



Project
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Towards Ecosystem Conservation and Sustainable Artisanal Fisheries in the Mediterranean basin

Guidelines

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The main aim of the ECOSAFIMED project is to promote sustainable artisanal fisheries and the conservation of the Mediterranean seabed. After two years of study in six different maritime areas of Spain, Italy and Tunisia, the project offers, as one of its main results, a set of guidelines to make artisanal fisheries activity more sustainable. These results have been reached after analysing the data from the oceanographic surveys, where the seabed has been filmed, and from direct observation during on-board surveys with fishermen. In this regard, the impact of selected *métiers* over benthic communities has been assessed. These are the 10 recommendations addressed to fishermen, public Administration and scientific bodies to reduce the impact of artisanal fisheries on the seabed:

1. Avoid fishing in areas where fragile communities have been detected

Black corals and gorgonians represent the most important habitat-forming benthic species of the Mediterranean Sea. Due to their longevity, slow growth rates, limited dispersal ability, and possibility to enhance biodiversity levels of the benthic community, they are considered fragile and vulnerable species. When they are detected, due to the capture of large benthic species or huge quantities of habitat-forming species, scientific experts should be informed and fishing gears no longer deployed along the same track and in the nearby area. This is particularly relevant when exploring new fishing grounds. Furthermore scientists should be supported to map the extent of such important habitats in order to provide the spatial information to fishermen.

2. Promote the inclusion of fishermen's knowledge in scientific studies and monitoring activities

The long experience of fishermen is a source of information of enormous value. Their reporting on extraordinary captures, occurrence of rare species and large animal forests and species of considerable size helps to increase our limited knowledge on the seabed, as well as to identify high valuable sites where to establish Marine Protected Areas. Experts may provide the fishermen with photographic charts of the most common and valuable species occurring in the bycatch to be used on-board for a first identification. This information also represents a way to transform the fishing activity into an opportunity for collaboration. Networks of fishermen-cooperatives-experts-managers should be established to keep trace of valuable discard species.

3. Return in water the benthic discard in less than 30 minutes and avoid as much as possible discard

Experimental evidences (targeting the gorgonian *Paramuricea macrospina*) highlight that the survival of accidental captures increases up to 85% if the colonies are returned to the sea in less than 30 minutes. For the same reason, it is important to avoid damaging and crushing of branched or three-dimensional organisms (such as bryozoans, sea urchins, gorgonians, sponges...) during the cleaning operations to reduce their

fragmentation and enhance their recovery. Particular attention should be posed to the gorgonians coming onboard with their own support (such as a rock): experimental data suggest that, when returned to the water, the probability to fall on the sea bottom in the upright position is 90%, reducing the possibility to be covered by sediment and enhancing their chance of survival. It may be concluded that the survival of accidental captures of benthic species increases if they are returned as soon as possible to the sea so as to reduce their exposure to air and heat.

4. Return the benthic discard in the same location where the gear has been hauled

Complex marine benthic communities are heterogeneously distributed on the sea bottom according to environmental conditions. Gorgonians and black corals, representing the most important habitat-forming benthic species in the Mediterranean Sea at a depth of 50-200m, are known for their slow growth rates as well as their limited dispersal ability and tendency to form aggregations on the sea bottoms. Returning the benthic discard species in approximately the same area of collection increases the probability that they fall back in their original area of distribution, where environmental conditions are optimal for their growth, therefore enhancing their survival rate.

5. Pursue the establishment of Marine Protected Areas or fishing restriction zones to protect the identified valuable ecosystems

The most efficient way to guarantee the protection of valuable and fragile benthic identified ecosystems is their declaration as Marine Protected Areas with specific regulations to curb negative impacts on these ecosystems or areas with some level of restriction for fishing activities. These are not necessarily widely geographically extended as they may only enclose specific populations of important species. In case the explored areas are already protected or their designation is in progress, data coming from the ECOSAFIMED experience should be included in the decision making.

6. Promote the use of more selective gears and more efficient materials

Experiments show that the type of gear plays an important role in the magnitude of the impact. The selection of more efficient materials, such as multi-monofilament trammel nets (MMF) over polyamide ones, carefully used over maërl bottoms, reduces by 64% the capture of substrate. It is very important to promote studies to develop more selective and less impacting gears and then encourage fishermen to use them.

7. Decrease the fishing impact by reducing the number of sets of nets in the same site over a single season

The impact of fishing nets is accumulated in each fishing operation if the gear is deployed in exactly the same place repetitively, for the entire fishing season. A good practice is to reduce the number of fishing operations in the same place. The maximum number of repeated operations in the same fishing track conducted on maërl bottom with trammel nets should be defined depending on the gear, the site and its conservation status, and a significant reduction is always suggested.

8. Decrease the fishing effort by reducing the length of the fishing sets of nets

The most productive habitats (coralligenous outcrops, rocky areas and maërl habitats) show a typical patchy distribution over limited rocky areas surrounded by sandy bottoms. Remotely Operated Vehicles (ROV) surveys showed that the length of a trammel net for decreasing the impact should be between 500 and 800 meters length to make fisheries activity and seabed conservation compatible. This minimizes the undesirable impact on habitats and the possibility for the portions of the nets exceeding this length to remain entangled. Adaptations of this "optimal length" should be made depending on the gear and the site, and a significant reduction is always suggested.

9. Promote the regular mending of fishing nets

One of the factors that increases the contact surface between the seafloor and demersal fishing nets like trammel nets, is the loss of the buoys line, that weigh the gear and keep the net anchored in an upright position on the sea bed. The loss of the line enhances the possibility for the net to fall on the rocks hence to entangle the benthic organisms. Also, lost pieces of nets easily remain entangled on arborescent organisms, as demonstrated by ROV footage. Avoiding the presence of damages in the nets reduces the probability for the gear to come in contact with the benthic species.

10. Promote best fishing practices with easy, straight-forward and good quality video footage

"An image is better than thousands of words" This captures the essence of this recommendation. Straight-forward video footage, visually showing the scientific backgrounds to some statements (such as the occurrence of lost gears, the survival of discarded species, the status of the returned organisms in the water), obtain a much higher attention and a much more positive response than any technical report or graph. Video footage therefore should be considered as a priority communication tool and a key element to propose recommendations.