EcoWater

Meso-level eco-efficiency indicators to assess technologies and their uptake in water use sectors

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About EcoWater

In this, first issue of the EcoWater Newsletters, we would like to devote some space for introducing our Project, and presenting the context of the research and of the activities that we plan to develop in the next 3 years in more detail.

EcoWater is a Collaborative Research Project, financed by the 7th Framework Programme of the European Commission. It focuses on a systems' approach for developing meso-level eco-efficiency indicators, and develops 8 Case Studies on diverse water service systems across Europe. The Case Studies serve as the proof-of-concept on the employed approach and for deriving policy recommendations of local and wider EU relevance.

>>>Read more on the EcoWater context and objectives on Pages 2-3 and on our Case Studies on Pages 4-8

The EcoWater Launch

EcoWater was launched officially on the 1st November 2011. The Project's kick-off meeting was held in Greece, at the premises of the National Technical University of Athens, with the participation of all project participants.

>>>Read more on Page 9

Forthcoming EcoWater event

The next EcoWater event is scheduled for 3-5 October 2012. It includes the Project's Annual Meeting and a workshop for the Sinistra Ofanto Irrigation Scheme.

>>>Read more on Page 9

The Portugal Workshop

The 1st EcoWater Case Study workshop was held in Évora on the 20th April 2012. It was attended by 22 EcoWater participants and 13 local actors, and was aimed at discussing on eco-efficiency indicators and deciding on technologies that can be assessed in the Monte Novo Irrigation Scheme Case Study.

>>>Read more on Page 11

Our Planned Events

During its 3-year timespan, EcoWater plans a series of different events, both at local (Case Study) and wider European and international scale.

Events will foster operational research-industry-policy links, by engaging local actors and policy makers, as well as industrial and policy platforms.

In total, 8 local workshops, 3 large-scale events targeting different audiences, and 1 final conference are foreseen, starting from the early stages of the Project.

>>>Read more on Page 10

Deliverable releases

During its first 6 months, EcoWater developed 3 deliverables.

These concern eco-efficiency indicators applicable for meso-scale assessments in the Project Case Studies, the structure of a technology inventory for systematizing relevant parameters, and a review of existing frameworks and tools for eco-efficiency analysis.

Furthermore, the prototype of one of the EcoWater tools has been released for testing.

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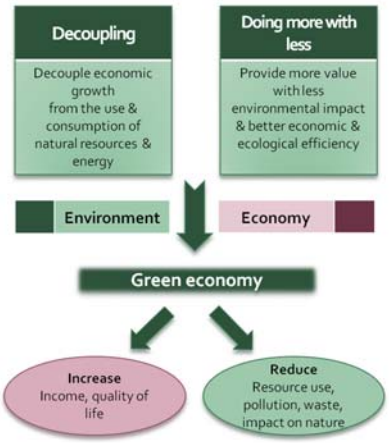
ECOWATER: CONTEXT & OBJECTIVES



Towards a Green Economy (Based on concepts from the UNIDO/UNEP Programme on RECP)

Eco-efficiency, as first defined in 1992 by the WBCSD, describes the concept of creating more goods and services while using fewer resources and creating less waste and pollution. It has emerged as an important tool for companies to re-think markets, increase profitability and reduce resource consumption and emissions. At the level of individual units and enterprises, eco-efficiency motivates (i) the re-engineering of processes, to reduce pollution and resource consumption and avoid risks, (ii) the re-design of products, to increase their value and minimize production costs, and (iii) the re-valorization of by-products, to make more efficient use of resources and generate additional cash flow.

EU policies have linked eco-efficiency with the wider aim of resource efficiency. Progress towards a resource efficient Europe would require, among others, the development of new techno-economic systems that will be capable of decoupling economic growth from resource depletion. Research concerns the measuring of progress towards this goal, focusing also on the means, opportunities, incentives, and barriers towards eco-efficiency enhancement.

