Plastic Waste Free Islands in the Mediterranean

Envisioning solutions to plastic pollution

Layman Report

Fondation Didier et Martine Primat

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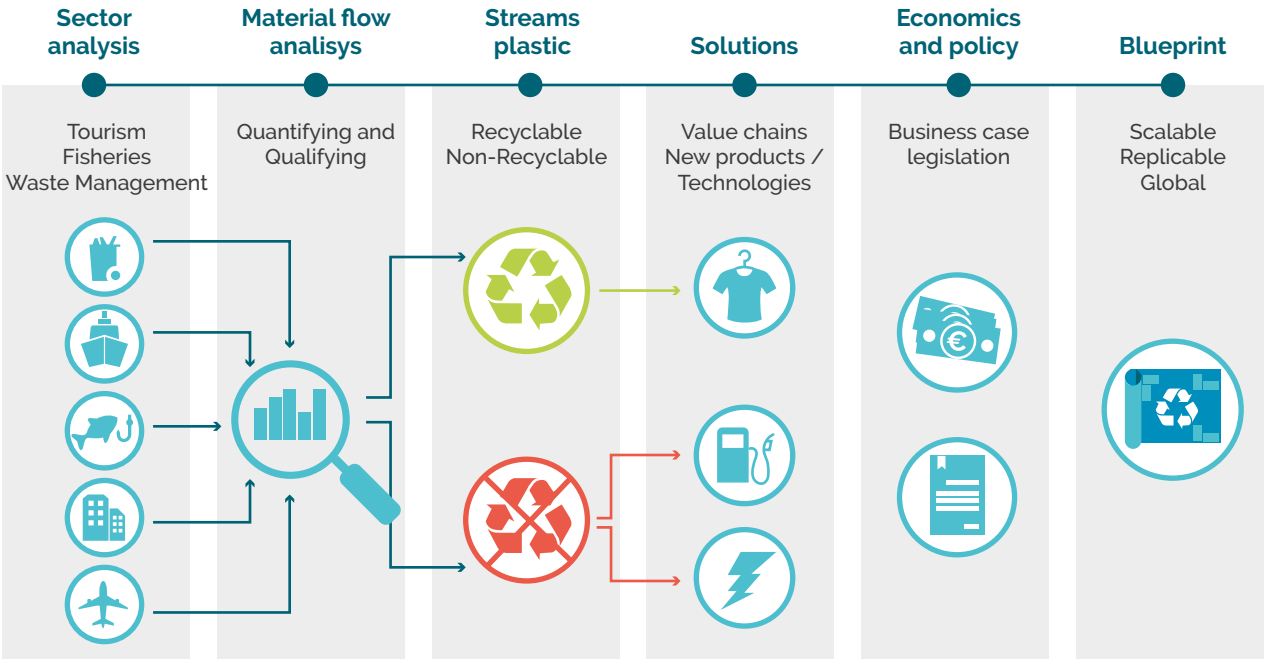
Content

PLASTIC WASTE FREE ISLANDS IN THE MEDITERRANEAN

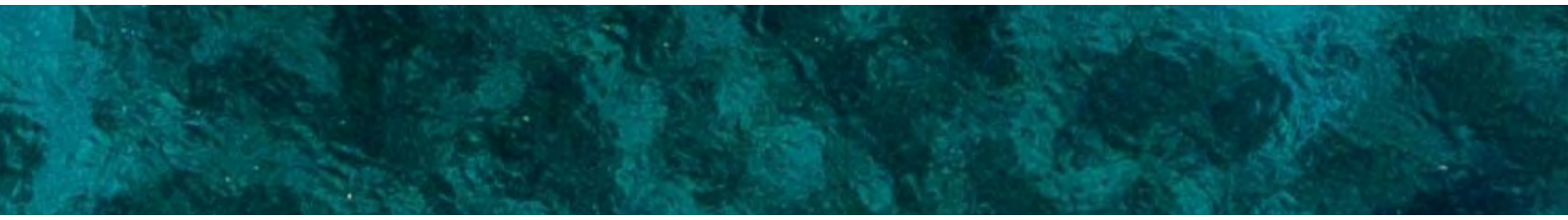
The plastic pollution issue in the Mediterranean

Widely regarded as one of the most threatened environments in the world, the Mediterranean Sea is subject now to ubiquitous plastic pollution. As a result of high population densities, lack of consistent waste-management schemes, and large influxes of tourists and strategic merchant navigation, this environment is under significant pressure. The total plastic accumulated in the Mediterranean Sea is estimated in the order of magnitude of 1,178,000 tonnes, with a possible range from 53,500 to 3,546,700 tonnes[1]. This has adverse impacts on the health of ocean ecosystems, the integrity of food supplies and people's livelihoods. Plastic pollution is a design, production, consumption and disposal challenge that must be tackled across plastic's entire lifecycle. Most efforts to minimise and mitigate the impacts of plastic pollution are focused on the mainland, particularly rivers and coastal areas. To date, not much attention has been paid to islands.

	Global view on plastic in Cyprus	Global view on plastic in Menorca
Collection rate	93%	90%
Management rate	7%	10%
Collection for recycling	11%	14%
Domestic recycling rate	0%	0%
Leakage	0.76 Kt	78 t
Per capita leakage	0.9 Kg	0.8 Kg



1. Boucher, J. & Bilard, G. (2020). The Mediterranean: Mare Plasticum. Gland, Switzerland: IUCN. x+62 pp.



Islands' vulnerability to plastic pollution

- Many Mediterranean islands tend to have economies that largely depend on tourism and fisheries.
- Islands have to deal with plastic waste they generate themselves, as well as plastic debris that washes ashore from other places.
- In most cases, islands do not have any recycling facilities and, for this reason, they export plastic waste collected.

The project

In 2019, with support from the Didier and Martine Primat Foundation, IUCN Med launched the Plastic Waste Free Islands Med (PWFI Med) project, as part of the global IUCN's Close the Plastic Tap Programme. Implemented in Menorca and Cyprus, the project demonstrated effective, quantifiable solutions to address plastic leakage from both islands.

The project also aimed to enhance the adoption of plastic leakage reduction measures by tourism, fisheries and waste management sectors. Best practices and lessons learnt were packaged into a 'blueprint' for use beyond the initial two target islands. Key regional bodies were equipped with the blueprint and supported to identify further opportunities to scale up its application.

Outcomes

- **Improved** knowledge of plastic waste generation among 2 target islands.
- **Increased** policy effectiveness in reducing plastic waste generation.
- **Enhanced** adoption of plastic leakage reduction measures by tourism, fisheries and waste management sectors through alternate value chain development.
- **Development** of Plastic Waste Free Island blueprint and endorsement by regional bodies.

3 years

2019-2022

2 islands

Menorca and Cyprus

3 sectors

Tourism, fisheries and waste management

The plastic pollution problem in Mediterranean islands

Plastic pollution is a design, production, consumption and disposal challenge that must be tackled across plastic's entire lifecycle.

Most efforts to minimise and mitigate the impacts of plastic pollution are focused on the mainland, particularly rivers and coastal areas. But little attention has been given to islands and how this problem affects them. For economies that are especially dependent on marine resources the impact can be high:

Less income and reduced employment in coastal communities due to decreased tourism related to dirty and less attractive beaches.

