PLASTIC POLLUTION IN THE KYRGYZ REPUBLIC

FINAL REPORT FOR the Kyrgyz Republic

December 2022

With support from

Intention and context of the work

This work allowed to identify plastic pollution hotspots in the Kyrgyz Republic, with a focus on montaineous areas. It is based on the methodology developped by UNEP/IUCN “National Guidance for Plastic Pollution Hotspotting and Shaping Action” but is adaped to local level and complemented with field data-collection..

The guidance was applied at **national level** in order to provide a detailed assessment of plastic leakage across nine distinct yet complementary hotspots categories and draws clear statements to help shaping action.

Once the national assessment was established, it was downscaled to the local level and complemented by **field assessment** with the help of Independent Ecological Expertise (IEE), a local expert. The main outcome of this work consists in a local assessment of plastic leakage across 13 locations and a preliminary set of possible interventions and instruments.

STRUCTURE AND OBJECTIVE OF THIS PRESENTATION

1

APPLYING THE GUIDANCE AT NATIONAL LEVEL

Provides a detailed assessment of plastic leakage across five distinct yet complementary hotspots categories and draws clear statements to help shape action.

2

ZOOMING AT LOCAL LEVEL THROUGHT A FIELD ASSESSMENT IN MOUTAIN AREAS

Provide a local assessment of plastic leakage accross 13 locations and a preliminary set of possible interventions and instruments in line with the plastic pollution hotspots results.

3

APPENDICES

Provides additional information including, methodology used, results data tables, hotspot score assessments and modelling assumptions.

4

BIBLIOGRAPHY

STRUCTURE AND OBJECTIVE OF THIS PRESENTATION

1
2
3
4

PLASTIC POLLUTION HOTSPOTS

1.1 Country Overview

Provides an outlook of the leakage assessment at the country level.

1.2 Detailed Hotspots Results

Provides a visual analysis and key interpretations across five complementary categories in which hotspots are prioritised based on a plastic leakage assessment.

1.3 Actionable Hotspots

Formulates clear statements based on the detailed hotspot analysis to help shape action towards plastic leakage abatement.

A. Polymer Hotspots

B. Application Hotspots

C. Sector Hotspots

D. Regional Hotspots

E. Waste Management Hotspots

STRUCTURE AND OBJECTIVE OF THIS PRESENTATION

1
2
3
4

FIELD ASSESSMENT

2.1 Mountain Overview

Provides an outlook of the plastic pollution in mountain areas.

2.2 Results Of The Field Study

Provides a visual analysis and key interpretations based on a local field assessment conducted by local experts.

2.3 Local Actions Recommendations

Provides a list of possible instruments to implement and monitor progress of suggested interventions.

STRUCTURE AND OBJECTIVE OF THIS PRESENTATION

1

2

3 **APPENDICES**

3.1 Introduction to the guidance

Provides the objectives of the Guidance, and introduces its associated workflow and main deliverables.

3.2 National data repository

Provides data tables with the detailed figures behind the graphs.

3.3 Local data repository

Provides data tables with the detailed figures behind the graphs.

4 **BIBLIOGRAPHY**

ICONS AND COLOUR CODE TO GUIDE THE READER

Reference to the methodology (module/tool)

Learnings, that complement the key take aways with more details, of information that is not necessarily visible on the graph

Reference to the appendices

Limitations of the study, can be inaccurate data or gap in the modelling

Key take away as the main conclusion of a graph or result in a writen format

Things we foresee to unlock the limitations. They can serve as guidance for future studies

Methodology and appendices

Sections slides

Results and interpretations

KEY DEFINITIONS

Hotspots: They 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.

Interventions: They 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: They 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.

Properly disposed: Waste fraction that is disposed in a waste management system where no leakage is expected to occur, such as an incineration facility or a sanitary landfill. We define a sanitary landfill as a particular area where large quantities of waste are deliberately disposed in a controlled manner (e.g., waste being covered on a daily basis, as well as the bottom of the landfill designed in a way to prevent waste from leaching out). Landfilling is mainly the result of a formal collection sector.

Improperly disposed: Waste fraction that is disposed in a waste management system where leakage is expected to occur, such as a dumpsite or an unsanitary landfill. A dumpsite is a particular area where large quantities of waste are deliberately disposed in an uncontrolled manner, and can be the result of both the formal and informal sectors. A landfill is considered as unsanitary when waste management quality standards are not met, thus entailing a potential for leakage.

Littering: 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.

Uncollected: Waste fraction (including littering) that is not collected by the formal sector.

Mismanaged waste: It is defined as the sum of uncollected and improperly managed waste. The mismanaged waste index is the ratio of the mismanaged waste and the total waste. It is abbreviated as MWI and its value given in percentage.

Leakage: Plastic that is released to the environment, specifically to rivers and oceans. The leakage rate is ratio between leakage and total waste generated, and its value is given in percentage.

Release rate: It is defined as the ratio between leakage and total mismanaged waste, and its value is given in percentage.

Macro-plastic: Large plastic waste readily visible and with dimensions larger than 5 mm, typically plastic packaging, plastic infrastructure or fishing nets.

Micro-plastic: Small plastic particulates below 5 mm in size and above 1 mm. Two types of micro-plastics are contaminating the world's oceans: primary and secondary micro-plastics. In this study, we focus on primary micro-plastics which are are plastics directly released into the environment in the form of small particulates.

Mass balance: Mass balancing is a mathematical process aiming at equalising inputs and outputs of a given material flow across a system boundary. In our case, inputs consist of domestic production and imports while outputs consists of exports, waste generation and increase of stock. A mass balance allows to check data consistency and helps reconcile different datasets when needed.

Formal sector: Waste management activities planned, sponsored, financed, carried out or regulated and/or recognized by the local authorities or their agents, usually through contracts, licenses or concessions

Informal sector: Individuals or a group of individuals who are involved in waste management activities, but are not formally registered or formally responsible for providing waste management services. Newly established formalized organizations of such individuals; for example, cooperatives, social enterprises and programs led by non-governmental organizations (NGOs), can also be considered as the informal sector for the purpose of this methodology.

For additional definitions, please refer to the publication: 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. Definitions of formal and informal sector are taken from: United Nations Framework Convention On Climate Change - Clean Development Mechanism (UNFCCC-CDM) , 2010, AMS-III.AJ. EB70, Annex 28 - Small-scale Methodology: Recovery and Recycling of Materials from Solid Wastes.

WHAT WE MEAN BY PLASTIC LEAKAGE / IMPACTS

A By plastic leakage we refer to a quantity of plastic entering rivers and the oceans

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

Parameters ruling the leakage quantification in the model

- General waste management
- Recycling
- Wastewater and run-off water management
- Plastic consumption patterns
- Population density
- Value of the polymer
- Size of application
- Type of use
- Distance to shore and rivers
- Hydrological patterns

Parameters ruling qualitative impact assessment

- Beach clean-up data
- Size and shape of applications
- Presence of toxic substances in polymers or additives

Leaked plastic stems from uncollected and improperly disposed waste.

Note that the rest of the uncollected and improperly disposed plastic may be leaking into other environmental compartments such as "soil", "air" or "other terrestrial compartment" as defined in the Plastic Leak Project (PLP) guidance.

This information is not required to shape action but could be calculated using the PLP guidance.

LINK to the PLP guidance

LEAKAGE PATHWAY AT A GLANCE

KEY ABBREVIATIONS AND UNITS

Polymer abbreviations

NAME	ABBREVIATION
Polyethylene Terephthalate	PET*
Polypropylene	PP
Low-density Polyethylene	LDPE
High-density Polyethylene	HDPE
Polystyrene	PS
Polyvinyl Chloride	PVC

Calculation variables

NAME	ABBREVIATION
Mismanaged waste index	MWI
Leakage rate	LR
Release rate	RR

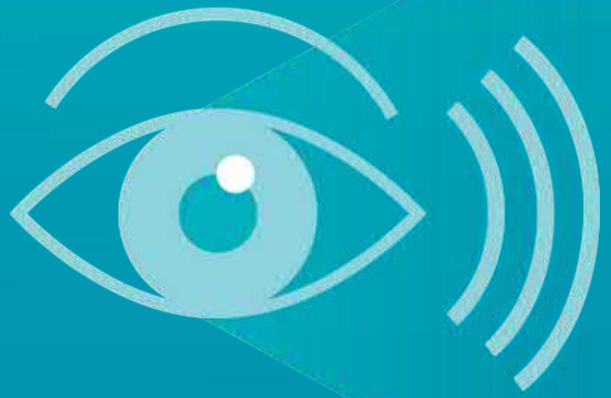
Key units

NAME	SYMBOL
Gram	g
Kilogram	kg
Tonne	t
Kilo tonne (or thousand tonne)	kt
Mega tonne (or million tonne)	Mt
Kilometer	km
Square kilometer	km^2

*In this study, PET resins are distinguished from Polyester which includes polyester fibres, polyester films and polyester engineered resins.

1 APPLYING THE GUIDANCE AT NATIONAL LEVEL

NATIONAL POLLUTION HOTSPOTS



1.1 COUNTRY OVERVIEW

SUMMARY AT A GLANCE

Global view on plastic in the Kyrgyz Republic

33%
Collection rate

93%
Mismanaged rate

6.6% Collection for recycling

5.8% Domestic recycling rate

17 Kt
Leakage

2.7 Kg
Per capita leakage

Hotspots

Most critical polymers

- LDPE
- PET
- Polyester
- PP
- PET
- PP
- PS
- PVC

Number of hotspots per waste management stage

- Waste generation
- Waste segregation
- Waste collection
- Leakage while waiting for collection
- Waste related behaviors
- Waste management infrastructure

73% of Leakage comes from rural areas

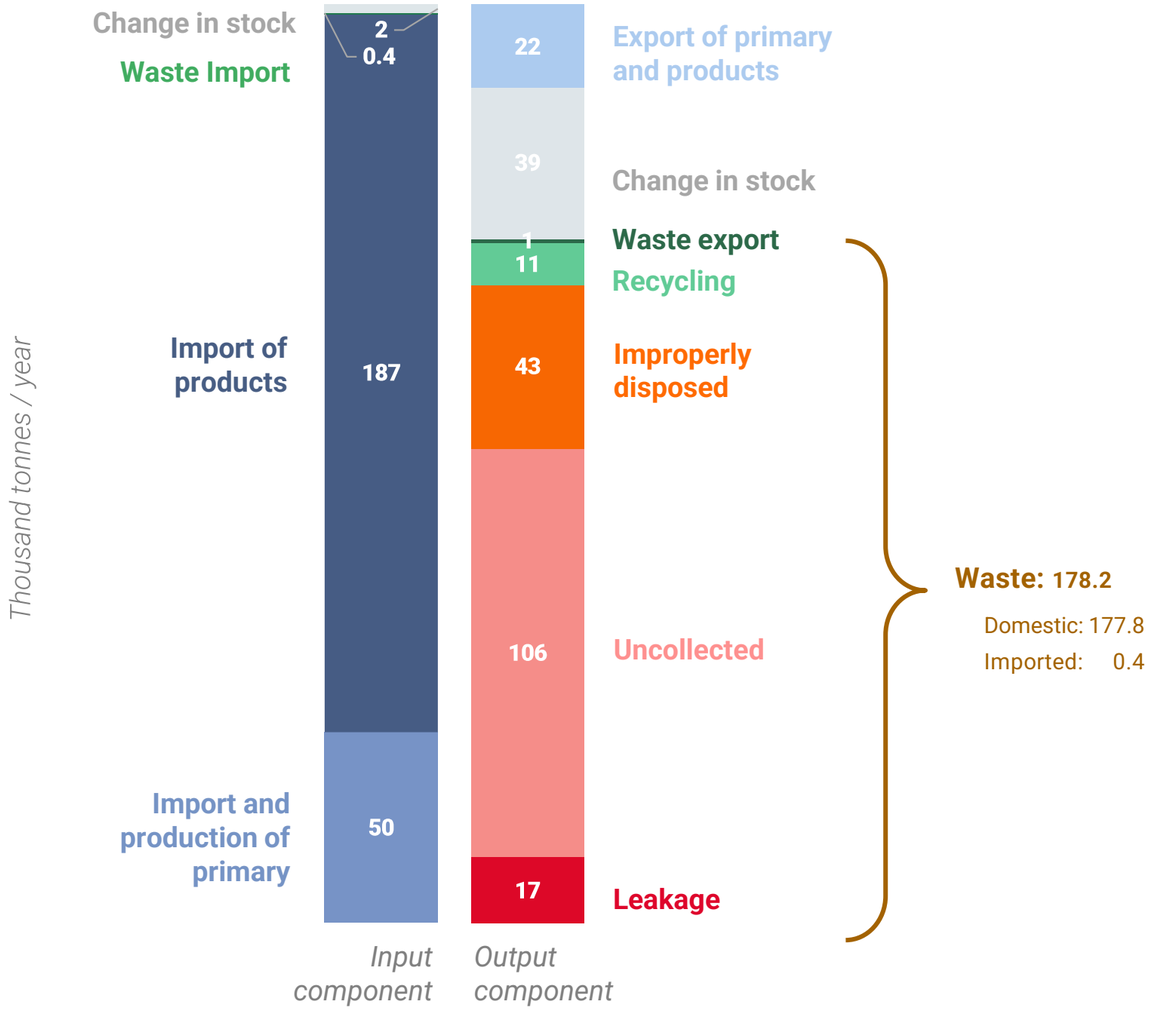
Shaping action from the hotspots

9
Actionable Hotspots

8
Priority Interventions

COUNTRY PLASTIC MATERIAL FLOW [2019]

Summary of the results for all plastics in the country



Key take-aways

- There is no primary plastic production in Kyrgyz Republic.
- The average per capita plastic waste generation is **28 kg/capita/year.**
- Although there are 406 waste dumpsites in the Kyrgyz Republic, only 107 are authorized (26%) and there are no sanitary landfills.
- Almost 70% of the plastic waste generated in the Kyrgyz Republic remains uncollected. This is due to low collection rates outside city centres, high littering rates and open burning of waste prior to collection.
- In the Kyrgyz Republic, **17 kt** of plastic waste leaked into the ocean in 2019. This is equivalent to a plastic leakage of **2.7 kg/capita/year**.

* Average plastic waste generation per capita values are derived from the What a Waste 2.0 database (*Kaza et al., 2018*)

The “improperly disposed” waste encompasses waste disposed at unsanitary landfills and dumpsites. For simplicity, in this figure, we removed part of the “leakage” from the “improperly disposed” and “uncollected”.

OPEN BURNING: A ROUGH ESTIMATE

166 kt

Total plastic mismanaged

47%

released into the air as noxious chemical substances through open burning

POLLUTION TO THE AIR:

77.3 kt

Key take-aways

- **Open burning** of mismanaged plastic waste in the Kyrgyz Republic poses significant risks for human health (due to the release of noxious chemical substances such as dioxine and particulate matters) and directly contributes to climate change.

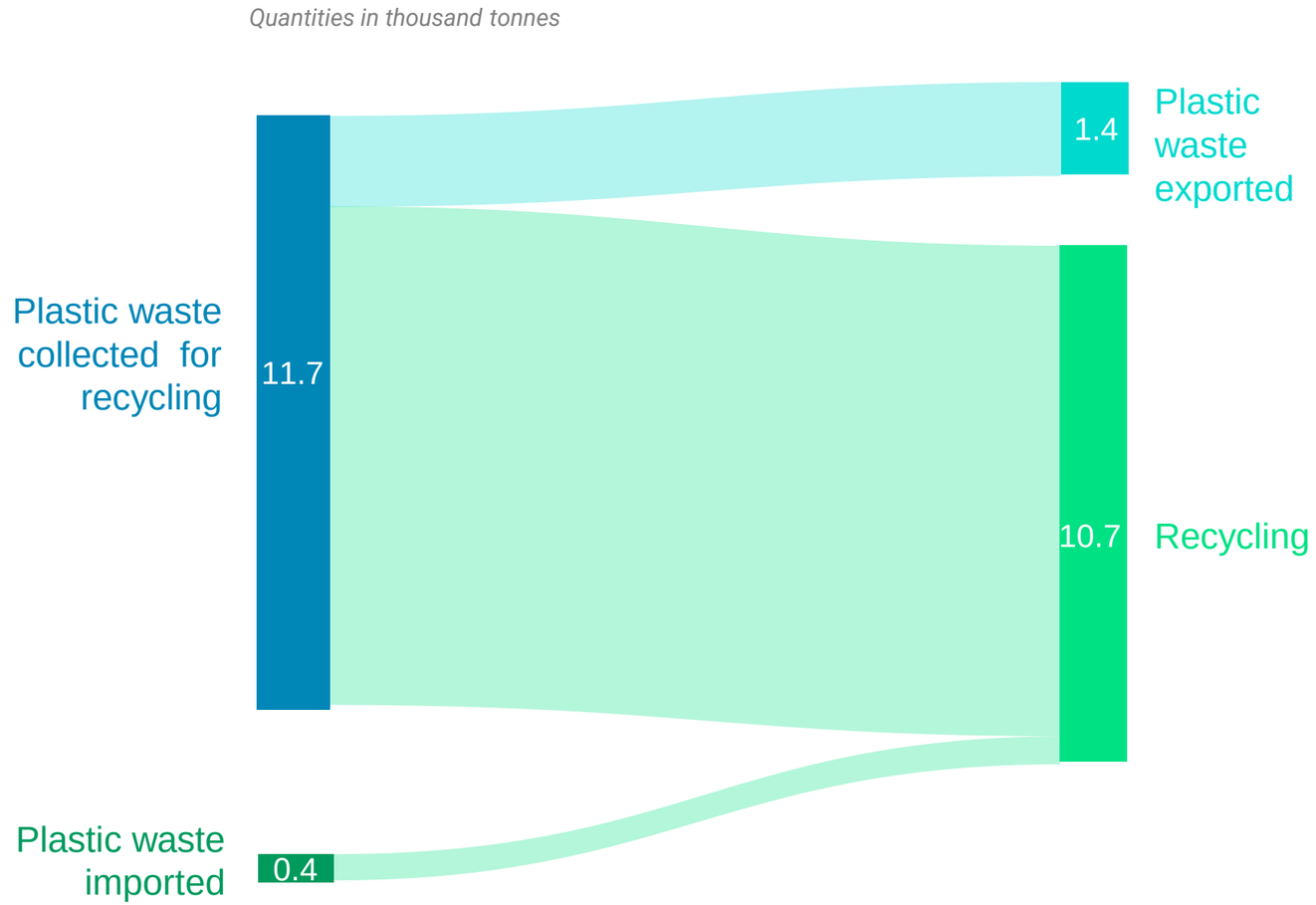
Limitations

Although we do not have specific data on burning, we suggest a rough estimate of how much plastic could be polluting the air by using the assumptions made in the *Breaking the Plastic Wave* report (*Lau et al, 2020*): 60% of uncollected plastic waste and 13 % of plastic waste at dumpsites are burnt on average worldwide. In the case of the Kyrgyz Republic, it leads to an estimate of 47% of the total plastic mismanaged contributing to air pollution through open burning.

Unlocking limitations

Investigate open burning practices and conduct field studies to estimate the amount of mismanaged plastic waste that is burned.

RECYCLING: IMPORT OF WASTE AND RECYCLING CAPACITY



Key take-aways

- Kyrgystan collects 11.7 kt of plastic for recycling, the majority is recycled in the country and the rest is exported.
- Imported waste is minor (0.4 kt), and it is assumed to be recycled in the country.

Limitations

- There are no official data on plastic recycling in Kyrgyzstan. Plastic for recycling is collected by the informal sector, and sorting and recycling facilities are mainly small businesses, half of which are non-registered companies (*Sim et al., 2013*).
- The only two existing estimates of volumes of plastic collected for recycling were inconsistent with respect to the estimated waste generation volumes.
- Personal communication with Independent Ecological Expertise (IEE) highlighted illegal export of waste as common practice that could not be captured in this assessment.

Unlocking limitations

Put in place a reporting system for recycling companies in order to gain better insight onto the recycling sector. Investigate waste trade.

