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Integrated assessment of forest ecosystem services to support forest management strategies: an experience from the Italian Apennines

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The role of ecosystem services (ESs) provided by European forests has been repeatedly recognized by several international initiatives and policy statements. In the objectives of Sustainable Forest Management (SFM) the maintenance and improvement of forest ES are included and their role in contributing to a green economy has been acknowledged. The maintenance and improvement of ESs provided by forest ecosystem must be done through an active involvement of the stakeholders in the decision-making process. This further emphasizes the need for integrated assessment approaches and incorporates local knowledge and requests into decision-making process.
Forest management strategies can generate a trade-off between ESs, especially when the relationships among ESs are not well known. In this view, the effects of forest management practices on ESs provision represent a key point for future development of many forested zones. This can also be seen as a new challenge to cope with a changing environment. Maintaining and balancing the ESs supplied by forests require an integrated approach able to evaluate biophysical, economic and social aspects simultaneously. In the international literature, two main approaches are used to assess ESs from the biophysical point of view: the first one is based on a qualitative assessment of ESs, using experts' opinion and stakeholders' evaluation; the second focuses on the quantitative assessment of ESs through field measurements of biophysical outcomes.
The aim of the present study is to assess the ESs provided by artificial black pine forests (Pinus nigra Arnold) under different forest management strategies, analyzing trade-offs and synergies that are generated. An integrated approach has been adopted, including stakeholders' evaluation and biophysical assessment. The study has been developed in the Pratomagno forest, in the Italian Apennines, characterized by a high demand for recreational and aesthetic opportunities. In order to improve the ESs provision in the medium-long period, two different silvicultural treatments (selective and traditional thinning) have been tested and the effect on five main ESs was assessed. Timber and bioenergy production, carbon sequestration, and biodiversity conservation were assessed using field data and in addition to the information provided by local forestry enterprises. Recreational and landscape values were assessed by means of a two-stage participatory approach. This was based on a preliminary stakeholder analysis followed by the investigation of the opinions of 200 stakeholders through the face-to-face administration of a semi-structured questionnaire. Analytic Hierarchy Process (AHP) method was used to identify the preferred forest landscape from the aesthetic point of view and Travel Cost method (TCM) to evaluate recreational value.
The comparison showed that the selective thinning is more suitable to enhances all ESs than the traditional thinning (from below). These studies help to reflect social interests and perceptions in ES assessment, to provide policy makers with information and to improve the understanding of the effect of management decisions.