



CIHEAM

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



International Union for the  
Conservation of Nature  
Centre for Mediterranean Cooperation



ICARDA  
Science for Better Livelihoods in Dry Areas



SOCIETY FOR  
ECOLOGICAL  
RESTORATION

## Advanced Course

# RESTORATION OF DEGRADED DRYLANDS AND MONITORING OF DESERTIFICATION PROCESSES

Zaragoza (Spain), 5-10 February 2018

### 1. Objective of the course

Drylands are a key terrestrial biome, covering 45% of Earth's land surface and supporting over 38% of the total global population. They are highly vulnerable to global environmental change. Desertification and land degradation, driven by increasing human pressure on land and water resources, are the most important and pressing environmental and socio-economic issues currently faced by dryland people. The sensitivity of drylands to these problems is amplified from the fact that their primary productivity is strongly limited by precipitation and soil nutrient availability, and both of these factors are undergoing changes associated with increasing atmospheric greenhouse gases and air pollutants. Because of the extent of dryland ecosystems globally, and the dependence of an important part of the human population on them for goods and services, it is crucial to establish effective programmes to monitor land degradation processes that can detect the onset of desertification and restore degraded land before degradation becomes irreversible or restoration too costly.

Dryland countries have a long history of restoration of degraded lands, a task that traditionally has been conducted by planting trees, whether native or not, paying little attention to the views of the local communities and to ecosystem functioning. The last decades have seen unprecedented interest and research efforts in the development of new technologies and participative approaches to effectively restore degraded drylands. Yet, new approaches have not been widely implemented, despite the renewed interest in restoration actions imposed by global initiatives such as the Bonn Challenge. At the same time, important conceptual progress has substantially advanced our understanding of desertification processes and produced new tools to monitor dryland status by means of biophysical and socio-economic indicators, including ecosystem functioning. In parallel, several high profile international initiatives launched in the framework of the United Nations Convention to Combat Desertification (UNCCD), such as the "2030 Agenda for Sustainable Development", have placed concepts such as Land Degradation Neutrality and desertification at the forefront of political and environmental issues.

This course aims to: (i) present the latest scientific and technical advances in land restoration with the purpose of combating desertification; (ii) improve knowledge on how to effectively restore degraded drylands, from project planning to the implementation and monitoring phases; and (iii) introduce available tools to monitor desertification processes. Case-studies from Mediterranean countries will be discussed, relevant high profile international initiatives will be introduced, and practical work will be performed by the participants to get familiar with state-of-the-art tools.

By the end of the course participants will:

- Know innovative approaches to restore degraded drylands and to monitor desertification processes.
- Have criteria to select the most appropriate measures to restore degraded drylands, being aware of their constraints.
- Gain experience in the practical design and implementation of participative approaches for the restoration of degraded drylands.
- Improve skills to design monitoring programs to evaluate the success of restoration actions.
- Exchange their own experience with scientists and practitioners of different disciplines involved in the restoration of degraded drylands and the monitoring of desertification processes.

### 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), the Centre for Mediterranean Cooperation of the International Union for the Conservation of Nature (IUCN), and the International Center for Agricultural Research in the Dry Areas (ICARDA), with the collaboration of SER Europe (European Chapter of the Society for Ecological Restoration). The course will take place at the Mediterranean Agronomic Institute of Zaragoza and will be given by well qualified lecturers from international organizations, and government departments, research centres and universities in different countries.

The course will be held over a period of one week, from 5 to 10 February 2018, in morning and afternoon sessions.

### 3. Admission

The course is designed for 25 participants with a university degree and is aimed at professionals from public and private organizations working in topics related with the management of degraded dryland areas, who are interested in applying the most advanced knowledge to restore them and to monitor desertification processes and restoration actions.

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.

### 4. Registration

Candidates must apply online at the following address:  
<http://www.admission.iamz.ciheam.org/en/>

Please display on a notice board if possible



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See updated information at

[www.iamz.ciheam.org](http://www.iamz.ciheam.org)

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Applications must include the *curriculum vitae* and copy of the supporting documents most related to the subject of the course.

The deadline for the submission of applications is **24 November 2017**.

Applications from those candidates 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 Mediterranean countries and from ICARDA MENA partners 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 Organization, 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.