1.2 DETAILED HOTSPOTS NATIONAL RESULTS

5 CATEGORIES OF HOTSPOTS

WHAT

WHAT

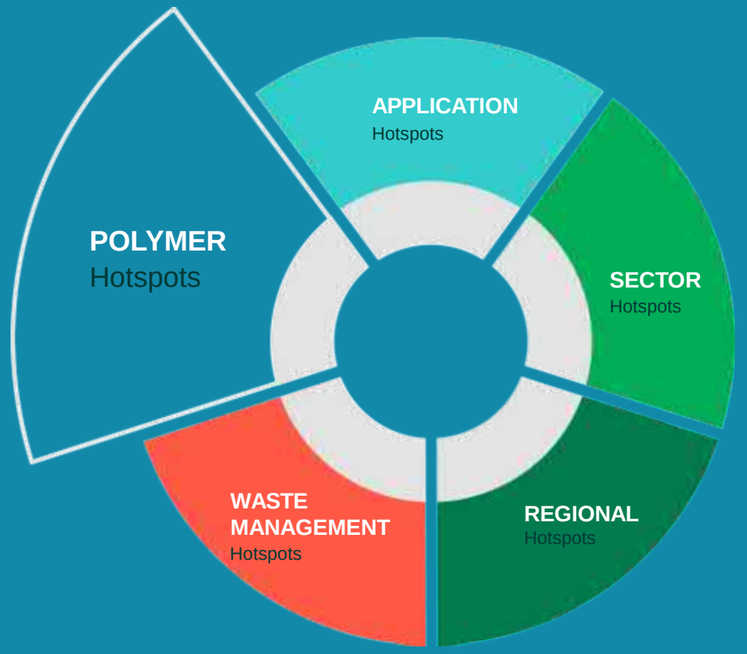
WHERE

WHERE

WHY

ACTIONABLE HOTSPOTS FORMULATION

A POLYMER HOTSPOTS

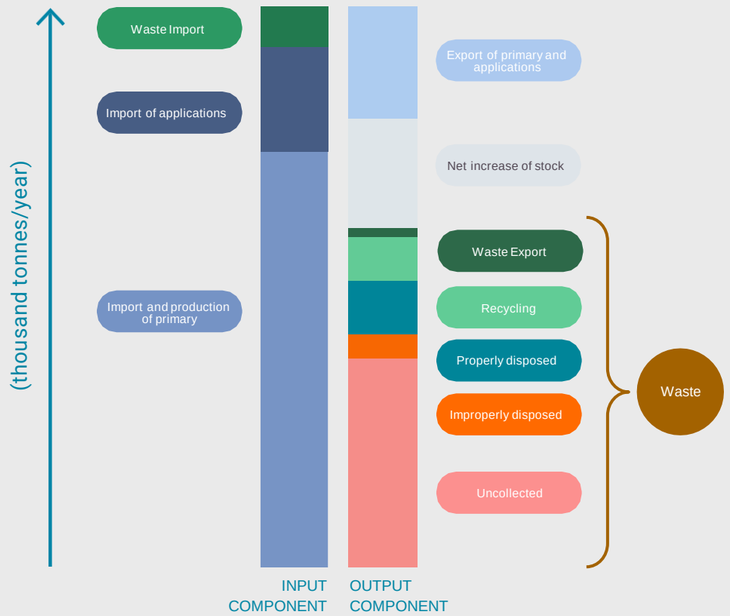


OBJECTIVE AND INSTRUCTIONS

Key question answered:

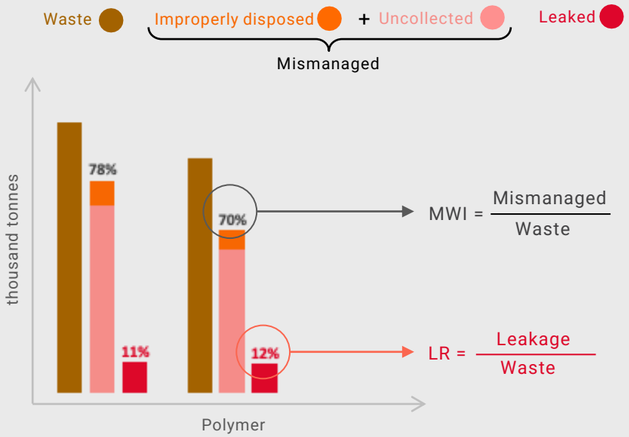
Which polymers are most critical in the country regarding plastic leakage?

What are the bar components of the polymer mass balance graph?

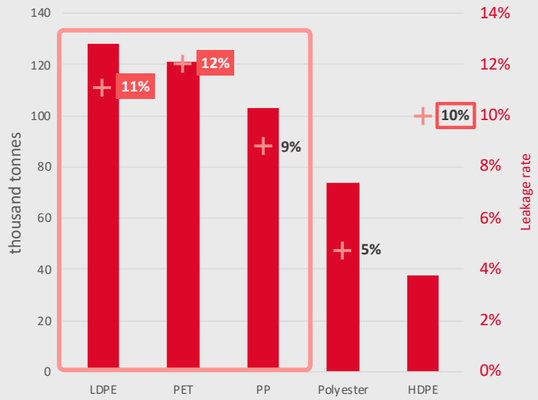


How to read the polymer hotspot graph?

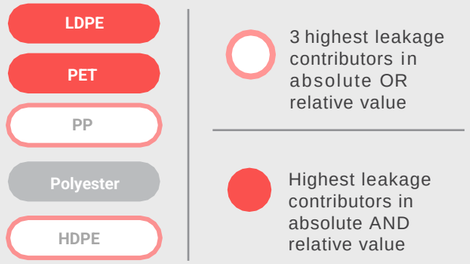
1. Determine leakage from mismanaged waste



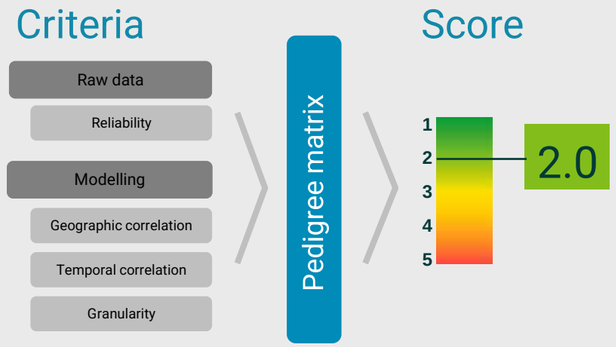
2. Focus on leakage and leakage rate



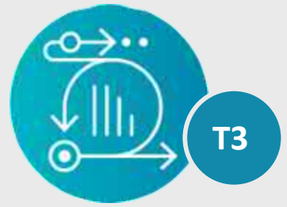
3. Select hotspots based on absolute and relative leakage



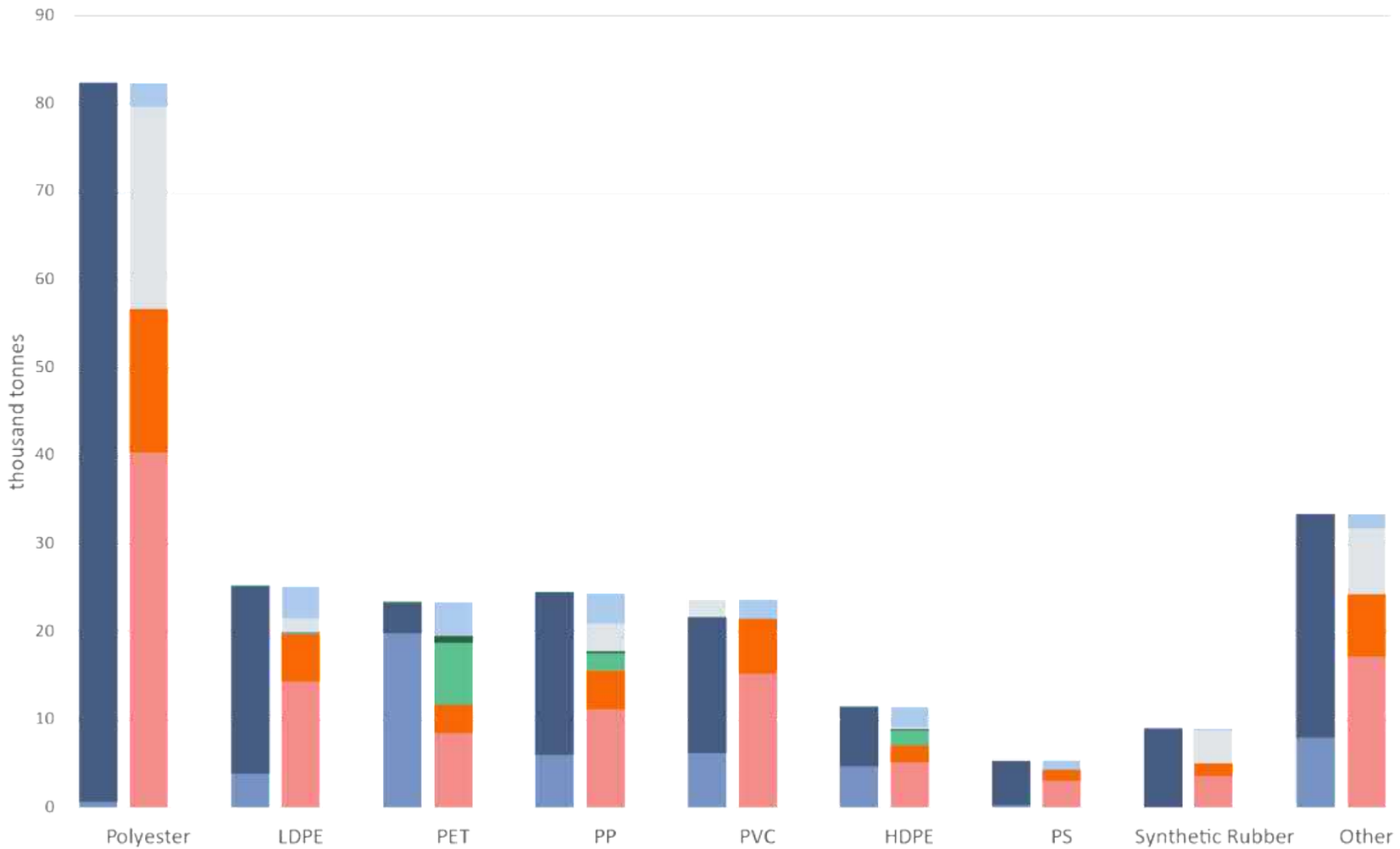
4. Assess the quality score of the results



For more details, please read the Methodology



MASS BALANCE BY POLYMER [2018]



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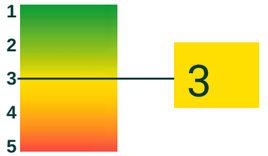


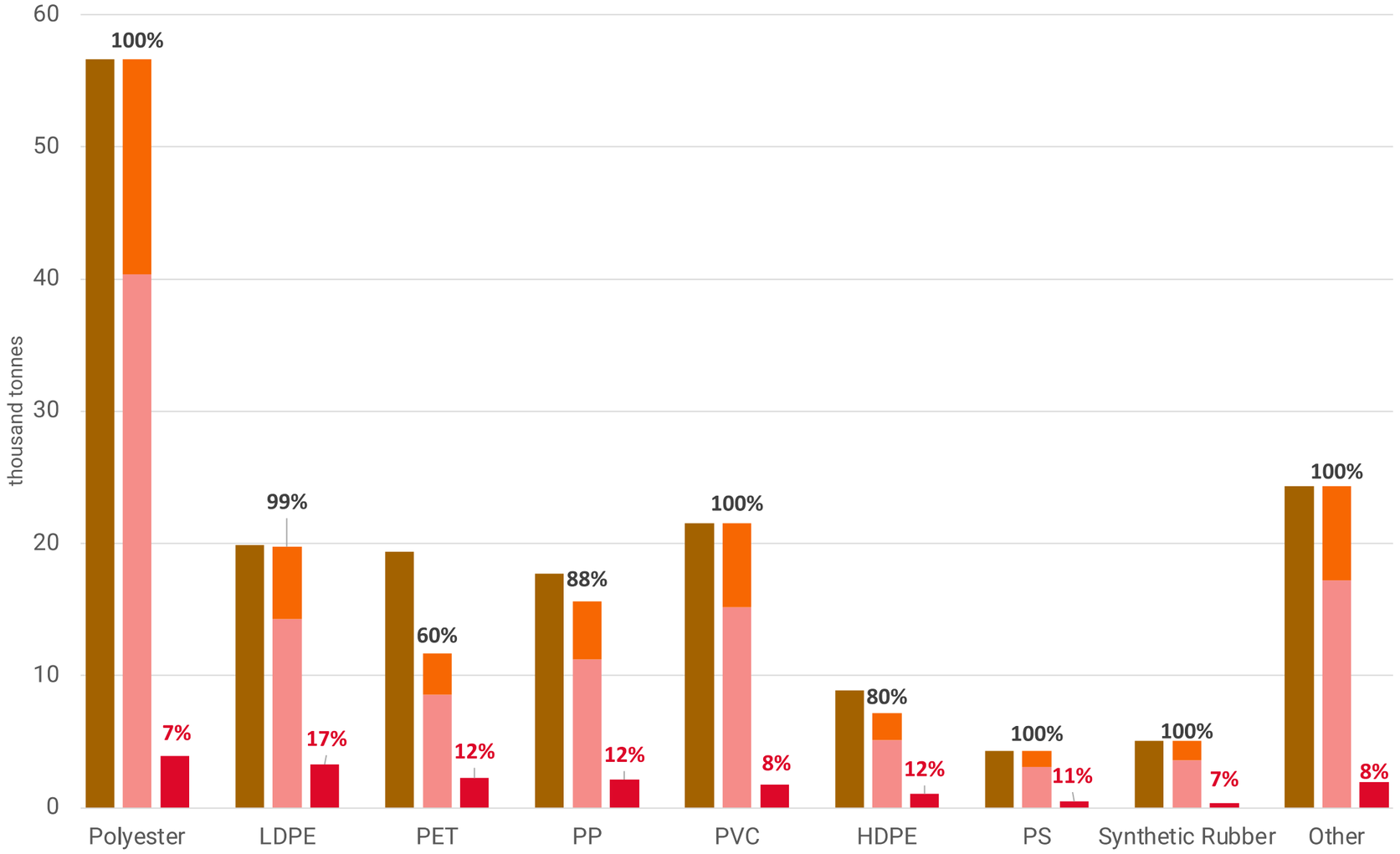
INPUT

- Waste Import
- Import of products
- Import and production of primary

OUTPUT

- Change in stock
- Waste export
- Export of primary and products
- Recycling
- Properly disposed
- Improperly disposed
- Uncollected

MISMANAGED WASTE AND LEAKAGE BY POLYMER [2018]



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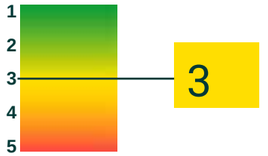


Waste

Improperly disposed

+

Uncollected

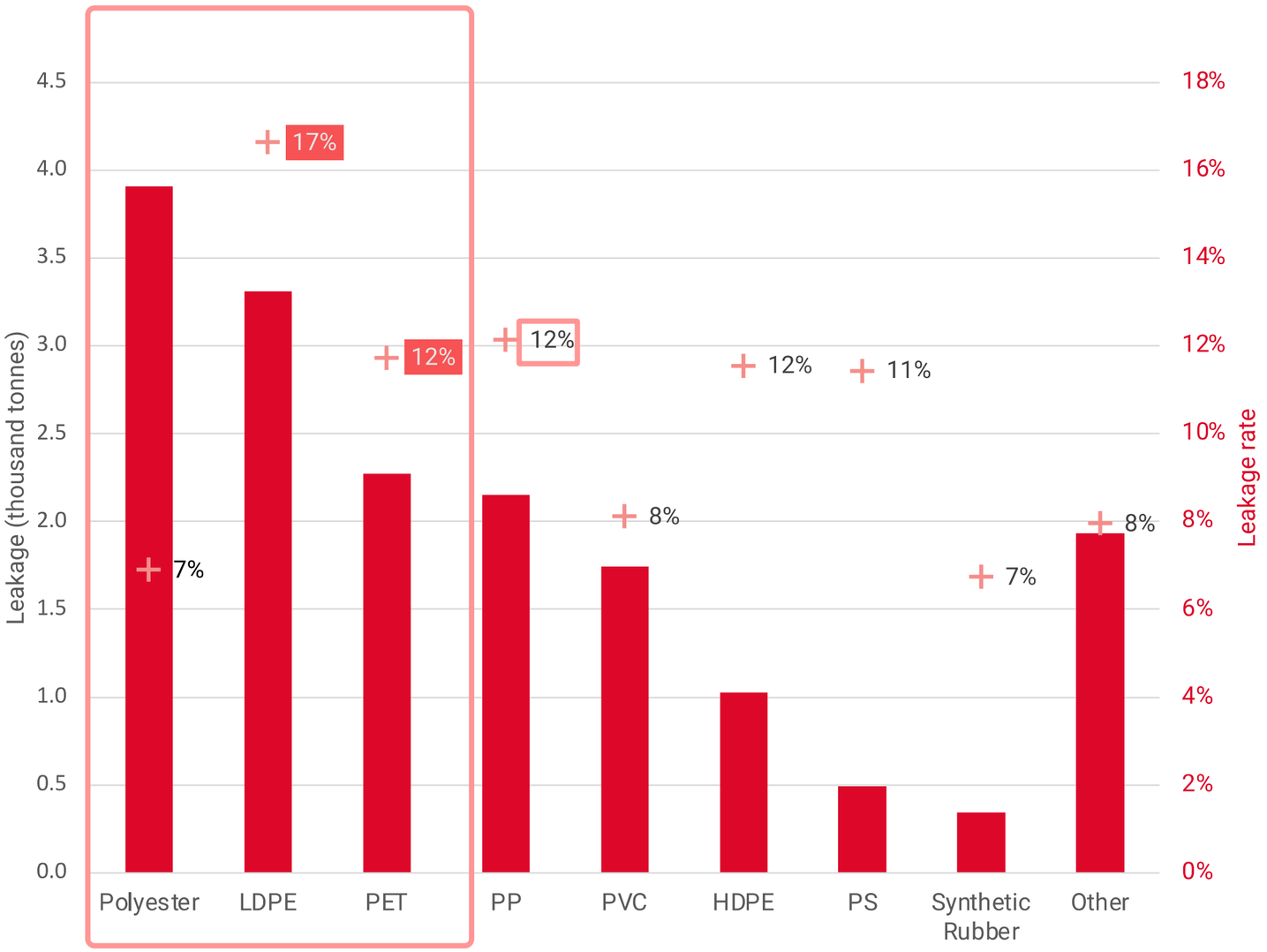
Mismanaged

Leaked

X% | Mismanaged Waste Index (MWI)

X% | Leakage Rate (LR)

POLYMER HOTSPOTS [2018]



LDPE

PET

Polyester

PP

PET

PP

PS

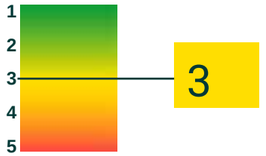
PVC

Other

3 highest leakage contributors in absolute OR relative value

Highest leakage contributors in absolute AND relative value

Quality Score



Key take-aways:

- **Polyester,** extensively used in textiles, is the top contributor in absolute leakage (3.9 kt), with a leakage rate of 7%.
- **LDPE** is the 2nd contributor to leakage (3.3 kt), and at 17% it has the highest leakage rate.
- **PET**is the 3rd polymer by absolute leakage (34 kt) and by relative leakage.
- **PP** is a hotspot due to its high relative leakage (12%).

POLYMER HOTSPOTS:
INTERPRETATION AND LIMITATIONS

All polymers

Learnings

- Export of plastic products from the Kyrgyz Republic is limited, since there is no plastic production in the country, the country relies on import of finished products and raw material.
- Most plastic is imported in the country in the form of finished products, except for PET that is imported mostly as raw material, with manufacturing taking place within the country.
- There is no proper disposal of plastic in the Kyrgyz Republic, since there are no sanitary landfill or incineration facilities.
- Recycling takes place only for certain products and polymers. PET bottles are the most recycled, followed by PP and HDPE containers.
- Polyester, LDPE, PET and PP are the main contributors to plastic leakage in the Kyrgyz Republic. LDPE has a particularly high leakage rate due to the fact that it is not recycled and that its release rate from land to river is high.

