COST Action ES1104 'Arid Lands Restoration and Combat of Desertification: Setting up a Drylands and Desert Restoration Hub' focuses on practical measures that can be used by practitioners, stakeholders and authorities to restore degraded drylands and manage their recovery.

Training School 6
Iberian Training School on Restoration in Mediterranean Drylands

13 – 21 May 2015

University of Lisbon (PT) and Autonomous University of Madrid (ES)

Background

The recovery of the vegetation component after disturbance in an ecosystem is often fairly good, but the original structure and functioning of the ecosystem take longer to be restored. Revegetation is one of the main tools used as the first step for restoring a degraded or degradation-prone ecosystem, especially when keystone plant species have disappeared due to the disturbance frequency and intensity or to the combination of several drivers acting either at the same or at different times. Special attention has to be paid when dealing with arid to semiarid areas where the ecosystem functioning follows a sink-source pattern that affects conservation and flows of resources. The success of revegetation actions depends on many factors related to plant management: species selection, seed and seedling quality, site preparation, and the early availability of light and soil resources. Many different techniques aimed at overcoming these constraints will be described during the training school.

This Iberian Training School will focus on drylands ecological restoration and agricultural land management in order to combat desertification through the establishment and management of vegetation. We will provide the students with the scientific basis and practical guidance in field classes for sustainable land use, and we will create and strengthen links between them and established experts. In addition to classroom lectures, there will be practical classes and field trips to apply relevant methodologies for successful revegetation and soil conservation.

Each student will be expected to give a short presentation (3 slides) about his/her scientific and professional background, and at the end of the training school they will present how they will incorporate the acquired knowledge to their own work.

In Portugal, the training school will be coordinated by Cristina Branquinho (Associate Researcher of the Faculty of Sciences University of Lisbon) in collaboration with Portuguese and Spanish trainers which will deliver lectures and practical classes. In Spain, the training school will be coordinated by Alejandro Valdecantos (CEAM-University of Alicante) and María José Marques (Autonomous University of Madrid), in collaboration with Spanish trainers which will organize field trips and lecture classes.

Programme

Tuesday 12 May

Trainees arrive in Lisbon

Wednesday 13 May

Trainees will be welcomed by the Portuguese host, and will have the opportunity to present their 3 slides as an introduction to their scientific and technical background and interests. Trainees will then be introduced to the most important drivers of desertification and soil degradation in Mediterranean areas, and to the most important functional groups of Mediterranean vegetation. The first steps of the revegetation process will be detailed: (i) defining the objectives; (ii) soil establishment and improvement; and (iii) revegetation techniques for desertified and degraded areas: planting and seeding methods.

Thursday 14 May

This will be a full day of field work based at a restored cement quarry site. Trainees will put into practice the theoretical knowledge acquired on the previous day: they will perform a field survey of plants where different seedling experiments were used, and will apply the Landscape Functional Analysis (LFA) method to different areas with different ages after restoration and using different methods.

Friday 15 May

A series of revegetation techniques and principles will be presented which can be adapted to different types of habitats. In the more desertified areas of Portugal there have been more than 30 years of restoration activities, mainly of forest areas. Other case studies will include sown biodiverse pastures, the use of biological soil crusts to restore desertified environments, and techniques for revegetating artificial dunes. Areas dominated by *Pinus halepensis* largely result from its plantation and often exhibit low diversity and resilience. Pine thinning will be presented as a case-study to increase functional diversity in those pine plantations.

Saturday 16 May

A field trip will be organized to visit the area of montado system (a multifunctional savannah like agroforestry system) and dune vegetation.

Sunday 17 May

Travel by coach to Madrid will be used as a field trip to interpret the changes in vegetation with increasing aridity. Arrival at 16:00. Free time to visit the city. Welcome dinner in Madrid.