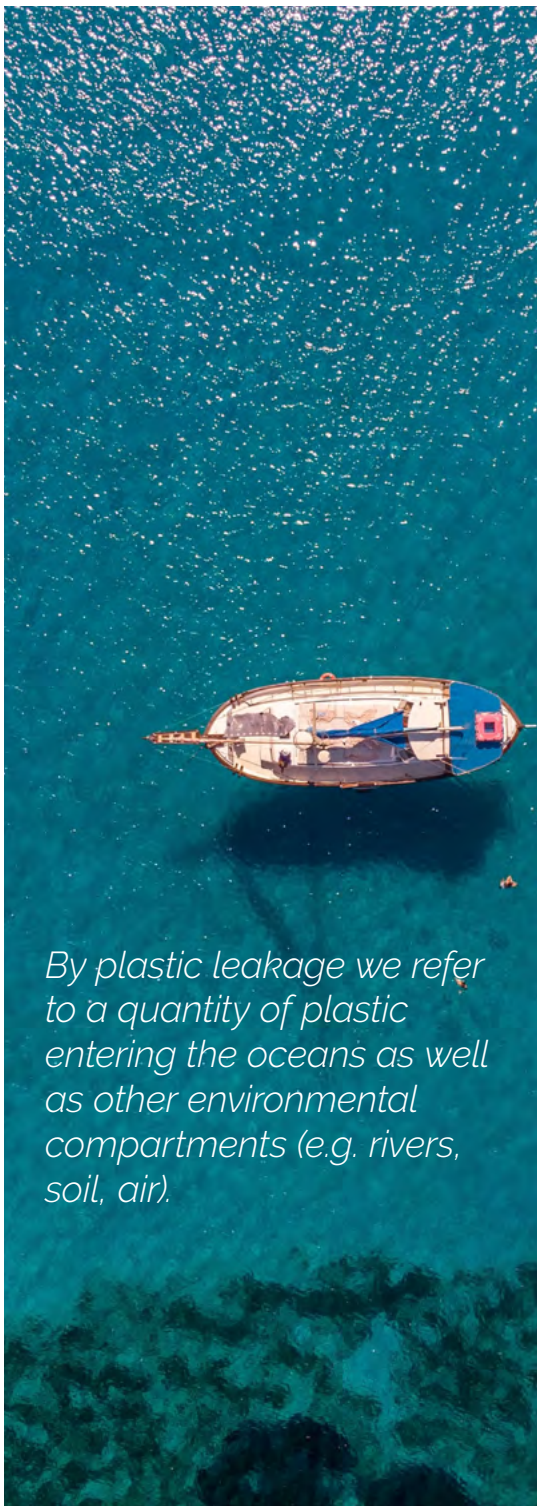
High costs for coastal and beach clean-ups.

Loss of employment in artisanal fisheries due to reduced catch.

Damage to ship propulsion equipment caused by marine litter.

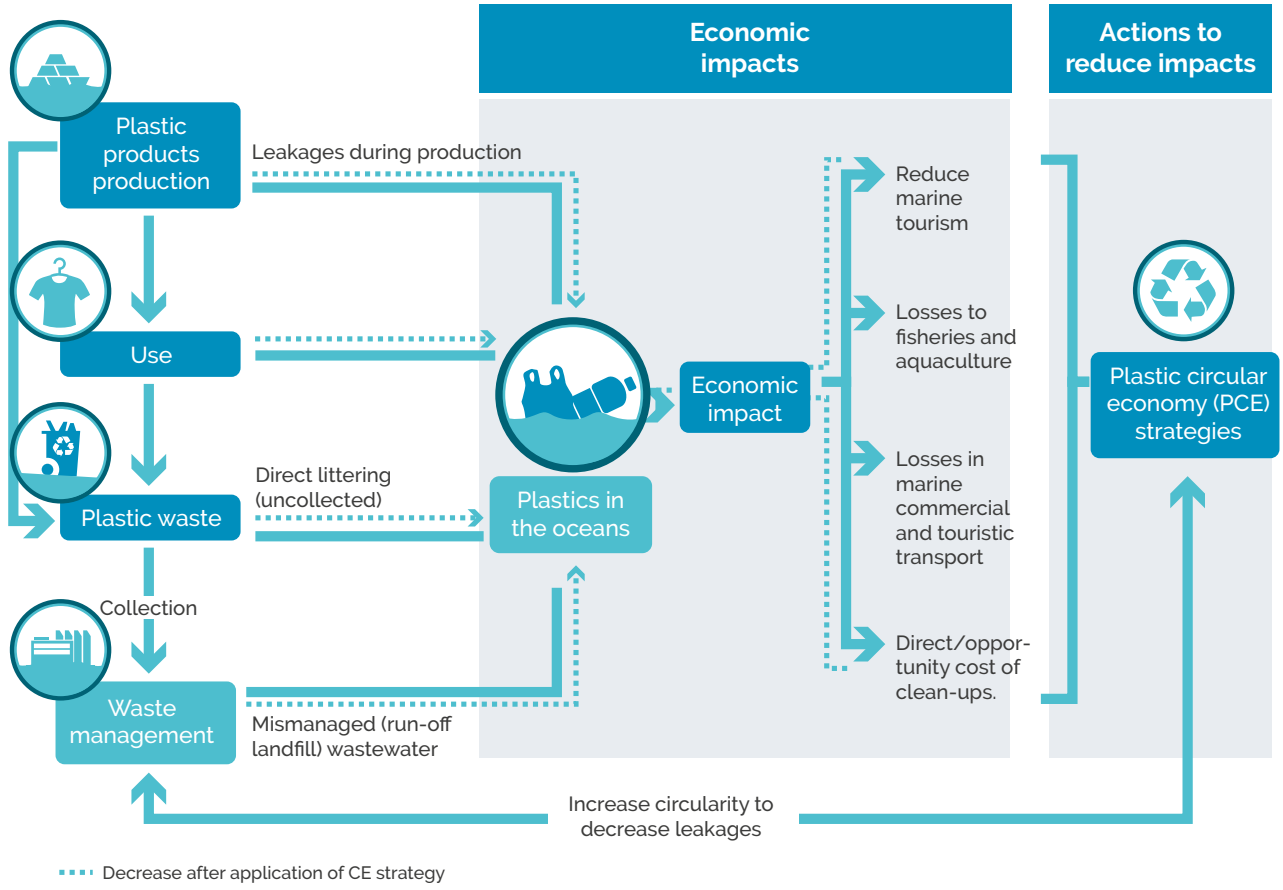
Increased risk of flooding due to blockage of stormwater systems and drainage, and higher maintenance for water-using infrastructure.

Actions are needed to reduce plastics use, and to create a circular economy in plastics with minimal leakage.



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

Figure 3. Conceptual framework, the role of plastic circular economy strategies to decrease economic impacts. With the implementation of plastic circular economy strategies, the circularity of plastic will increase, hence, leakages and their consequent impacts will decrease.



Source: Economic Assessment of a Deposit Refund System (DRS), an Instrument for the Implementation of a Plastics Circular Economy in Menorca, Spain.

Legal and policy frameworks

The management of plastic waste is governed by many EU and National laws, concerning waste separation, landfill, incineration, packaging, and more. Without such regulation, there are few incentives to manage plastic waste effectively, to prevent its leakage to the environment, or to develop circular economy strategies.

However, there remain significant implementation gaps and challenges

Inadequate waste collection and separation is common, including poor waste management infrastructure.

