

# Stream Restoration and Bioengineering Training Course

Organized in collaboration with the European Federation of  
Soil and Water Bioengineering (EFIB)

Date: **16-17 September 2019**  
Venue: The National Water  
Conservation Awareness Centre  
Nigret and Fiddien Valley  
**MALTA**



*Figure: Restored Salix and Populus galleries at Fiddien*

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## Abstract

Wied il-Fiddien is one of the largest intermittent streams that flows for between 9-10 months per year, depending on the extent of precipitation. In this project, various bioengineering techniques are used to restore the structure and functions of the riparian habitats found along the valleybed, including re-contouring, replacement of invasive species by species typical of Willow and Poplar galleries of the Central Mediterranean, and slowing down of the

water flow to increase aquifer replenishment. The techniques used will be discussed in detail in this training course, and experiences learnt from previous projects along the same valley are used to increase the area covered by these riparian ecosystems. Following the completion of this project, this intermittent stream is expected to host the largest extent of riparian ecosystems in the country, turning Wied il-Fiddien into a potential refugium for riparian species.

The objective of this training course is to teach all the people involved or working in this project, the various restoration and bioengineering techniques that will be used to restore the habitats.

## Venue and organisation

The training course will be held over two days, the first in the National Water Conservation Awareness Centre at Nigret on Monday 16th September, and the second will be held in the field at Fiddien valley on Tuesday 17th September. The on site training session on Tuesday will include practical training on how to build gabion dams, brushlayers and crib walls, and will be led by Dr. Gianluigi Pirrera. Lunch will be served on both days at the National Water Conservation Awareness Centre at Nigret between 1200-1330. Coffee breaks will be available at the centre on Monday in the morning and in the afternoon.

Potential participants will need to send an email showing their interest in attending the training course to [emancalleja@gmail.com](mailto:emancalleja@gmail.com) and state which company they are representing and their interest in the training course. Potential participants will also state whether they have any allergies such that the necessary amendments to the menu could be organised for those participants. The cost of the training course for all accepted participants is free.

## Tutors

### Dr. Prof. Rosemarie Stangl (AUSTRIA)

Rosemarie Stangl is Full Professor and Head of the Institute of Soil Bioengineering and Landscape Construction at BOKU Vienna (University of Natural Resources and Life Sciences). Her academic work centers on vegetation technologies and soil and water bioengineering techniques. Detailed technical planning and design for nature based solutions have been advanced as core competences. Research is focusing on enhancing nature based solutions and green infrastructures for restoring lost ecosystems in residential and natural landscapes and on advancing vegetation functionalities.

Prof. Stangl has been organising and holding training courses in soil and water bioengineering both on theoretical and on practical level for authorities, planners and practitioners. She has been EFIB Board Member for more than 10 years and followed Prof. Florin Florineth as the General Manager in 2016.

### Dr Eman Calleja

Dr. Eman Calleja is an ecologist having over 20 years' experience in environmental conservation, restoration and the management of Mediterranean ecosystems. He has a PhD in Plant and Environmental Sciences from the University of Warwick, UK, a Masters Degree in Environmental Management and Conservation from the Mediterranean Agronomic Institute of Chania, Greece, and a Bachelor of Science Degree in Biology and Chemistry from the University of Malta. He is a published author having a number of papers on environmental science in international peer review journals. He is a specialized practitioner in ecological restoration, and a member of the International Society for Ecological Restoration, with extensive practical experience in restoration ecology. In his career he has written over 50 studies, restoration plans and baseline ecological studies, many of which were for major national projects.

Dr. Gianluigi Pirrera

Water & Soil Bioengineer, born in 1957 and living in Sicily. He is National Vice President of the AIPIN (Italian Association of Bioengineering) and board member of the SIEP Iale (Italian Association of Ecology Landscape). He works since 1983 with a holistic approach to water, ecological restoration and environmental analysis. His topic, over the Bioengineering techniques, are the ecological restoration of the archeological sites and the water bioremediation by plants. For BioEngineering and PhytoRemediation he was UN consultant in Northern Cyprus. He was EFIB teacher for professional training in Brazil, Mexico and Spain and adjunct professor at the Faculty of Architecture, University of Palermo

Author of several publications, including 5 books on wetlands, root morphometry, bioengineering, environmental analysis, urban and mediterranean landscapes.

In 2015 he got the Mention Agritecture & Landscape EXPO Milano for "Danisinni: Agritecture & Culture" (published at the Barcelona Landscape Biennial). In the 2018 he won the European Award Ecomed EFIB of Soil & Water Bioengineering for his studies about techno soil.

Programme

Monday 16<sup>th</sup> September

Time	Item	Lecturer
0830-0930	Principles of restoration ecology and Mediterranean plant ecology	Dr Eman Calleja
0930-1000	Species composition, Dominant species, Habitat structure	
1000-1030	Coffee Break	

1030-1130	Species identification and Propagation	
1130-1200	Mycorrhizae, planting techniques, transplanting techniques, and Habitat management	
1200-1330	Lunch break	
1330-1400	Presentation by the General Manager of the European Federation of Soil and Water Bioengineering	Dr. Prof. Rosemarie Stangl
1400-1445	Bioengineering structures: Gabion dams, cribwalls, brushlayer/branchpacking systems	Dr. Gianluigi Pirrera
1445-1530	Introduction to the principles and concepts of stream restoration	
1530-1600	Coffee Break	
1600-1645	Methods: <ul style="list-style-type: none"> <li>• Radical bio technique and Root morphometry?</li> <li>• Techno soils, forced radical engraftment and Cocoon: 3 technologies to combat desertification and climate change.</li> </ul>	
1645-1730	<ul style="list-style-type: none"> <li>• River bed phyto remediation: The case study of Morello Valley in Sicily</li> <li>• Two wetlands case studies in Sicily and Lombardy</li> </ul>	

Tuesday 17<sup>th</sup> September

Time	Item	Lecturer
<b>0900-1000</b>	Plant identification techniques	Dr Eman Calleja
<b>1000-1200</b>	On-site training: Bioengineering techniques: Gabion dams.	Dr. Gianluigi Pirrera
<b>1200-1330</b>	Lunch break	
<b>1330-1700</b>	On-site training: Brushlayer and Cribwall techniques	Dr. Gianluigi Pirrera



Figure: Fiddien valley reedbeds