nanoplastics in the Aquatic Environment. Critical Review. In: Bergmann M., Gutow L., Klages M. (eds) Marine Anthropogenic Litter. Springer, Cham. https://doi.org/10.1007/978-3-319-16510-3_12

Gigault J, ter Halle A, Baudrimont M, Pascal PY, Gauffre F, Phi TL, El Hadri H, Grassl B, Reynaud S (2018) Current opinion: What is a nanoplastic? Environmental Pollution 1-5

On-the-go vs in-home plastics

On-the-go plastic items are those consumed while on the move in public spaces, whereas in-home plastics are used in houses or at cafes and restaurants.

Source: http://www.seas-at-risk.org/images/pdf/publications/SeasAtRiskSummarysingleUseplasticandthemarineenvironment.compressed.pdf

Plastic

Plastics are commercially-used materials made from monomers and other raw materials chemically reacted to a macromolecular structure, the polymer, which forms the main structural component of the plastic.

The name plastic refers to their easy processability and shaping (G: plas-tein = to form, to shape). Plastics are usually divided into two groups according to their physical or chemical hardening processes: thermoplastic and thermosetting resins (i.e., polymers). Plastics contain additives to achieve defined properties.

Sources: Elias, H. G., 2003. An introduction to plastics. Ed. Weiheim. https://eur-lex.europa.eu/eli/reg/2011/10/oj

Plastic Application

A product or packaging partially or totally made of plastic.

Plastic detachable part

Any part of the packaging that can be removed to access the product or that is directly in contact with the product such as a lid, a sleeve or a protecting film.

Polymer

Polymers are group of organic, semi-organic, or inorganic chemical substances containing large polymer molecules. These molecules are formed by linking together small molecules, called monomers, by polymerisations processes (G: polys = many, meros = part). According to the International Union of Pure and Applied Chemistry (IUPAC) *polymer* and *macromolecular substance* are synonyms.

Source: Elias, H. G., 2003. An introduction to plastics. Ed. Weiheim.

Primary microplastic

Primary microplastics are plastics directly released into the environment in the form of small particulates. They may be intentionally added to products such as scrubbing agents in toiletries and cosmetics (e.g., shower gels) or they may originate from the abrasion of large plastic objects during manufacturing, use or maintenance such as the erosion of tyres when driving or of the abrasion of synthetic textiles during washing.

Source: Boucher, J., Friot, D., 2017. Primary Microplastics in the Oceans : a Global Evaluation of Sources. IUCN

Recycled plastic

A recycled plastic is a plastic made from recovered and recycled material. The term "secondary" is often used interchangeably with "recycled".

Recycling, upcycling and downcycling

Recycling is when waste materials are converted into new materials for the production of new products. Upcycling is when materials are recycled to produce a higher value or quality product than the original. Downcycling is a recycling process where the value of the recycled material decreases over time, being used in less valued processes, with lesser quality material and with changes in inherent properties, when compared to its original use.

Source: Pires A, Martinho G, Rodrigues S, Gomes MI (2019) Sustainable Solid Waste Collection and Management

Sanitary landfills

Landfilling is the deliberate disposal of large quantities of litter in a particular area, that is controlled (e.g., waste being covered on a daily basis, as well as the bottom of the landfill designed in a way to avoid spills). Landfilling is mainly the result of a formal collection sector.

Secondary microplastic

Secondary microplastics originate from the degradation of larger plastic items into smaller plastic fragments **once exposed to the environment**. This happens through photodegradation and other weathering processes of mismanaged waste such as discarded plastic bags, or from unintentional losses such as fishing nets.

Source: Boucher, J., Friot, D., 2017. Primary Microplastics in the Oceans : a Global Evaluation of Sources. IUCN

Single-use plastic

Single-use plastics products include a diverse range of commonly used fast-moving consumer products that are discarded after having been used once for the purpose for which they were provided, are rarely recycled, and are prone to littering.

Source: Council of the European Union (2019) DIRECTIVE (EU) 2019/... OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of on the reduction of the impact of certain plastic products on the environment. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CONSIL:ST_5483_2019_INIT&qid=1554217975397&from=EN

SPI code

In 1988 The Society of the Plastics Industry (SPI) created a coding system that assists recyclers with the recycling of plastics. Virtually all plastic products have the recycling symbol. The number inside the triangle indicates the type of synthetic resin:

Resin Identification Number	Resin	Resin Identification Code –Option A	Resin Identification Code –Option B
1	Poly(ethylene terephthalate)	1 PETE	01 PET
2	High density polyethylene	2 HDPE	02 PE-HD
3	Poly(vinyl chloride)	3 V	03 PVC
4	Low density polyethylene	4 LDPE	04 PE-LD
5	Polypropylene	5 PP	05 PP
6	Polystyrene	6 PS	06 PS
7	Other resins	7 OTHER	07 O

Supply chain

The supply chain of a product includes all its upstream activities. This includes the processes involved in its production and distribution, as well as aspects such as material type, material sourcing and transport of products between production stages and from final production to markets.

Take-back scheme

A take-back scheme is when firms retrieve products they manufacture or sell from customers at the products end of life via third parties or contractors in order to recycle, resell, appropriately dispose or renovate them.

Source: https://www.plasticseurope.org/en/about-plastics/what-are-plastics/large-family

Tyre and road wear particles

Tyre wear particles are generated from the friction between the tyre and the road. This ensures a sufficient grip on the road and safety. The particles are therefore not simply rubber pieces from the tyre, but an agglomeration of material from the tyre and the road. They are therefore identified as Tyre and Road Wear Particles (TRWP).

Source: http://www.etrma.org/uploads/Modules/Documentsmanager/20180320-etrma-trwp-plastics-strategy.pdf

Value chain

The value chain is the sum of all of the processes involved in cradle-to-grave activities (such as upstream resource sourcing and production, to downstream marketing, after-sales services and product end-of-life) by which a company adds value to a product.

Virgin plastic

A virgin plastic is a plastic made from virgin raw material (i.e., the extraction of crude oil). The term “primary” is often used interchangeably with “virgin”.

Waste-to-energy (WtE)

Waste-to-energy is a waste treatment technique designed to recover energy from waste. The incineration of waste is taken advantage of to produce heat and/or electricity.

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