



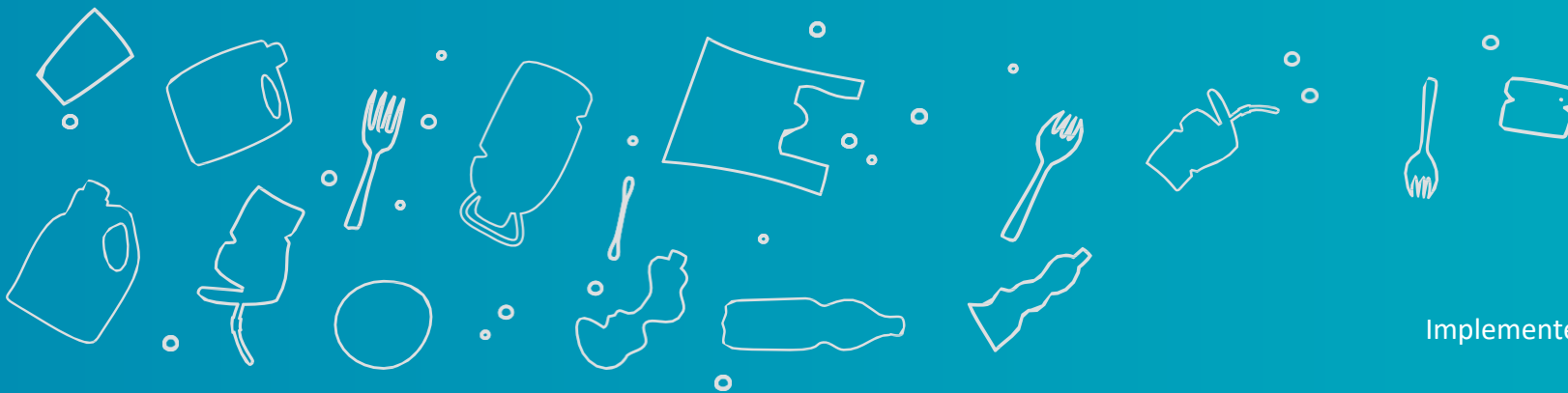
NATIONAL GUIDANCE FOR PLASTIC POLLUTION HOTSPOTTING AND SHAPING ACTION



T4

Identification of Waste Management Hotspots

September
2020



Implemented with



NATIONAL GUIDANCE FOR PLASTIC POLLUTION HOTSPOTTING AND SHAPING ACTION

Disclaimer

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the United Nations Environment Programme concerning the legal status of any country, territory, city or area or of its authorities, or concerning delimitation of its frontiers or boundaries. Moreover, the views expressed do not necessarily represent the decision or the stated policy of the United Nations Environment Programme, nor does citing of trade names or commercial processes constitute endorsement.

Design and layout: Anna Mortreux | Anagram

Copyright © United Nations Environment Programme, 2020

Authorship



Alexandre Bouchet – EA
Paola Paruta – EA
Guillaume Billard – EA
Julien Boucher – EA

Quantis

Laura Peano – Quantis

HOW TO READ THIS DOCUMENT



MODULE

Modules are the instruction for the tools. Each module is composed of one or several tools. Technical modules focus on generating hotspot information by the technical team. Strategic modules focus on generating interventions and instruments by involving a wider group of stakeholders.



TECHNICAL MODULE



STRATEGIC MODULE



TOOL REFERENCE

Tools are the building blocks of the guidance. Tools are of three categories: input tools (for data collection), assessment tools (to generate the hotspots, interventions and instruments) and output tools (to provide summarised information and shareable data repository).



INPUT TOOL



ASSESSMENT TOOL



OUTPUT TOOL

White background

WORKFLOW SLIDE

Describes key stages and main actions to run the module and associated tools.

Grey background

SUPPORTING INFORMATION

Provides supporting information, references of background data.



Blue background

DEFINITIONS AND DESCRIPTIONS

Provides key definitions and high level objectives of the modules and tools.



TABLE OF CONTENTS

5	▶	Objective of the Module	10		TOOL T4.1 Waste management hotspot canvas
6	▶	Relationship of module T4 with other modules	14		TOOL B Summary of hotspots per category
7	▶	Tools associated with module T4			
8	▶	Tools associated with this module			
9	▶	How to use this module?			

OBJECTIVES OF THE MODULE

This module aims at identifying elements within the waste management and infrastructure chain that have a critical influence on plastic leakage.

The output of this module is a dashboard listing a large number of waste management elements with a colour code indicating their negative (hotspot), positive (coolspot) or neutral contribution to plastic leakage. The positive or negative contribution of an element to the leakage is determined by its performance within the waste management system in comparison to a quantitative or qualitative benchmark.

