

Case study:

Integrated Waste Management

Mersing Islands, Malaysia

August 2022





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Integrated solid waste management good practices to prevent plastic marine litter in the East Asian Seas region

Case Study in the Mersing Islands

With support from the **US Environmental Protection Agency (USEPA)**, the **Coordinating Body on the Seas of East Asia (COBSEA)** is compiling good practice case studies on integrated waste management for the prevention of plastic marine litter in the East Asian Seas and supporting pilot demonstration activities in selected COBSEA participating countries. Measures aim to reduce waste and illegal dumping, improve collection and recycling, engage the informal waste sector and local communities, and address riverine flows of marine litter with a focus on land-based sources of plastic pollution. The COBSEA Secretariat coordinates with relevant regional organisations and initiatives to promote knowledge sharing and coordination.

COBSEA implemented a pilot integrated waste management system through its partner **Reef Check Malaysia**. Local stakeholders were trained on plastic use reduction and waste separation to facilitate recycling. The pilot project also included the purchase and installation of a plastic compactor machine and a simple disposal and sorting infrastructure, so that recyclable materials can be processed and taken to the mainland for recycling.



CASE SUMMARY

The pilot implemented in the **Mersing Islands, Malaysia**, attempted to overcome challenges faced by small, remote islands through capacity building; education and awareness; training and investment in essential infrastructure and equipment; and establishing long-term financial support for the transportation of recyclables. The pilot has started to diminish pollution of the marine environment around the four islands by implementing household segregation of waste and a processing and transportation system.



Location

The Mersing Island archipelago is situated off the east coast of Peninsular Malaysia. The project will be implemented on four of the inhabited islands.



515
inhabitants



22
tourist resorts



Focus Area

- Reuse/ prevention
- Recovery
- Collection & segregation
- Sorting
- Recycling/upcycling
- Data collection/monitoring



Timeframe

Mid May – End of August 2022

During the establishment of the pilot, resources were utilized to find long-term support for the transportation of recyclables to mainland.



Background

Mersing is a district located on the north-east coast of Johor, positioned on Malaysia's south-east coast facing the South China Sea. The District has diverse natural wonders, including long stretches of untouched mainland coastal beaches, mangrove-lined rivers and uncrowded rainforest reserves.

The Mersing Island archipelago off the coast is near pristine and biologically diverse. The islands' economies are primarily based on tourism and fishing, with the leading tourism destinations being Besar, Sibul and Tinggi. Each island has a hybrid solar/diesel generator to power local villages; resorts have their own electricity generator. Fresh water is from sources on the island; there is no integrated sewage treatment, with most households and resorts relying on simple septic tanks or soakaway systems; there is no municipal waste management service, and there are no public transport services.

Five of the islands are inhabited (only four are within this project's scope), all with populations under 200. The islands are tourist destinations, adding to the waste disposal burden. The combination of small local populations and distance from the mainland has resulted in a situation where the local council cannot provide waste management. Domestic and resort trash is therefore mainly disposed of locally, resulting in some ending up in the ocean, adding to the broader marine debris problem.



Activities

The project comprised the following activities which were carried out by Reef Check Malaysia who was established on the islands:



Step 1 Education

1. **Awareness raising:** Reef Check Malaysia worked with village leaders who approved different awareness raising activities. This included
 - a. Visiting households at determined times to present the new waste disposal system and encourage residents to join the initiative.
 - b. Visiting the local school and working together with the teachers to involve school kids in waste segregation.
 - c. Soap-making workshop to reduce single use plastics.
 - d. Beach cleanup.
 - e. Participating in local community WhatsApp groups to send explanatory and educational videos to clear doubts and continue to encourage villagers to segregate their waste.



Photo 1: Engagement with community to discuss approach to managing the recycling programme.



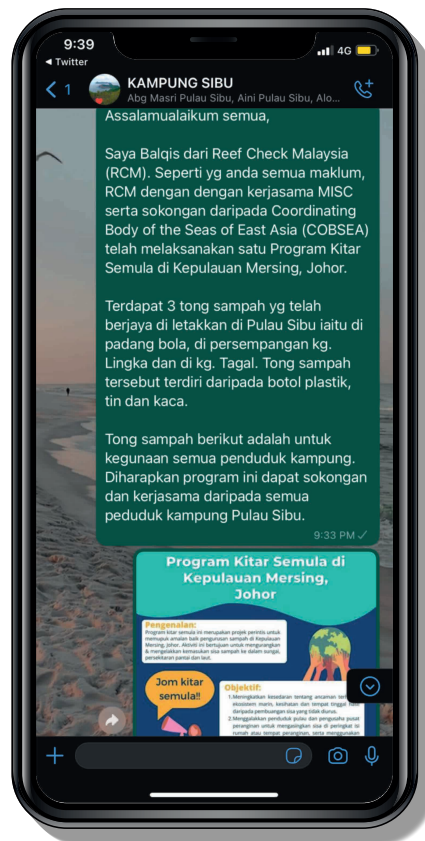
Photo 2: Workshop with local women to make soap from used cooking oil



Photo 3: Awareness programme with school students.