Eco-efficiency metrics at the level of business units and specific products (micro-level) are at a very advanced stage of development and documentation. Similarly, macro-level indicators, which measure the eco-efficiency performance at sectoral and national levels, are widely applied to denote progress towards decoupling and green growth. However, policies that foster technology uptake require further information on systemic changes, which cannot be obtained by aggregating micro-level or disaggregating macro-level data. Meso-level analyses, which focus on the dynamic behavior of product and service systems, are employed to assess whether the integration of innovations results in a positive or negative change in the overall eco-efficiency of a system. They can further contribute to analysing the factors that influence innovation uptake, by examining interdependencies and heterogeneity among actors.

EcoWater seeks to address the existing gap in eco-efficiency metrics by adopting a systems' approach for developing meso-level indicators and for assessing the performance of innovative technologies, using water service systems as case application examples.

The EcoWater concepts

The specific research objectives of EcoWater concern:

- The selection and development of eco-efficiency indicators, suitable for assessing the systemic eco-efficiency improvements or deteriorations from innovative technologies. Indicators will be applicable to different systems and sectors of water use, and relevant for supporting pertinent policies and decisions;

- The integration of existing tools and assessment methods in a modeling environment, for the system-wide environmental and economic benchmarks of innovations, considering impacts across the relevant value chains and interactions among the actors involved;
- The elaboration of Case Studies in different systems and sectors to assess innovative technologies and practices in terms of their holistic contribution to eco-efficiency improvements;
- The analysis and characterisation of existing structures and policies and their impact on the uptake capacity for new technologies, and of possible policy instruments (regulatory, economic, institutional) that could foster technology uptake, through the development and testing of different scenarios on policy and management factors.

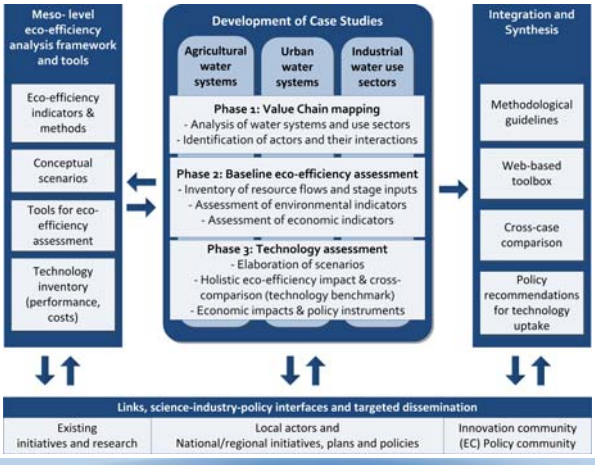
The EcoWater objectives will be achieved through the development of an analytical framework, which will include a set of indicators for meso-level eco-efficiency assessment, environmental and economic characteristics of technologies, and methods to support (i) systemic environmental impact assessments, (ii) economic assessments, (iii) analysis of value chains and interactions among actors, and (iv) conceptualisation of technology implementation and uptake scenarios.

PROJECT STRUCTURE

The main components of EcoWater are:

- An analytical framework for quantitative meso-level eco-efficiency assessment, building upon the review, customisation and selection of relevant indicators and methods. The framework will include an inventory with information on technology performance, costs and footprints, and tools for the analysis of systemic improvements from eco-innovations.
- Eight (8) Case Studies, which are the platform against which methodologies and tools will be tested and refined. Their implementation will aim at the assessment of innovations to improve eco-efficiency , and of the economic impacts from technology uptake.
- Integration and synthesis of results through step-wise methodological guidelines, an expandable and adaptable web-based toolbox to support future assessments, and policy recommendations, focusing on structural, socio-economic and management factors for technology uptake in water service systems.

An additional component concerns the development of science-industry-policy links with EU initiatives, policy actors and industry representatives.



Project structure and methodological approach

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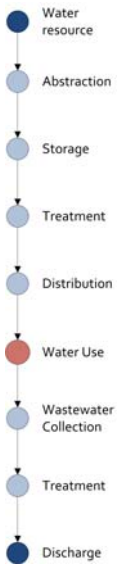
THE ECOWATER CASE STUDIES

The EcoWater Case Studies are the platform for the testing and refinement of the analytical framework and tools developed by the Project. Furthermore, their analyses will provide pragmatic evidence on the factors that can influence environmental and economic performance across value chains, and on the dynamics that can affect technology uptake by the different actors.