WASTE MANAGEMENT HOTSPOTS CATEGORIES

The intention of the waste management dashboard is to provide a clear overview of what can be improved along the waste management system to reduce or avoid plastic leakage. For clarity, the waste management hotspots are organised according to the following categories:

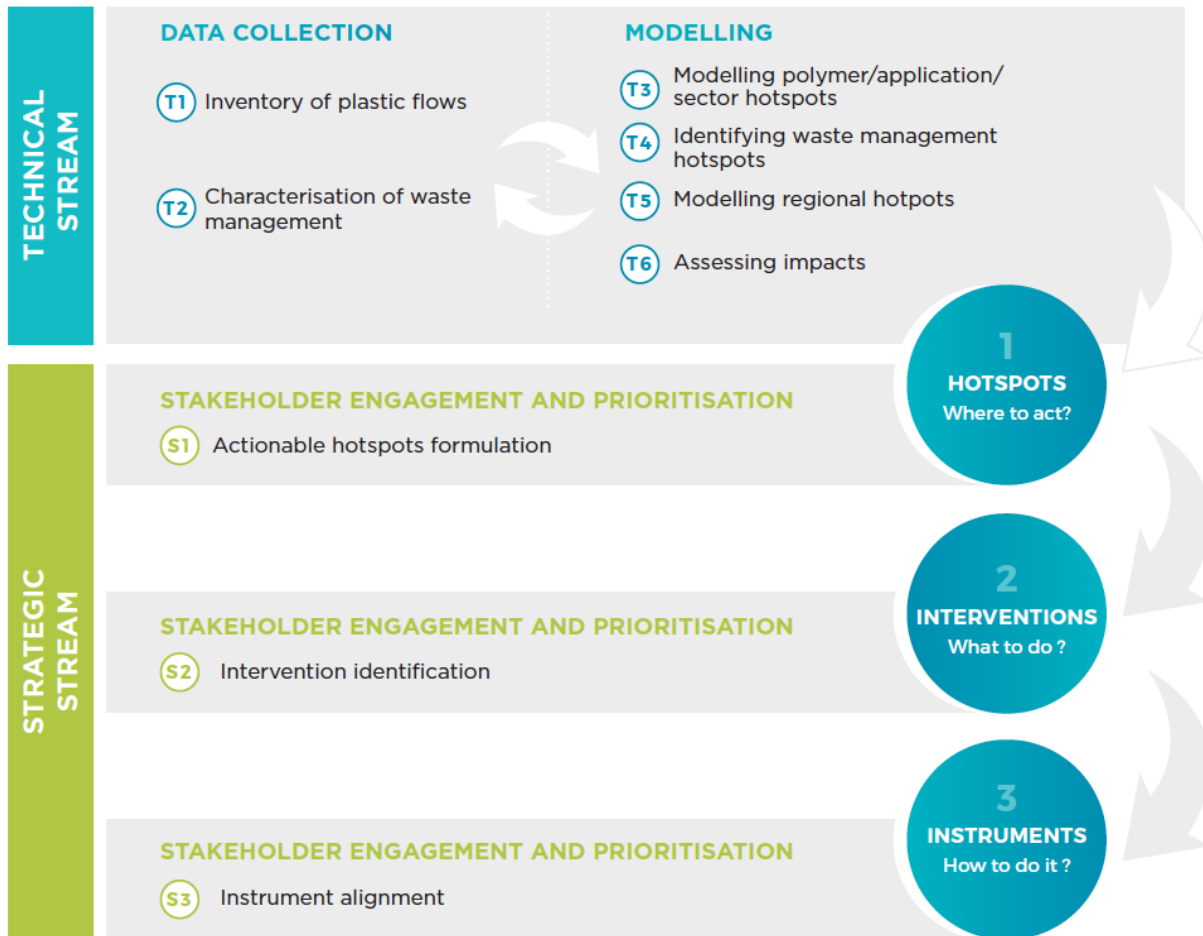
- Waste generation
- Waste segregation
- Waste collection
- Leakage while waiting for collection
- Waste related behaviours
- Waste management infrastructure
- Post-leakage management
- Waste water management

Illustration of waste management dashboard :