Inadequate capacity exists for monitoring plastic collection and recycling, and there is generally poor coordination among relevant administrative bodies.

Implementation of waste management plans is slow.

Public awareness is low.

Private sector involvement in waste management is low.

Few common quality standards for waste collection exist.

It's a big problem to solve. Where should we start?

The partners in the Plastic Waste Free Islands Mediterranean project used a tool developed by UNEP and IUCN to help identify where plastic leakages were worst and why. This provided the starting point for developing more effective circular economy strategies.

Extended Producer Responsibility (EPR)

An important factor in effective waste management is the application of the principle of the Extended Producer Responsibility (EPR), the assumption of responsibility by the importers and manufacturers of selected products for financing and infrastructure performance to enable consumers to return a product when it becomes waste, in order for it to be appropriately managed. The implementation of Extended Producer Responsibility is already regulated for plastic packaging waste. Its extension to include non-packaging plastics is important to create an effective circular economy in plastics.

Assessing the problem

The hotspotting method and guidance

The value of the guidance is not just in providing a methodology for quantifying and categorising plastic waste. It also provides a strong evidence base for policy making.

The Hotspotting method starts by mapping plastic leakage and its impacts across the value chain by collecting and analysing relevant data on plastic production, consumption, waste management and disposal. This data is used to identify hotspots where leakage is high according to sector, geographic area, or type of plastic so that specific priorities for action can be identified.

The Guidance enables governments, in collaboration with key stakeholders, to set targets, agree and implement actions, and monitor progress in tackling these hotspots.

1. **Where** to act?

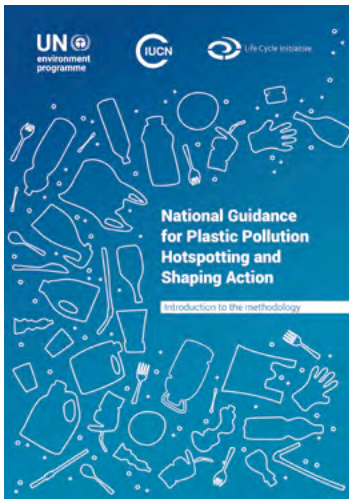
- Identify which type of leakage and impact is predominant along the plastic value chain (see section 3.2.1).
- Identify where the leakage is occurring at national, sub-national and local levels (see section 3.2.2).
- Identify what is the key driver of the leakage along the waste management system (see 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).



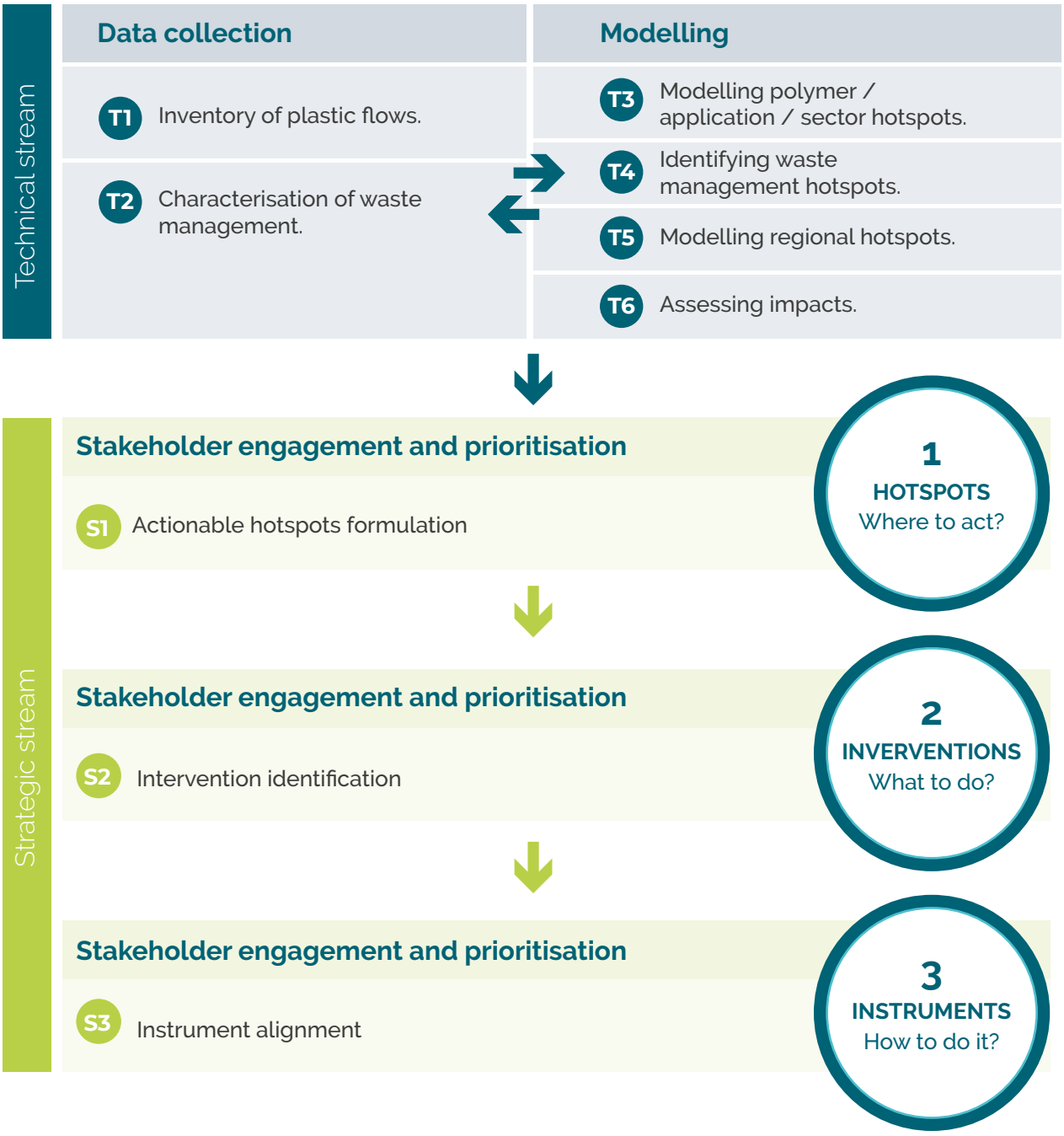
The Guidance introduces a clear and simple science-based workflow to support the development of key interventions and instruments at the national, sub-national or local levels, to help turning the tide on plastic pollution.

https://plastichotspotting.lifecycleinitiative.org/wp-content/uploads/2020/07/National-Guidance-for-Plastic-Hotspotting-and-Shaping-Action-Final-Version-2.1.pdf

Added value of the guidance

The guidance produced and tested in the project provides a methodology that can be replicated anywhere to identify plastic waste hotspots and how they can be rectified. It addresses all types of plastic leakage, so that the whole system is understood. It employs a systematic approach involving all key stakeholders and guides users through a reproducible workflow towards implementable solutions.