The Case Studies are formulated around a common theme, the assessment of technology impacts across water service systems. In each Case Study, the value chain that will be analysed includes all stages required to render water suitable for a specific use purpose. The value chain typically includes all stages upstream (water abstraction, storage, distribution) and downstream (wastewater collection, treatment and disposal) of water use, as well as the processes which can influence water quality and quantity within the water use stage (e.g. dyeing in the textile industry).

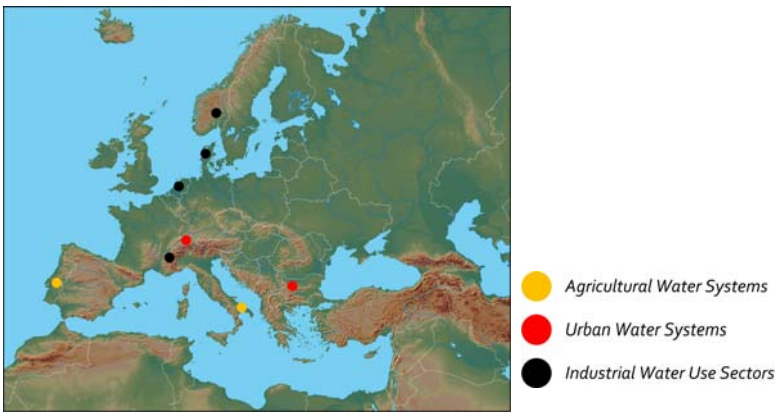


Typical structure of the water service systems to be analysed through the EcoWater Case Studies

The motivation for choosing water service systems as common theme was based on the following criteria:

- The importance of water as production input;
- The significant environmental impact and costs entailed in making water suitable for different purposes;
- The need for holistic approaches in assessing the performance of different technologies in the water sector; and
- The fact that the uptake of water-related innovations remains primarily regulatory-driven.

However, each Case Study concerns a different sector (agriculture, urban water use and industry) and assesses a broad range of technologies across the value chain, that can minimize the footprint of water use. Furthermore, the development of the Case Studies in different geographical areas across Europe, enables the representation of a broad range of regulatory, economic, social and environmental conditions, ensuring the widest possible applicability of the EcoWater approach and results.



Location of the EcoWater Case Study areas

CASE STUDIES ON AGRICULTURAL WATER SYSTEMS

The two Case Studies on agricultural water systems and use concern shifts from rainfed to irrigated agriculture and innovations that can reduce water and energy footprints and production inputs. The Case Studies are developed for two irrigation schemes of Southern Europe, the Sinistra Ofanto Irrigation Scheme in Apulia, Italy, and the Monte Novo Irrigation Scheme in Southern Portugal.

The Sinistra Ofanto Case Study

The Sinistra Ofanto Case Study (*"Meso-level assessment of eco-efficiency improvements through innovative technologies for irrigation water management and agricultural production"*), concerns an irrigation system designed for on-demand-delivery for a cropping pattern of olive trees and field crops. In the last decades, more profitable and input-demanding crops have been favoured. As irrigation demand is increasing, the network supply is insufficient to meet water requirements, and additional water is abstracted by the Ofanto River and 2000 local wells, managed directly by farmers. The performance of the water delivery network is worsening, the system suffers from inadequate discharge and pressure, and irrigation pumps do not operate efficiently. The uncontrolled withdrawal of groundwater periodically causes drops of the groundwater table, saltwater intrusion in aquifers, and results in the use of salty water for irrigation with consequent degradation of soil quality.

The Monte Novo Case Study

The Monte Novo Case Study (*"Eco-efficiency assessment in new hydro-agricultural systems – New technologies for eco-efficient water management and agricultural production"*) concerns a relatively recent irrigation scheme, associated with the Alqueva Multi-Purpose Project, one of the largest water-related investments ever made in Portugal. The system was designed to supply water on demand, enabling farmers to use water in the desired quantity and without time restrictions. The scheme marks a transition in local agriculture: where rainfed crops previously dominated, an extensive water supply system allows the development of large-scale irrigation. However, not all farmers have connected to the scheme; the increase of connections and retaining irrigation practices in the area are goals of the local authorities, to ensure use of the new infrastructure and adequate cost recovery. On a broader scale, and despite the expected socio-economic benefits, increased costs in terms of resources (water, energy and agro-chemicals) and environmental impacts are anticipated.

