

## Theme session Q

### Integrating economic and social sciences in marine ecosystem services research

Conveners: Cristina Pita (Portugal), Tony Charles (Canada), Maria Grazia Pennino (Spain), Sebastian Villasante (Spain)

#### Introduction and background

The provision of marine ecosystem services (ES) and the well-being of people who rely on these services are being altered by increasing pressures as overfishing, eutrophication, climate changes, and pollution among others. The complex social-ecological interactions involved, the diversity of ES provided by marine ecosystems, and the possibility of abrupt changes, make necessary to understand the linkages between structure and functioning of the marine ecosystem and various human activities from local to regional scales. Indeed, there are diverse and competing interests for the multitude of uses for marine resources and where they occur in space. Therefore, common principles and broader management evaluation to ES use is needed as national activities may have trans-boundary effects on the whole ecosystem. In particular, policy-makers need to know the costs and benefits of ES to manage them sustainably, taking into account also the specific pressures, affiliated uncertainties, and risks. Long-term strategic management measures require the properly harmonization of ecological, economic, and social factors accompanied by overarching considerations of the appropriate governance to continue without degrading ES. This essentially requires the development and implementation of more comprehensive and holistic frameworks that will be able to understand, anticipate and analyse ecological, economic and social changes.

The main aim of the section was to enhance the development and implementation of frameworks able to integrate ecological, economic and social factors in marine ES research, particularly due to the high impact that these have in policy initiatives as the European Marine Strategy Framework Directive (MSFD), the Magnuson-Stevens Act in the USA, or the Fisheries Act in Canada.

#### The papers called for to the session were within the following topics:

- Understanding of differential impacts on marine ecosystems, marine sectors and coastal communities due to the implementation of high impact policy initiatives at different spatial and temporal scales.
- Multidisciplinary research tools and methodologies to assess the economic, social and institutional changes to deal with policy initiatives.
- The human dimension and stakeholder attitudes and perceptions toward policy initiatives concerning fisheries and ocean governance.
- International cooperation at the national and/or regional levels around social sciences and marine ES.
- Ecosystem services use and management through participative approaches;
- Modelling frameworks to conduct cost-benefit analysis of spatial planning scenarios for marine ecosystem services.

**Contributions to the session:**

Several contributions focused on ecological-economic or bio-economic models, more precisely about the development and implementation of integrated ecological and economic models used to deal with discards and the landing obligation, to define Marine Protected Area taking into consideration the economic relevance that these areas have for society, and to simulate different management scenarios for overexploited species in small-scale fisheries in Brazil. Other contributions focused on the issue of stakeholder participation in management and all reached the conclusion that it is difficult and unclear how to include information collected from stakeholders into a systematic approach.

Most contributions highlighted problems and difficulties encountered when doing social sciences research, as well as social science research needs, and problems that researchers have integrating social factors in a reliable modelling framework able to understand the dynamics of ES.

The papers and the resulting discussions highlighted several areas for further consideration:

- Despite the recognition of the need to include social factors into the evaluation of ES, there remains a need for a commensurate attention to social data collection and more efforts to integrate social science knowledge into ES research.
- The qualitative nature of social science data is (often) difficult to integrate into models, and the variability resulting from this type of data needs to be addressed.
- Most work tends to focus on provisioning ESs and the fishing activity, and there is a need for greater knowledge about other categories of ESs (such as cultural services), and other marine activities such as recreation and tourism.
- Researchers need to learn new skills to be able to collect and integrate different information (ecological, economic, social factors) in a standardized modelling framework, and it is necessary to define a priori what information is needed.
- Information generated through consultative and collaborative research has the capacity to lead scientists, local communities, and decision-makers to gain an increased appreciation of each other's contributions, and to better value and acknowledge the role of the social sciences.

**Concluding remarks**

The theme session and its presentations show that significant progress have been made integrating economic factors in marine ESs research, but also that further research is urgently needed in order to integrate social factors. In particular, some progress is being made to collect and analyze social data but the integration of these studies in a concrete framework is still missing.

We highlight the need to make it further explicit to policy-makers and researchers that the social sciences can contribute to improving both the ways that marine ES research occurs and its outcomes. On a rapidly changing and increasingly crowded planet, the legitimacy, saliency, robustness and effectiveness of ecosystem management decisions and actions will increasingly depend on rapid social learning and institutional adaptation based on multiple types of knowledge.