Schematic of the guidance: workflow, key activities and main deliverables



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

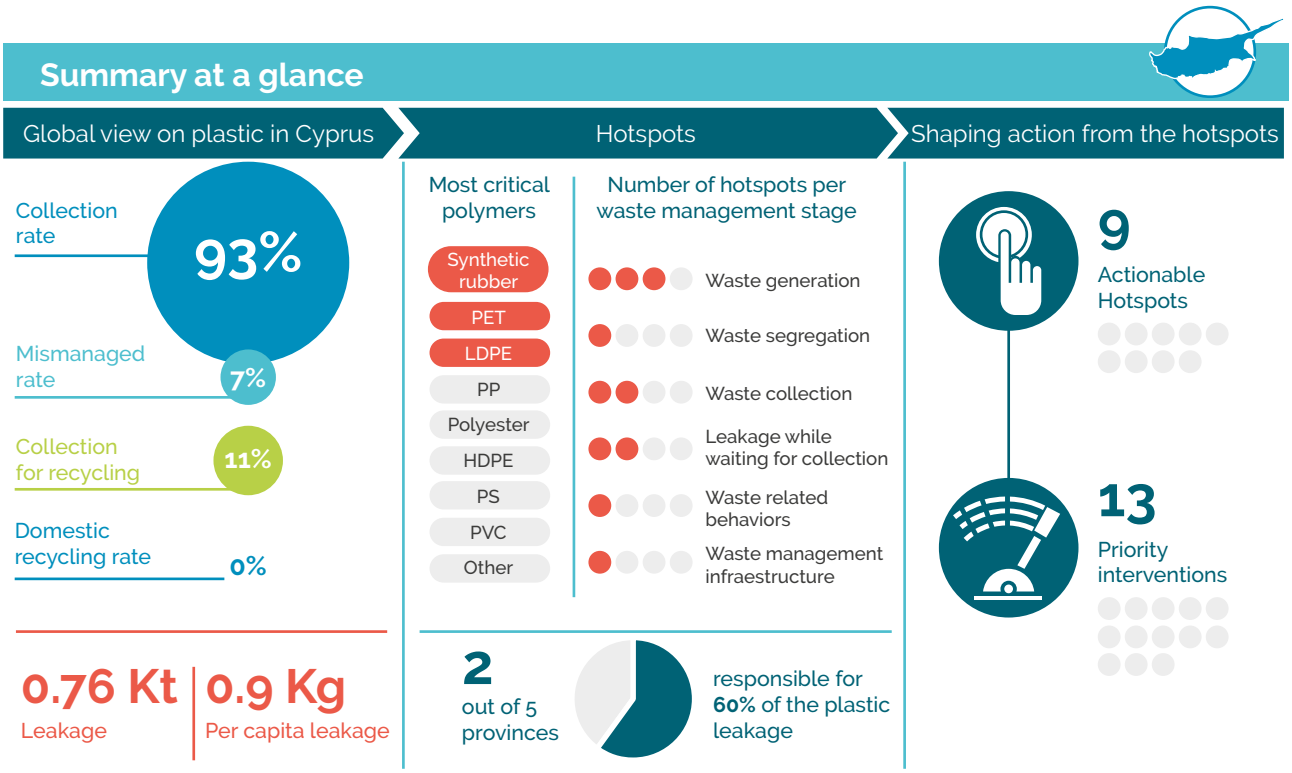
Guides the user through a reproducible workflow including data-collection, diagnostic, planning and implementation tools

- 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.

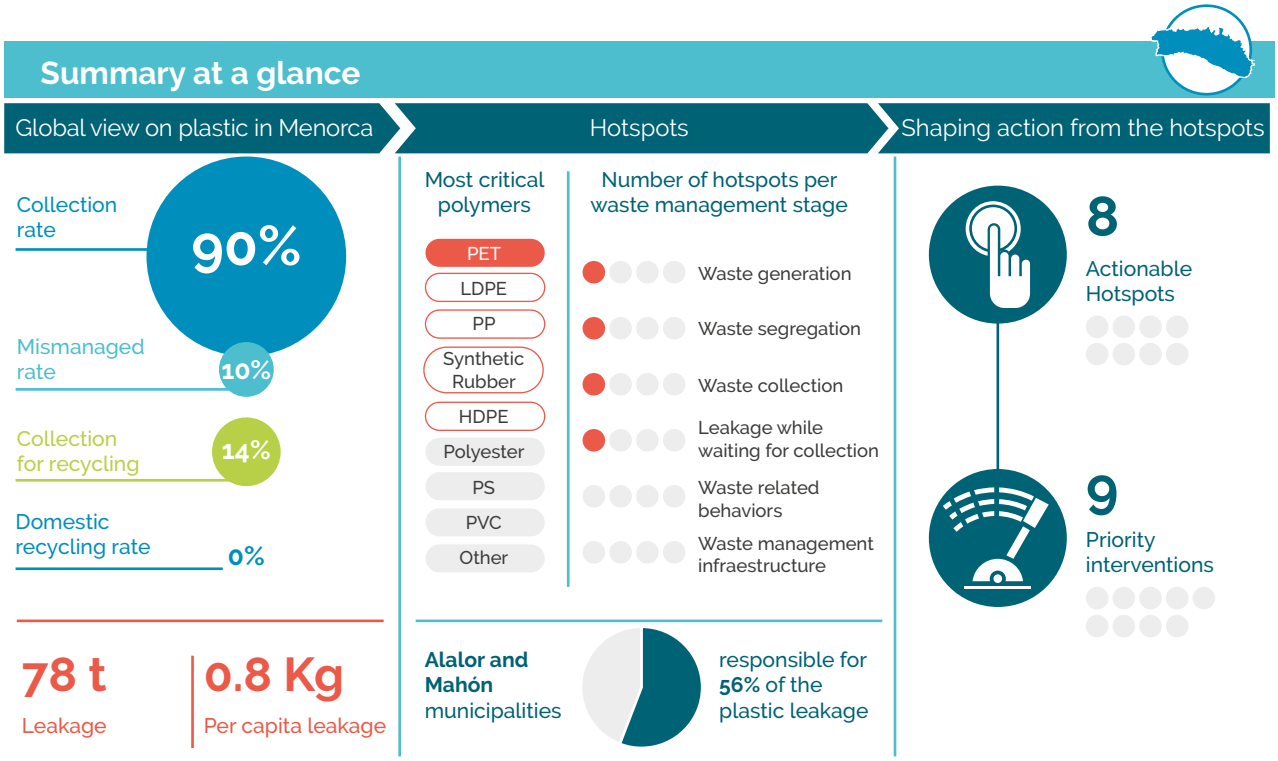
Source: National Guidance for Plastic Pollution Hotspotting and Shaping Action.

Results of assessments

The hotspotting process provides specific information which explains the problem according to types of plastic, to sector, and to location, enabling targeted actions to be developed and implemented, as illustrated in the summaries below for Cyprus and Menorca.