WASTE GENERATION	Plastic waste import	Plastic waste export	Plastic waste per capita generation	Share of plastic in waste stream
WASTE SEGREGATION	Segregation of compostable waste	Segregation of recyclable plastics	Segregation by the informal sector	Public infrastructure availability
WASTE COLLECTION	Formal collection of municipal waste	Formal collection of industrial waste	Value of recycled plastics	Value of non-recycled plastics
LEAKAGE WHILE WAITING FOR COLLECTION	Design of waste bins	Frequency of collection	Climatic conditions	Other (e.g. animals)
WASTE RELATED BEHAVIOURS	Littering driven by cultural habits	Littering due to a lack of public waste bins	Frequency of fly-tipping	Frequency of illegal burning
WASTE MANAGEMENT INFRASTRUCTURE	Share of waste in dumpsites	Share of waste in landfills	Informal recycling	Recycling capacity
POST-LEAKAGE MANAGEMENT	Frequency of city cleaning and sweeping	Frequency of waterway cleaning	Frequency of coastal clean-up	Frequency of other clean-up activities
WASTE WATER MANAGEMENT	Management of run-off waters	Waste water collection	Waste water treatment efficiency	Fate of WWTP sludges

● Negative contribution to the leakage
● Positive contribution

○ Neutral contribution
● Not assessed



RELATIONSHIP OF MODULE T4 WITH OTHER MODULES

Module T4 is part of the technical work stream. The result of this module is the identification of the most relevant elements within the waste management system that have a critical influence on plastic leakage. This influence can be either positive (contributes to reduce leakage) or negative (contributes to increase leakage)

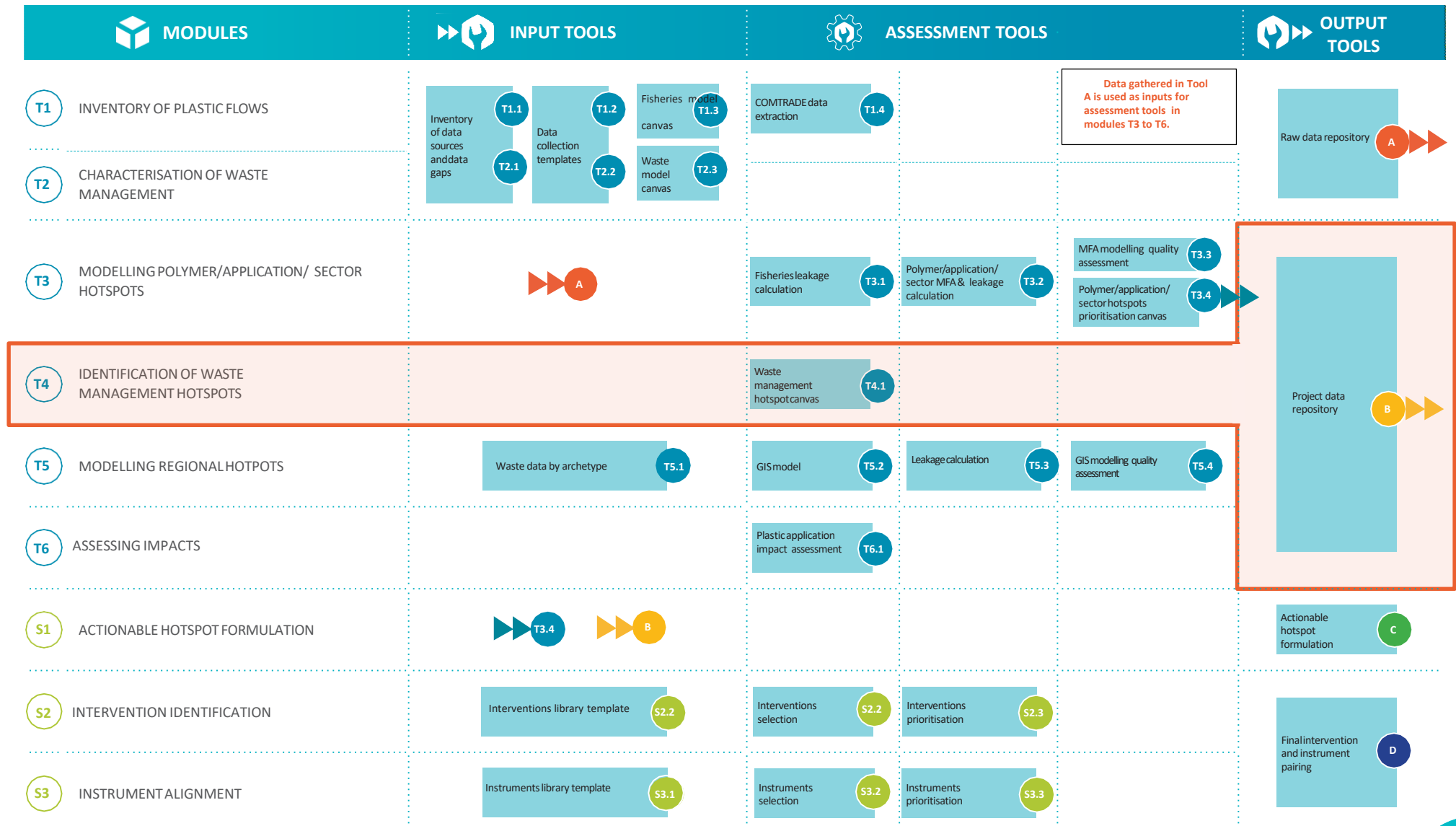
Module T4 organises the information collected in module T1 and T2, to establish if an element in the waste management system performs better or worse compared to its associated quantitative or qualitative benchmark. It provides module S1 with key information on “where to act” along the waste management chain in order to mitigate plastic leakage in the country.

