CIHEAM
International Centre for Advanced Mediterranean Agronomic Studies
Mediterranean Agronomic Institute of Zaragoza

INFORMED
INtegrated research on FOrest Resilience and Management in the mEDiterranean

European Forest Institute
Mediterranean Regional Office - EFIMED

Advanced Course

CONCEPTS, METHODS AND TOOLS FOR AN INTEGRATED APPROACH OF RESILIENCE IN MEDITERRANEAN FORESTS

Zaragoza (Spain), 12-16 December 2016

1. Objective of the course

Mediterranean forests are complex social-ecological systems characterized by an important biodiversity, high levels of spatial environmental heterogeneity, and a long history of deep interlinking with human populations to which they provide a bunch of ecosystem services. Mediterranean forests are also considered as a hotspot of global change impacts and risks (drought, fires, pests, etc.). Adapting forests to global change is particularly challenging because of the multiple levels of uncertainty in future socio-economic and climatic scenarios, ecosystem responses, and impacts of forest management practices, among other factors. Ideally, adaptive management efforts should foster future provision of desired ecosystem services.

Resilience is the capacity of a system to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes. Forest resilience is driven by ecological dynamics and functions, management, policy and governance. Considering all these dimensions together in an integrative framework that bridges disciplines and scales is a condition of success towards long-term persistence of the Mediterranean forests and the services they provide.

This course is framed in the context of the INFORMED project (INtegrated research on FOrest Resilience and Management in the mEDiterranean, http://www6.inra.fr/informed-foresterra_eng). This research project develops a dynamic approach of the resilience of Mediterranean forests facing global change. Its scientific objectives are to fill-in knowledge gaps on the basic mechanisms that determine the flexibility of the social-ecological system in response to disturbance; to integrate knowledge by combining different process-based models at various spatial and temporal scales; and to use integrated knowledge to develop management strategies as well as policy and governance guidelines to foster forest system resilience.

The aims of the course are: (i) to clarify the concepts needed to better understand the dynamics and functions of Mediterranean forest social-ecological systems; (ii) to give guidance on the use of available methods and tools needed to integrate knowledge from different disciplines; and (iii) to present good practices on the use of these methods and tools for informed decision making on forest management in the context of global change and related uncertainties.

By the end of the course, the participants will:

- Have a holistic view of Mediterranean forests as complex social-ecological systems.
- Have a clear understanding of the concept of resilience and its use in forestry.
- Increase their knowledge on adaptive management options for Mediterranean forests.
- Be capable to develop and use customized global change scenarios.
- Have a clear understanding of the diversity of forest ecological models, and get practical experience in ecological modelling.
- Gain experience on critical interpretation and efficient use of the information provided by these models.
- Become familiar, in theory and practice, with economic assessment of ecosystem services in Mediterranean forests.
- Be informed on data management tools and their usefulness.

2. Organization

The course is jointly organized by the **International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM)**, through the **Mediterranean Agronomic Institute of Zaragoza (IAMZ)**, and the **INFORMED** project (INtegrated research on FOrest Resilience and Management in the mEDiterranean), with the collaboration of the **Mediterranean Regional Office of the European Forest Institute (EFIMED)**. The course will take place at IAMZ and will be given by well qualified lecturers participating in the INFORMED project, coming from research centres and universities in different countries, and from EFIMED.

The course will be held over a period of 1 week, from 12 to 16 December 2016, in morning and afternoon sessions.

3. Admission

The course is designed for 25 professionals with a university degree. It is intended for decision makers, managers, technical advisors, researchers, NGOs and other professionals involved in forest system management in Mediterranean environments.

Given the diverse nationalities of the lecturers, knowledge of English, French or Spanish will be valued in the selection of candidates, since they will be the working languages of the course. IAMZ will provide simultaneous interpretation of the lectures in these three languages.

Please display on a notice board if possible

Instituto Agronómico Mediterráneo de Zaragoza
Avenida de Montañana 1005, 50059 Zaragoza, Spain
Tel.: +34 976 716000, Fax: +34 976 716001
E-mail: iamz@iamz.ciheam.org
CIHEAM

See updated information at
www.iamz.ciheam.org

INFORMATION CONTINUES OVERLEAF

4. Registration

Application forms may be obtained from:

Instituto Agronómico Mediterráneo de Zaragoza
Avenida de Montañana 1005, 50059 Zaragoza (Spain)
Tel.: +34 976 716000 - Fax: +34 976 716001
e-mail: iamz@iamz.ciheam.org
Web: www.iamz.ciheam.org

Candidates should send the completed application form to the above address, accompanied by a detailed *curriculum vitae*, stating degree, diplomas, experience, professional activities, language knowledge and reasons for applying to the course. Copies of certificates should be enclosed with the application.