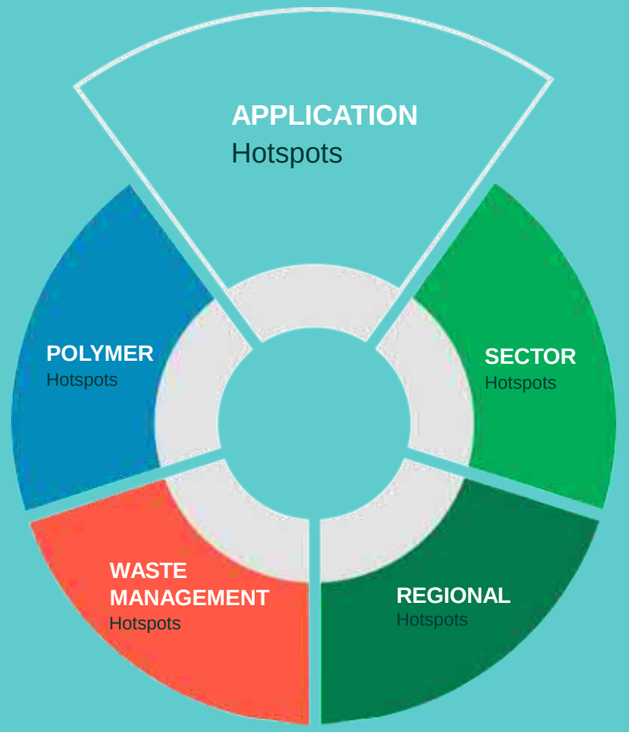
Limitations

- Recycling volumes by polymer were modelled based on total recycling capacity (extrapolated by Sim et al., 2013) and on the type of applications that are accepted at plastic collection points in Bishkek (Tazar app). Therefore, the uncertainty on the recycling rates by polymer is high.
- Data on collection rates are available only for the municipal solid waste (*Sim et al., 2013, International Solid Waste Association, 2017)*. We assume that collection rates are similar across all sectors, which is reflected in similar collection rates across all polymers.
- According to a personal communication with Independent Ecological Expertise (IEE), illegal import and export of plastic waste are common practice in the Kyrgyz Republic, but estimates are not available. Furthermore, the fate of imported and exported waste is not known.

Unlocking limitations

- Gather insight on collection rates and fate of waste by sector.
- Implement reporting on recycling volumes by polymer.
- Limit illegal trade of waste and shed light on fate of imported waste.

B APPLICATION HOTSPOTS

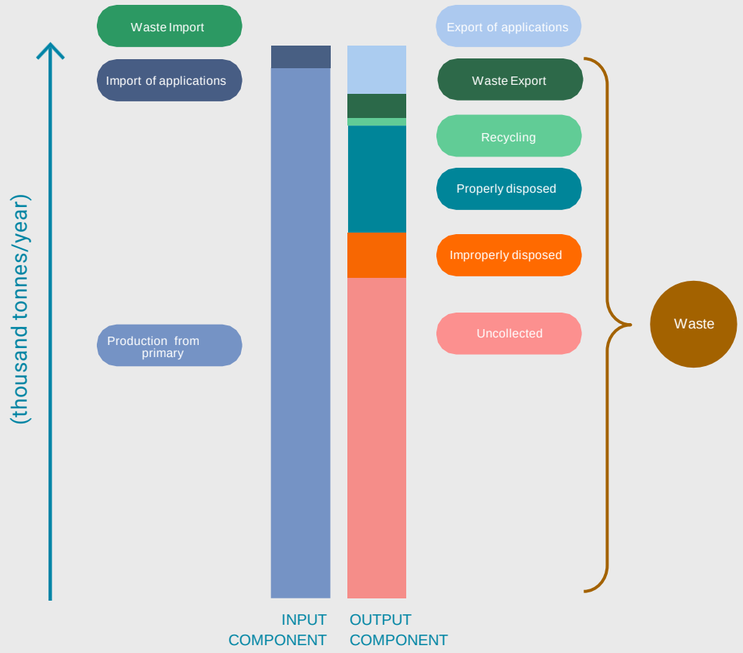


OBJECTIVE AND INSTRUCTIONS

Key question answered:

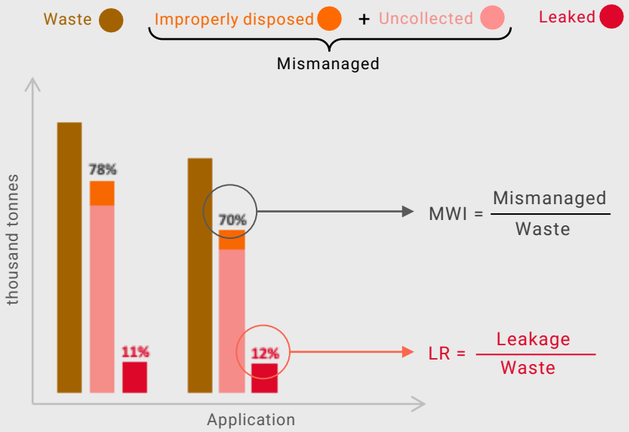
Which applications are most critical in the country regarding plastic leakage?

What are the bar components of the application mass balance graph?



How to read the application hotspot graph?

1. Determine leakage from mismanaged waste



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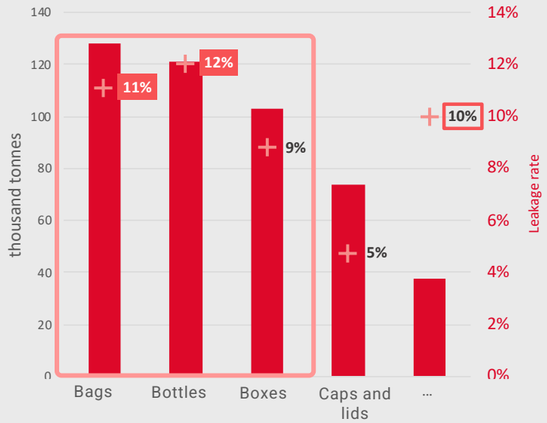
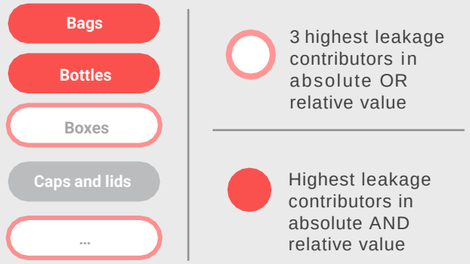
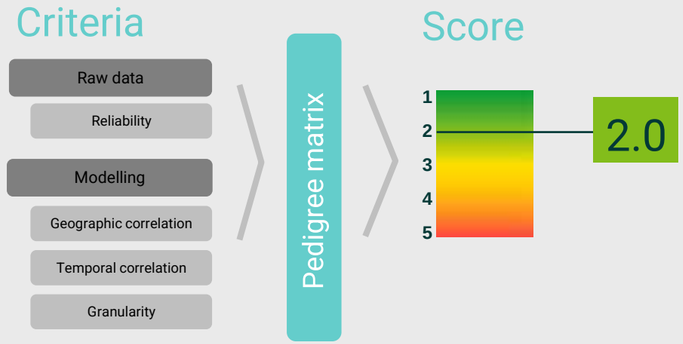


3. Select hotspots based on absolute and relative leakage



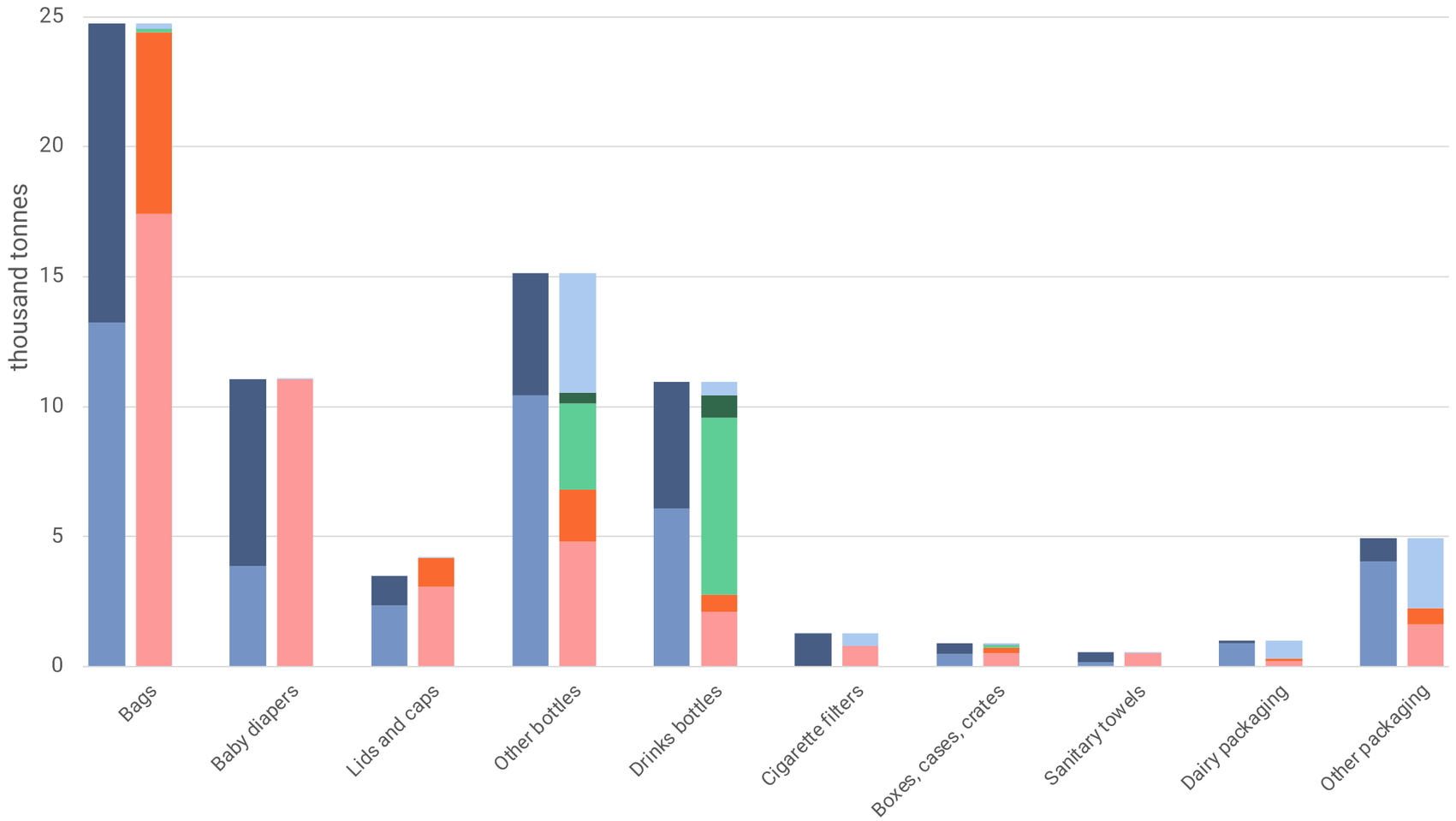
4. Assess the quality score of the results



For more details, please read the Methodology

MASS BALANCE BY APPLICATION [2019]

The application analysis covers most of known short-lived products, which corresponds to **37% of total plastic waste** generated in the country in 2019.



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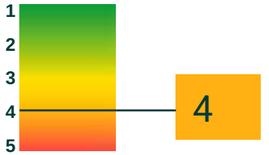


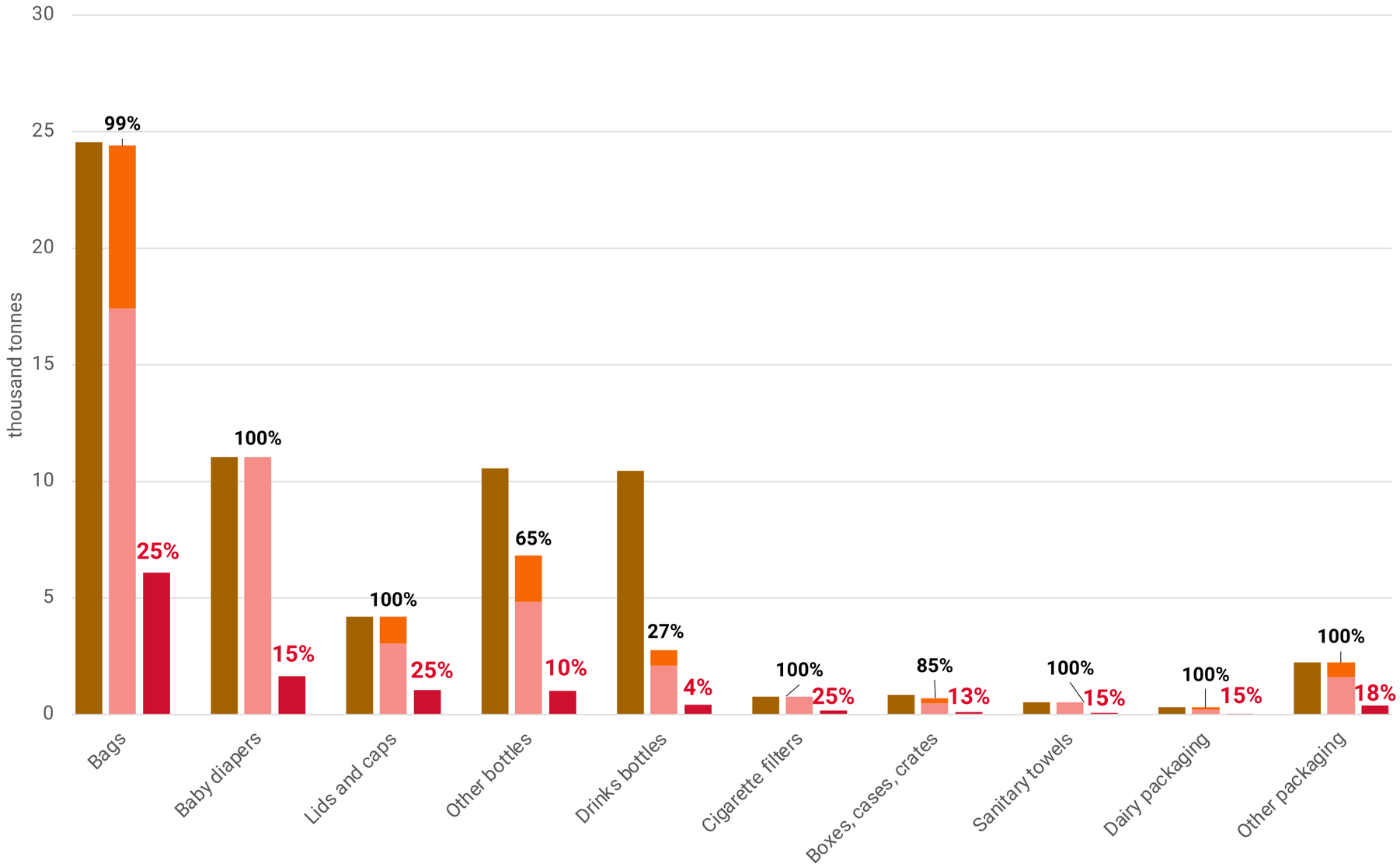
INPUT

- Waste Import
- Import of products
- Production from primary

OUTPUT

- Waste export
- Export of applications
- Recycling
- Properly disposed
- Improperly disposed
- Uncollected

MISMANAGED WASTE AND LEAKAGE BY APPLICATION [2019]



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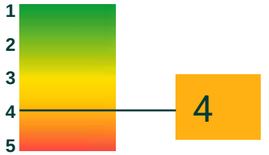


Waste

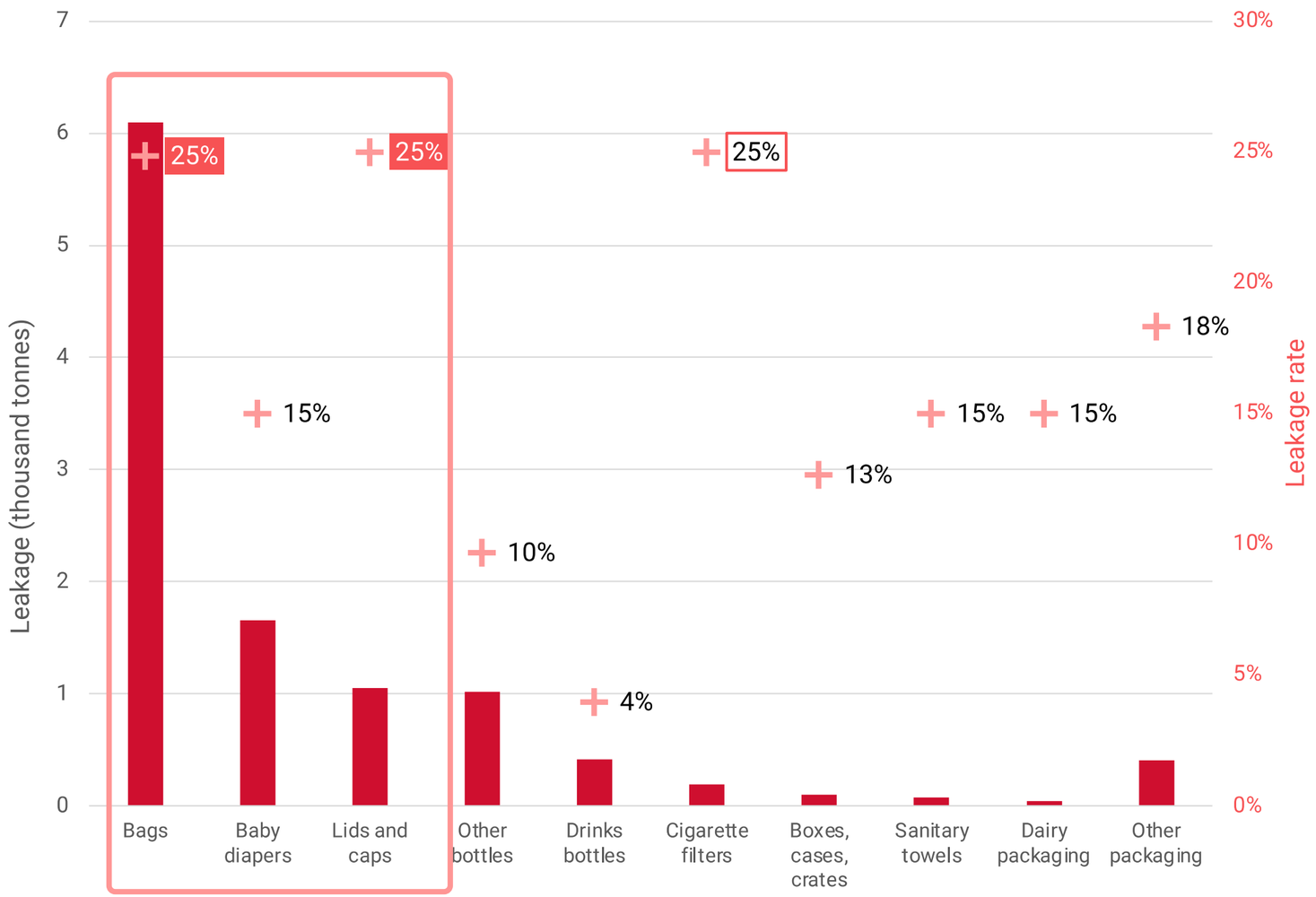
Improperly disposed + Uncollected = Mismanaged

Leaked

X% | Mismanaged Waste Index (MWI)

X% | Leakage Rate (LR)

APPLICATION HOTSPOTS [2019]



Bags

Lids and caps

Baby diapers

Cigarette filters

Boxes, cases, crates

Bottles

Dairy packaging

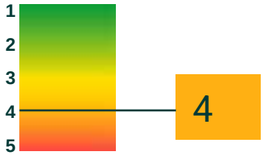
Sanitary towels

Other packaging

3 highest leakage contributors in absolute OR relative value

Highest leakage contributors in absolute AND relative value

Quality Score



Key take-aways

- **Plastic bags** are by far the highest contributors in absolute leakage (6.1 kt), with a high leakage rate (25%).
- **Baby diapers** are the 2nd highest contributor in absolute leakage (1.7 kt).
- **Lids anc caps** are 3rd in absolute leakage (1.0 kt), with a high leakage rate (25%).
- Although **cigarette filters** rank low in absolute leakage (0.2 kt), their leakage rate is high at 25%.