This process of hotspots synthesis for module S1 has to be done by the user based on his appraisal of the results in module T4.



T4

TOOLS ASSOCIATED WITH MODULE T4



EXCEL TOOLS ASSOCIATED WITH THIS MODULE

ASSESSMENT TOOL

T4.1

WASTE MANAGEMENT HOTSPOT CANVAS



Waste management stage	Potential hotspot	Is it a hotspot?	Justification	Source
Waste generation	Plastic waste import	HOTSPOT	Only 7% of the waste recycled in the country is locally sourced; the remaining 93% is imported. The formal sector only recycles imported waste (around 800t a year) and it does not recycle domestic waste (i.e. VPA, VCC). Domestic waste is recycled by the informal sector in improper conditions.	VPA interview and VCC report VN_14
	Plastic waste export			
	Plastic waste per capita generation		Vietnam produces more waste per person than the rest of the world.	
	Share of plastic in waste stream	HOTSPOT	Vietnam is a 3rd stream in the waste stream depending on the waste stream.	

TYPE:
ASSESSMENT TOOL

OBJECTIVE:

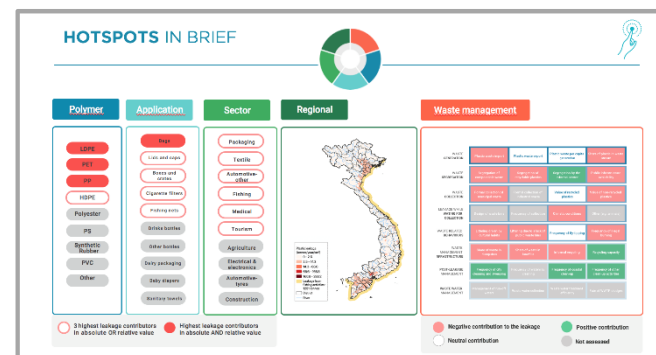
Automatically generate a dashboard highlighting positive or negative contribution of waste management elements to plastic leakage.



OUTPUT TOOL



PROJECT DATA REPOSITORY



TYPE:
OUTPUT TOOL

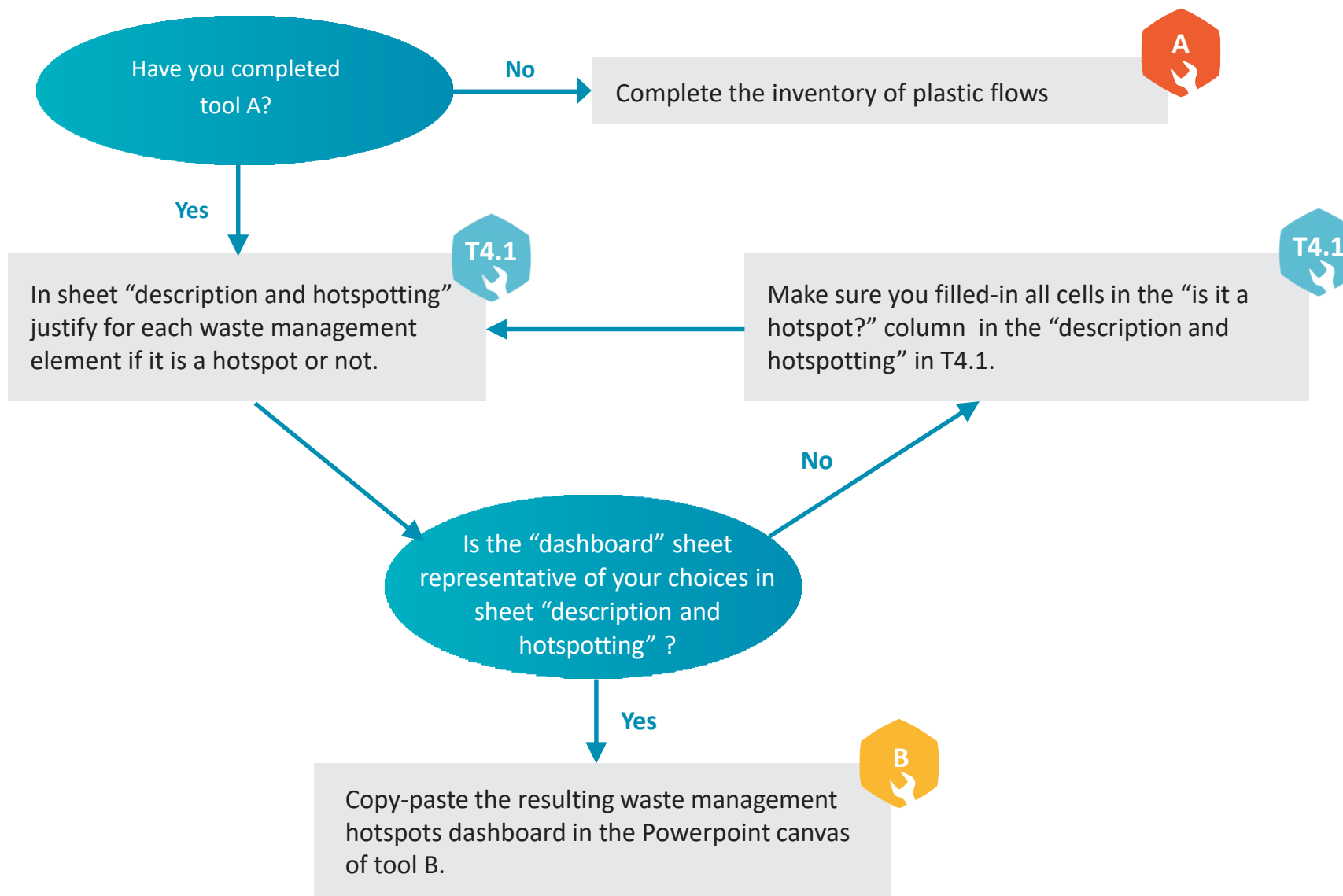
OBJECTIVE:

Canvas in PowerPoint to recap all hotspots.



These tools are available in the Excel Spreadsheet associated with this module.

HOW TO USE THIS MODULE?





TOOL

T4.1

Waste management hotspots canvas



HOW TO USE THIS TOOL ?

The excel file T4.1 contains two working sheets, “description and hotspotting” and “dashboard”. The sheet “Description and hotspotting” is divided into two parts: the *waste management hotspots description* (1) and the *waste management hotspotting in the project area* (2).

(1)

Waste management hotspots description					
<p>This table intends to answer the following questions: WHAT are the potential plastic hotspots across its waste management chain? HOW can these potential hotspots induce a plastic leakage?</p> <p>Please note that the value chain is considered within a specific country</p>					
Waste management stage	Potential hotspot	Description	How is plastic leakage induced?	Hotspot criteria	Criteria type
Waste generation	Plastic waste import	Quantity (tonnes) of plastic waste imported in the country	High quantities of plastic waste imported increase the risk of direct plastic leakage, e.g. If the imported plastic waste is mismanaged or jeopardises the plastic recycling capacity for domestic plastic waste (domestic recycling capacity overload which induces an economic trade-off between recycling domestic or imported plastic waste)	HOTSPOT if imports of scraps represents more than 20% of plastic recycling in the country NEUTRAL if imports of scraps represents between 10% and 20% of plastic recycling in the country COOLSPOT if import of scraps represents less than 10% of plastic recycling in the country	Quantitative expert judgment
	Plastic waste export	Quantity (tonnes) of plastic waste exported from the country	High quantities of plastic waste exported increase the risk of indirect plastic leakage in countries where there is a high waste mismanagement level	HOTSPOT if exports of scraps negatively impacts waste management chain in recipient countries NEUTRAL if exports of scraps are properly managed and do not impact local recycling in recipient countries COOLSPOT if no exports of scraps	Qualitative
	Plastic waste per capita generation	Quantity (tonnes) of plastic waste generated per capita per year	High plastic waste generation rate increases the risk of plastic leakage.	HOTSPOT if >> 53 kg/year/capita NEUTRAL if ~ 53 kg/year/capita COOLSPOT if << 53 kg/year/capita	Quantitative documented Jambeck et al. 2015
	Share of plastic in waste stream	Percentage of plastic in total waste (municipal)	High percentage of plastic in waste stream highlights a disproportionate use of plastic which increases the risk of plastic leakage.	HOTSPOT if >> average of the income level in WaW2.0 NEUTRAL if ~ average of the income level in WaW2.0 COOLSPOT if << average of the income level in WaW2.0	Quantitative documented What a Waste 2.0

(2)

