Best practices for marine litter reduction in the EU

CleanSea partners catalogued and evaluated the potential of voluntary institutional arrangements, understood here as good and best practices, in reducing marine litter in the four European regional seas. Good practices were defined in this study as those arrangements that have proven to be effective in delivering a contribution to marine litter reduction. Best practices were defined in this study as those good practices that demonstrate social, technological and/or institutional innovation in a specific category of the waste hierarchy. Understanding good and best practices and their conditions for success can help Europeans achieve litter-free seas.

A novel approach
Three aspects were new about this study. First, it targeted good practices along all stages of the marine waste hierarchy of: (1) prevention, 2) redesign and/or reuse, 3) recycling, 4) collection, 5) clean-up, and 6) awareness), paying particular attention to upstream initiatives where most information is lacking. Second, it used innovation as the defining criterion for best practice examples. Third, it represents one of the first systematic efforts to understand the potential impact and conditions of success of selected best practices in a comparative fashion, by sharing a common research protocol among partners in the four European regional seas.

Best practice selection criteria
On the basis of literature and web research, stakeholder workshops and interviews with selected actors, a total of 134 good practices for marine litter reduction were identified, 49 of which were assessed as best practices on the basis of the following three innovation criteria:

- **Technological innovation**, or stimulating modernization and disruptive shifts in the engineering sphere, e.g. advanced plastic recycling techniques;
- **Institutional innovation**, or creating new institutional structures to reflect new ideas and practices, e.g. specialized institutions addressing waste management concerns and sector-led initiatives fostering the circular economy;
- **Social innovation**, or enacting change regarding how the social environment functions, e.g. repair cafés.

Best practices throughout the waste hierarchy
Taking the waste hierarchy as a starting point, the analysis showed that awareness raising and clean-up activities are the most frequent both in good and best practice examples. However, we also observed a relatively large number of collection (including treatment and incineration of waste) and, more importantly perhaps, redesign initiatives in the 'best practices' category in relation to those identified in the 'good practices' category, suggesting a trend towards innovation in the earlier stages of the waste hierarchy.

Nine best practices were selected to be analysed in more detail in order to further understand their contribution to marine litter reduction (Table 1). The following selection criteria were employed:

- (a) best practices should cover collectively all the different stages of the waste hierarchy; and

- (b) best practices should represent collectively a mix in terms of institutional maturity, ranging from very recently implemented practices to those that have a longer implementation record and are embedded in existing institutional structures.

Major features in the analysis included the ambition of targets, the number and type of actors adopting the particular initiative or practice, the institutional capacity, the monitoring and compliance methods, and synergy or competition with public regulation.

Table 1. Nine selected best practices to reduce marine litter in North East Atlantic, Baltic, Mediterranean and Black Sea regions.

GREEN DEALS	Agreements made between national governmental agencies, companies and civil society organisations to carry out marine litter reduction measures in the sectors of shipping, fisheries and beach recreation in the Netherlands.
COURTAULD COMMITMENT	A voluntary agreement aimed at improving resource efficiency and reducing waste within the retailing sector in the United Kingdom.
PLASTIC FREE ISLAND OF JUIST	New means of marine litter collection, combined with cleaning up and awareness raising in Germany.
FREE PORT RECEPTION FACILITIES	An incentive for ships to discharge their waste at port in order to reduce illegal dumping of sewage and waste at sea in Sweden.
MARINE CLEAN	Design of new products aimed at reducing marine litter, including: equipment for collection of marine litter, edible and biodegradable packaging in Lithuania.
CADAQUÉS DEPOSIT-REFUND SCHEME	Deposit-refund scheme applied to the collection of single use beverage containers in Spain.
MOTRIL FISHING WASTE MANAGEMENT SYSTEM	Comprehensive waste management system at port, involving fishermen and particularly focused on removing litter from the seabed in Spain.
PAY AS YOU THROW PRICING SCHEME	Incentives for reducing waste and landfilling, and increased recycling of packaging and e-waste, through a system of weighing household waste in Greece.
NESSEBAR MUNICIPALITY	Prevention, collection and awareness raising in a coastal municipality in Bulgaria.

Success factors for marine litter reduction practices
The analysis resulted in five conditions for success that need to be taken into account in the design of practices aiming to address environmental challenges in general, and marine litter, more specifically (see also Figure 1):

First, ambition of practices is relative and, therefore, **targets** need to be set and evaluated, taking into account the national and regional political and socio-economic context. For example, in places where environmental regulation and implementation has been consistently problematic, the mere implementation of relatively less stringent targets can be considered ambitious in itself.

Second, the establishment of **monitoring and compliance mechanisms** is important particularly as initiatives grow, become more heterogeneous, and run the danger of free riding behaviour. In this context, the education and training of personnel responsible for overseeing the implementation of the relevant practice, and the related investment of resources is essential.

Third, the adoption of practices by a **'critical stakeholder mass'** both in terms of numbers as well as in terms of market share is indispensable for the success and upscaling of best practices. In this context, clear financial and environmental benefits appear to entice broader and more committed stakeholder involvement. However, financial incentives are not the sole answer towards achieving marine litter reduction. Indeed, social recognition and a sense of ownership of the practices implemented are fundamental elements of success due to reputational and personal satisfaction benefits which may act as powerful social incentives towards behavioural change.

Fourth, the **role of government** is pivotal in the success of best practices through the provision of targets in the context of broader regulatory frameworks, but also in terms of providing resources for organisation and networking activities, and even financial support in some cases. Indeed, none of the nine best practices examined in this study would have been successful without support by the relevant public actors.

Fifth, a **level playing field** within and across the EU regions is necessary to avoid the creation of waste havens in places with less stringent environmental regulation and fewer best practice initiatives. Thus, while ambition is context-specific and needs to be taken into account in policy-making, forward looking policy should simultaneously strive for the creation of more equitable conditions across all regions in order to be successful.

1. Design practices that are ambitious while acknowledging that ambition is relative depending on the national and regional political and socio-economic context.

2. Ensure that monitoring and compliance mechanisms are in place particularly as initiatives grow and become more heterogeneous.

3. Entice the adoption of the relevant practice by a 'critical stakeholder mass' via the provision of not only financial but also social incentives, such as recognition and ownership.

4. Acknowledge the pivotal role of government in the success of voluntary practices through the provision of sound regulatory frameworks, as well as organisational and financial support.

5. Ensure a level playing field within and across regions by supporting the development of more and better practices in regions that are currently lacking them.

Figure 1. The five CleanSea success factors for marine litter reduction.

Discussion

Some conditions may be easier to meet than others. For example, conditions that relate more to design characteristics of the practices themselves, such as the ambition of targets of an individual practice, may require less effort and coordination in relation to those which demand structural changes. This refers in particular to the creation of a level playing field which would allow for the implementation of practices with similar ambition within and across EU regions, such as the transfer of knowledge as well as the provision of organisational and financial incentives and support. Yet, conditions interrelate and the absence of one may jeopardise the success of another. Indeed, an ambitious practice that is not sufficiently monitored may fail to be implemented successfully. Likewise, an ambitious practice adopted by a limited number of actors is unlikely to institute change. Furthermore, unless widely adopted, a few well designed practices in some countries and regions in the EU may serve as showcases of what it is possible but will fail to result in durable marine litter reduction. In short, all conditions are considered equally important. Policy makers should strive to satisfy them simultaneously in their effort to design and support practices that aim to reduce marine litter in the EU.