*The impact assessment uses data from the coastal clean-up report from *Ocean Conservancy (2019)*

APPLICATION HOTSPOTS:
INTERPRETATION AND LIMITATIONS

All applications

Learnings

- The Kyrgyz Republic mostly recycle drink bottles and other bottles (e.g. shampoo, detergent, etc).
- Bags are overwhelmingly the lead cause of plastic pollution to waterways, due to their low value for recycling (due to their low density) and high mobility.
- Baby diapers are the second contributor to leakage absolute terms, this is due to high consumption rates, low collection rates and improper disposal in unsanitary landfills
- Cigarette filters have the highest leakage rate. In the Kyrgyz Republic, one in four cigarette filters leaks to waterways. This is due to the fact that they are often litters outdoor and their small size causes them to be easily transported by water and wind.

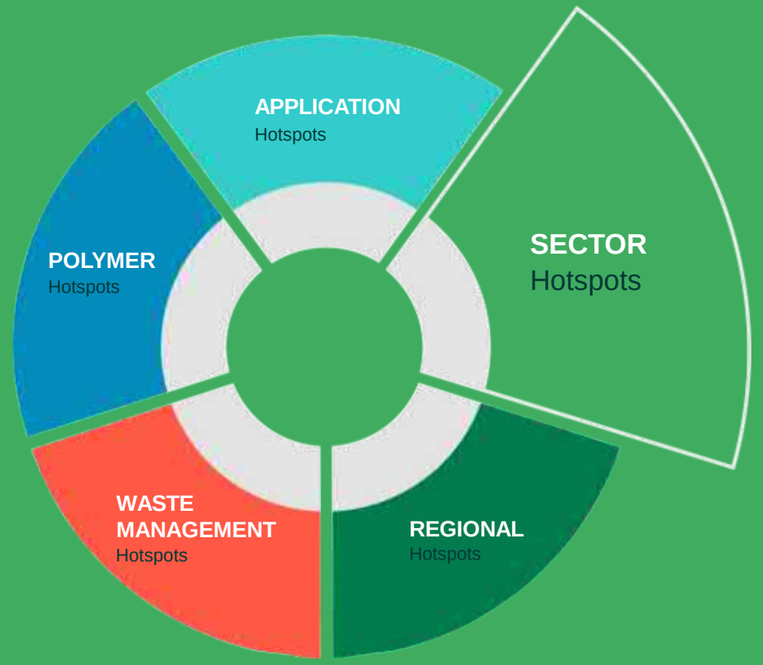
Limitations

- We found no data available on production quantities by applications type in the Kyrgyz Republic. The production quantities have been estimated using the assumption that the relative importance in the country production was reflected in the relative importance in trade.
- The application selected only cover 37% of all plastic applications. It is possible that other items, e.g. clothing, have a high contribution to the total leakage, which is not assessed here.
- Information on recycling by application type are available only at a qualitative level.

Unlocking limitations

- Implement reporting on recycling volumes by application type.
- Collect information of plastic converters in the country to understand which type of plastic application are produced domestically from primary plastic material.

C SECTOR HOTSPOTS

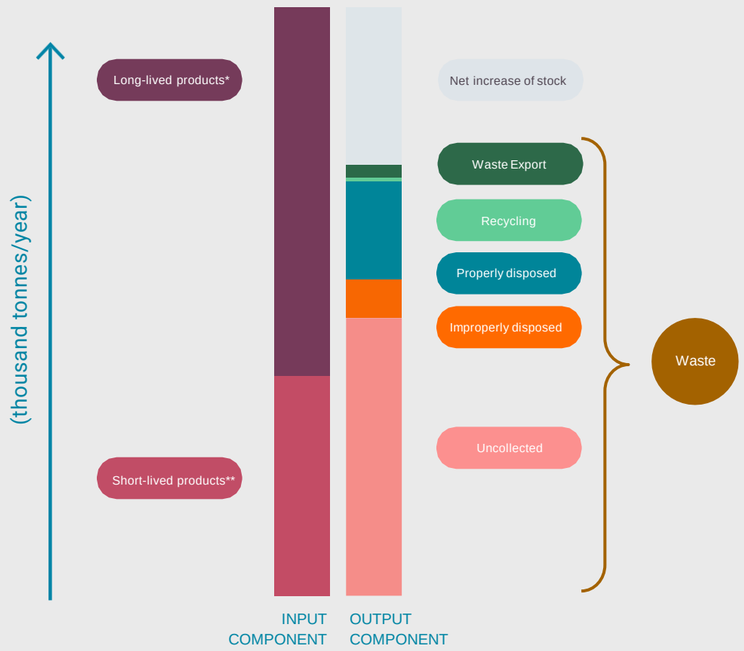


OBJECTIVE AND INSTRUCTIONS

Key question answered:

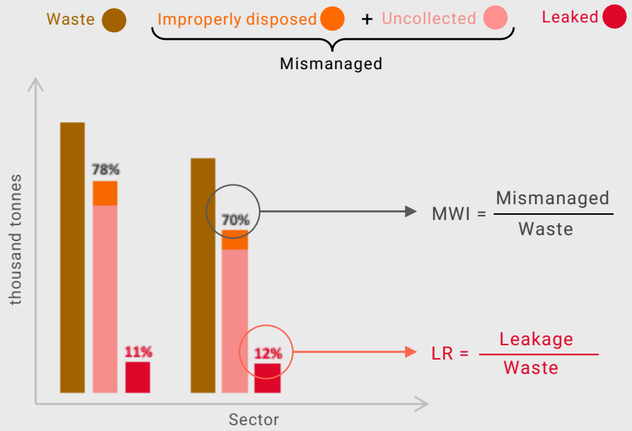
Which sectors are most critical in the country regarding plastic leakage?

What are the bar components of the sector mass balance graph?

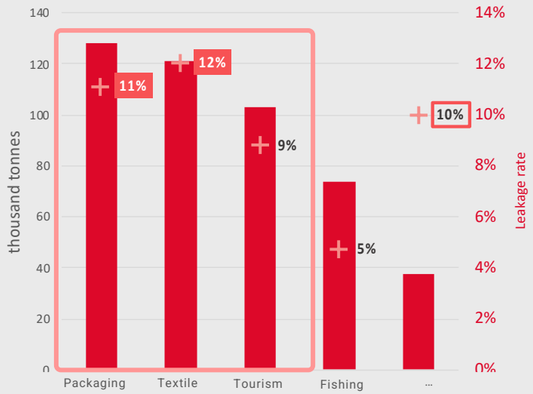


How to read the sector hotspot graph?

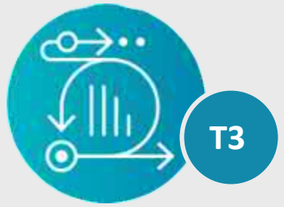
1. Determine leakage from mismanaged waste



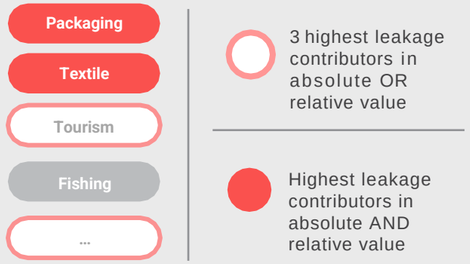
2. Focus on leakage and leakage rate



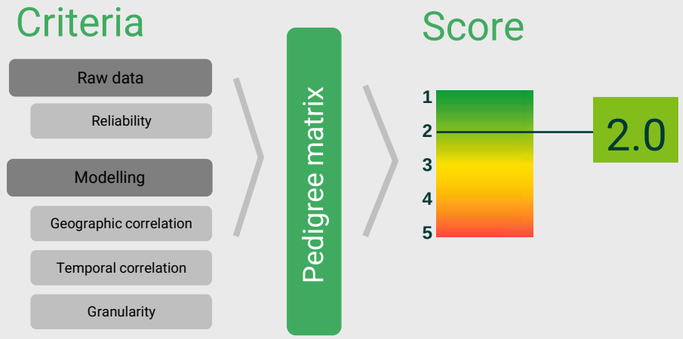
For more details, please read the Methodology



3. Select hotspots based on absolute and relative leakage

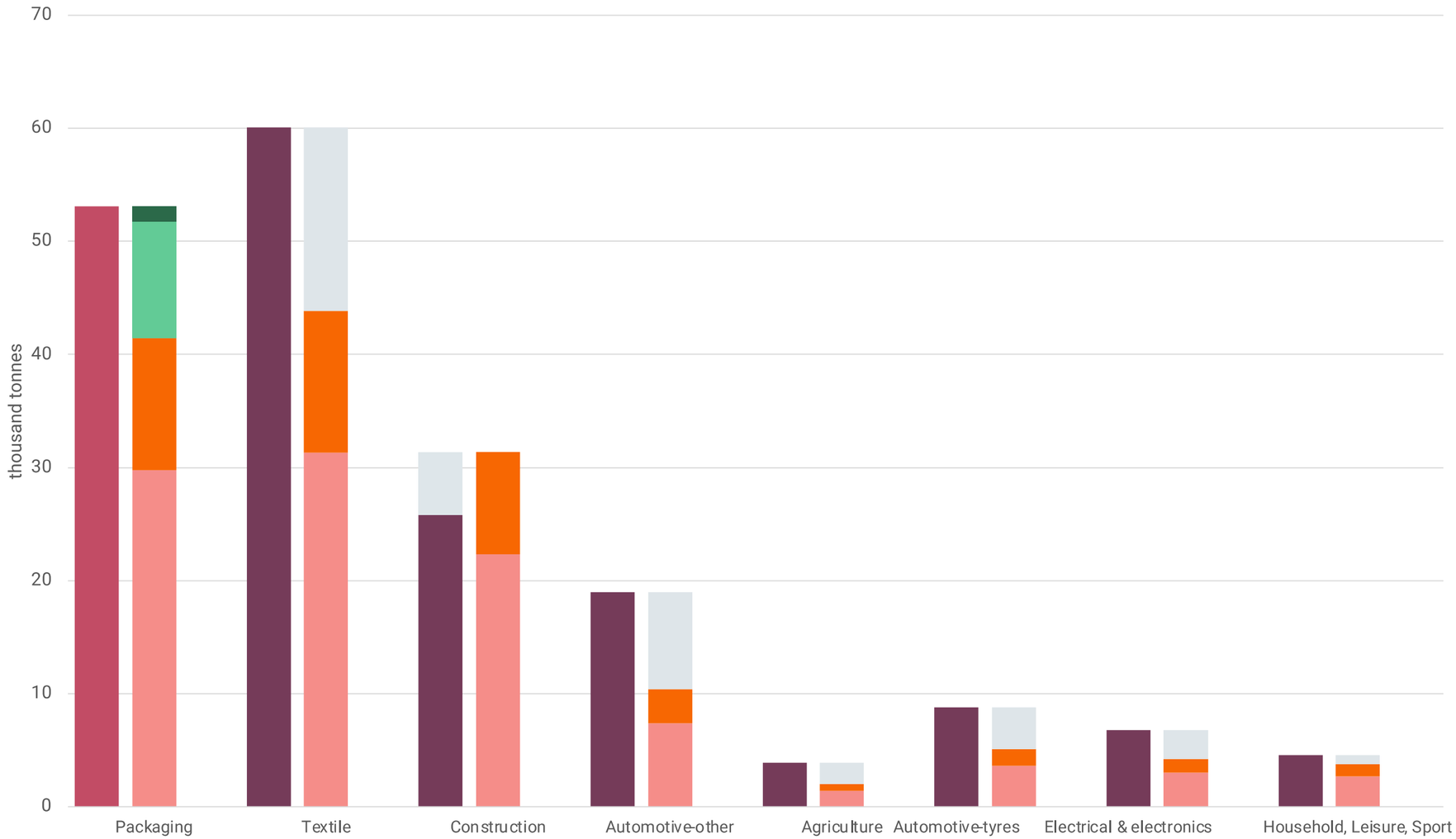


4. Assess the quality score of the results

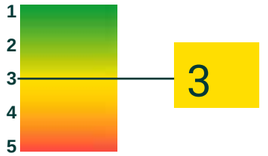


* **Short-lived products**: products that are disposed within the year of study (Life-time < 1 year)
** **Long-lived products**: products that are disposed after the year of study (Life-time > 1 year)

MASS BALANCE BY SECTOR [2019]



Quality Score



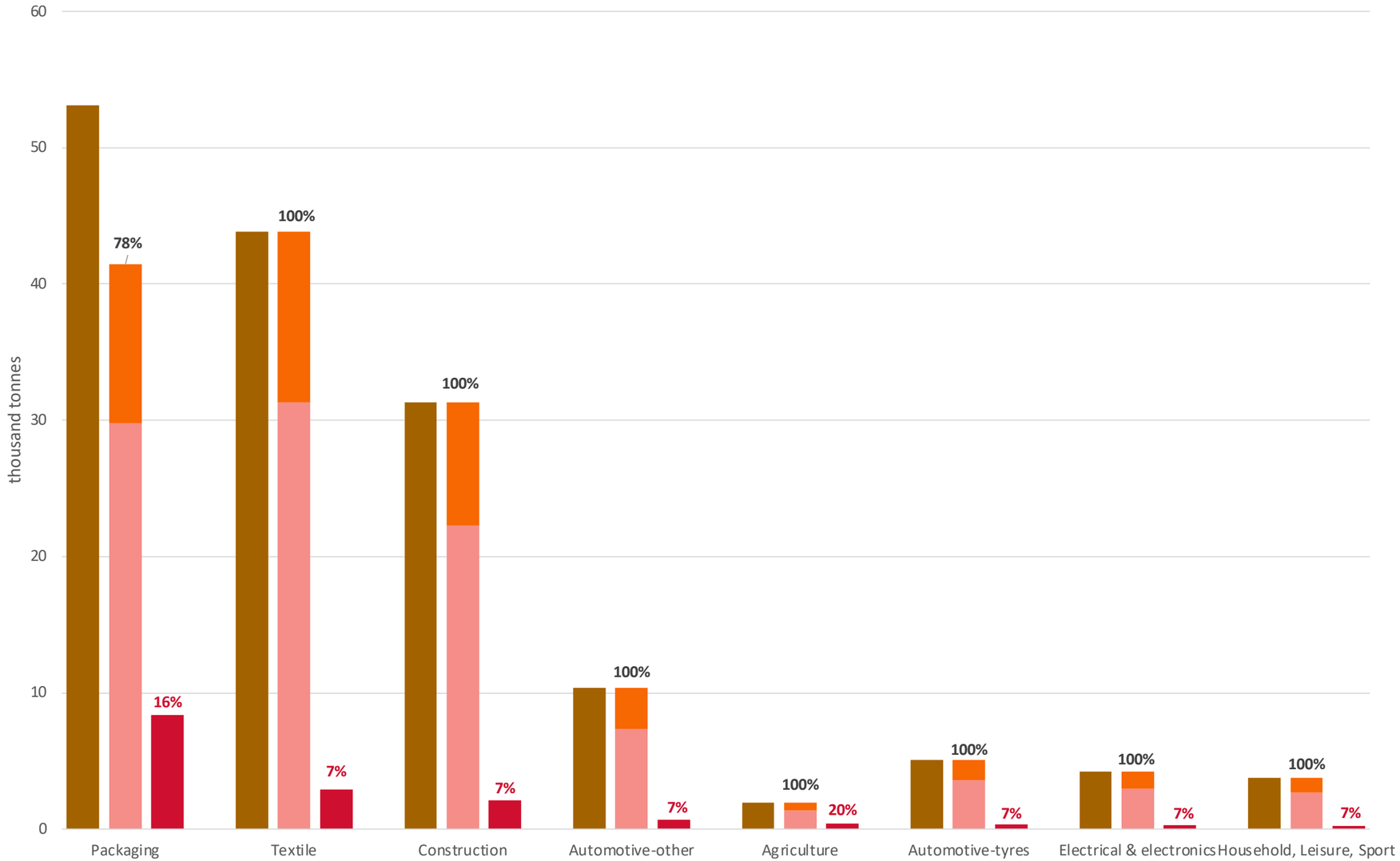
INPUT

- Short-lived products
- Long-lived products

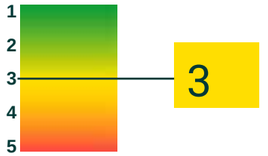
OUTPUT

- Charge in stock
- Waste export
- Export of primary and products
- Recycling
- Properly disposed
- Improperly disposed
- Uncollected

MISMANAGED WASTE AND LEAKAGE BY SECTOR [2019]



Quality Score



Waste

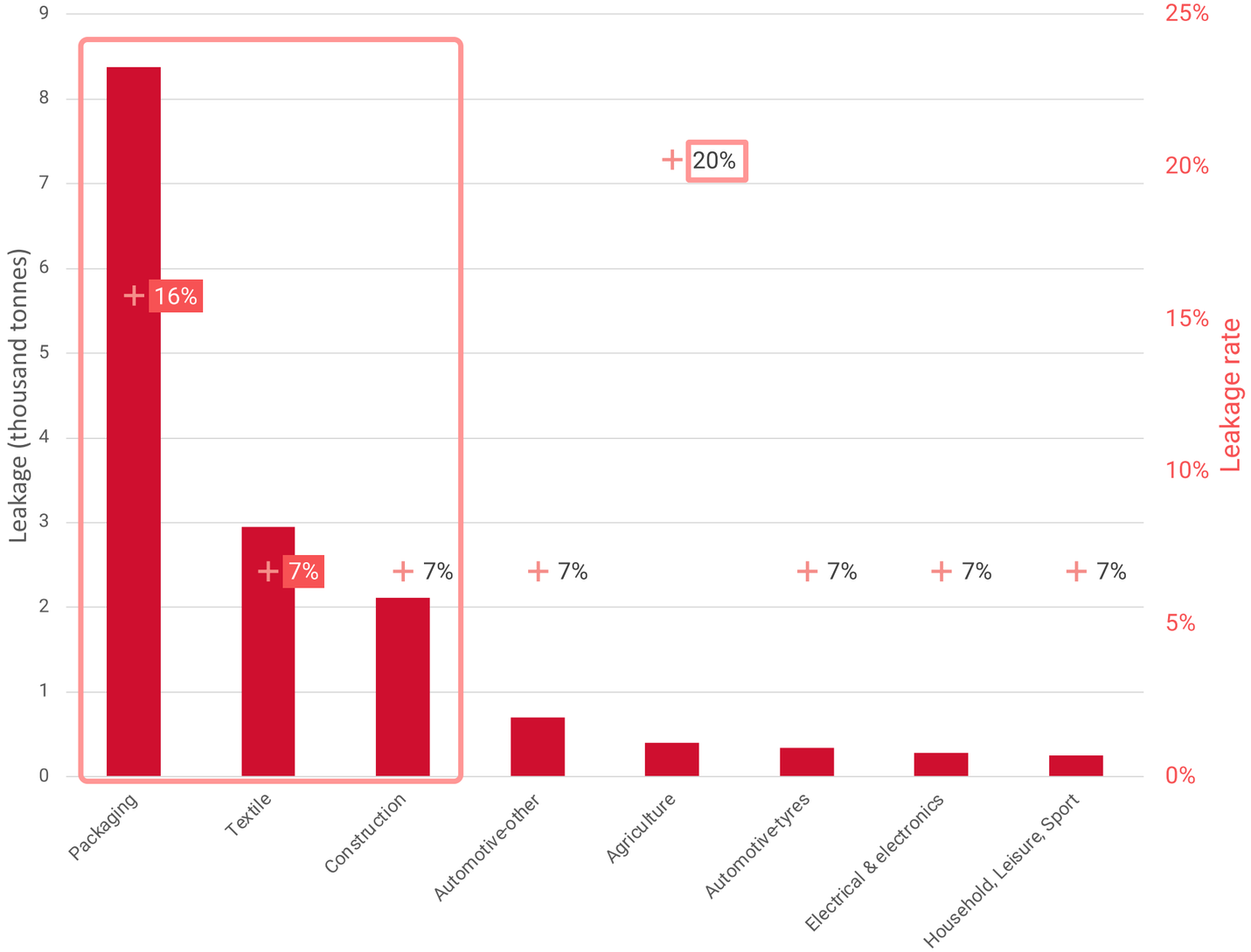
Improperly disposed + Uncollected = Mismanaged

Leaked

X% | Mismanaged Waste Index (MWI)

X% | Leakage Rate (LR)

SECTOR HOTSPOTS [2019]



Packaging

Textile

Construction

Agriculture

Medical

Household, Leisure, Sport

Automotive-tyres

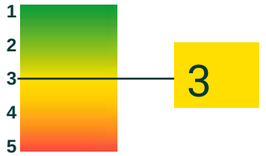
Electrical & electronics

Automotive-other

3 highest leakage contributors in absolute OR relative value

Highest leakage contributors in absolute AND relative value

Quality Score



Key take-aways

- **The packaging sector** contributes to 54% of the total plastic leakage with 8.4 kt of packaging waste leaking into oceans and waterways.
- **The textile sector** is the 2nd highest contributor to plastic leakage in absolute value (2.9 kt).
- **Construction** is the third contributor to plastic leakage to waterways with 2.1 kt.
- **The Agriculture sector** has the highest leakage rate, with 20% of the plastic used in agriculture being leaked.