Waste management hotspotting for the project area		
Country archetype: Vietnam	Criterion choices: HOTSPOT NOT ASSESSED COOLSPOT NEUTRAL	
Year: 2018		
Is it a hotspot?	Justification	Source
HOTSPOT	Only 7% of the waste recycled in the country is locally sourced, the remaining 93% is imported. The formal sector only recycles imported waste (around 850kt a year) and it does not recycled domestic waste (cilt. VPA, VCCI). Domestic waste is recycled by the informal sector in improper conditions.	VPA interview and VCCI report VN_r14
	Vietnam produces around 50 kg of plastic waste per person per year	EA - Country baseline analysis
HOTSPOT	Vietnam is a LMC (8% of plastic in waste stream on average), but the share of plastic in the waste stream is from 15% to 20% depending on the source	VN_r10 GA Circular summarises the waste characterisation studies

The *waste management hotspots description* section (1) helps the user understand how each element of the waste management system can induce a plastic leakage and what is the threshold (benchmark) for this element to become a hotspot.

On the other hand, the *waste management hotspotting for the project area* section (2) is where the user decides whether an element of the waste management system is a hotspot or not. The detailed procedure is described in the next slide.



HOW TO USE THIS TOOL ?

The section *waste management hotspotting in the project area* of the sheet “Description and hotspotting” of tool T4.1 is the only part of the tool where the user has to add some inputs. The user can use the following steps as a guide to complete this tool:

Step 1 - Fill the name of the area and the year of study. **(3)**

Step 2 – Determine if the waste management element is a hotspot in regard to its associated benchmark value. **(4)**

Step 3 – Justify your choice by describing why the element is a hotspot or not by filling the *Justification* and *Source* columns **(5)**. The user can use values compiled in the raw data repository (tool A) as a reference for justification. The justification can either be quantitative or qualitative depending on the criteria type. **(6)**

Potential hotspot	Hotspot criteria	Criteria type	Benchmark source	Is it a hotspot?	Justification	Source
Plastic waste import	HOTSPOT If imports of scraps represents more than 20% of plastic recycling in the country NEUTRAL If imports of scraps represents between 10% and 20% of plastic recycling in the country COOLSPOT If import of scraps represents less than 10% of plastic recycling in the country	Quantitative expert judgment		NEUTRAL	Low scraps import and assumed to be recycled without impacting domestic recycling	EA country overview
Plastic waste export	HOTSPOT if exports of scraps negatively impacts waste management chain in recipient countries NEUTRAL if exports of scraps are properly managed and do not impact local recycling in recipient countries COOLSPOT if no exports of scraps	Qualitative		HOTSPOT NOT ASSESSED COOLSPOT	scraps exports	EA country overview
Plastic waste per capita generation	HOTSPOT if >> 53 kg/year/capita NEUTRAL if ~ 53 kg/year/capita COOLSPOT if << 53 kg/year/capita	Quantitative documented	Jambeck et al. 2015	NEUTRAL	capita plastic waste generation is about 43 kg/cap/year, which nonetheless remains above the average in Africa (11 kg/cap/year)	EA country overview; WaW2
Share of plastic in waste stream	HOTSPOT if >> average of the income level in WaW2.0 NEUTRAL if ~ average of the income level in WaW2.0 COOLSPOT if << average of the income level in WaW2.0	Quantitative documented	What a Waste 2.0	HOTSPOT	On average we find 18% plastic in waste stream, which is above 11% income level average	EA regional hotspot

Waste management hotspotting for the project area

Country archetype:
South Africa
Year:
2018

Criterion choices:
HOTSPOT
NOT ASSESSED
COOLSPOT
NEUTRAL





SUPPORTING INFORMATION FOR TOOL T4.1

HOW TO DETERMINE BENCHMARK VALUES?

The evaluation of a waste management element as a hotspot can be performed either in a qualitative or quantitative way. For the latter, we suggest by default benchmark values from the What A Waste 2.0¹ database for solid waste management (Figure A), and from various sources² for waste water management (Figure B). These by default benchmark values are provided at global level for different income levels.

¹ Kaza, Silpa; Yao, Lisa C.; Bhada-Tata, Perinaz; Van Woerden, Frank. 2018. What a Waste 2.0 : A Global Snapshot of Solid Waste Management to 2050. Urban Development;. Washington, DC: World Bank. © World Bank.
<https://openknowledge.worldbank.org/handle/10986/30317> License: CC BY 3.0 IGO
² Compilation from Williams et al. (2012), Baum et al. (2013) and Van Dreht et al. (2009)

weighted AVERAGE from WaW2.0

Income level	% plastic in the waste stream
HIC	11%
UMC	11%
LMC	8%
LIC	4%
Income level	% sanitary landfill
HIC	37%
UMC	57%
LMC	30%
LIC	2%

