

ECOLOGICAL PLANNING OF FOREST SYSTEMS

Executive summary

The growing demand for environmental sustainability poses new challenges to land planning. This textbook explores how currently available ecological concepts and theories can be made applicable in landscape and forest planning and highlights opportunities and constraints to be considered at the different stages of the planning process in order to meet environmental sustainability goals.

The text is mainly addressed at graduate students in environmental and forest management and planning; it is also helpful to forest and environmental professionals and public servants to manage land, and distinctively the forest resources, by means of an ecologically-sound approach.

The book has been conceived with the main following objectives:

- to provide improved understanding of the multifunctional role of forest ecosystems in the context of the modern paradigm of sustainability;
- to frame the role of landscape ecology within land planning;
- to highlight how forest management can increase the ecological value of the landscape, even under degraded environments;
- to provide basic knowledge on land and urban planning tools, dealing with the management of environmental resources at different spatial levels in Italy;
- to highlight the role of the forest management plan as an essential tool for the implementation of sustainable forest management (SFM) at local scale;
- to present the specificity of forest management and planning within protected areas and Natura 2000;
- to present Environmental Impact Assessment and Strategic Environmental Assessment procedures, with a focus on forest resources and forest planning tools.

A summary of main chapters' contents is provided here below. Book organization allows most chapters to be read as standalone and assists readers with thematic interests.

Chapter 1 – Ecological planning: the fundamentals

Introduces the fundamentals of land planning and management based on an ecological approach and highlights its connections with the principles of sustainable development.

Chapter 2 – About forest ecosystems and landscape ecology

Provides a background on main theories and concepts useful to deal with complexity of the ecological systems; multiscaled levels of ecological organization found in the land mosaic (habitat, population, community, ecosystem, landscape) are presented. Attention is devoted to the presentation of parameters to monitor the ecological functionality of forest ecosystems. The chapter introduces also landscape ecology concepts (landscape spatial configuration and function, habitat fragmentation, connectivity) and analytical tools at the root of ecological networks planning.

Chapter 3 – Basics of large scale ecological planning

Seeks to give the link between analytical tools of landscape ecology and their implementation in the framework of plans and programs relevant in Italy for managing land at various spatial scales. Focus is given to: i) the Regional Landscape Plan, aimed at identifying areas of homogeneous landscape value at regional scale for which different objectives of landscape quality are defined; ii) the Provincial Territorial Coordination Plans qualified to design and manage ecological networks over large territories. The chapter provides the reader with examples of how landscape ecology can help addressing planning goals, by presenting techniques for classifying landscapes and assessing their ecological value and introducing the ecological networks approach as tool to preserve and enhance biodiversity at different spatial scales in fragmented landscapes.

Chapter 4 – Ecological planning of forest systems: general features

Introduces the fundamentals of SFM thinking, an implementation of the ecological approach directed towards the sustainable use of forest resources. Multiple dimensions of SFM are reviewed, with special reference to: wood and non-wood production, global environment protection, biodiversity conservation, combating drought and desertification, landscape conservation and requalification, forest-grazing and forest-wild fauna interaction, ecological restoration of degraded areas.

Chapter 5 - Forest sector and land planning tools

Addresses the need of vertical and horizontal integration between urban and environmental planning and forest planning tools operating at various scale levels in Italy. Forest planning requires consideration of strategic goals and/or guidelines for the sustainable management of forest resources set out by other sectoral or multi-sectoral plans in force in the area covered by planning. This is far from being a trivial task, due to the variety of instruments to be examined, scales involved and to the difficulty of clearly establishing links and hierarchies between plans. The chapter provides a reference framework to guide forest planners in the consideration of relevant urban and environmental plans. Main goal is to give an overview of issues addressed by urban and environmental plans that are tied to the governance of forest resources (preservation of the landscape, soil conservation and water pollution, forest fire prevention, wildlife management). The ultimate goal is to facilitate the identification of synergistic effects between plans, in the perspective of reinforcing horizontal and vertical integration in the overall current planning system.

Chapter 6 – Fundamentals of sustainable forest management

Presents the fundamentals of SFM taking into account various applications (silviculture, arboriculture, agroforestry, urban forestry). The chapter introduces the concepts of classic silviculture as well as the approach of systemic silviculture. Principles of forest planning are introduced, the key instrument to frame SFM in a real-world context and to achieve a balance between use and long-term conservation of forest resources, within a specific spatio-temporal horizon of action.

Chapter 7 – Forest planning at a national level

Outlines national-level legislation on SFM and forestry in Italy. Specific attention is devoted to the most recent laws and sectoral programs that explicitly recognize the need for the implementation of SFM in Italy.

Chapter 8 – Forest planning at a regional level

Provides an insight of forest planning instruments under the responsibility of Regional Administrations in Italy: i) the regional forest plan, the reference program for setting objectives and strategies for SFM; ii) the regional plan against wildfires, i.e. the strategic plan to coordinate wildfire protection, prevention and suppression measures.

Chapter 9 - Forest planning at a landscape level

Presents concepts and goals of forest planning instruments at landscape level, acting mainly as a connection tool between the regional and the local forest plans. The main goal of this plan is to set the scene for local level forest management plans: this is achieved by defining a coordinated framework of strategies and provisions for the multifunctional management of forest resources to be implemented in the territory considered by the plan.

Chapter 10 - Forest management plans

Focuses on the main local forest planning tool, i.e. the forest management plan. The plan fundamentals are outlined: forest compartment delineation; stand assessment and monitoring at compartment level; forest intervention prescriptions. The chapter also provides a reference scheme of the structure, content and main cartographic documents of forest management plans in Italy.

Chapter 11 - Forest planning within nature reserves

Examines planning and management tools applied in areas designated for nature conservation in Italy (national parks, regional parks and nature reserves). Forest management options applicable within such areas are illustrated with respect to the naturalness of forest stands and the zoning schemes.

Chapter 12 - Forest planning within Natura 2000 sites

Deals with forest planning issues in Natura 2000 sites. Forest management approaches are delineated in the perspective of maintaining, or restoring, habitats and species at a favourable conservation status, while taking into account economic, social and cultural requirements as a means to achieve sustainable development. Monitoring tools are introduced, as well as procedures to assess plans or projects that may have a significant impact on the site's conservation objectives.

Chapter 13 - Forest systems and integrated environmental assessment

Addresses Environmental Impact Assessment and Strategic Environmental Assessment procedures, aiming to ensure that plans, programmes and projects likely to have significant effects on the environment are made subject, prior to their approval or authorization, to the assessment of their ecological sustainability, with a view to reduce their environmental impact. A methodological framework is outlined to evaluate potential negative environmental impacts on forest ecosystems. Likewise, objectives and fields of application of the Strategic Environmental Assessment are described, with distinctive reference to forestry and landscape planning tools.