SECTOR HOTSPOTS:
INTERPRETATION AND LIMITATIONS

All sectors

Learnings

- Most of the plastic input on the market in the Kyrgyz Republic is used in the textile sector, since clothes are used more than one year and Kyrgyz economy is growing, the plastic waste generation from the textile sector is lower than the input on the market. Ultimately the main sector by plastic waste generation is the packaging sector.
- The packaging sector is the main contributor to plastic leakage in the Kyrgyz Republic. Most of the plastic waste comes from the packaging sector, and since
- The agriculture sector has a high leakage rate, due to the use of LDPE polymer which is not recycled in the Kyrgyz Republic and which, due to its low density, can be more easily transported (high release rate).

Limitations

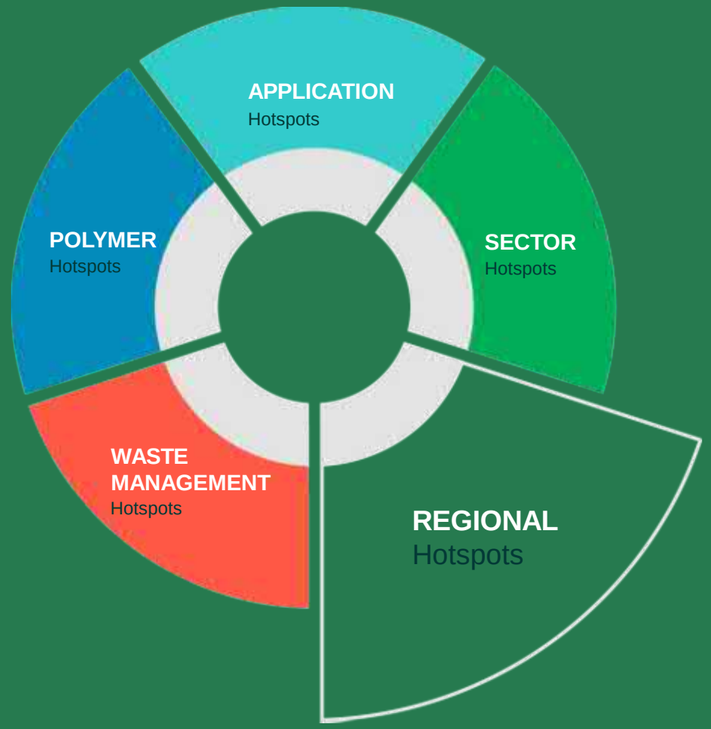
- Data on collection rates are available only for the municipal solid waste, which usually includes waste from “packaging“ sector, “household, leisure, sport” sector, and “textiles” sector (*Sim et al., 2013, International Solid Waste Association, 2017).* For the other sectors the collection rates are not reported, therefore we assume that they will be similar to those used in other sectors.
- The information available on Tazar app suggests that recycling is only limited to packaging applications (bottles, containers, boxes), therefore, we assure that there is no packaging recycling from other sectors. Nonetheless, there could still be unreported recycling from other sectors that is not captured in this assessement.

Unlocking limitations

- Investigate waste disposal practices for industrial sectors such as automorive, construction, electrical and electronics.

D

REGIONAL HOTSPOTS

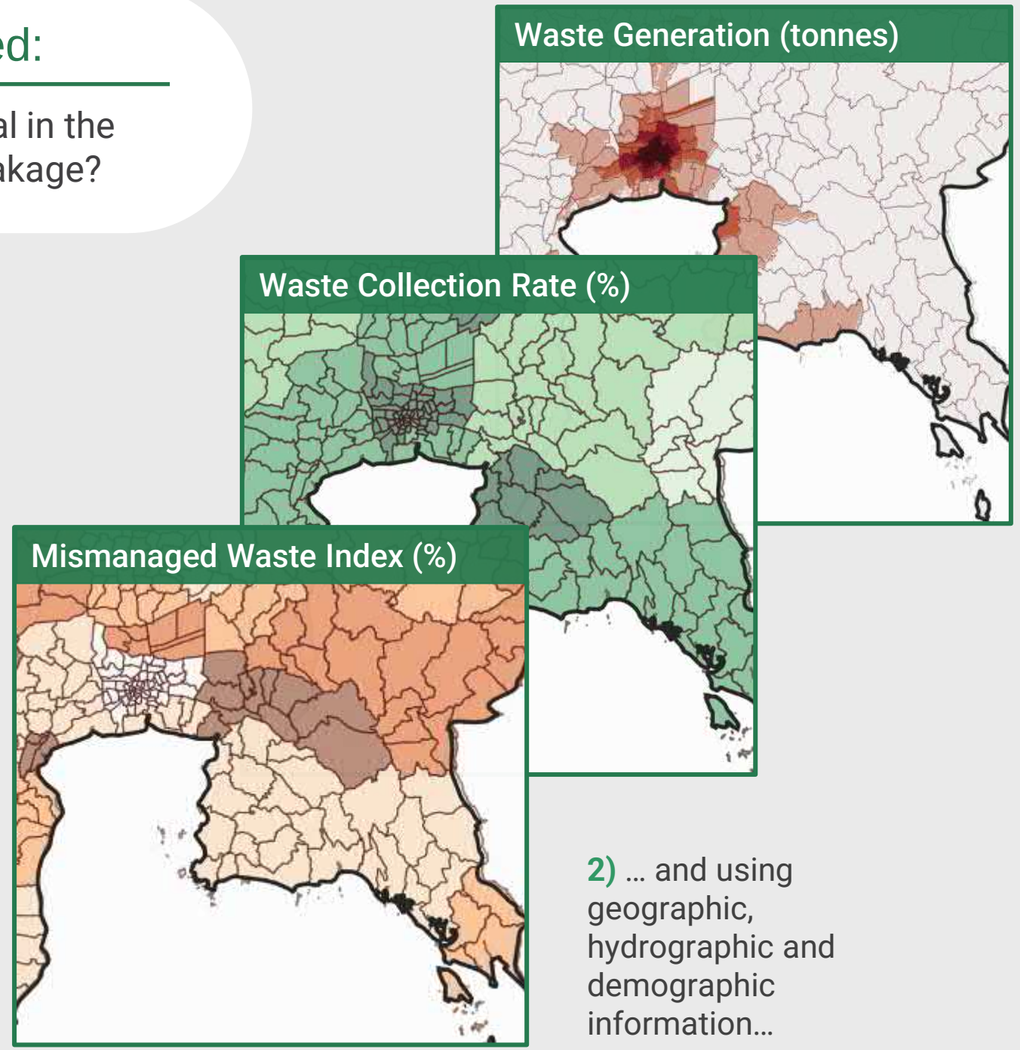


OBJECTIVE AND INSTRUCTIONS

Key question answered:

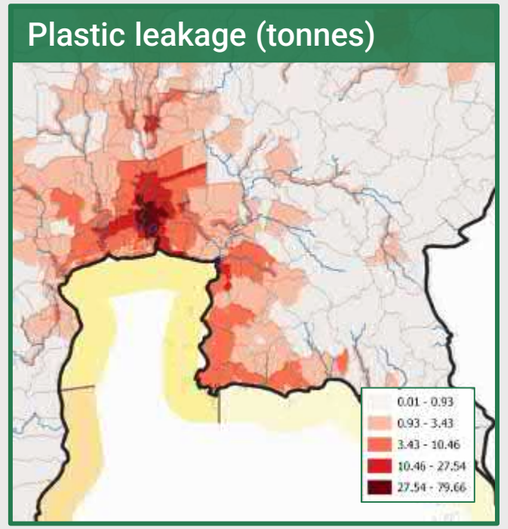
Which areas are most critical in the country regarding plastic leakage?

1) Overlaying different information available at city / district / sub-district level and/of modelled through archetypes…

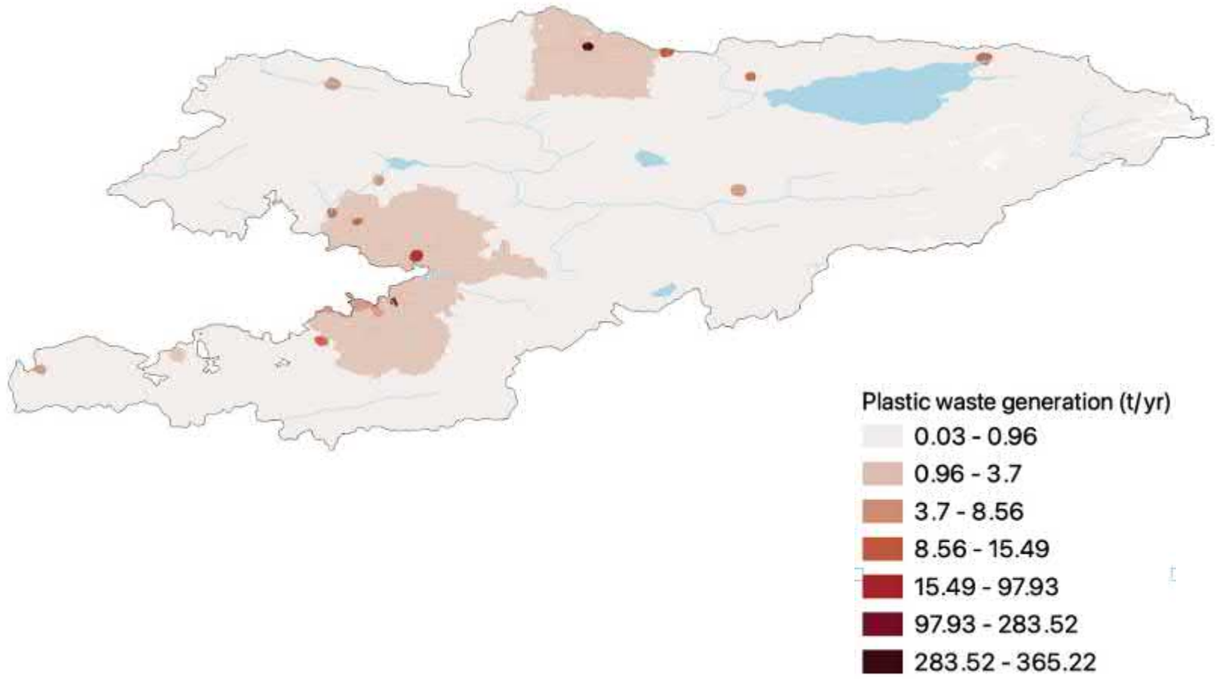


2) … and using geographic, hydrographic and demographic information…

3) … allows to compute a leakage map and identify regional hotspots



WASTE GENERATION:
MAP AND INTERPRETATIONS



More details available in Appendices

Key take-aways

- Plastic waste generation is concentrated around urban areas, where the population density is higher.
- The main rivers and lakes are represented to highlight the areas that are more at risk of contributing to plastic pollution to waterways.

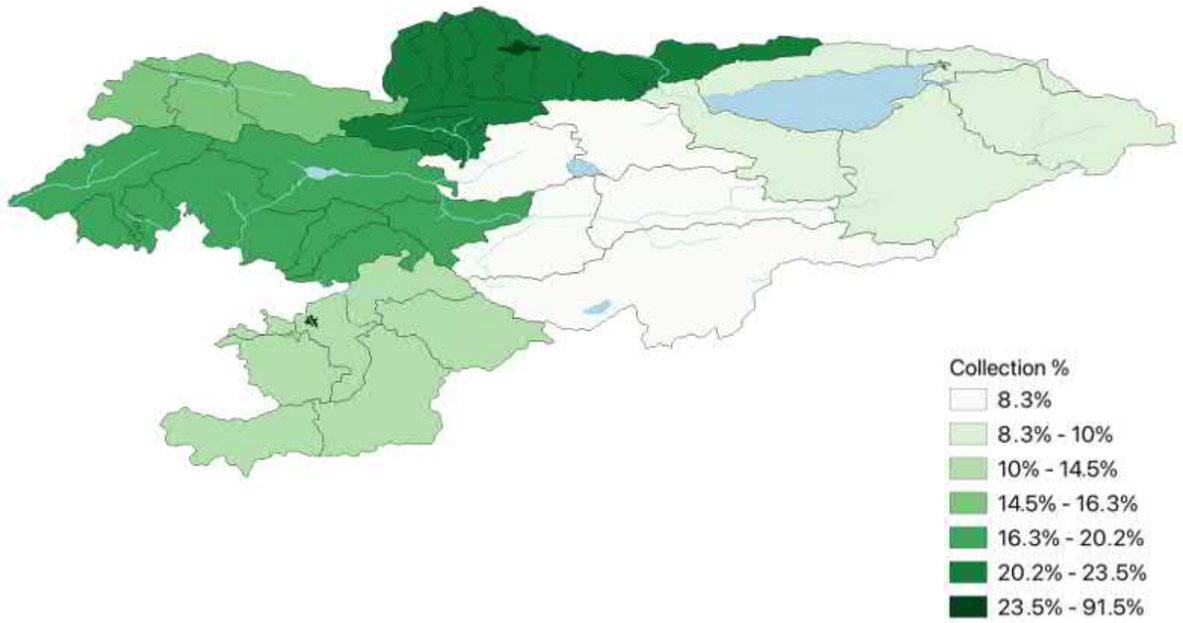
Limitations

The waste generation estimates displayed on the map are based on population densities. Here we assume the per capita waste generation is the same everywhere, although the per capita waste generation is likely higher than the rural waste generation.

Unlocking limitations

Waste carachterisation studies should be conducted in rural and urban areas to determine the difference is waste generation rates.

WASTE COLLECTION:
MAP AND INTERPRETATIONS



Key take-aways

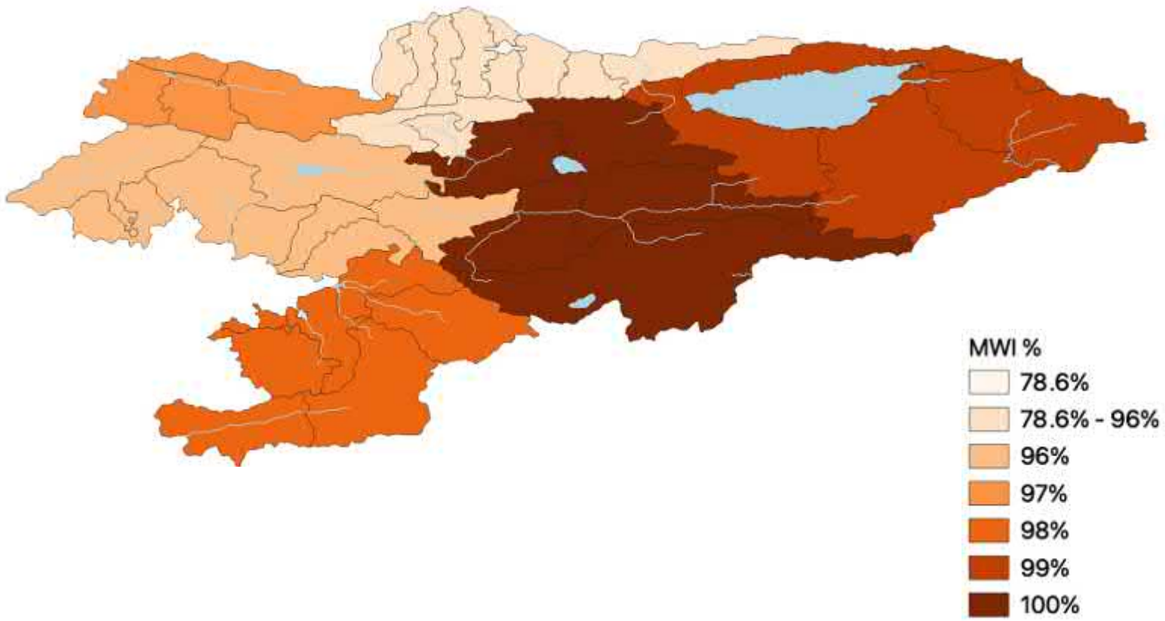
- In urban areas, waste collection coverage is at 85%. In addition, waste pickers collect waste from the street for recycling. Overall, 91% of the plastic is collected in urban areas.
- In rural areas, 7.5% of the plastic waste is collected. The remainder is disposed in illegal dumpsites or burnt.

Limitations

The information regarding waste collection rates is very limited. Here, data from a waste managment study conducted in Bishkek (*Sim et al., 2013*) and were used as a proxy for all urban areas. The collection rates in rural areas were determined so that the national collection coverage is 30% (*International Solid Waste Association, 2017*).

More details available in Appendices

MISMANAGED WASTE INDEX:
MAP AND INTERPRETATIONS



More details available in Appendices

Key take-aways

- The average MWI in Kyrgyz Republic is 93%.
- Since there are no sanitary landfill or incineration facilities, the only plastic that is not mismanaged is the one that is recycled.
- Urban areas have the lowest MWI, at 79%. MWI in rural areas is 100%.

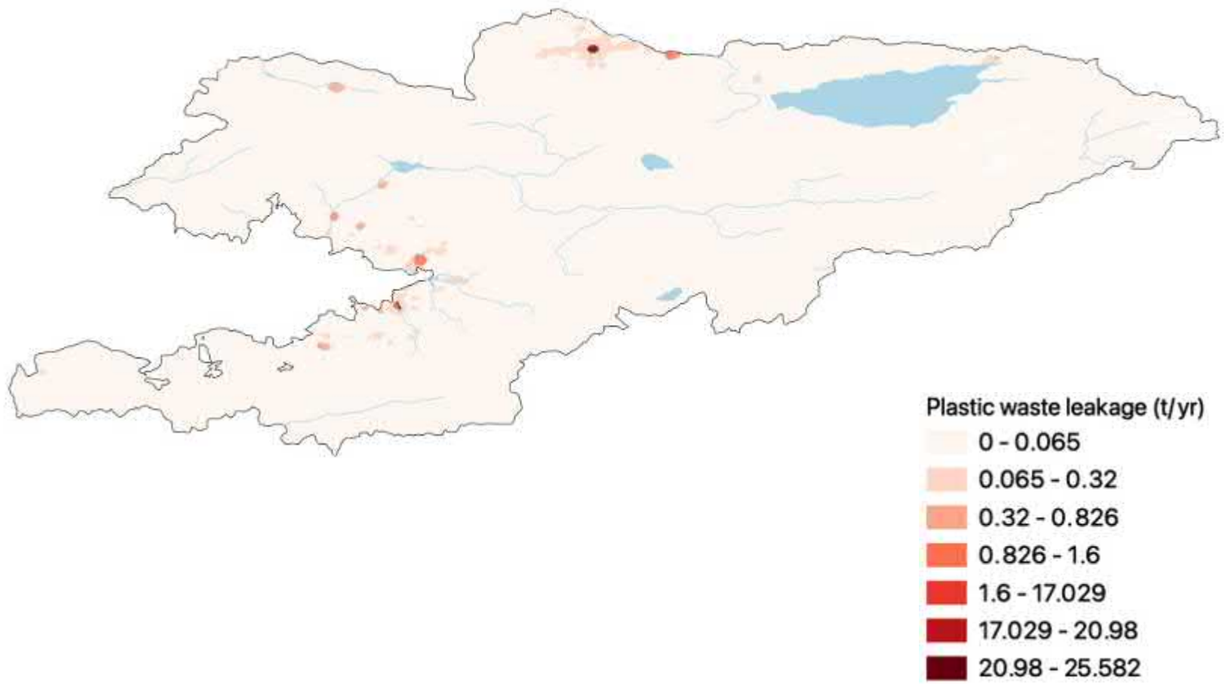
Learning

The landfill in Bishkek is sometimes described as a sanitary landfill, but it is not operated as such (*Sim et al., 2013*), and there is visual evidence of open burning of waste on site (*UNEP, IEE, 2022*).