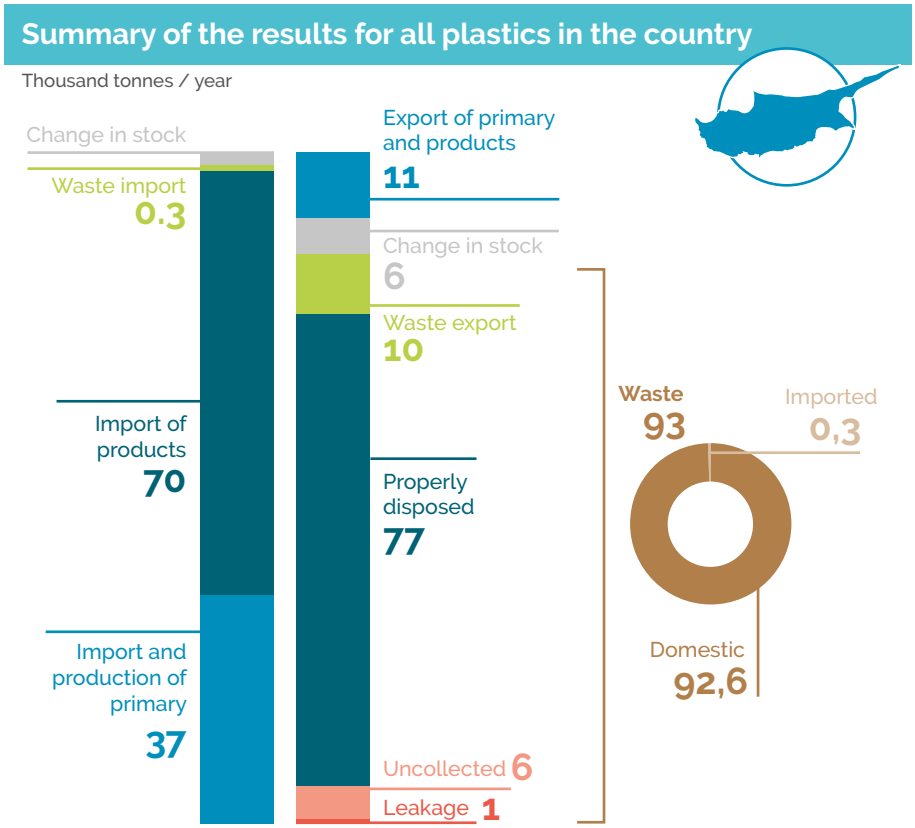
Source: National Guidance for Plastic Pollution Hotspotting and Shaping Action. Final Report for Cyprus.



Analysis indicates where plastics come from and where they go, including leakage to the environment. For example, in the Republic of Cyprus most waste is properly managed on the island, but still a significant 7% is mismanaged.

Source: National Guidance for Plastic Pollution Hotspotting and Shaping Action. Final Report for Menorca.

Some results extracted from the report for the republic of Cyprus.



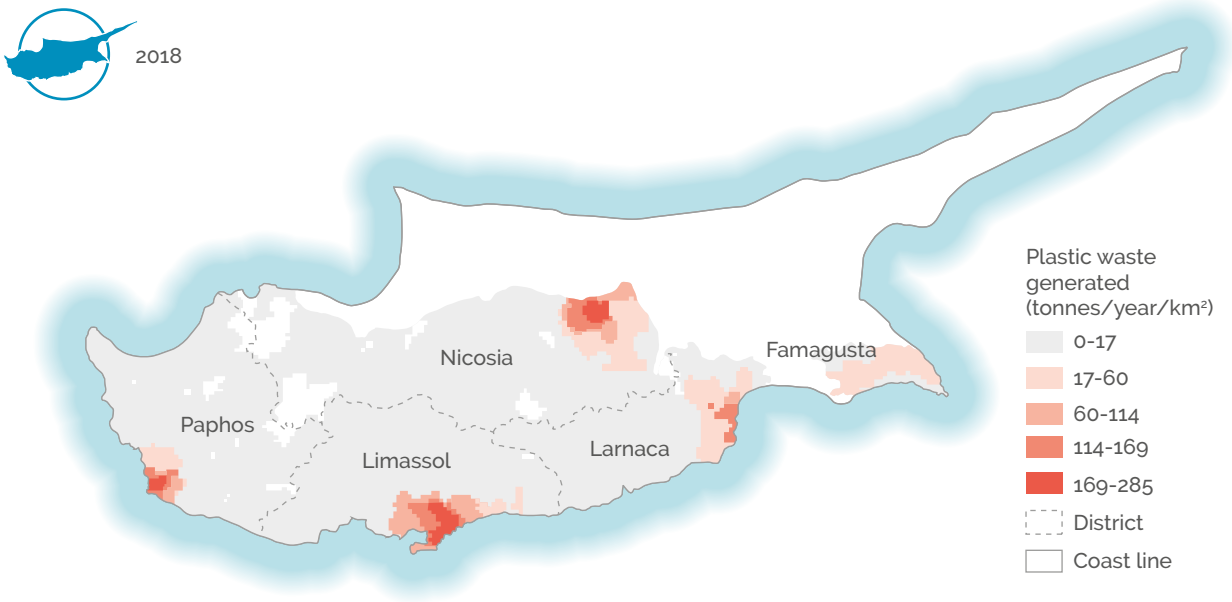
Note: for simplicity, in this figure, we removed a part of the 'leakage' from the 'uncollected', so that the 'uncollected' value displayed corresponds to a post-leakage situation.

Source: National Guidance for Plastic Pollution Hotspotting and Shaping Action. Final Report for Cyprus.

Mapping this information (see figure) shows where the problems lie, so that relevant publics and stakeholders can be engaged in finding solutions.

Source: National Guidance for Plastic Pollution Hotspotting and Shaping Action. Final Report for Cyprus.

Waste generation: map and interpretations



Limitations

Although the total value of waste generated by tourists is known by province based on the number of beds, we cannot visualise precise tourist hotspots at a pixel level due to a lack of granularity in the geographical data.

Unlocking limitations

Gather more granular data on where tourists are dwelling during stay with specific coordinate positions.

Key take-aways

- Plastic waste generation is concentrated around the cities of Nicosia, Limassol, Paphos and Larnaca.
- On average, plastic accounts for 15% of the total waste stream.

In the example summary from Menorca, its clear that PET plastics used in packaging are one of the key sources of plastic leakage to the environment. Their production as waste is concentrated in and around cities, and areas with high tourist populations. The waste management analysis shows that problems exist in aspects of waste segregation, and waste collection (including the design of waste bins). This level of detail allows stakeholders and policy makers to take targeted and effective action to reduce leakage, including by reducing waste production.

Some results extracted from the report for the island of Menorca

Polymer

PET | LDPE | PP | Synthetic Rubber | HDPE | Polyester | PS | PVC | Other

Sector

Packaging | Automotive-tyres | Tourism | Fishing | Medical | Textile | Agriculture | Electrical & Electronics | Automotive-other | Construction

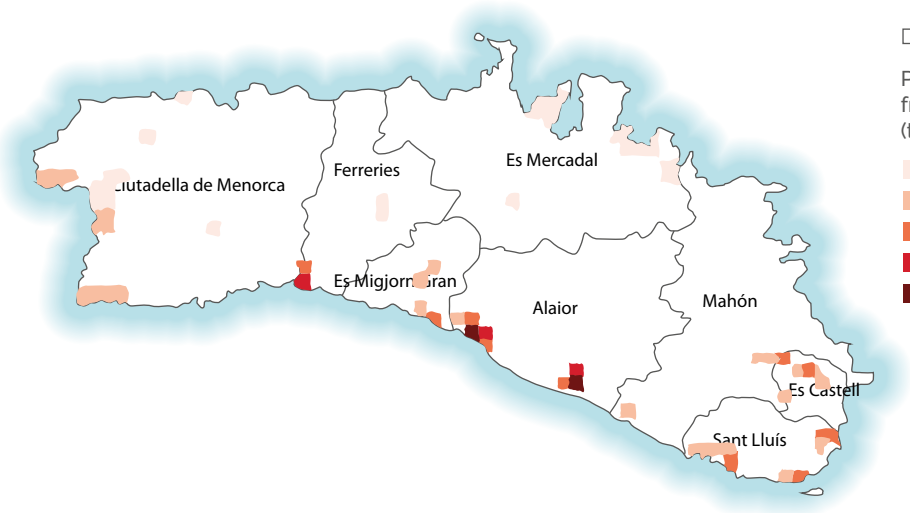
- Highest leakage contributors in absolute and relative value.
- 3 highest leakage contributors in absolute or relative value.