Monday 18 May

Field trip to visit the National Centre of Forest Genetic Resources 'El Serranillo' in Guadalajara (50 km from Madrid), devoted to developing R+D projects on forest improvement and development. Topics to be covered include: seed collection; seedling production and propagation of Mediterranean trees and shrubs; managing plant, soil and human activities for avoiding/reversing dryland degradation; plant functioning along a stress gradient; plant-plant relationships in restoration (competition vs facilitation, and the role of nurse plants in restoration).

Tuesday 19 May

Lecture classes at the Autonomous University of Madrid. Introduction to the region and contrast to the previously visited sites. Topics to be covered include: soil characteristics and indicators of disturbance due to unsustainable management practices; soil texture and structure; water holding capacity; soil organic matter; theoretical concepts and laboratory methods; training in soil sampling to determine texture by feel, bulk density, water infiltration and soil moisture.

Wednesday 20 May

Field visit to the IMIDRA Research Centre 'Centro de Olivicultura La Chimenea' in Aranjuez (50 km from Madrid). Trainees will learn how to analyse how land can be best used for agriculture, examining the levels of need, opportunities and constraints. They will get an overview on how man has used the territory over centuries, and how and why some land is now abandoned. They will acquire a global perception of the agricultural landscape in the centre of the Iberian Peninsula and analyse the consequences of vegetation scarcity in these semi-arid areas. They will also identify the driving forces leading to land degradation that may increase the risk of desertification in this region.

Trainees will observe different types of management of one of the most important Mediterranean crops: olives. The Research Centre has established various types of management (super intensive, intensive, extensive, flat bench terraces, sloping bench terraces, different cover crops in the strips, etc.). Cover cropping can also be used in cereal crops. They will see in this in-situ and the use of no-tillage techniques. Trainees will have the opportunity to carry out simple measurements in the field and they will see firsthand the consequences of these different land management practices on water and soil conservation in vulnerable areas. Landscape Function Analysis will also be used to compare results under different environmental conditions in Portugal and Spain.

Thursday 21 May

During the morning trainees will work in the laboratory of the Autonomous University of Madrid with their own samples. Discussion of results will provide the students with the vision of the best and worst practices identified in this training school.

This knowledge can be transferred to a wide range of practitioners. The final part of the training school will include social aspects of land management and restoration with meetings with local stakeholders. A World Café meeting with farmers is scheduled during the last day for mutual learning. Finally the students will share their ideas for applying the knowledge acquired during the training school to their own research.

Friday 22 May

Trainees depart from Madrid

Eligibility

Applicants should be graduate students, PhD-students, post-docs, or early stage researchers enrolled in or affiliated to an Institution located in a COST country: Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Norway,

Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and the former Yugoslav Republic of Macedonia.

Applicants from approved Near Neighbor Country institutions are also eligible to apply: the Centre for Ecological-Noosphere Studies, Armenian National Academy of Sciences; Al Hussein Bin Talal University, Jordan; Ibn Zohr University, Morocco; Al-Quds University, Palestine; and the Institut des Regions Arides, Tunisia.

The area of study of applicants should fit with the topic of this training school.

Logistics

Rooms in Lisbon and Madrid have been reserved at a cost of €55 per night (bed and breakfast).

It is the responsibility of each participant to provide adequate insurance cover (personal, travel and medical) for the whole duration of the training course and travel period.

Financial support

COST Action ES1104 is offering 18 places on the training school on a competitive basis. Successful applicants will be offered a maximum grant of €1500 as a contribution towards the costs of travel, accommodation and meals. The exact award offered will depend on the cost of travel as this differs considerably across eligible countries. Please note that the grant will be paid by bank-to-bank transfer **after** the course has been completed.

How to apply

Send a letter of application stating your reasons for wanting to take part in the Training School to María José Marqués (mariajose.marques@uam.es) by **17 April 2015**. The letter should be accompanied by the following documents:

(1) a 1-2 page CV containing your personal information, current home and university/institution mailing addresses, e-mail, Skype name (if possible), university education background including current enrolment status, training/work experience, publications.
(2) a 1 page letter of motivation stating why you would like to participate in this training school.
(3) for PhD students only: contact details of your supervisors.