Limitations

It is assume that collection of plastic for recycling in rural areas is negligeable. In rural areas the waste is more geographically dispersed and transport costs reduce the economical profitability of waste recycling. Nonetheless, no information was found to support or contest this hypothesis.

REGIONAL LEAKAGE:
MAP AND INTERPRETATIONS



More details available in Appendices

Key take-aways

- Annual leakage of mismanaged waste: 17.2 thousands tonnes.
- 73% of the leakage comes from rural areas, which mirrors the population distribution between rural and urban areas.

Learning

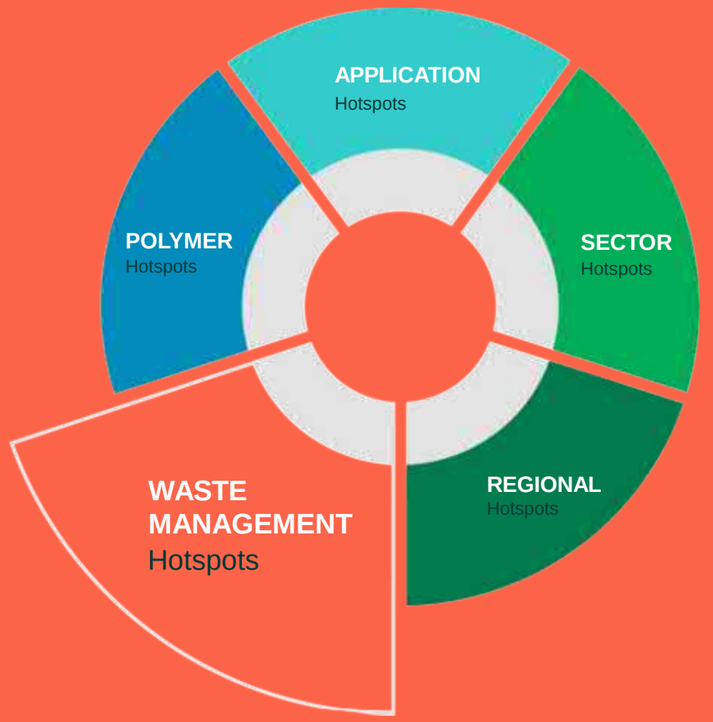
- The main drivers of leakage in the Kyrgyz Republic are the low collection rates and the disposal of waste at unsanitary landfills and dumpsites. This lead to large quantities of plastic being mismanaged, part of which leaks to rivers and lakes across the country.

Limitations

Water runoff data by watershed were not available for the Kyrgyz Republic, therefore release rates are based only on the distance to river or lake-shore.

E

WASTE MANAGEMENT HOTSPOTS



OBJECTIVE AND INSTRUCTIONS

Key question answered:

Which waste management stages are most critical in the country regarding plastic leakage?

1) Decide for each element* of the waste management system if its contribution to leakage mitigation is positive (coolspot), neutral or negative (hotspot)

Waste management stage	Potential hotpsot	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% in imported. The formal sector only recycles imported waste (around 850kt a year) and it does not recycled domestic waste (cit. VPA, VCCI). Domestic waste is recycled by the informal sector in improper conditions.	VPA interview and VCCI report VN_r14
	Plastic waste export			
	Plastic waste per capita generation		Vietnam produces around 50 kg of plastic waste per person per year	EA - Country baseline analysis
	Share of plastic in waste stream	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

2) Understand at a glance the status of the waste management system in the country

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

*For detailed element descriptions and methodology, refer to tool T4.1

T4

WASTE MANAGEMENT HOTSPOTS

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

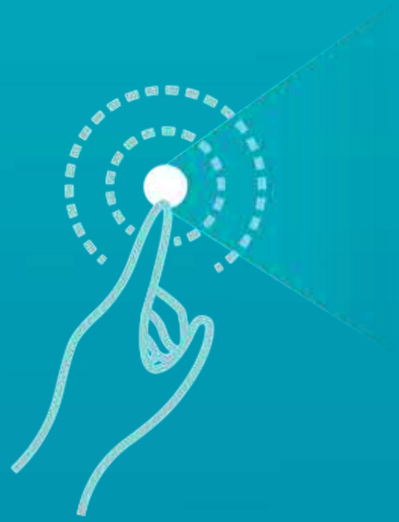
For more details and justifications, check tool T4.1

- **Negative contribution to the leakage**
- **Neutral contribution**
- **Positive contribution**
- **Not assessed**

Key take-aways

- The per capita plastic waste generation is in line with the county income level category.
- There is no segregation of waste at household level, but some public containers are available in Bishkek to dispose of PET bottles.
- Formal collection of waste is high in urban areas, but low in rural areas where there is only one pick up point.
- The informal sector plays a key role in collecting, segregating and recycling plastic.
- Open burning is a common practice in rural and urban areas.
- There are no sanitary landfills or incinerators. All collected waste that is not recycled is disposed of in dumpsites and incineration facilities.

* Average plastic waste generation per capita values are derived from the What a Waste 2.0 database (*Kaza et al., 2019*)



1.3 ACTIONABLE HOTSPOTS

HOTSPOTS IN BRIEF

Polymer

- LDPE
- PET
- Polyester
- PP
- PET
- PP
- PS
- PVC
- Other

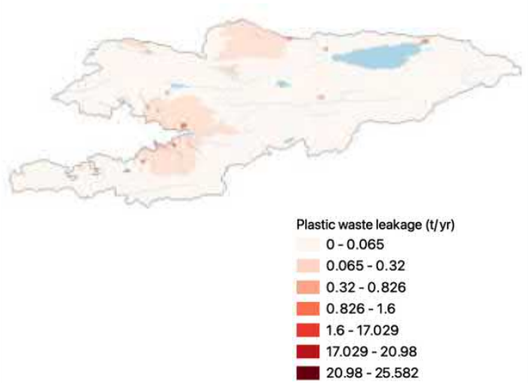
Application

- Bags
- Lids and caps
- Baby diapers
- Cigarette filters
- Boxes, cases, crates
- Bottles
- Dairy packaging
- Sanitary towels
- Other packaging

Sector

- Packaging
- Textile
- Construction
- Agriculture
- Medical
- Household, Leisure, Sport
- Automotive-tyres
- Electrical & electronics
- Automotive-other

Regional



Waste management

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

3 highest leakage contributors in absolute OR relative value

Highest leakage contributors in absolute AND relative value

Negative contribution to the leakage

Positive contribution

Neutral contribution

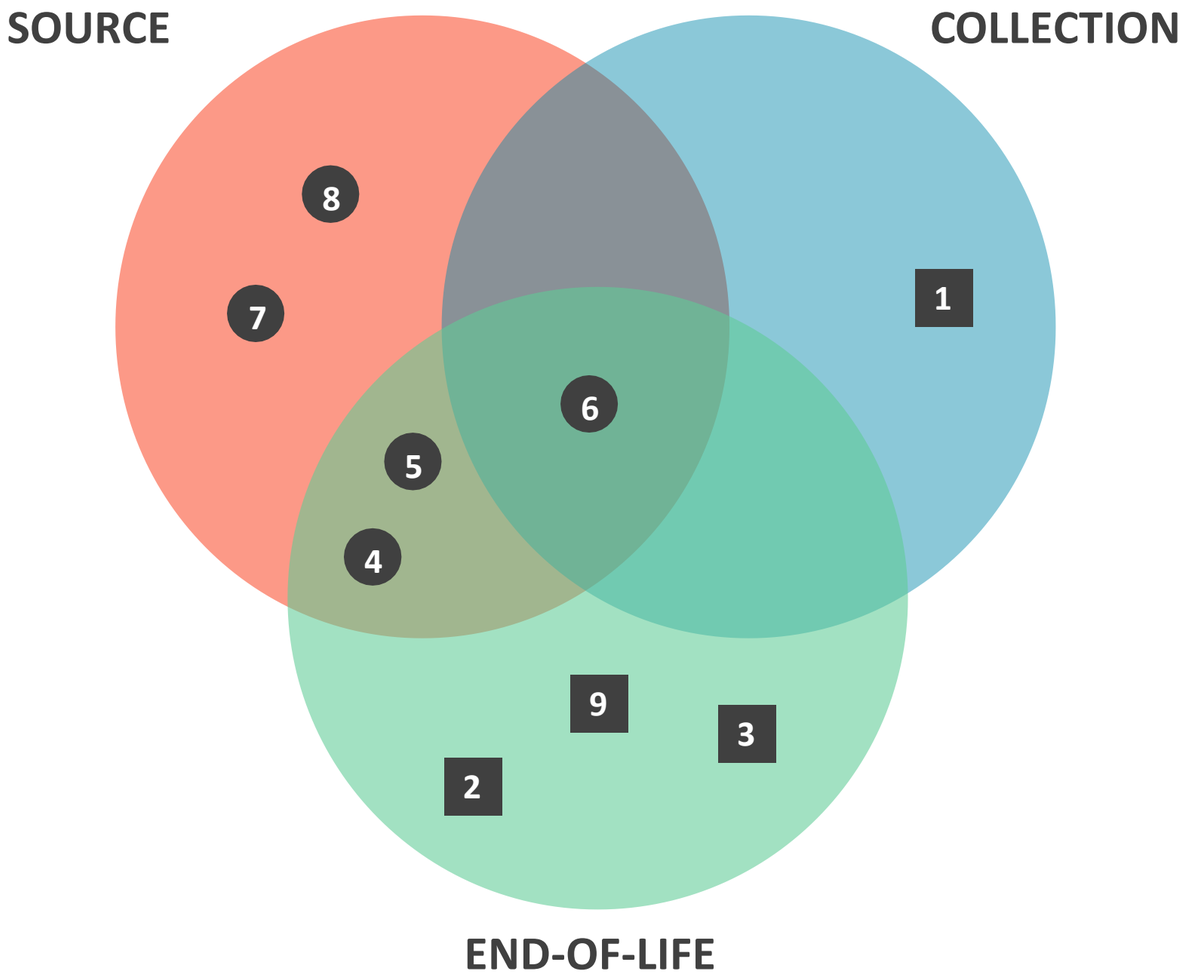
Not assessed

ACTIONABLE HOTSPOTS LIST

[#]	[ACTIONABLE HOTSPOT]	[■/●]
1	The low collection rates in rural areas (8%) is a root cause of plastic pollution in the environment.	■
2	The absence of sanitary landfills and incinerators means that all waste disposed of at dumpsite is susceptible to leakage.	■
3	It is estimated that almost half of the plastic waste in the Kyrgyz Republic is burnt leading to dangerous air pollution.	■
4	LDPE leaks to waterways because it is the most used polymer by the packaging sector and it is not recycled.	●
5	Plastic bags leak because they are the most consumed plastic packaging item and they are not likely to be collected for recycling by the informal sector due to their low per item value.	●
6	Plastic from the packaging sector leaks to waterways due to high single-use packaging consumption, littering and release rate.	●
7	Plastic is used in large volumes in the textile sector, possibly because of the low average temperatures in Kyrgyzstan.	●
8	Polyester polymer, used mainly for synthetic textile, is the highest contributor to plastic leakage due to the high consumption quantity.	●
9	Although the Kyrgyz Republic is a land-locked country, pollution to waterways happens due to presence of rivers and lakes that originates from glaciers.	■

■ **GENERIC** (Concerns all plastic types and all regions) ● **SPECIFIC** (Concerns specific plastic types and all regions)

ACTIONABLE HOTSPOTS CHARACTERISATION



Each actionable hotspot can address plastic pollution at one or multiple stages along the plastic value chain. We notice that the list of actionable hotspots for the Kyrgyz Republic calls for a set of actions across the value chain, yet with an emphasis on the end-of-life.

GENERIC (Concerns all plastic types and all regions)

SPECIFIC (Concerns specific plastic types or regions)

2 ZOOMING AT LOCAL LEVEL

FIELD ASSESSMENT IN MOUTAIN AREAS

2.1 MOUNTAIN OVERVIEW

WHAT CHALLENGES DO WE FACE ?

Formal waste management system often do not exist in remote mountainous areas.

Low collection rate.

Transportation of the waste is costly and difficult.

Volumes of waste are increasing because of intensive tourism, with no adequate waste management system in place.

Pollution of waterways at the source and therefore the population's water resources.

WHERE DOES THE PLASTIC WASTE COME FROM ?

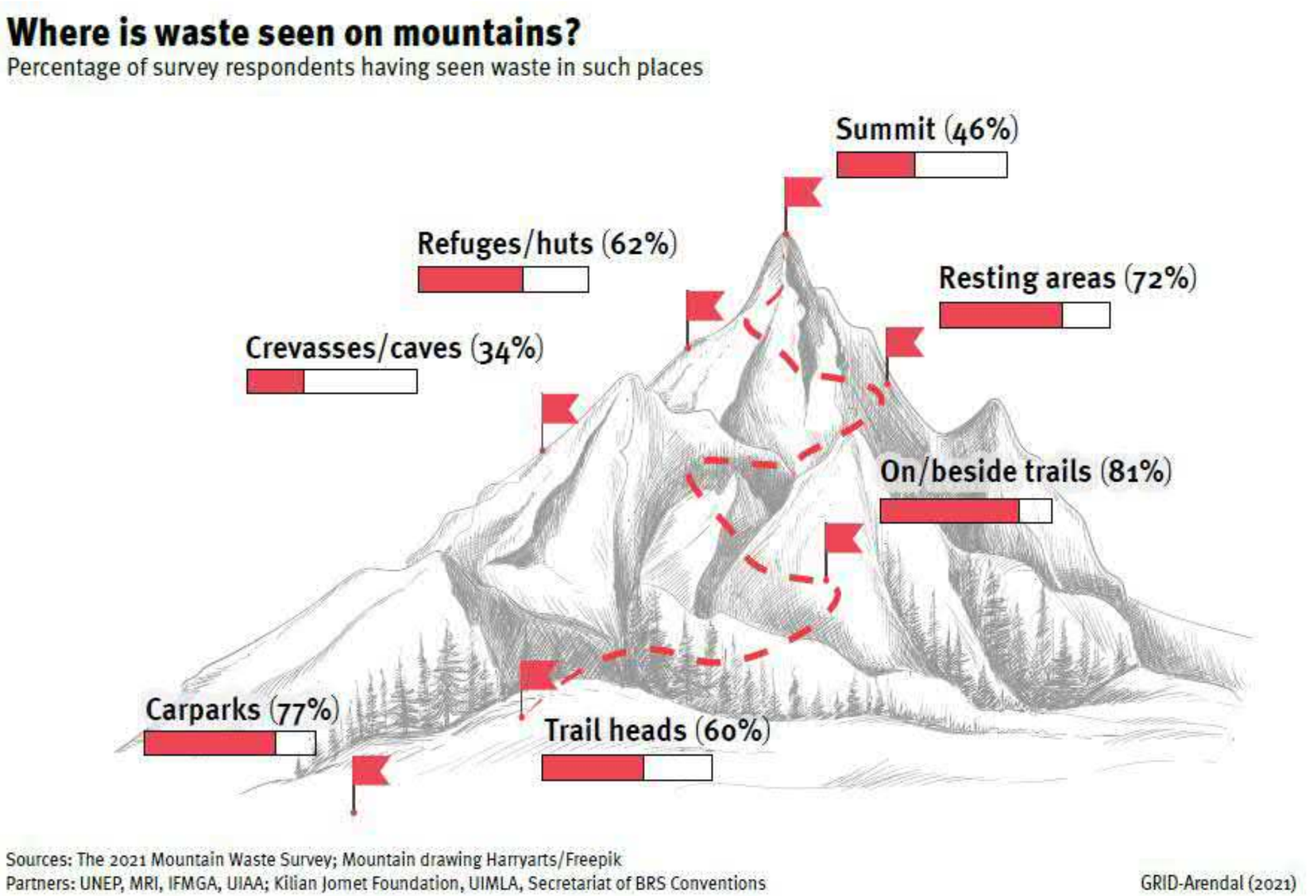
Tourism in high mountain areas that comes in masses into areas without a waste management infrastructure.

Pollution from **resident** population in low mountain areas due to increase of single-use plastic consumption and poor waste management system.

WHERE IS PLASTIC WASTE FOUND IN THE HIGH MOUNTAIN AREAS ?

Key take-aways

- A recent survey asked communities of mountain enthusiasts from around the globe to share their experience and what plastic waste they see during a typical mountain trip.
- Results found that the participants find waste almost everywhere on the trails, but the most common location for waste to be seen in mountains are:
  - On or beside trails (81.5%)
  - In car parks (77.4%)
  - In resting areas (72.6%)



WHERE IS PLASTIC WASTE FOUND IN THE LOW MOUNTAINS AREAS ?

Key take-aways

- Medium sized mountain towns (with a population range between 3400 and 51500, and at an altitutde between 1600m and 1780m) are dominated by the resident population.
- Those towns benefit from landfill, but the waste management system is quite poor.
- The picture on the right shows an example of dumpsite : the dumpsite of Balykchy in the province of Issyk-Kul (UNEP, IEE, 2022).

WHAT IS THE SITUATION IN THE KYRGYZ REPUBLIC ?

CURRENTLY, THERE ARE NO ACCURATE DATA AVAILABLE IN LITERATURE ON THE EXTENT OF PLASTIC POLLUTION IN THE MOUNTAINS OF THE KYRGYZ REPUBLIC.

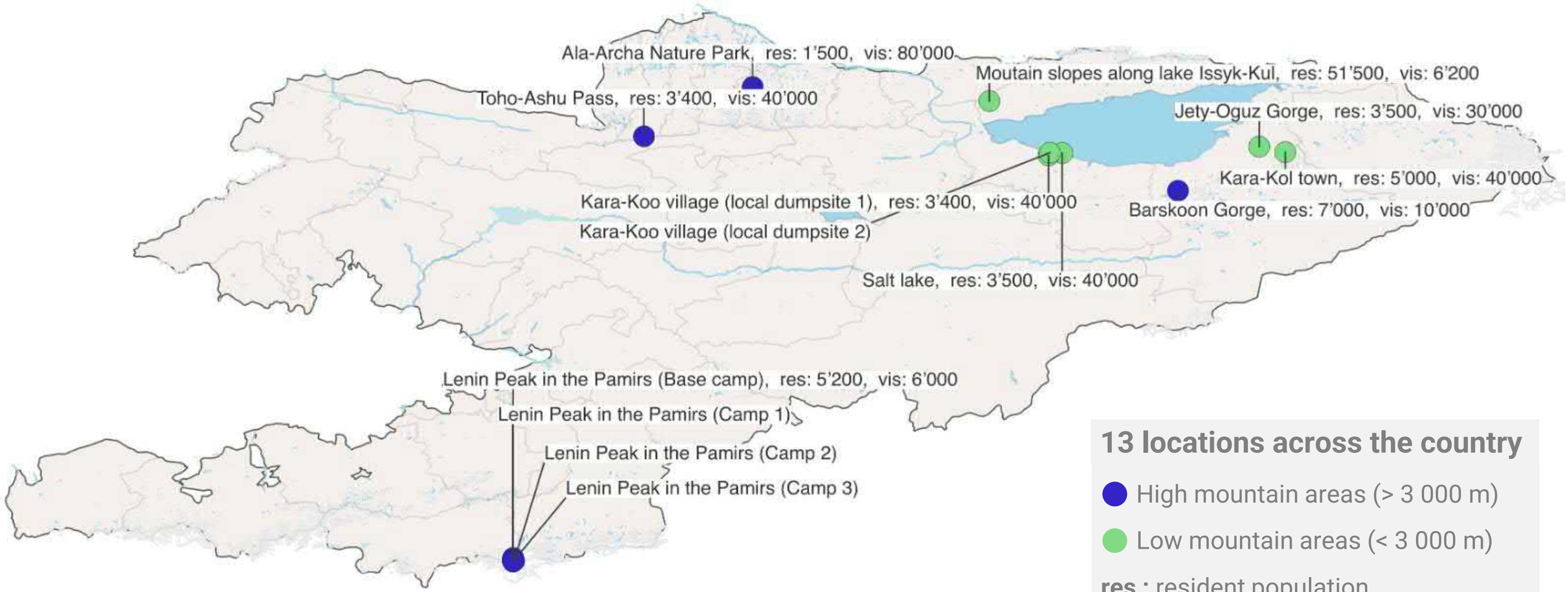
A **local assessment** was performed with the help of the "Independent Ecological Expertise" organization to address this limitation.