Photo 4: Beach clean-up with school students to raise awareness on marine litter.



Raising awareness through WhatsApp and Facebook

Step 2 Separation Waste



2. Establish waste segregation: Reef Check Malaysia worked with village leaders who approved and helped getting government approval for the establishment of the segregating system.

- a. Simple segregation bins were built and tested on the islands.
- b. Once the prototype was improved, villagers were formally invited to segregate recyclables, non-recyclables and organic waste and dispose it in these bins.

- c. Bins were placed at strategic locations around the villages on the islands, each serving several households.
- d. Individuals from each community were appointed to manage the waste segregation, collecting segregated waste regularly.



Photo 5: Recycling bins built by the local community.

Step 3 Collection



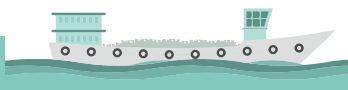
3. Waste transfer/recycling:

- a. Once the approval from the government was received, a waste transfer facility was built on Sibu Island. Sibu has the largest local population.
- b. The transfer station was equipped with waste handling, sorting and storage facilities.
- c. A baling machine was installed to crush plastic, reducing volume for more accessible transport to the mainland.



Photo 6: Storage facility for collected recyclables to be transported off the island.

Step 4 Transportation



4. Sustainable funding:

Transportation off the island, is the highest cost and it cannot be internalised, so it needs a funding model. A model can be that the communities work with tourism operators and then they cover the costs of transport. Or that the local government supports transportation through municipal government funding or through a waste management fund fee charged to tourists. For this, Reef Check Malaysia did the following:

- a. Met with local resorts to invite them to sponsor the transportation of recyclables to the mainland.
- b. Met with the local government to discuss the possibility that they cover the costs of transportation through different budget lines.



Photo 7: Meeting with local government to discuss post-project funding options.

Stakeholders involved

The key stakeholders in the programme were the island communities, on whose cooperation success depended. Strong village leadership made this easier to achieve.

State and municipal government agencies provided permits for operating waste management facilities on the islands. They are also key stakeholder consultations relating to long-term sustainable funding for waste management on the islands.

Finance

With support from the US Environmental Protection Agency (USEPA), the Coordinating Body on the Seas of East Asia (COBSEA) partnered with Reef Check Malaysia to implement the pilot in the Mersing Islands.

Co-funding for related activities is provided by MISC which is supporting conservation work in the Mersing Islands through Reef Check Malaysia in a five year project.

In the longer term, tourism operators or the municipal government are expected to contribute to the cost of transportation of recyclables to mainland as this is too high for the sale of recyclables to cover it.

Impact of activities

The project's immediate impact is to improve the cleanliness of local village and beach areas by reducing the amount of plastic discarded or otherwise released into the environment. This is relevant to sustain tourism activities which are important for sustaining the economic activities of these resorts.

In the medium term, this will contribute to an improved physical environment for tourism, securing livelihoods in the future.

The longer-term impacts of the project will see a reduction in pollution of marine environments, including coral reefs, seagrass beds and mangroves. This will reduce impacts on the functioning of these ecosystems, thereby protecting ecosystem services and potentially reducing plastic entering the food chain.

Communities

There is an increased understanding and awareness of the impact of human waste. This causes a shift towards more sustainable practices for residents in general and for tourism operators.

Workers involved in the creation of the waste sorting facility improved their income. Waste collectors and processors are being paid for their contributions, improving their livelihood.



CASE LEARNING



Why is it good practice?*

*See criteria in Appendix

The approach adopted in this project has several strengths:

- The waste management concept is locally driven, having been adopted by the local island communities, resorts and other relevant stakeholders. Furthermore, it has demonstrated coordination across stakeholder groups.
- Local stakeholders and the private sector have been closely involved in the project, from initial concept to implementation.
- The project will achieve significant economic impact by improving local tourism and reducing threats to ecosystems posed by marine litter, particularly plastics.
- The project was designed in a way that takes into account local social and economic conditions. The various island communities have different waste management needs, which was incorporated into the project implementation.
- The approach adopted was based on experience on three other small, remote islands, on which a similar waste management problem was addressed.



