Horizon 2020 Capacity Building/Mediterranean Environment Programme

"Constructed Wetlands for Wastewater Treatment"

Sub-regional training: 12-14 October, Dubrovnik, Croatia 2011

Introduction

The Horizon 2020 Initiative

The "**Horizon 2020 Initiative"** aims to de-pollute the Mediterranean by the year 2020 by tackling the sources of pollution that account for around 80% of the overall pollution of the Mediterranean Sea: municipal waste, urban wastewater and industrial pollution.

Horizon 2020 was endorsed during the Environment Ministerial Conference held in Cairo in November 2006 and is one of the key initiatives run under the Union for the Mediterranean (UfM). The H2020 2007-2013 Road-Map focuses on the following four pillars:

- Identification of projects to reduce the most significant sources of pollution.
- Identification of capacity-building measures to help neighbouring countries creates national environmental administrations that are able to develop and police environmental laws.
- Use of the EC's research budget to develop greater knowledge of environmental issues relevant to the Mediterranean and ensure this is shared.
- Develop indicators to monitor the success of Horizon 2020.

H2020 is made up of the following components: monitoring, reporting and research (RMR); investment; and capacity building. Under each component, a project is currently being run. H2020 Capacity Building/Mediterranean Environment Programme (H2020 CB/MEP) is the project aiming at enhancing the capacities to address pollution problems at institutional and society level. In addition, through the H2020 MEP, a Hot Spot Investment Programme (HSIP) for the West Balkans and Turkey - as complementary to the Mediterranean HSIP (MeHSIP) – has been elaborated. The other two projects currently being carried out under the investment and RMR H2020 components are respectively the MeHSIP and the ENPI Shared Environmental Information System (ENPI SEIS).

The framework - Horizon 2020 Capacity Building/Mediterranean Environment Programme

Obviously pollution is expected to be substantially reduced through the installation and proper functioning of major infrastructures (e.g. sewage treatment plants), installing pollution reduction technologies in industries, etc. However, this won't work if institutional and individual capacities are not in place. This is what the H2020 CB/MEP aims to enhance by operating within the existing and developing policy instruments, and supporting the implementation of the commitments undertaken in the framework of the ENP as well as other regional agreements e.g. of the Barcelona Convention, while cooperating, coordinating and synergising with all relevant (EU and other) programmes.

Aims and objectives

The main objective of this project is to support the implementation of Horizon 2020 with a special focus on environmental mainstreaming. It aims to address the following problems:

- low political priority given to the environment;
- insufficient integration of environment in the different sector policies (agriculture, tourism, transport or energy) and lack of inclusion of the different actors from local to international level;
- Insufficient capacities and resources at institutional and civil society level.

More specifically, the purpose is to support the implementation of the Horizon 2020 Initiative Road Map and Work Plan through capacity building and awareness raising activities, and to promote integration of environment issues in other sectors policies.

Partners

This project is funded by the European Union and implemented by the National and Kapodistrian University of Athens (NKUA) in consortium with: Mediterranean Action Plan of the United Nations Environment Programme and its Regional Activity Centres and Programmes (UNEP/MAP and its RACs), National Waste Management Agency (ANGed)/ Regional Solid Waste Exchange of Information and Expertise Network in Mashreq and Maghreb Countries (SWEEPNet), Umweltbundesamt GmbH – Austrian Environment Agency (AEA), Lebanese Ministry of Energy and Water - the General Directorate of Hydraulic and Electrical Resources (LMoEW), Hellenic Ministry for Environment, Energy and Climate Change, UNESCO-IHE Institute for Water Education (UNESCO-IHE), Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE), Arab Network for Environment and Development (RAED), WWF Mediterranean Programme Office (WWF MedPO), Association of Cities and Regions for Recycling and Sustainable Resource Management (ACR+), Arab Countries Water Utilities Association (ACWUA).

Partner Countries

The Partner countries are: Albania, Algeria, Bosnia- Herzegovina, Croatia, Egypt, Israel, Jordan, Lebanon, Montenegro, Morocco, occupied Palestinian territory, Tunisia, Turkey, Syria.

Course Description - "Constructed Wetlands for Wastewater Treatment"

Introduction to the training course

This sub-regional training course is organized within the framework of the ENPI Horizon 2020 CB/MEP project. It is organized by the UNESCO-IHE Institute for Water Education. Its duration is 3 days and the language of the training course will be English. Up to 30 participants are expected to attend from Albania, Bosnia Herzegovina, Croatia, Montenegro and Turkey.