Regional

Municipality

Plastic leakage from residents in urban areas (tonnes/year/km²)

- 0.01-0.59
- 0.59-1.93
- 1.93-4.71
- 4.71-7.00
- 7.00-9.35



Municipality

Plastic leakage from tourists (tonnes/year/km²)

- 0.001-0.055
- 0.055-0.165
- 0.165-0.344
- 0.344-0.735
- 0.735-1.324

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 infraestructure 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 unsanitary 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

Source: National Guidance for Plastic Pollution Hotspotting and Shaping Action. Final Report for Menorca.

Solutions & best practices

The hotspot reports, by helping to identify key sectors and their problems regarding plastic waste, enabled Cyprus and Menorca to devise action plans to reduce plastic waste leakage and increase the circularity of the plastics economy on each island.

They focussed on three key sectors: waste management, tourism and fisheries. Some examples are given below.

- Assessment of problems.
- Key actions.

Assessment of problems

Summary Menorca

10 220 tonnes of plastic waste generated in Menorca in 2018, from which 2476 tonnes (24%) are attributed to the tourism sector. Plastic waste generation per capita amounts to **111 kg/cap/year** (including tourists on annual basis).

90% collection rate on average.

No recycling facilities in Menorca. Around **14%** of plastic waste is exported for recycling.

7734 tonnes of plastic waste are landfilled (assuming no incineration facility is in place).

10% of plastic waste is mismanaged in Menorca (either littered or uncollected).

78 tonnes of plastic leak into waterways from Menorca in 2018, including 19 t (24%) attributed to the tourism sector. This corresponds to a **1%** leakage rate and **0,8 kg/cap/year** leakage per capita.

Source: National Guidance for Plastic Pollution Hotspotting and Shaping Action. Final Report for Menorca.

Summary Cyprus

92 588 tonnes of plastic waste generated, from which 10 495 tonnes are attributed to tourism. Plastic waste generation per capita amounts to 94 kg/cap/year, well above the Western Europe average* (64 kg/cap/year).

93% collection rate on average.

No recycling facilities in Cyprus. Around **11%** of plastic waste is exported for recycling.

Only **7%** of waste generated in Cyprus is mismanaged (stemming from littering and uncollected waste).

756 tonnes of plastic leak into waterways in 2018, including 86 tonnes from the tourism sector. This corresponds to 1% leakage rate and 0,8 kg/cap/year leakage per capita.

Source: National Guidance for Plastic Pollution Hotspotting and Shaping Action. Final Report for Cyprus.

Examples of key actions

Source: Action Plan to prevent plastic waste in the Republic of Cyprus 2030.

Example A. Tourism Action plan, Republic of Cyprus

ACTION 1	Reduce single-use PET bottles' consumption through sales of tap water in hotels
ACTION 2	Reuse cups and food containers in hotels (on a voluntary basis)
ACTION 3	Reduce single-use PET bottles' consumption through renting reusable water bottles and beach supplies in hotels (on a voluntary basis)
ACTION 4	Reduce avoidable plastic items in hotels
ACTION 5	Reduce plastic packaging waste from personal care products in hotels

Example B. Waste Management Action Plan, Menorca

Reduce plastic leakage by 20% in the waste management sector by 2030

- Reduce plastic leaks from ports.
- Reduce plastic leaks in shipyards during ship maintenance work.
- Reduce leakage plastic leaks from agriculture.
- Reduce plastic leakage to the sea through the stormwater system.
- Reduce plastic leaks from industrial estates.

Reduce microplastic and nanoplastic pollution by 25% in the waste management sector by 2030

- Avoid contamination of groundwater by micro and nanoplastics, due to the use of sludge in agriculture.
- Reduce leakage of microplastics and nanoplastics in wastewater treatment plants.

Prioritize waste prevention by 2030

- Promote citizen initiatives and NGOs activity.
- Improve knowledge about the impacts of plastic pollution.
- Take joint action to tackle plastic pollution.
- Guarantee compliance with the Balearic Law on waste and contaminated soil (2019).

Source: Action Plan to prevent plastic waste in the Menorca 2030.

Circular economy models

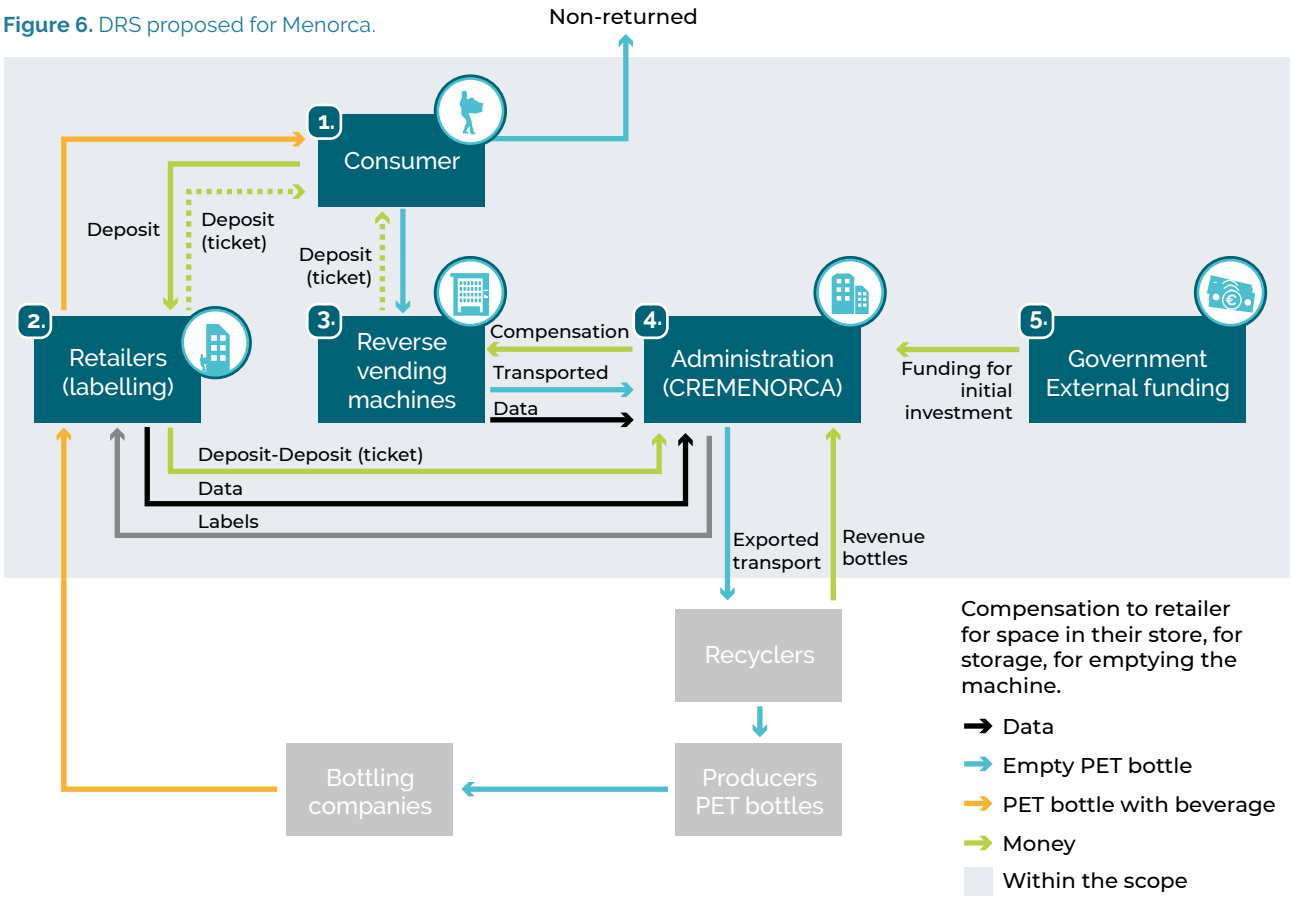
The circular economy concept helps us to think about re-use and recycling of plastics, rather than just their safe disposal. The partners in the Plastic Waste Free Islands project investigated circular economy business models for key plastic resources, aiming to facilitate the development of better practices.