Success factors

- The pilot was integrated into an ongoing, long-term programme addressing various environmental challenges in the islands, including coral reef and seagrass conservation. As a result:
 - ▶ A Body of knowledge on local stakeholders had already been developed and was used to implement this project.
 - ▶ This programme included a consultation process which resulted in the need for an integrated waste management system and which further helped to ease communication and acceptance of the project.
 - ▶ A project team was already in place, with good relationships with stakeholders. This made the communication of the goals of the project more manageable.
- The local chief became a local champion of the pilot and ensured local and governmental permits were expedited.
- Although these islands are remote, they are still close enough to mainland for transportation to be feasible.
- The system implemented is simple, easy to understand and did not require expensive tools or machinery. This also means that the machinery will be easily fixed and maintained.



Overcoming barriers/challenges

What were the main barriers/challenges to delivery?	How were these barriers/challenges overcome?
<ul style="list-style-type: none"> Permits to establish integrated waste management system 	<p>The project had to be implemented in a very short timescale, good stakeholder relationships previously established were key to overcoming challenges related to public and government pilot approval.</p>
<ul style="list-style-type: none"> Disrupted international supply chains 	<p>Covid-related supply chain disruptions caused delay to delivery of key equipment; flexible project design allowed us to implement other components while waiting for the equipment to be delivered.</p>
<ul style="list-style-type: none"> Long distances between islands increase logistical challenges 	<p>Finding ongoing, long-term funding is essential to cover the costs of transportation between the islands and also to mainland as transportation costs are higher than the revenue obtained from the sale of recyclables. Effective planning of project activities to ensure integration is essential to reduce logistical challenges.</p>
<ul style="list-style-type: none"> Limited project management skills among local communities 	<p>The project relied on local communities for implementation of some aspects, including construction of a waste transfer station and deployment of bins. Good project oversight, continual communication and mentoring help to minimize the impact of this lack of capacity. Effective planning of project activities to ensure integration is essential to reduce logistical challenges.</p>
<ul style="list-style-type: none"> Institutional 	<p>Local institutional weaknesses created some difficulty in securing land-use permits for construction of waste transfer stations. This was overcome through good local stakeholder relationships.</p>



Lessons learned

A detailed understanding of the local political, legal and cultural context is essential to success, for instance, to secure a permit to use the land to develop the waste transfer station. Projects take more time when working with small communities in remote locations. It is important to establish strong long-term stakeholder relationships for long-term success. This should not be underestimated.

This model requires ongoing, long term funding as the sale value of the recyclables does not cover the operation costs, especially the transportation costs. It was important to include funding for continued transportation of waste beyond the timeframe of the project to allow for the establishment of other ongoing funding mechanisms.



How to replicate this practice

Bearing in mind the challenges this project faced with a restricted timescale and lack of capacity at the local level, the practice can readily be replicated in other areas that have similar socioeconomic status:

- Distant from.
- No existing waste management system.
- Limited funding for infrastructure development.



Realistic timescales.



Establishing strong stakeholder relationships before starting the design and implementation of the pilot.



Stakeholder and community consultation to understand needs.



Political support.



Sufficient capacity building and door-to-door awareness raising.



Simple machinery that requires no or little electricity and managing capacity.