Figure A

AVERAGE from WWTP TOOL

Source: compiled by authors from Williams et al. (2012), Baum et al. (2013) and Van Dreht et al. (2009)

Income level	Average % sewerage connection
HIC	65%
UMC	32%
LMC	14%
LIC	3%
Income level	Average % treatment of collected
HIC	72%
UMC	34%
LMC	13%
LIC	7%

Figure B



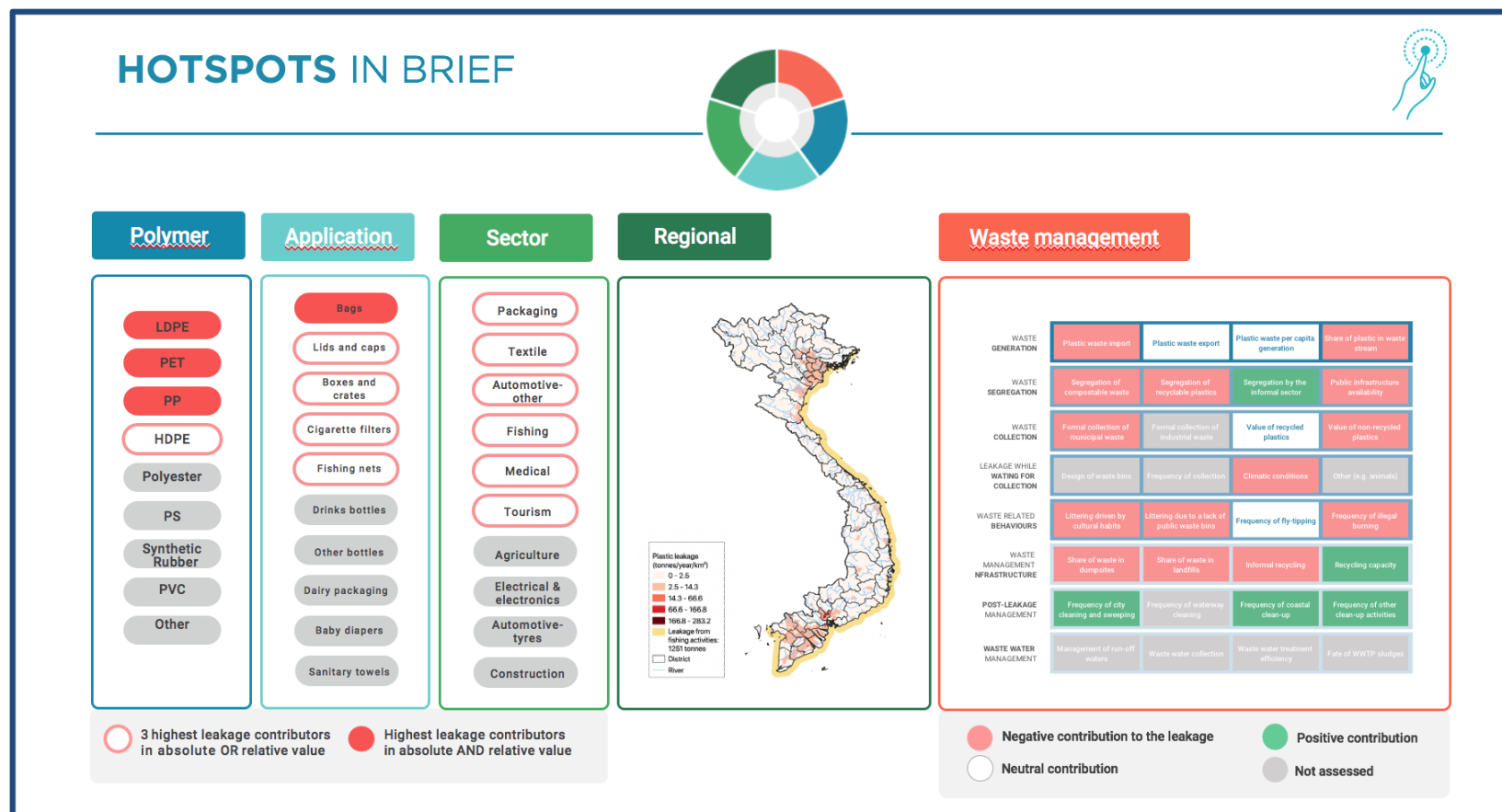
B

Project data repository

HOW TO USE THIS TOOL ?



Plastic leakage Hotspots from all categories at a glance



This powerpoint recap allows to summarise all hotspots results from modules T1 to T6 at a glance, including the waste management dashboard from tool T4.1.

HOW TO USE THIS TOOL ?

