

Assessing the impact of fisheries on demersal resources using ecosystem-based indicators.

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Fishing has been pointed as one of the oldest and main anthropogenic pressures, having an impact on marine ecosystems. Fishing generates by-catch, discards and high grading, the latter being a routine practice in European waters. Existing management systems have been proven to be ineffective to tackle most of the underlying issues. There is a high degree of public awareness about the risks and consequences of overfishing and the need to manage technological innovations and economic incentives wisely in often sensitive ecosystems.

Fisheries management, mainly focused on single species, is shifting to an ecosystem approach to management (EAM) with the objective to sustain both healthy ecosystems and the fisheries they support. Sustainable fisheries are faced with socio-economic difficulties such as excess capital, fast technological progress, labour force redundancy and conflicts between groups of fishermen. In multi-stakeholder settings, different perceptions about spatiotemporal patterns in fish stocks and related activities are important but problematic as they elicit controversies and unbalanced disputes.

Our study will focus on the demersal (living on or near the sea-bottom) fisheries in two European marine regions with different ecosystem characteristics, the North Sea and the North-eastern Mediterranean. A generic set of SMART (Specific Measurable Achievable Relevant Time-bound) indicators relevant to the EAM will be selected and quantified in the two study areas to assess the pressure exerted on fishery resources, their state, the socio-economics of the fisheries, as well as the governance of the respective fishery systems. Hence, the effectiveness of existing management regimes will be evaluated and possible recommendations will be provided to stimulate action in improving pursuance of sustainability objectives.

The main target is to develop a generic set of relevant and meaningful indicators that may be applicable to different ecosystems as advisory tools contributing to sustainable fisheries management. New knowledge produced through this PhD project will constitute value added output in line with needs arising by high-level policies' (Marine Strategy Framework Directive, Common Fisheries Policy) objectives.

References

Bethan C., C.R. Smart, F.C. Neale, J.P. Hawkins, S. Newman, A.C. Milman and C.M. Roberts. 2011. Fisheries mismanagement, published online 21 October 2011, doi:10.1016/j.marpolbul.2011.09.032.

European Commission 2008. Communication from the commission to the council and the European parliament. The role of the CFP in implementing an ecosystem approach to marine management. Available online from: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0187:FIN:EN:PDF>.

FAO. 1999. Report of the meeting of FAO and non-FAO regional fishery bodies or arrangements. Rome, 11-12 February 1999. FAO Fisheries Report 597. Rome, FAO. 53p.

FAO. 2003. Garcia S.M., A. Zerbi, C. Aliaume, T. Do Chi, and G. Lasserre. 2003. The ecosystem approach to fisheries – Issues, terminology, principles, institutional foundations, implementation and outlook. FAO Fisheries Technical Paper 443. 71 pp.

Franquesa R. 2001. Methodology and use of socio-economic indicators for managing fisheries. OECD Fishing Committee, AGR/FI(2001)12/Part 1.

Jackson J.B.C., M.X. Kirby, W.H. Berger, K.A. Bjorndal, L.W. Botsford, B.J. Bourque, R.H. Bradbury, R.G. Cooke, J. Erlandson, J.A. Estes, T.P. Hughes, S.M. Kidwell, C.B. Lange, H.S. Lenihan, J.M. Pandolfi, C.H. Peterson, R.S. Steneck, M.J. Tegner and R.R. Warner. 2001. Historical overfishing and the recent collapse of coastal ecosystems. *Science* 293(5530):629-637.

Rijnsdorp A.D., N. Daan, W. Dekker, J.-J. Poos and W.L.T. Van Densen. 2007. Sustainable use of flatfish resources: addressing the credibility crisis in mixed fisheries management. *J. Sea Res.* 57(Spec. Issue 2-3):114-125.

Verweij M.C., W. van Densen and A. Mol. 2011. The tower of Babel: Different perceptions and controversies on change and status of North Sea fish stocks in multi-stakeholder settings. *Marine Policy* 34:522-533.