

PART V

Challenges for the Future

Cork oak woodlands face an uncertain future. They are subject not only to land use changes driven by local conditions in North Africa and Europe and by European Union agricultural policies but also to global changes and market trends. In the final part of the book we address some of the hottest scientific and policy topics of our day, including climate change and its impact on ecosystems and the notion of payments for ecosystem services. We also draw attention to the relevance of the work presented in the previous four parts of the book on a global scale, as is now possible thanks to the Millennium Ecosystem Assessment (MA 2005a, 2005b). From 2001 to 2005, more than 1,360 experts worldwide pooled their knowledge and resources to produce the monumental documents widely known as the MA. Their findings provide a state-of-the-art scientific appraisal of the condition and trends in the world's ecosystems, the services they provide, and the scientific basis for action to conserve and use them sustainably. Their work continues on the global level and encourages those developing proactive strategies for managing individual ecosystems, in order to adapt to and mitigate climate change and desertification threats while fighting the loss of biodiversity.

In Parts I, II, and III we provided a state-of-the-art survey of scientific knowledge, providing the bases for practical strategies and techniques for restoration and adaptive management of cork oak woodlands anywhere in the western Mediterranean region. We also showed how these strategies and techniques could be of interest to everyone actively engaged in restoration and management of other woodland and forest ecosystems. Next, in Part IV we presented an economic analysis for some cork oak woodlands, with many indications of the complex array of factors affecting policy and land use decisions in the region. In the site profiles presented throughout the book, we

have also seen many discussions of socioeconomic issues on the site scale. We saw that, like many other Mediterranean ecosystems and landscapes, cork oak systems are of value to people for many reasons that range from utilitarian goods to hunting, recreation, and tourism; to biodiversity conservation; and, indeed, to the intangible value of cultural identity with a given landscape.

Now, in Part V we draw back a bit and provide a very broad perspective. In Chapter 17 we present an overview of conservation value and an application of the rapidly emerging notion of ecosystem services as they apply to cork oak woodlands, both in southwestern Europe and in northwestern Africa. As is true everywhere, a clear research goal for the future must be to apply environmental and ecological economics tools to the valuation of biodiversity conservation and ecosystem services of cork oak woodlands and derived cultural systems. This valuation will have great impact on management and planning.

Next, we discuss climate change from the perspectives provided by empirical evidence of the physiological response to rising temperatures and CO₂ (Chapter 18) and by a detailed ecosystem vulnerability modeling approach that can provide a bridge between the complex relationships of ecology and economics and the models used in vulnerability assessments and optimization strategies (Chapter 19).

Finally, in Chapter 20 we bring together all the elements and perspectives discussed in this book in order to develop and compare some simple land use scenarios and discuss alternative strategies, in light of all we have seen in the course of our grand tour. We hope this will help land managers and decision makers adapt management in such a way as to combine conservation, sustainable use, and restoration of cork oak woodlands and of other ecosystems and landscapes.

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