Focus on two types of areas :

- **High mountain areas (>3000m)** that welcome a lot of tourists/alpinists (average of 22'000/year), but few residents.
- **Medium size mountain towns (<3000m)** which are dominated by the resident population.

2.2 RESULTS OF THE FIELD STUDY

Assessed locations
by Independent Ecological Expertise



13 locations across the country

- High mountain areas (> 3 000 m)
- Low mountain areas (< 3 000 m)

res : resident population

vis : yearly visitors

Assessed locations
by Independent Ecological Expertise

Toho-Ashu Pass

Ala-Archa Nature Park

Moutain slopes along lake Issyk-Kul

Jety-Oguz Gorge

Kara-Kol town

Lenin Peak in the Pamirs

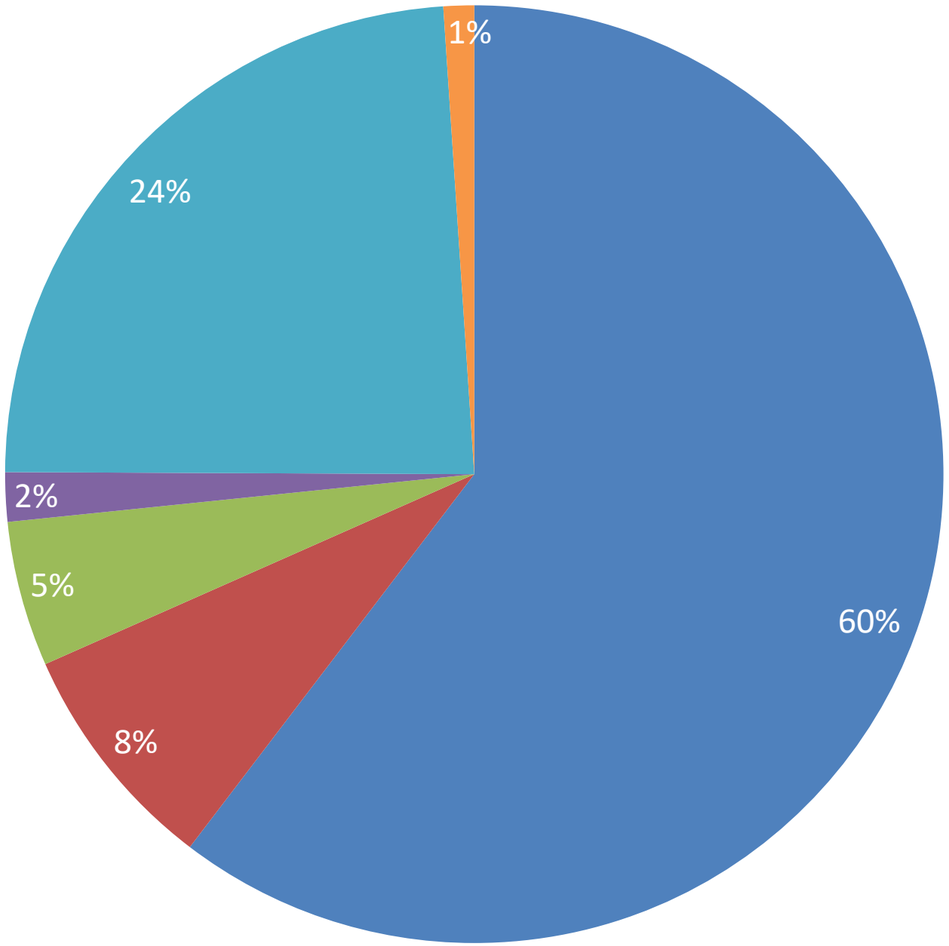
Barskoon Gorge

Kara-Koo village (local dumpsite 2)

Kara-Koo village (local dumpsite 1)

Salt lake

Mismanaged waste composition in high mountain areas (%) assessed by Independent Ecological Expertise

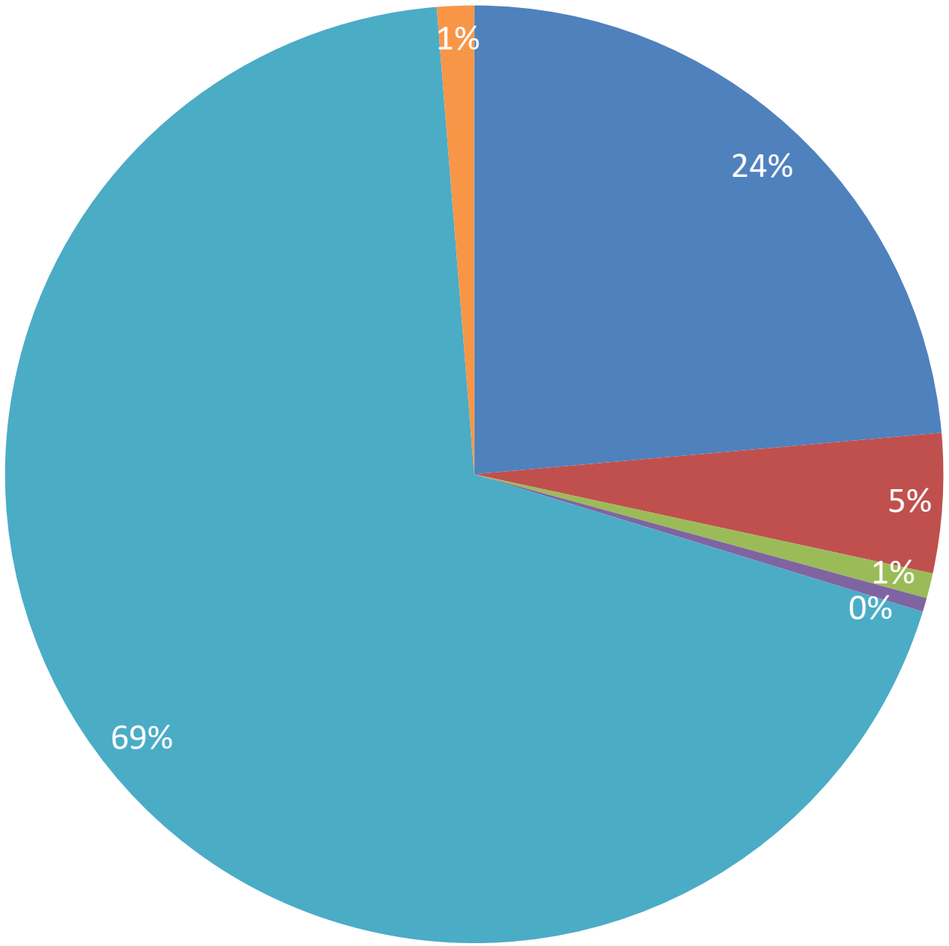


PET
PS
PP
unknow
LDPE
HDPE

Key take-aways

- The waste encountered in high mountain areas is mostly due to **touristic activities.**
- The most common polymer found are **PET (60%)**, which usually corresponds to bottles, and **LDPE (24%)**, which corresponds to canisters, packaging and bags.
- The waste generated per capita is 11 kg per year, which is close to the results we found at national level (7.26 kg/capita per year). This is most likely because during the field study it was possible to assess all waste sites in the high mountain areas.

Mismanaged waste composition in low mountain areas (%) assessed by Independent Ecological Expertise

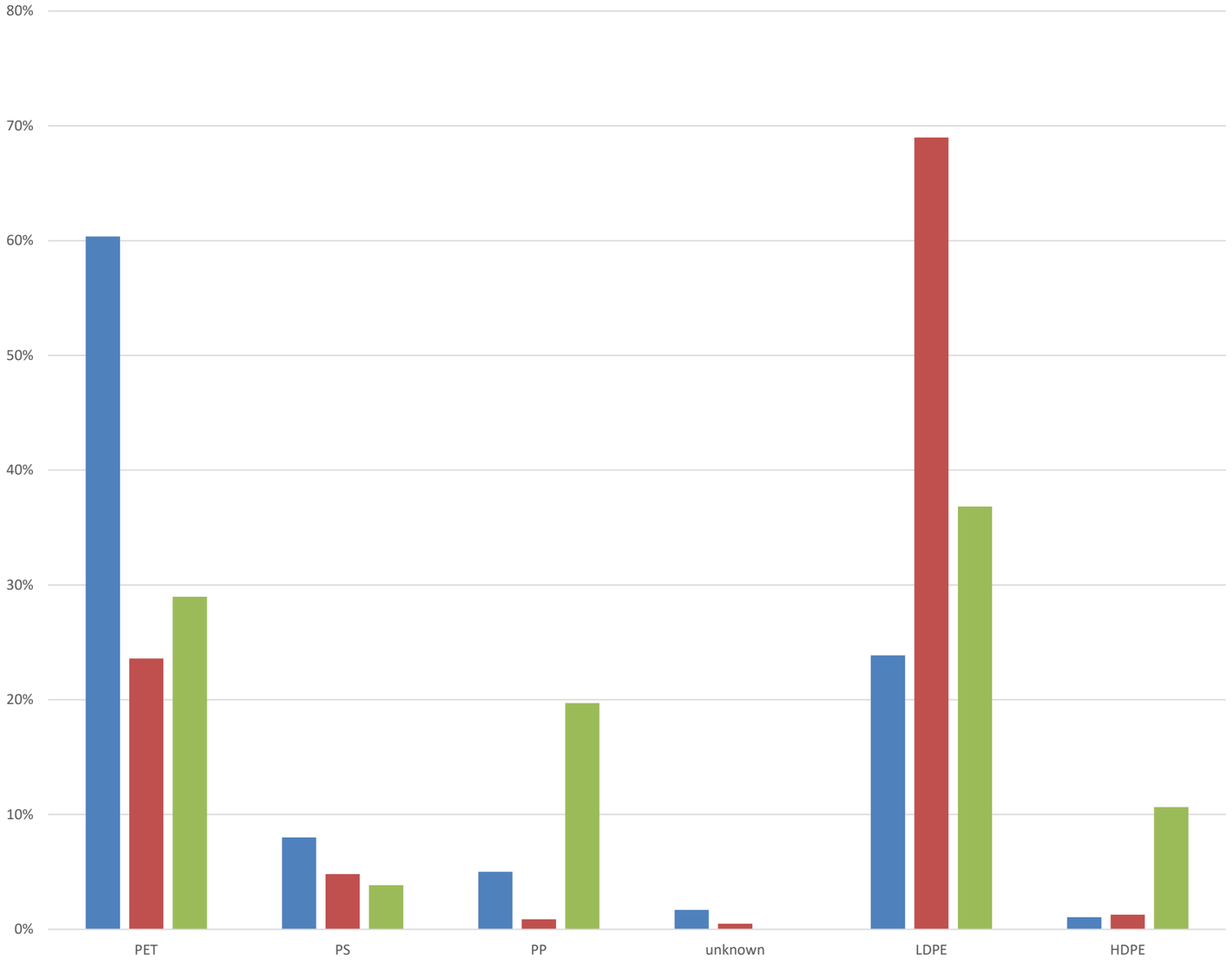


PET
PS
PP
unknow
LDPE
HDPE

Key take-aways

- The waste encountered in low mountain areas is due to the **resident population and the touristic activities.**
- The most common polymer encountered are **LDPE (69%)**, which corresponds to canisters, packaging and bags, and **PET (24%),** which usually corresponds to bottles.
- The waste generated per capita is 0.87 kg per year, which is far from the results we found at national level (7.26 kg/capita per year). This difference is probably due to the impossibility of covering all dumpsites of the residential areas during the field assessment.

Comparison on mismanaged waste composition with the national assessment (%)



Key take-aways

For residential low mountain regions, touristic high mountain region and national assessment, the main packaging polymer found in nature are PET and LDPE.

According to the national assessment PP and HDPE should also play an important role, but according to the field assessment they are only found in minor quantities.

2.3 LOCAL ACTIONS RECOMMANDATION

WHAT CAN BE DONE ABOUT PLASTIC WASTE ?

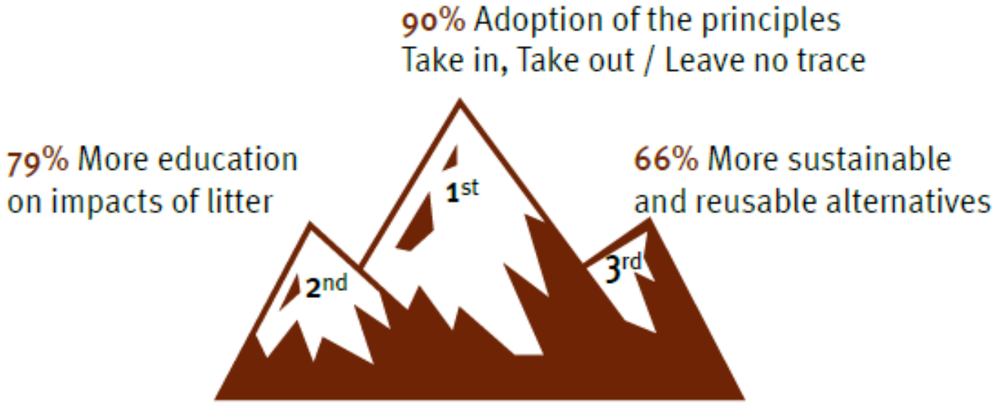
Key take-aways

- Going back to the recent survey , communities of mountain enthusiasts were asked how to reduce waste in the mountains and who should be responsible for the mountains clean-up activities.
- In order to reduce the waste the top 3 actions proposed where :
  - **Principle of take in take out** : people take back everything they bring on a mountain trip and dispose of it in the proper waste management system.
  - Act on the **educational** side with awareness campaigns for example.
  - Choose more **sustainable** and reusable **alternative** to waste.
- As for the responsible sector or people for mountains clean-ups, we find the individual responsibility at the top of the podium, followed by the tourism and trekking associations.

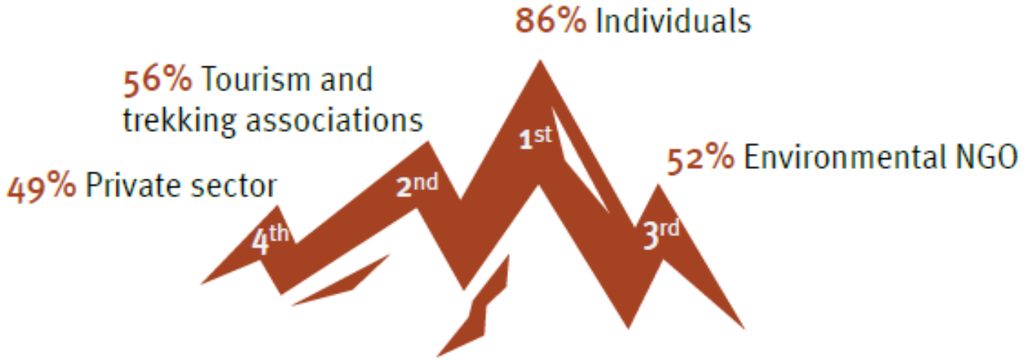
Solutions to the waste issue in mountains

Percentage of the total number of respondents

How can we reduce or eliminate waste in the mountains ?



Who should be responsible for mountain clean-up activities ?



Sources: The 2021 Mountain Waste Survey; icons from Vecteezy.com

RECOMMENDATIONS OF EXPERTS

Mr. Oleg Pecheniuk, Independent Ecological Expertise
Dr. Vladimir Komissarov, Silk Road Tourism Association
Structure based on the GRID-Arendal and al. (2002) Policy Brief, BRS

	Stakeholders	Responsability	Interventions
Policy 	• State	• Creation of a legislative framework • Control and supervision of compliance with legislation in the field of waste management	• Methods of state regulations of the level of collection and processing of plastic waste for which national programs are being developped • Instate administrative and/or criminal punishment to anyone willing to set there camp (in high mountain areas) in an unauthorized location
Financing 	• State • Manufacturers • Suppliers	• Fund scientific research • Organize and finance of system related to the circulation of plastic waste	• Targeted subsidies for recycling or supporting recycling of plastic waste

Infrastructure 	• State
	• Tracking companies
	• Tourism operators
		• Develop small-scale solutions adapted to the mountain communities
		• Implement waste monitoring and management programs
			• Increase capacity for proper waste disposal (sanitary landfills if other upstream solutions cannot be applied)
			• Deposit-refund mechanisms in order to organize the collection and processing of certain type of plastic
			• Creation of an association of tourism operators to:
			  • Make sure there are waste collection containers and toilets in the areas of the base camps
			  • Define an area were the tents are allowed

Outreach 	• Tourism operators	• Implicate the public in actions against plastic pollution • Raise awarness among the citizen and the tourists	• Widespread practice of productis and importer responsability • Clean polluted areas