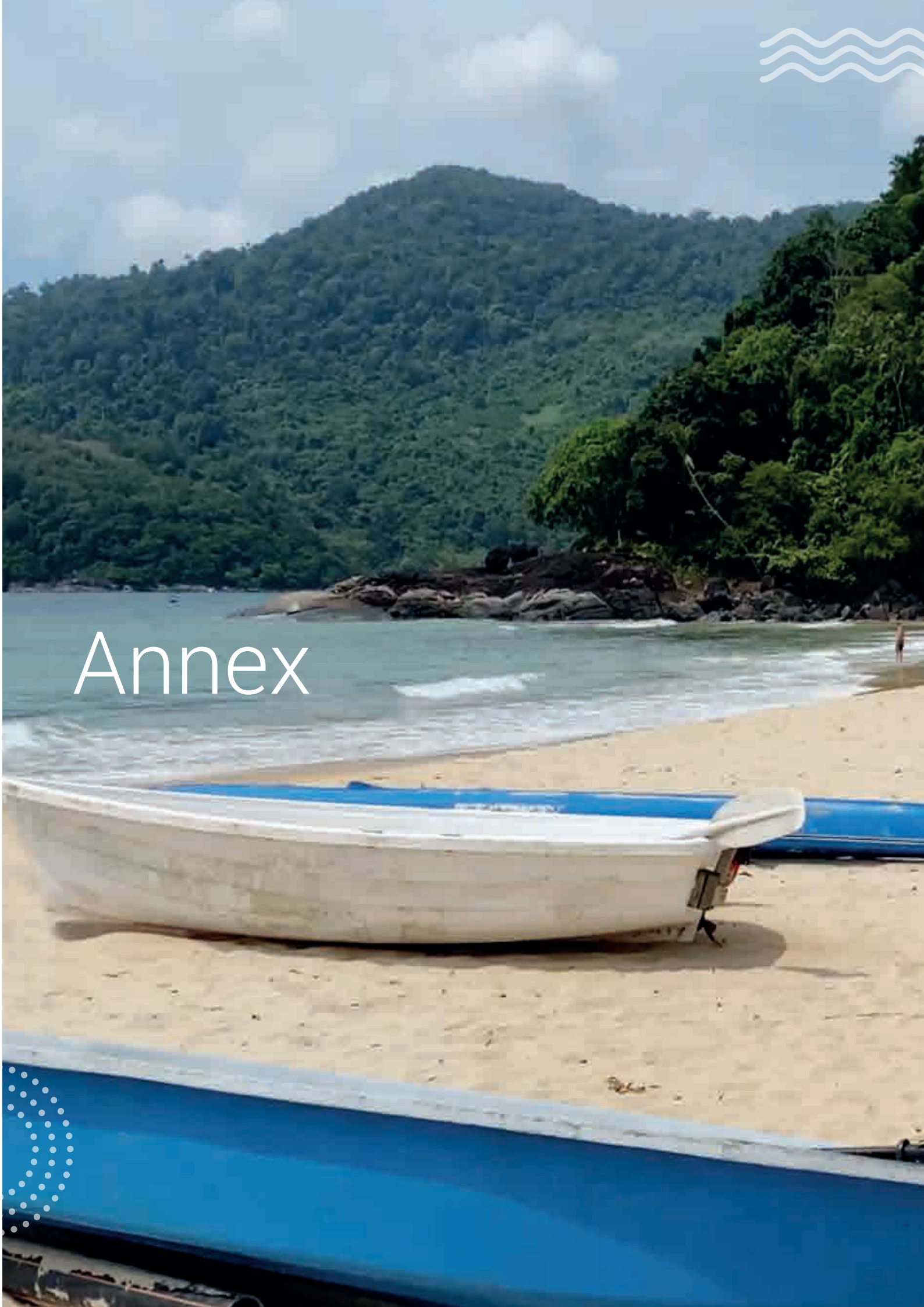
Financial support for several months after establishing the system to encourage either tourism or government to commit long-term funding.

Contact for questions on replication:

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Annex



ANNEX 1: Good Practice Criteria

1	Country/locally driven process, linked to existing processes, national/municipal/city strategies and measures (e.g. inclusion of priority sectors and social, environmental, and economic development goals).
2	Commitment and leadership at high political level (such as mayors).
3	Coordination across different key ministries/agencies (e.g. finance, environment) with clear mandates and dedicated resources available/mobilized.
4	Involvement of stakeholders and partners across sectors (including the private sector and civil society) and aiming to build consensus amongst them (incl. stakeholder analysis).
5	Long-term vision combined with clear definition of short and medium-term policy goals, targets, and underlying measures, documented in an implementation strategy/plan.
6	Aims to achieve significant environmental impact, including consideration of risks and adverse effects, toward reduction and prevention of marine litter prioritizing solutions at the top of the waste hierarchy, incl. clear tracking and quantification of impacts against a baseline.
7	Consideration of economic viability, based on sound business models (incl. consideration of an exit strategy) and clear indication of costs and identification of sustainable funding sources (incl. consideration of long-term funding), including incentives for investments.
8	Consideration of social and economic impacts, risks and benefits, including consideration of environmental and human rights of vulnerable groups, potential livelihood opportunities, and effective participation mechanisms.
9	Balance of different interventions including e.g. economic incentives, capacity building measures, information systems and technology deployment and use, as needed.
10	Evidence-based action, using reliable data/information (e.g. waste/material flow analyses, assessment of waste leakage hotspots, marine litter monitoring) and based feasibility analysis of the situation/problem, impact potential, costs and benefits, gaps and needs.
11	Dynamic process including a mechanism for periodic review, stakeholder feedback, adjustment and reporting, as relevant.
12	Evidence of peer-to-peer knowledge exchange and learning.



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