The deadline for the submission of applications is **30 September 2016.**

Applications from those candidates who cannot present their complete records when applying, or those requiring authorization to attend the course, may be accepted provisionally.

Registration fees for the course amount to 500 euro. This sum covers tuition fees only.

5. Scholarships

Candidates from CIHEAM member countries (Albania, Algeria, Egypt, France, Greece, Italy, Lebanon, Malta, Morocco, Portugal, Spain, Tunisia and Turkey) may apply for scholarships covering registration fees, and for scholarships covering the cost of travel and full board accommodation in the Hall of Residence on the Aula Dei Campus.

Candidates from other countries who require financial support should apply directly to other national or international institutions.

6. Insurance

It is compulsory for participants to have medical insurance valid for Spain. Proof of insurance cover must be given at the beginning of the course. Those who so wish may participate in a collective insurance policy taken out by the IAMZ, upon payment of the stipulated sum.

7. Teaching organization

The course requires personal work and interaction among participants and with lecturers. The international characteristics of the course favour the exchange of experiences and points of view.

The course will be taught with a combination of lectures, practical sessions and debates. Participants will work in groups on several exercises that will allow them to put theory into practice, analyse the potentials and limits of some tools for forest modelling and data management, and explore how these tools can help integrated forest management and decision making in a context of global change and related uncertainties.

8. Programme

1. **Setting the context (2 hours)**
   - 1.1. Mediterranean forests and global change
     - 1.1.1. Mediterranean forests as biodiversity hotspots and providers of multiple ecosystem services
     - 1.1.2. Mediterranean forests as hotspots of global change: drivers, risks and related uncertainties
   - 1.2. Social-ecological systems (SES)
     - 1.2.1. Integrating ecological, socioeconomic and management decision processes
     - 1.2.2. Mediterranean forests as SES
2. **Conceptual framework (6 hours)**
   - 2.1. Resilience and stability in the integrative frame of SES. Challenges managing these features under global change
   - 2.2. Adaptation and adaptive management
     - 2.2.1. Adaptation as a polysemic term
     - 2.2.2. Forest adaptation for stability and/or resilience
     - 2.2.3. Adaptive management to face uncertainties in Mediterranean forests
   - 2.3. Risk and multi-risk management in Mediterranean forests (focus on fire, drought, pests, overexploitation)
   - 2.4. Discussion on the conceptual framework based on the participants' own experience
3. **Turning theory into practice: methods and tools (9 hours)**
   - 3.1. Indicators of forest resilience
   - 3.2. Global change scenarios
     - 3.2.1. Using already available scenarios
     - 3.2.2. Good practices for scenario building
   - 3.3. Understanding and dealing with the multiplicity of ecological model predictions
     - 3.3.1. Types of models: pros and cons
     - 3.3.2. Necessity of comparing several models and predictions. Dealing with divergent results
   - 3.4. Economic assessment of forest management options
     - 3.4.1. Methodologies for market ecosystem services (production functions approaches)
     - 3.4.2. Methodologies for non-market ecosystem services (stated/revealed preferences)
     - 3.4.3. Payments for ecosystem services
   - 3.5. Tools supporting transdisciplinary data integration
     - 3.5.1. Data management plans
     - 3.5.2. Metadata systems
4. **Practical work (12 hours)**
   - 4.1. Modelling species distribution under global change scenarios. Understanding and evaluating the sources of uncertainty in predictions
   - 4.2. Analysis of the results of forest management scenarios on the production of non-wood forest products at multiple-scales
   - 4.3. Economic valuation of changes in ecosystem services' provision under global change scenarios
   - 4.4. Debate: take-home messages expressed by the participants

GUEST LECTURERS

R. ALÍA, INIA-CIFOR, Madrid (Spain)
F. BRAVO, iFOR (UVa-INIA), Palencia (Spain)
L. COLL, UdL/CTFC, Solsona (Spain)
M. GUIJARRO, INIA-CIFOR, Madrid (Spain)
A. JAPELJ, Slovenian Forestry Institute, Ljubljana (Slovenia)
V. LEBAN, Univ. Ljubljana (Slovenia)
F. LEFÈVRE, INRA, Avignon (France)
S. de MIGUEL, UdL, Lleida (Spain)
A. MORÁN-ORDOÑEZ, INFOREST (CTCF-CREAF), Solsona (Spain)
C. PICHOT, INRA, Avignon (France)
E. RIGOLOT, INRA, Avignon (France)
A. STENGER, INRA, Nancy (France)
H. VERKEK, EFIMED, Barcelona (Spain)

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