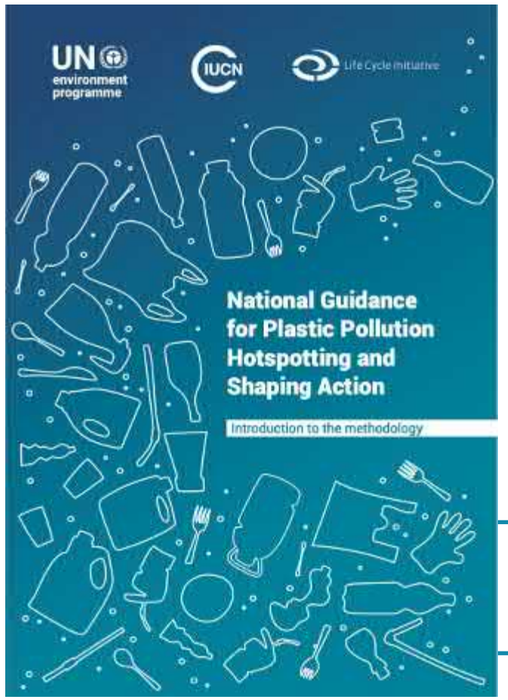
3 APPENDICES

3.1 INTRODUCTION TO THE GUIDANCE

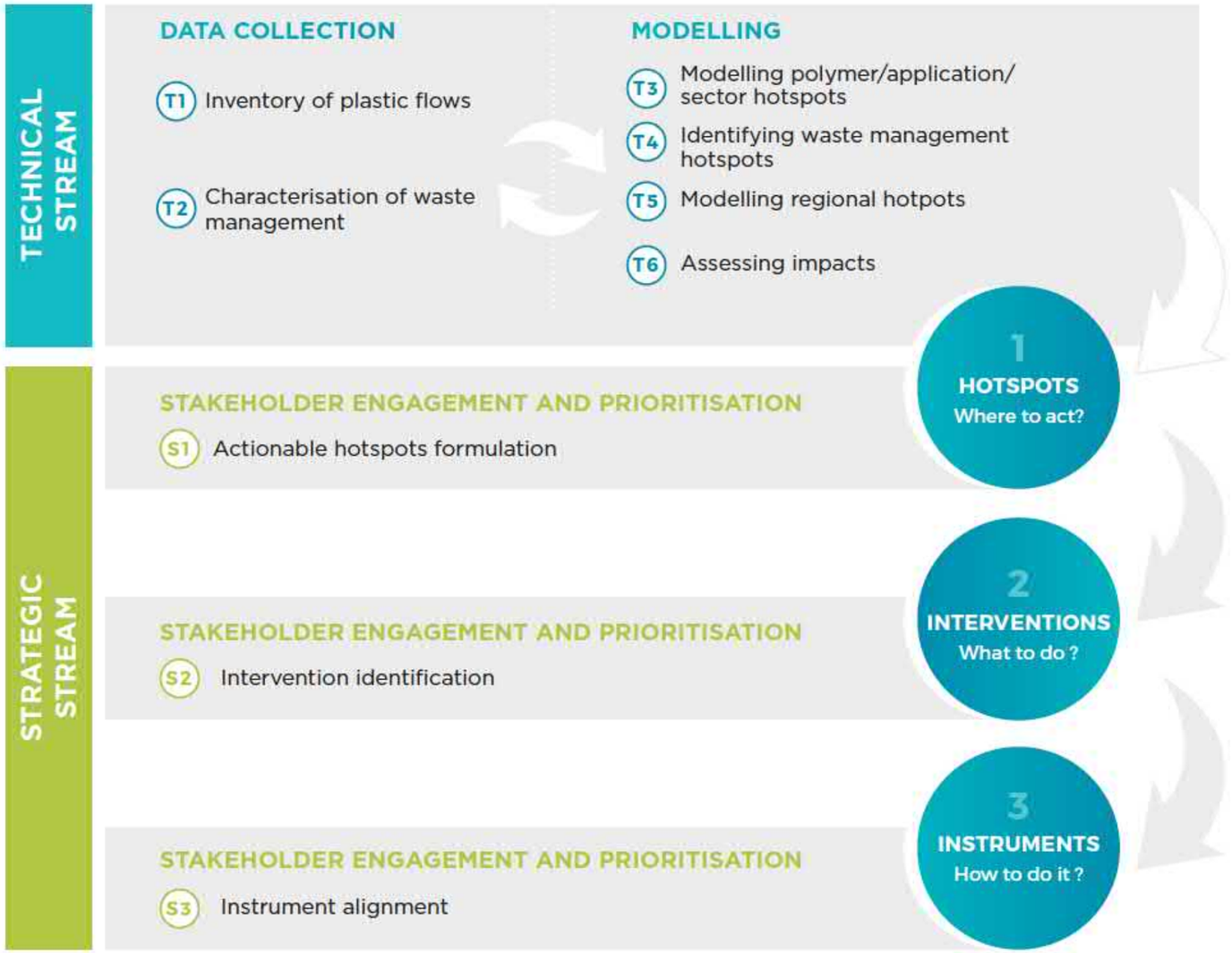
SCHEMATIC OF THE GUIDANCE

The guidance allows users to:

1. Generate country-specific plastic waste management datasets
2. Identify plastic leakage and pollution hotspots
3. Prioritise actions



LINK to the guidance



RELATIONSHIP BETWEEN HOTSPOTS, INTERVENTIONS AND INSTRUMENTS

The guidance is built upon the backbone of three questions: where to act? (Hotspots), what to do? (Interventions) and how to do it? (Instruments)

1 A component of the system that directly or indirectly contributes to the magnitude of plastic leakage and/or its impacts. It can be a component of the system, a type of product/polymer or a region within the country.

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

3 A practical way to implement the intervention and enable progress.

Examples

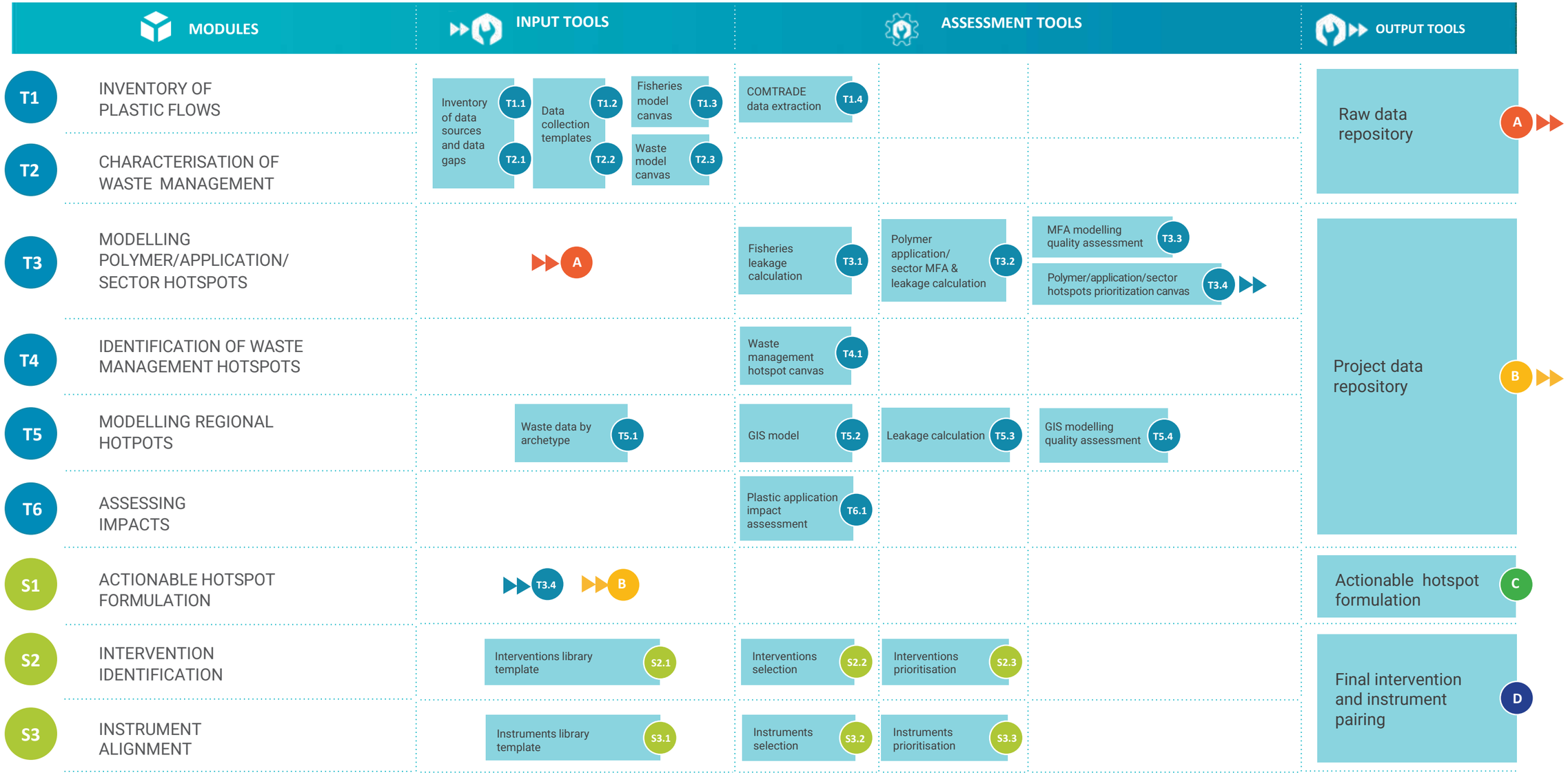
- Low recycling rate for flexible packaging
- Single-use plastic bags
- Low waste collection rate in rural areas

- Implement better eco-design + chemical recycling
- Reduce plastic bag use in the country
- Increase waste collection

- Develop funding mechanism through EPR* scheme
- Ban on plastic bags / introduce re-usable alternative
- Help local waste pickers to create a revenue stream

**EPR = Extended Producer Responsability*

STRUCTURE OF TOOLS ASSOCIATED WITH EACH MODULE



DISCLAIMER

This report intends to present **only the results of the analysis** and not the detailed modelling process.

Additional information on the methodology and modelling process can be found directly in the **modules and tools** associated with the guidance and highlighted by this icon.

3.1 NATIONAL DATA REPOSITORY

DETAILED SHARES BY POLYMER

Polymer Type	Waste produced in country	Domestic recycling of collected	Export of collected	Properly disposed	Improperly disposed	Uncollected	*Tot*	Collected	Mismanaged	Leaked	Waste produced and imported	Domestic recycling incl imported
PET	*19*	35%	5%	0%	16%	44%	*100%*	56%	60%	12%	*20*	36%
PP	*18*	11%	1%	0%	25%	63%	*100%*	37%	88%	12%	*18*	11%
Polyester	*57*	0%	0%	0%	29%	71%	*100%*	29%	100%	7%	*57*	0%
LDPE	*20*	1%	0%	0%	27%	72%	*100%*	28%	99%	17%	*20*	1%
HDPE	*9*	17%	2%	0%	22%	58%	*100%*	42%	80%	12%	*9*	18%
PS	*4*	0%	0%	0%	29%	71%	*100%*	29%	100%	11%	*4*	0%
Other	*24*	0%	0%	0%	29%	71%	*100%*	29%	100%	8%	*24*	0%
Synthetic Rubber	*5*	0%	0%	0%	29%	71%	*100%*	29%	100%	7%	*5*	0%
PVC	*22*	0%	0%	0%	29%	71%	*100%*	29%	100%	8%	*22*	0%
Total	*178*	*6%*	*1%*	*0%*	*27%*	*67%*	*100%*	*33%*	*93%*	*10%*	*20*	*6%*

- **Waste** = Collected + Uncollected
- **Collected** = Domestic recycling of collected + Export of collected + Properly managed + Improperly managed
- **Mismanaged** = Improperly managed + Uncollected

WASTE MANAGEMENT BY REGION

Region	Population 2019	Generated t	Collected t	Collected for recycling t	Mismanaged t	Leaked t	Share of Collected	Share of Mismanaged	Generated kg/cap	Collected for recycling kg/cap
Batken	491046	13663	2233	309	13354	1232	16%	98%	28	0.6
Biškek	1056450	29395	26874	6294	23102	2310	91%	79%	28	6.0
Chüy	893956	24874	5836	1015	23859	2430	23%	96%	28	1.1
Jalal-Abad	1242056	34560	7962	1372	33187	3420	23%	96%	28	1.1
Naryn	316408	8804	730	19	8785	902	8%	100%	28	0.1
Osh	1351096	37594	5444	673	36921	3814	14%	98%	28	0.5
Osh (city)	286310	7966	7283	1706	6261	901	91%	79%	28	6.0
Talas	263917	7343	1480	238	7106	740	20%	97%	28	0.9
Ysyk-Köl	488260	13586	1356	87	13498	1440	10%	99%	28	0.2

3.1 LOCAL DATA REPOSITORY

DETAILED SHARES BY POLYMER OF MISMANAGED WASTE

Polymer	Total quantity (pcs)	Total volume (m3)	Total mass (kg)
PET	163 300.00	163.30	6 532.00
PS	27 940.00	28.05	1 139.40
PP	20 450.00	10.60	363.50
unknown	3 480.00	35.40	153.30
LDPE	1 528 200.00	77.30	12 324.00
HDPE	3 950.00	7.32	255.60

DETAILED SHARES BY TYPE OF PLASTIC OF MISMANAGED WASTE

Type of plastic	Polymer	Total quantity (pcs)	Total volume (m3)	Total mass (kg)
Bottles	PET	163 300.00	163.30	6 532.00
Canisters	LDPE	200.00	0.20	30.00
Cups	PS	6 440.00	6.55	64.40
Cups, containers	PS	21 500.00	21.50	1 075.00
Hygiene products (diapers), unidentify type of plastic	unknown	80.00	0.30	4.80
Hygiene products, pieces of equipment (tents, ropes, personal items), unidentify type of plastic	unknown	80.00	1.90	46.00
Hygiene products,unidentify type of plastic, nylon bags, adhesive tape, packaging	unknown	70.00	1.00	5.00
Lids, cheese wrappers	PP	20 450.00	10.60	363.50
Packaging	LDPE	1 523 000.00	76.80	12 194.00
Scotch tape, packaging	unknown	3 250.00	32.20	97.50
Shampoo bottles	HDPE	1 200.00	1.20	67.00
Soap cleansers	HDPE	2 750.00	6.12	188.60
Tight bags, polyethylene film	LDPE	5 000.00	0.30	100.00

DETAILED SHARES BY POLYMER OF MISMANAGED WASTE IN HIGH MOUNTAIN AREAS

Polymer	Total quantity (pcs)	Total volume (m3)	Total mass (kg)	Specific weight (kg/m3)	Total mass per capita (kg/cap)	Total mass per capita (%)
PET	67 000.00	67.00	2 680.00	40.00	2.30	60%
PS	8 700.00	8.70	355.00	40.80	0.16	8%
PP	11 050.00	6.60	222.50	33.71	0.19	5%
unknown	930.00	10.45	75.30	7.21	0.04	2%
LDPE	120 200.00	6.40	1 060.00	165.63	0.71	24%
HDPE	220.00	3.55	46.80	13.18	0.06	1%

DETAILED SHARES BY TYPE OF PLASTIC OF MISMANAGED WASTE IN HIGH MOUNTAIN AREAS

Type of plastic	Polymer	Total quantity (pcs)	Total volume (m3)	Total mass (kg)	Specific weight (kg/m3)	Total mass per capita (kg/cap)	Total mass per capita (%)
Bottles	PET	67 000.00	67.00	2 680.00	40.00	2.30	37%
Canisters	LDPE	200.00	0.20	30.00	150.00	0.09	2%
Cups	PS	2 000.00	2.00	20.00	10.00	0.02	1%
Cups, containers	PS	6 700.00	6.70	335.00	50.00	0.29	7%
Hygiene products (diapers), unidentify type of plastic	unknown	30.00	0.05	1.80	36.00	0.00	0%
Hygiene products, pieces of equipment (tents, ropes, personal items), unidentify type of plastic	unknown	80.00	1.90	46.00	24.21	0.31	7%
Hygiene products,unidentify type of plastic, nylon bags, adhesive tape, packaging	unknown	70.00	1.00	5.00	5.00	0.10	3%
Lids, cheese wrappers	PP	11 050.00	6.60	222.50	33.71	0.19	6%
Packaging	LDPE	115 000.00	5.90	930.00	157.63	0.83	23%
Scotch tape, packaging	unknown	750.00	7.50	22.50	3.00	0.02	1%
Shampoo bottles	HDPE	0.00	0.00	0.00	not applicable	not applicable	not applicable
Soap cleansers	HDPE	220.00	3.55	46.80	13.18	0.06	2%
Tight bags, polyethylene film	LDPE	5 000.00	0.30	100.00	333.33	2.03	not applicable

DETAILED SHARES BY POLYMER OF MISMANAGED WASTE IN LOW MOUNTAIN AREAS

Polymer	Total quantity (pcs)	Total volume (m3)	Total mass (kg)	Specific weight (kg/m3)	Total mass per capita (kg/cap)	Total mass per capita (%)
PET	96 300.00	96.30	3 852.00	40.00	0.06	24%
PS	19 240.00	19.35	784.40	40.54	0.01	5%
PP	9 400.00	4.00	141.00	35.25	0.00	1%
unknown	2 550.00	24.95	78.00	3.13	0.00	0%
LDPE	1 408 000.00	70.90	11 264.00	158.87	0.19	69%
HDPE	3 730.00	3.77	208.80	55.38	0.00	1%

DETAILED SHARES BY TYPE OF PLASTIC OF MISMANAGED WASTE IN LOW MOUNTAIN AREAS

Type of plastic	Polymer	Total quantity (pcs)	Total volume (m3)	Total mass (kg)	Specific weight (kg/m3)	Total mass per capita (kg/cap)	Total mass per capita (%)
Bottles	PET	96 300.00	96.30	3 852.00	40.00	0.06	0.23
Canisters	LDPE	0.00	0.00	0.00	not applicable	not applicable	not applicable
Cups	PS	4 440.00	4.55	44.40	9.76	0.00	0.04
Cups, containers	PS	14 800.00	14.80	740.00	50.00	0.01	0.68
Hygiene products (diapers), unidentify type of plastic	unknown	50.00	0.25	3.00	12.00	0.01	0.06
Hygiene products, pieces of equipment (tents, ropes, personal items), unidentify type of plastic	unknown	0.00	0.00	0.00	not applicable	not applicable	not applicable
Hygiene products,unidentify type of plastic, nylon bags, adhesive tape, packaging	unknown	0.00	0.00	0.00	not applicable	not applicable	not applicable
Lids, cheese wrappers	PP	9 400.00	4.00	141.00	35.25	0.00	0.01
Packaging	LDPE	1 408 000.00	70.90	11 264.00	158.87	0.19	0.39
Scotch tape, packaging	unknown	2 500.00	24.70	75.00	3.04	0.00	0.00
Shampoo bottles	HDPE	1 200.00	1.20	67.00	55.83	0.00	0.00
Soap cleansers	HDPE	2 530.00	2.57	141.80	55.18	0.00	0.00
Tight bags, polyethylene film	LDPE	0.00	0.00	0.00	not applicable	not applicable	not applicable

DETAILED SHARES BY TYPE OF POLYMER AND LOCATIONS OF MISMANAGED WASTE

Location	PET	PS	PP	unknown	LDPE	HDPE
Ala-Archa Nature Park (Racek hut - Aksai glacier, alpin camp)	77%	7%	4%	1%	12%	0%
Toho-Ashu Pass	64%	4%	5%	1%	27%	0%
Moutain slopes along lake Issyk-Kul (neighborhood of Balykchy)	22%	4%	1%	0%	73%	0%
Salt lake	68%	6%	3%	3%	17%	3%
Kara-Kol town (gorge and ski base)	50%	13%	0%	15%	20%	2%
Jety-Oguz Gorge	73%	6%	2%	2%	18%	0%
Barskoon Gorge	83%	2%	2%	0%	12%	0%
Kara-Koo village (local dumpsite 1)	48%	2%	1%	0%	48%	1%
Kara-Koo village (local dumpsite 2)	19%	2%	1%	1%	77%	1%
Lenin Peak in the Pamirs (Base camp - Ashik Tash - 3623m)	69%	12%	6%	1%	12%	1%
Lenin Peak in the Pamirs (Camp - 4418m)	67%	10%	10%	1%	6%	6%
Lenin Peak in the Pamirs (Camp - 5381m)	0%	0%	0%	100%	0%	0%
Lenin Peak in the Pamirs (Camp - 5570m)	0%	0%	0%	100%	0%	0%

PICTURES OF THE FIELD ASSESSMENT
PROVIDED BY INDEPENDENT ECOLOGICAL EXPERTISE

Toho-Ashu Pass

PICTURES OF THE FIELD ASSESSMENT
PROVIDED BY INDEPENDENT ECOLOGICAL EXPERTISE

Ala-Archa Nature Park

PICTURES OF THE FIELD ASSESSMENT
PROVIDED BY INDEPENDENT ECOLOGICAL EXPERTISE

Moutain slopes along lake Issyk-Kul

PICTURES OF THE FIELD ASSESSMENT
PROVIDED BY INDEPENDENT ECOLOGICAL EXPERTISE

Jety-Oguz Gorge

PICTURES OF THE FIELD ASSESSMENT
PROVIDED BY INDEPENDENT ECOLOGICAL EXPERTISE

Kara-Kol town

PICTURES OF THE FIELD ASSESSMENT
PROVIDED BY INDEPENDENT ECOLOGICAL EXPERTISE

Barskoon Gorge

PICTURES OF THE FIELD ASSESSMENT
PROVIDED BY INDEPENDENT ECOLOGICAL EXPERTISE

Salt lake

PICTURES OF THE FIELD ASSESSMENT
PROVIDED BY INDEPENDENT ECOLOGICAL EXPERTISE

Kara-Koo village (local dumpsite 1)

Kara-Koo village (local dumpsite 2)

Lenin Peak in the Pamirs

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