
Scenario-based modelling for management of Mediterranean forests: a review.

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Abstract

The number of studies aimed at understanding the complexity of ecological patterns and processes and their interaction with human societies has dramatically increased in the last two decades, but especially since the publication of the Millennium Ecosystem Assessment reports in 2003 and 2005. Integrative models and scenarios are key tools to disentangle this complexity, forecast the ecological consequences of current and future states of societal development and support well-informed decision making. But, what's the state of the art in the development and application of these tools?

We are conducting a review of the methods and scenarios in use for evaluating the future of biodiversity and ecosystem services provision in the context of forest systems across the Mediterranean basin. The review is framed within the international ERA-net Foresterra INFORMED project (INtegrated research on FOrest Resilience and Management in the MEDiterranean) that seeks to foster forest system resilience through biodiversity management (from genes to communities). Mediterranean forests represent a good example of biodiversity-rich and complex ecological systems, with a long history of human perturbations and management and currently threatened by ongoing global change. With our review, we aim to know which types of models are more widely used (correlative vs process-based) and how widespread is the implementation of integrated modelling approaches – those accounting for feedbacks across sectors (e.g. agriculture and forestry) and spatial scales within a single modelling framework. We also evaluate the prevalence of the use of multi-driver scenarios – those accounting for the simultaneous impacts of multiple direct and indirect drivers (e.g. climatic, land use, management) – and single-driver scenarios in literature. The overall goal is to understand the state of the art in how indicators of the state of Mediterranean forests are being developed/modelled, and to identify priority areas for future research.

Preliminary results show that the number of studies that focus on a single biodiversity or ecosystem service indicator, use a single model or scenarios based on a single-driver outnumber the more integrative studies. Our study will directly inform the currently-in-progress

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regional European and Central Asia assessment of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) on integrated assessment modelling and scenarios.

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