Target group

The capacity building activity is of an intermediate/advanced level and is targeted to:

- Mid-career wastewater managers and decision-makers from water authorities, water and sewerage associations, industrial plants and other competent bodies
- University staff in fields related to waste water treatment

Learning objective

Constructed wetlands are an interesting technology for wastewater treatment because of their relatively low cost, robustness and their capacity to remove organic material, nutrients, and pathogens as well as trace metals. The main objective of the course is to familiarize the participants with the concept of treating wastewater by means of constructed wetlands. The course will consist of three main parts: (1) Basic principles, (2) Design and (3) Operation.

Methodology and Structure

The general structure of the course will be:

- Lectures followed by plenary discussions
- Learning by doing exercises
- Case study exercises
- Participant presentations

Resources for participants

Resources that are intended to be provided to participants are:

- Powerpoint presentations
- Reference materials
- Assignments

Learning outcomes of the training course

After the workshop the participants will be able to:

- Describe the different components of wastewater and the processes that can be used to remove those components within natural treatment systems;
- Explain how the different types of constructed wetlands function;
- Make a comparison with waste stabilization ponds, a companion natural treatment technology;
- Evaluate the performance of constructed based on influent-effluent data;
- Make a simple design of a constructed wetland;
- Elaborate an operation and maintenance plan for a constructed wetland.

The course will allow sufficient time for clarifications/questions/discussions of emerging topics.

A preliminary overview of the course is given below:

The planned modules are the following:

- History and philosophy of constructed wetlands and overview of the course
- Introduction to wetlands
- Short review of wastewater treatment processes relevant for wetlands
- Types of constructed wetlands and how they function
- Presentations by participants on cases of their own country/region
- Introduction assignment
- Applications of constructed wetlands for different types of wastewater
- Model framework
- Constructed wetland sizing
- Waste stabilization ponds as a companion natural treatment technology
- Practical design aspects of constructed wetlands
- Operation and maintenance of constructed wetlands
- Economics and reuse, taking into account ecosystem services
- Working in groups on assignment
- Presentation assignments

Course schedule/ curriculum			
12.10.2011	***Description***	***Duration***	***Method/Speaker or Trainer***
Session 1	• Welcome - opening words • Introduction of speakers and participants • Overview of H2020 CB/MEP • Expectations of trainees	9.00-10.00	*H2020 CB/MEP Team member, Diederik Rousseau, PhD, MSc, Senior Lecturer Environmental Engineering, UNESCO-IHE Institute for Water Education*
Session 2	• History and philosophy of constructed wetlands and overview of the course • Discussion	10.00-10.45	Presentation, *Diederik Rousseau*
		Coffee (15 min.)	
Session 3	• Introduction to wetlands • Short review of wastewater treatment processes relevant for wetlands • Discussion	11.00-13.00	Presentations, *Diederik Rousseau*
		Lunch (1 hour)	
Session 4	• Types of constructed wetlands and how they function	14.00-15.30	Presentation, *Diederik Rousseau*
		Coffee (15 min.)	
Session 5	• Presentations by participants	15.45-16.30	Participants
Session 6	• Introduction assignment	16.30-17.00	Presentation, *Diederik Rousseau*

13.10.2011	***Description***	***Duration***	***Method/Speaker or Trainer***
Session 1	• Applications of constructed wetlands for different types of wastewater	9.00-10.30	Presentation, *Diederik Rousseau*
		Coffee (15 min.)	
Session 2	• Model framework	10.45-12.00	*Diederik Rousseau, Presentation and exercises*
Session 3	• Constructed wetland sizing	12.00-12.30	*Diederik Rousseau, Presentation and exercises*
		Lunch (1 hour)	
Session 4	• Participation process to the planned constructed wetland in the village of Grborezi (Livno, BiH)	13.30-14.15	Presentation, *Mr. Zoran Seremet (Youth Center Livno)*
Session 5	• Experience with decentralized treatment and constructed wetlands in Bosnia & Herzegovina	14.15-15:15	Presentation, *UNA Consulting*
		Coffee (15 min.)	
Session 6	• Companion natural treatment technologies: waste stabilization ponds & ecohydraulics	15.30-17.00	*Diederik Rousseau, Presentation*

14.10.2011	***Description***	***Duration***	***Method/Speaker or Trainer***
Session 1	• Practical design aspects • Operation and maintenance of constructed wetlands	9.00-10.30	Presentations, *Diederik Rousseau*
		Coffee (15 min.)	
Session 2	• Economics and reuse	10.45-11.15	*Diederik Rousseau*
Session 3	• Working in groups on assignment	11.15-12.30	Working Groups
		Lunch (1 hour)	
Session 4	• Working in groups on assignment	13.30-15.00	Working Groups
		Coffee (15 min.)	
	• Presentation of assignments	15.15-16.30	Working Groups
	• Closing Remarks • Certificates Award • Departure	16.30-17.30	