Case 1. Deposit-Return Scheme, Menorca

Bottles made from PET plastics are widely used for drinking water and other beverages. They represent a particular challenge for the circular economy. An economic assessment was made of a deposit-return scheme for the island of Menorca.

The modelling showed that a scheme could be run profitably, and achieve positive improvements over business as usual, increasing the fraction of bottles collected and recycled after use, reducing the fraction sent to landfill, and reducing the leakage to the environment.

Figure 6. DRS proposed for Menorca.



Source: Economic Assessment of a Deposit Refund System (DRS), an Instrument for the Implementation of a Plastics Circular Economy in Menorca, Spain

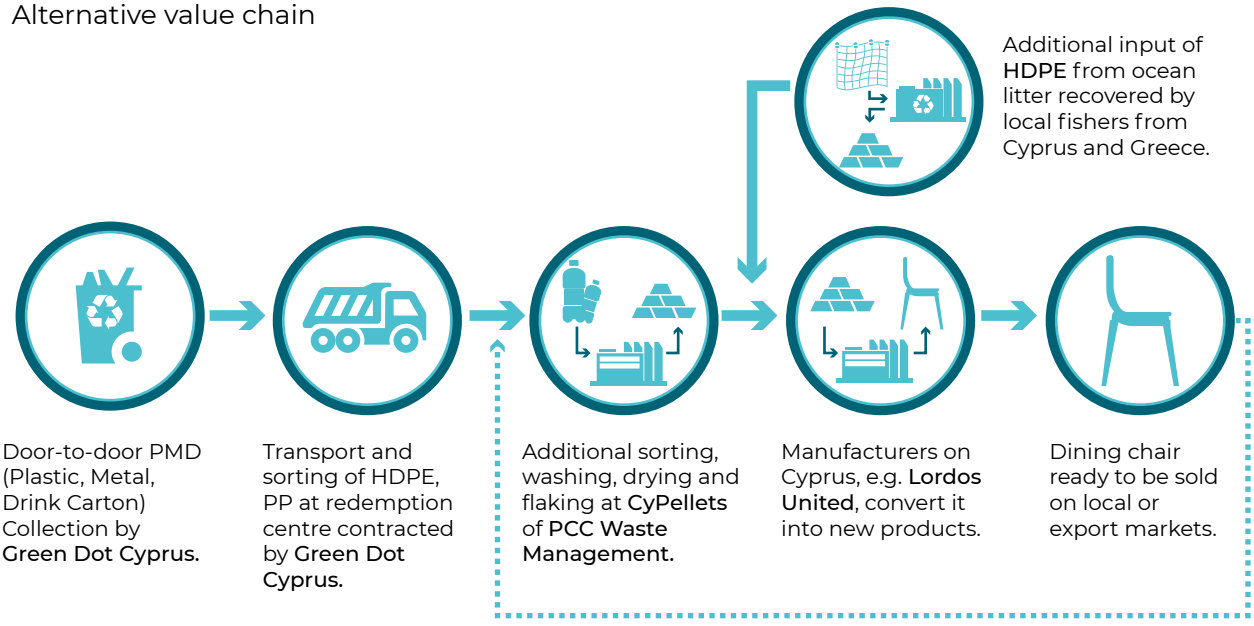
Case 2. Waste to Product Proof of Concept

Taking the principle of the circular economy, this study concentrated on the business opportunities based on the creation of new value chains through the recycling of two of the most common plastics in waste – HDPE and PP – into new products.

The study focussed on a traditionally designed chair for use in the tourism sector. The study identified a range of financial, social and environmental benefits.

Waste to product

Alternative value chain



Source: Plastic Waste Free Islands. Proof of concept: waste to product. Cyprus.

EXTRUSION BASED FURNITURE

Sturdy plastic chair made from locally sources plastic waste

- Inspired by traditional Cypriot dining chairs.
- Plastic lumber, beams, planks, parts (semi-finished product).
- Indoor / outdoor furniture (end product).
- Example Prototype:
  Dinner chair recycled PE/PP
  - Dimensions:
    L 499 x W 450 x H 809 mm
  - Weight: 10 kg
  - Intended use: dinner table, terrace, patio

SUMMARY OF THE BENEFITS

Financial benefits	Environmental benefits	Social benefits
Lower waste disposal and clean-up costs for government.	Lower landfill pressure for government: up to 150 tonnes / year or 13% HDPE/PP waste diverted from landfill.	Develop recycling market - Create more jobs on island in collection, sorting, cleaning, recycling – 6-7 FTE.
Better license to operate for construction and furniture market. And allows for green/circular public procurement.	Approx. 164.7 tonnes of CO_2 emissions saved by redirecting plastic waste into products.	Contribution to cleaner island and attractiveness for local population and visitors.
Customer loyalty for producers.	Reduced amount of plastic waste that might leak into the environment. Up to 150 tonnes / year diverted from potential leakage at the start.	Providing and ensuring continuous incentives for ocean waste recovery activities of local fishers.