Formal lectures are complemented by presentation and analysis of case studies, practical work, debates and a field trip.

During the course, participants will work in groups on practical exercises with the objective of applying the different concepts taught during the course. Participants will have to: (i) use the decision support system "Restoration Opportunity Assessment Methodology" to allocate priorities for restoration; and (ii) discuss options for the monitoring of restoration actions based on real data from diverse case studies.

Participants are encouraged to present their own work/research related to the course content through a poster presentation. This activity will be a valuable method to present their results and meet with the lecturers and other course participants for technical discussions.

A field trip to the Monegros area (Aragon, Spain) will be organized to discuss the impacts of overgrazing and possible restoration actions, and to see an irrigation area with soil and water salinization problems, where a comprehensive land restoration project has been carried out to improve agricultural systems, to restore biodiversity and to mitigate desertification.

## 8. Programme

1. **Introduction to ecosystem functioning and services in drylands (2 hours)**
  - 1.1. Abiotic and biotic drivers of ecosystem functioning in drylands

- 1.2. Ecosystem services associated to natural and productive dryland systems
2. **Land degradation and desertification (9 hours)**
  - 2.1. Conceptual basis
  - 2.2. Monitoring the processes of land degradation and desertification
    - 2.2.1. Social, economic and biophysical indicators to monitor land degradation at different levels and scales
    - 2.2.2. The World Desertification Atlas: an example of global indicators
    - 2.2.3. Geomatic systems to monitor land degradation: examples and applications
  - 2.3. The fight against desertification at the institutional and political level. Land degradation neutrality as a target of international policies
  - 2.4. Open discussion on land degradation neutrality
3. **Restoring degraded drylands and monitoring restoration actions (20 hours)**
  - 3.1. Introduction to the restoration of degraded drylands
  - 3.2. The planning phase
    - 3.2.1. Why and where to restore
    - 3.2.2. Restoration targets
  - 3.3. State-of-the art technologies for dryland restoration for different purposes and scales
    - 3.3.1. Soil conservation and water harvesting
    - 3.3.2. Manipulation of plant cover
    - 3.3.3. Use of biotic interactions
  - 3.4. Monitoring the success of restoration actions
  - 3.5. Participatory approaches to restore degraded drylands
  - 3.6. The economy of restoration: cost-benefits analyses, certifications and business opportunities
  - 3.7. Case studies on participatory restoration approaches
    - 3.7.1. Integrating climate change into restoration planning: a case from Southeast Portugal
    - 3.7.2. Participatory tools to integrate ecological restoration into land use planning in Eastern Spain
    - 3.7.3. Implementation and assessment of rangeland restoration actions in central Morocco
  - 3.8. Practical work
    - 3.8.1. Decision making to allocate priorities for restoration: Restoration Opportunity Assessment Methodology (ROAM)
    - 3.8.2. Design of monitoring programmes based on real case studies
  - 3.9. Technical visits to Monegros area, Aragón
    - 3.9.1. Passive restoration of areas degraded by grazing
    - 3.9.2. Restoring biodiversity and productivity in a degraded agricultural landscape
4. **Poster sessions and discussion (2 hours)**
5. **Round table on future perspectives of restoration in degraded drylands under global change (2 hours)**

## GUEST LECTURERS

G. del BARRIO, CSIC-EEZA, Almería (Spain)

C. BRANQUINHO, Univ. Lisboa (Portugal)

V. CASTILLO, UNCCD, Bonn (Germany)

F. COMÍN, CSIC-IPE, Zaragoza (Spain)

J. CORTINA, Univ. Alicante (Spain)

M. DERAK, MAPMDREF-DREFLCD Rif, Tétouan (Morocco)

R. de GROOT, Wageningen UR (The Netherlands)

M. KUZEE, IUCN, Washington DC (USA)

E.T. MAESTRE, Univ. Rey Juan Carlos, Móstoles (Spain)

Y. PUEYO, CSIC-IPE, Zaragoza (Spain)

A. VALDECANTOS, CEAM-UA, Alicante (Spain)

M. VALDERRÁBANO, IUCN-Med, Málaga (Spain)

C. ZUCCA, ICARDA, Rabat (Morocco)