Metrics for plastic leakage
at a glance

Recap of waste management by polymer (in % shares)

Year:	2018
Population:	95'540'395
plastic consumption	7589 kt
plastic consumption per cap	79 kg/cap/year
total plastic waste	5598 kt
plastic waste per capita	59 kg/cap/year
total plastic stock	1991 kt
plastic stock per capita	21 kg/cap/year
total collected	2527 kt
share collected	45%
collected per capita	26 kg/cap/year
total mismanaged	3314 kt
share mismanaged	59%
mismanaged per capita	35 kg/cap/year
leakage	529 kt
leakage rate	9%
leakage per capita	5.5 kg/cap/year

Polymer	Waste produced in country	Domestic recycled	Exported	Properly managed	Improperly managed	Uncollected	Total	Collected	Mismanaged	Leakage	Waste product import	Domestic recycling import
PET	1003	3%	8%	27%	12%	50%	100%	50%	62%	15%	1068	9%
PP	1171	1%	3%	25%	11%	60%	100%	40%	72%	11%	1189	2%
Polyester	475	0%	0%	30%	13%	57%	100%	43%	70%	6%	475	0%
LDPE	539	1%	2%	27%	12%	58%	100%	42%	70%	14%	1324	60%
HDPE	434	3%	10%	21%	10%	56%	100%	44%	66%	11%	434	3%
PS	245	1%	4%	18%	9%	68%	100%	32%	77%	10%	247	2%
Other	619	0%	0%	23%	11%	67%	100%	33%	77%	7%	619	0%
Synthetic Rubber	71	0%	0%	25%	11%	64%	100%	36%	75%	13%	71	0%
PVC	169	3%	8%	9%	5%	75%	100%	25%	80%	4%	170	3%
Average	-	1%	4%	24%	11%	59%	100%	41%	70%	11%	622	17%

Polymer Type	Production at import of primary product	Import of product	Import of waste	Change in stock	Uncollected	Improperly managed	Properly managed	Recycled	Export of waste	Export of primary product
LDPE	778	137	785	95	313	65	144	789	13	281
PET	1041	120	85	4	502	119	272	91	84	154
PP	1644	169	18	406	708	133	288	28	33	235
Polyester	110	1222	0	104	271	62	141	0	0	753
HDPE	575	55	0	158	242	43	91	14	44	38
PS	474	48	2	199	166	22	45	5	9	77
Synthetic Rubber	462	49	0	50	45	8	18	0	0	391
PVC	682	85	1	499	127	15	5	14	99	8
Other	1113	364	0	476	413	66	140	0	0	384

Polymer MFA and leakage in kt

Sector	short lifetime	long lifetime	leakage (microplastic)	leakage (macroplastic)	Improperly managed	Uncollected	Properly managed	Export of waste	Recycled	Stock added	leakage (sum)
Packaging	3136	0	0	355	249	2228	546	163	50	0	355
Others	0	1412	1	73	87	715	191	17	5	396	74
Textile	0	1505	1	52	120	960	262	2	1	161	53
Automotive-other	0	670	0	12	29	230	63	5	2	341	12
Agriculture	0	234	0	9	7	53	14	2	1	158	9
Electrical & electronics	0	343	0	8	19	152	42	4	1	124	8
Automotive-tires	0	121	6	3	6	53	13	0	0	50	8
Tourism	34	0	0	4	3	25	6	0	1	0	4
Construction	0	1195	0	3	7	60	16	4	1	1106	3
Fishing	0	5	0	1	0	3	1	0	0	1	1
Medical	7	0	0	1	1	5	1	0	0	0	1

Sector MFA and leakage in kt

Application	Sector	Import	Export	Production	Waste	Recycled	Export of waste	Properly managed	Improperly managed	Uncollected	Leakage
Bags	Packaging	36	229	2279	2086	2086	1	2086	229	2279	2279
Other packaging	Packaging	23	12	268	279	0	279	279	12	268	268
Lids and caps	Packaging	15	4	156	167	3	167	167	4	156	156
Boxes, cases, crates	Packaging	29	9	284	304	9	304	304	9	284	284
Other bottles	Packaging	12	20	256	248	25	248	248	20	256	256
Dairy packaging	Packaging	8	1	62	68	0	68	68	1	62	62
Drinks bottles	Packaging	7	8	119	118	12	118	118	8	119	119
Cigarette filters	Others	0	2	15	13	0	13	13	2	15	15
Baby diapers	Others	0	0	21	21	0	21	21	0	21	21
Sanitary towels	Others	16	24	24	17	0	17	17	24	24	24
Fishing nets	Fishing	3	7	10	6	0	6	6	7	10	10

Packaging application MFA and leakage in kt



Life Cycle Initiative

Implemented with



Contacts:

support@shaping-ea.com

Feng.wang@un.org

Lynn.Sorrentino@iucn.org