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MEDAC discussion paper

Maximum Sustainable Yield (MSY) in Mediterranean fisheries management. Some food for thoughts

During the WG1 meeting, held on 16th April, the scientific expert Fabio Fiorentino was invited by the MEDAC to present a communication entitled: "Maximum Sustainable Yield (MSY) in Mediterranean fisheries management. Some food for thoughts" the aim being to provide a better understanding of the critical issues surrounding current stock assessment activities, as well as proposals for assessment techniques to supplement the scientific information currently available which underlies management decisions.

The observations which emerged from the presentation included the fact that MSY is sensitive to variations in temperature and climate as well as to trophic interactions; that it can differ among target species included in the same fishery activity (mixed fisheries); that one fishery activity may influence the targets of another fishery activity.
It was also observed that the stock assessments and the associated management decisions in the Mediterranean were based on monospecific maximum sustainable yield estimation (Hjort, Russell, Graham, 1930 *et seq*.), not considering trophic interactions among species, between different types of fishing gear and with the surrounding environment over time (Ricker, 1954 and 1975; Travers-Trolet *et al*., 2020).

The scientific experts consulted by the MEDAC (Fiorentino and Libralato, 2021) for the purpose of evaluating the best management strategies in the presence of mixed fisheries, as in the case of the Mediterranean, indicate the following methods:

- "Pretty good yield" (Hilborn, 2010 and Rindorf *et al*., 2017), the adoption of measures aimed at achieving a compromise between fishing mortality at the low end of the PGY F-range for less robust species and fishing mortality at the high end of the PGY F-range for more robust species;

- in the absence of trophic interactions between species, the application of effort reduction corresponding to the FMSY of the mixed fishery target species and the adoption of other management measures to protect by-catch species. Management measures could include areas closed to fisheries (Russo, 2019) or the improvement of selectivity (Vitale *et al*., 2018), thus endeavouring to improve the exploitation pattern (MareFrame Project);

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- In the presence of significant trophic interactions between species, the assessment and management actions should also take the results obtained using approaches which include interactions between species into due consideration.

The scientific experts underlined that the above mentioned issues related to MSY should be contextualised in the wider framework of the ecosystem approach to fisheries management, taking into due consideration the ecological, economic, social and institutional dimensions (Fiorentino, 2021).

The MEDAC acknowledges the fact that the fisheries sector needs to be steered towards the criteria which would ensure achievement of full sustainability, without delay. An ecosystem-based approach shall allow managers to take into account multiple factors, including those independent from fisheries, and provide tools to mitigate the impact that management measures adopted for target species have on other stocks, especially when considering mixed fisheries. Management strategies indicated in this paper, represent a basis for discussion within the members of the MEDAC to address the complexity of mixed fisheries.

Whatever the approach in managing mixed fisheries is adopted, managers should deeply evaluate the socio-economic impacts, when proposing management scenarios to stakeholders.

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