

TOWARDS SUSTAINABLE COEXISTENCE OF AQUACULTURE AND FISHERIES IN THE COASTAL ZONE

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Globally, coastal areas are subject to an increase in competing activities. Coastal fisheries and aquaculture are highly dependent on availability and accessibility of appropriate sites. Aquaculture production is increasing, whereas fisheries are at best stagnant. Coastal activities also include activities such as recreation, tourism, facilities for renewable energy production, all of which are expected to increase in importance. There is also increasing focus on Marine Protected Areas (MPAs). Thus, competition for available sites will probably increase, emphasizing the need for Marine Spatial Planning (MSP) and improved management tools supporting policies for space allocation along the entire European coastline.

Successful MSP is not likely to be achieved without a certain level of conflict, and without iterative adaptations in management actions. MSP is viewed as an essential part of advancing ecosystem-based management as demanded by the Marine Strategy Directive. The biological interconnectedness of fisheries and aquaculture is strong, with factors such as competition for space, disease transmission, genetic impact from escapees, availability of food for cultured finfish, and organic and inorganic waste management. Furthermore, the public perception of aquaculture in Europe and North America may be characterized by the view of aquaculture being a “new” and “unnatural” activity, whereas fisheries are viewed as “traditional” and “natural” (Bergh 2007). However, in an ecosystem-based

management context, both industries represent human activities strongly influencing, and influenced by, the environment.

Depending on where and how marine spatial management is applied it can have dissimilar impacts on the natural, economical and social environments (Pascoe et al. 2009). Conflicts between different activities could hamper development. In Europe, annual growth of aquaculture has declined to 1%. This is partly because of market factors, but also because the industry is subject to stringent regulation and sustainable development is a major condition. This means that the bulk of the projected thirty million tonnes of additional aquatic products needed to feed the planet by the year 2050, when the world population is expected to reach nine billion, will be cultivated outside Europe (Ferreira 2012).

Management of aquaculture and fisheries, as well as other uses of the coastal zone, should be considered integral parts with local variations in their respective importance. Since different activities advance towards dissent economic, environmental and socio-cultural objectives, conflicts occur when these multi-dimensional activities collide, according to different spatial contexts and institutional settings. The COEXIST project aims at outlining a process which avoids unnecessary conflicts or even enhances mutual benefits between different activities in the coastal zone. By means of using a transparent approach based on multi-criteria analysis (MCA), we characterize and establish priorities of future development and/or conservation in coastal areas. MCA is a useful technique to incorporate stakeholder preferences when evaluating marine spatial management and propose improvements (Soma 2010). Data are obtained from enquiring different groups of stakeholders in six different case studies from Europe's coastal zone, representing different complexity, and different natural and social conditions.

By definition, aquaculture implies rearing large numbers of animals of the same species in limited space. This favours the establishment and proliferation of pathogens, i.e. viruses, bacteria and parasites capable of exploiting the reared animals as hosts (Krkosek 2011). Diseases can be spread from wild to farmed animals and vice versa, emphasizing the importance of limiting the potential of such transfers (Johansen et al. 2011). Pathogens may be spread by wild organisms, escapees from aquaculture, transport of cultured organisms, transport of equipment or people, ballast water from ships or water currents. We are investigating how disease interactions particularly affect the aquaculture activities - and the environment - in contrasting case studies. Models are used to review and analyse pathogen transmission and spreading (Murray 2009) are applied, and strategies for disease control, such as fallowing (Werkman et al. 2011), are investigated. By definition, fallowing, and control with area management are key issues. A possible development is a coherent and transparent management of larger areas or regions, in contrast to the individual farm-based management seen in most of Europe today.

An aim of the project is to identify ways to adapt currently applied spatial management to integrate different forms of aquaculture and fisheries in the coastal zone, while taking into account other key users (e.g. tourism, wind farms, aggregate extraction, shipping) and future developments and exploiting mutual opportunities. Conflicts and synergies are equally important study areas, improvements should be sought through decreasing conflicts and increasing synergies. For each case study, the currently applied marine spatial management of coastal activities will be evaluated, and improvements proposed based on scenarios. The objectives are to:

- Evaluate the effectiveness of the currently applied marine spatial management of coastal activities in achieving aquaculture and fisheries specific objectives within the framework of sustainable development of coastal zones
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- Evaluate adaptations to the currently applied marine spatial management and planning process in achieving aquaculture and fisheries specific objectives within the framework of sustainable development of coastal zones
- Propose improvements to the currently applied marine spatial management and planning process that will benefit the aquaculture and fisheries sectors specifically, and within the framework of sustainable development of coastal zones, limit the potential impact on other users as well as exploit mutual opportunities

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