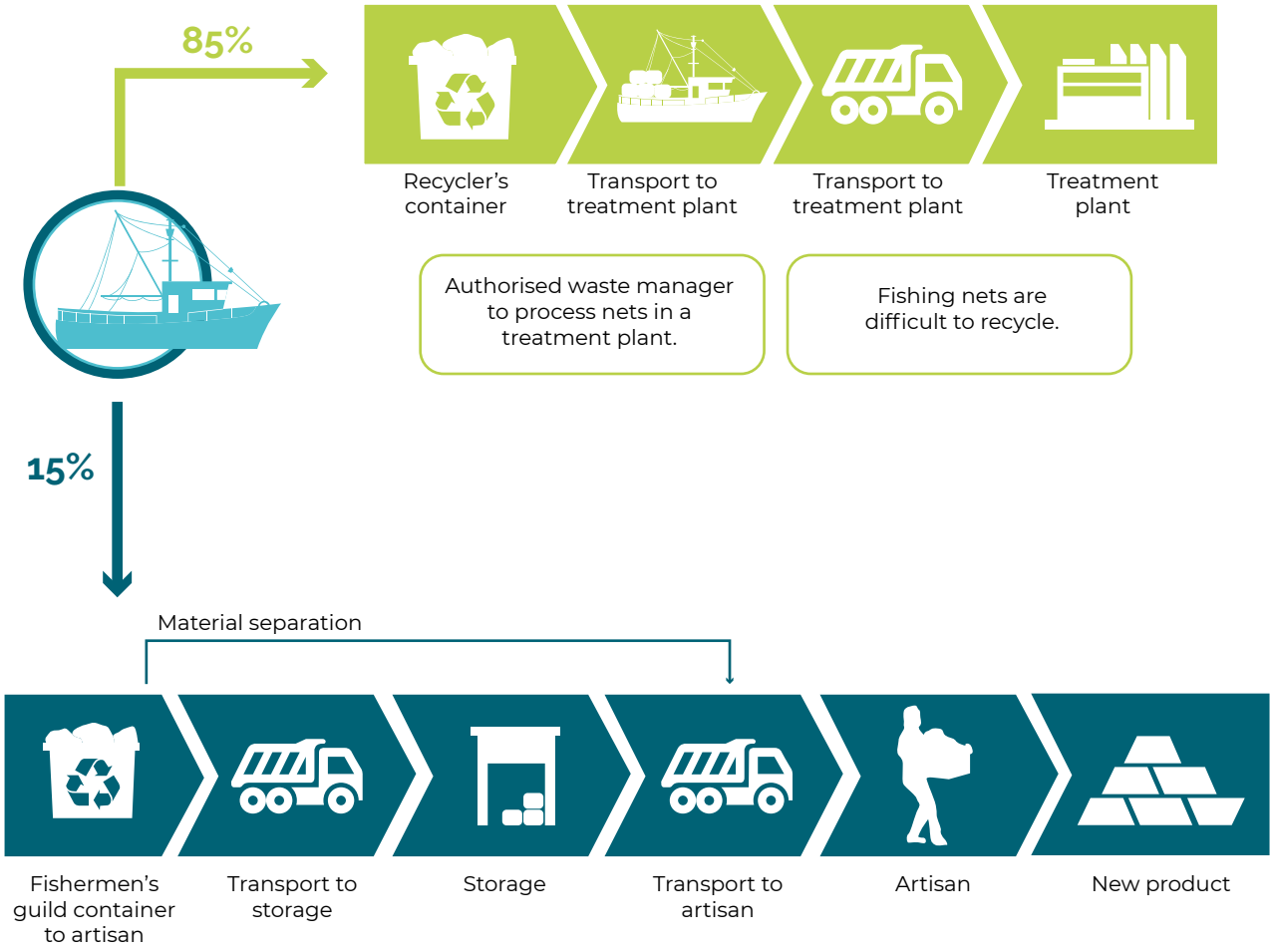
Source: Plastic Waste Free Islands. Proof of concept: waste to product. Cyprus.

Case 3. Artisan value chain

The Plastic Free Menorca Alliance has been working to reduce the impact of ghost fishing from discarded fishing nets, which amount to about 700 nets per annum.

A new value chain will recycle about 15% of these nets into a stylish lampshade made on the island by local artisans, creating jobs and supporting family incomes. This is a first circular economy product, with more anticipated in the future.

With our proposal the situation changes to...



Note: Menorca Preservation and PFM are aiming to identify further products to be developed with the aim to increase the % of nets re-used.

What stakeholders have to say

"For us, this challenge has meant being part of a project that aims not only to take care of our land, but also to use a material that has been very important for the livelihood of our people for many years; committing to respond to an environmental problem by giving it a second creative, lively, conscious and beautiful life. Being aware that the nets are used in our handicrafts has allowed us to contribute our grain of sand in the reuse of a material that is so much our own."

Caramuixes, craftswoman from Menorca.

"Menorca, due to its geographical characteristics and its socio-administrative structure, is a perfect place to implement collaborative pilot projects. In a small territory like our island, collaborations are essential to find real solutions. For this reason, the participatory process followed in the stakeholders' workshops to define the manuals of good practices and the Action Plan or the process followed for the new product proof-of-concept have been vital to achieve the objectives and to involve the local actors, by making them feel part of the solution. From our side, we value very positively how the pieces of the puzzle have come together to turn this idea into a reality: finding solutions for discarded fishing nets. Thank you for giving us this opportunity."

Eva Marsinyach, Observatori Socioambiental de Menorca - OBSAM.

"This project allowed us to cooperate with other organisations to find solutions to the plastic waste problem in the fishing sector. The results have shown that it is possible to valorise certain waste and give it new applications. The reuse of this waste generates direct benefits for the environment and for the whole community."

David Doblado, Associació LEADER Illa de Menorca)

"We believe that the project contributed to raising the awareness of the big plastic pollution issue in the Mediterranean. The combined effort of all the stakeholders in the tourism, waste management and fishing industries, under the guidance of IUCN and with the support of the Deputy Ministry of Tourism, the Fisheries Department and the Department of the Environment, brought only positive results."

Philippos Drousiotis, Cyprus Sustainable Tourism Initiative – CSTI.

"The Plastic Hotspotting Assessment in Cyprus and its outcomes were key to address the plastic pollution threats and solutions with the decision-makers and involve all the relevant stakeholders to tackle the issue. The results of the project contributed to the development of new research proposals by collaborating with various local and international institutions that will help tackle the issue even further."

Andreas Angeli, Together Cyprus.

Blueprint

The lessons learned from this project and other initiatives around the Mediterranean have been assembled into a 'blueprint' – a model of action that can be replicated in other islands to manage plastic waste more effectively, improve the environment, protect the economy, and even create jobs! Best practices and actions have been group in the following categories:

Assemble allies & Mobilise: bring people together in a community of practice to focus, coordinate and collaborate.

Experimentation & data collection: collect and analyse data concerning the sources of plastics and their impacts.

Reuse & find alternatives to plastics: eliminate single use, give second life to plastic and develop alternatives to limit the production and/or use of plastic.

Recommendations & new regulations: develop and implement action plans and new regulations concerning plastic.

Improve waste management: improve systems to collect and process plastic wastes.

Spread the word: raise awareness amongst both the public and institutions concerning the sources and consequences of plastic pollution.

Capitalisation activities: organise technical sessions, transfer workshops, etc. to put lessons learned into practice.

Conclusion

Plastic pollution is a complex issue, and it requires stakeholders at different levels to join forces to address it in a holistic and meaningful manner.

There are currently many efforts and initiatives being developed and carried out to curb plastic pollution in the Mediterranean at regional, national and local level.

The contribution of the PWFI Med project has been in tackling the problem at source, improving the current knowledge on plastic leakage and fostering the sharing of lessons learnt and insights among the several organisations and actors working across the Mediterranean basin to close the plastic tap.

Links to the main publications and resources

- National Guidance for Plastic Pollution Hotspotting and Shaping Action
- Plastic hotspot assessment report Cyprus
- Plastic hotspot assessment report Menorca
- Legal and policy assessment Cyprus
- Legal and policy assessment Menorca
- Economic assessment Cyprus
- Economic assessment Menorca
- Policy recommendations Cyprus
- Policy recommendations Menorca
- Action Plan Cyprus
- Action Plan Menorca

INTERNATIONAL UNION FOR CONSERVATION OF NATURE

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