Potential technologies to be assessed through EcoWater

Water management: SCADA systems for water distribution, sensors for monitoring weather variables and soil moisture, alternative irrigation methods/technologies, remote control of irrigation water supply and withdrawals, treated wastewater use

Energy consumption: RE-powered irrigation pumps, eco-friendly variable speed pumps, optimization techniques in pumping stations, network sectoring and dynamic pressure regulation

Eco-friendly agronomic practices: Use of organic matter (slurry and WTTP sludge), crops for CO_2 reduction, application of minimum tillage, no-till farming, run-off retention ponds, use of biodegradable mulches, changes in cropping patterns

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CASE STUDIES ON URBAN WATER SYSTEMS

The EcoWater Case Studies on urban water systems focus on technologies for more sustainable water supply and wastewater management, water conservation, resource separation and cleaner production in SMEs. Two distinct paths, the utility-customer-utility and utility-business (SME)-utility paths are analysed, in order to incorporate the different economic values associated with water use and assess opportunities and barriers for the uptake of innovations. The Case Studies concern two very diverse contexts, the urban water system of Sofia, Bulgaria, and urban water services in Zurich, Switzerland.

The Sofia Case Study

The Case Study for Sofia ("*Assessment of eco-efficiency improvements through innovative technologies for potable water supply and wastewater treatment*") concerns the local urban water supply and sewerage systems. These will be studied at the meso-level, focusing on the main functional interrelations of the engineering system and the interdependencies among the involved stakeholders. Innovative technologies for the most problematic stages and targeting the largest water users will be further studied. The system components considered most crucial in terms of eco-efficiency performance are: (a) the water distribution network, which experiences high levels of leakage; and (b) the sewerage network, several parts of which allow the infiltration of extraneous waters and exfiltration of wastewater.

The Zurich Case Study

The Zurich Case Study ("*Assessment of eco-efficiency improvements from the implementation of cleaner production and resource separation technologies in the provision of urban water services*") focuses on technologies to improve eco-efficiency in the entire span of urban water services .

Despite the high standards achieved in the Swiss waterways, the objectives of water laws are not fully achieved and current strategies fall short of new challenges. The Case Study will support meso-level dialogue on the distribution of the total costs and benefits of technologies, as these are often unevenly distributed among several actors. Thus, it can be the case that, without adequate compensation mechanisms, actors expected to employ new practices bear high costs, whereas others may benefit free of charge, leading to a less-than-optimal outcome in terms of technology uptake.

Relevant technologies to be assessed through EcoWater

Water supply, treatment and distribution: Improved pumping systems, low-friction pipe materials, elimination of micro-pollutants by nano-particles, activated carbon, and ozone treatment

Water use: Water saving sanitary appliances, pressure reducing devices, cleaner production innovations for SMEs, water-free and urine-free separation toilets, water efficient appliances

Wastewater treatment: Reduction in sludge generation, low energy consuming aeration systems, improvements in anaerobic sludge treatment, eco-sludge drying, technologies for phosphorus recovery from water, sludge and sludge ash after mono-incineration, biological phosphorus elimination

CASE STUDIES ON INDUSTRIAL WATER USE SECTORS

Case Studies targeting industrial water use sectors focus on technologies towards closed-loop systems, the recovery of resources and advanced treatment processes. They concern the textile industry, the dairy industry, the automotive industry, and the cogeneration of electricity and thermal energy. The study of the value chains will entail the assessment of economic impacts among actors involved, revealing ways through which more eco-efficient practices and technologies can be promoted in the corresponding sectors.

Textile industry, Biella, Italy

The Case Study for the textile industry ("*Assessment of eco-efficiency improvements through innovative technologies for wastewater treatment in the textile industry*") concerns the district of Biella, located in the NW of the Piedmont Region. The area is among the most significant for the textile industry worldwide, particularly with regard to wool and cashmere products manufacturing. The local textile industries have a significant impact on economic/social aspects, and on water exploitation and water pollution. Effluents from the textile units must be treated for the removal of fat, oil colours and other chemicals. This creates problems at the urban wastewater collection and treatment unit of the Biella Province. As the urban wastewaters are mixed with semi-treated waters from industries, sludge cannot be used as fertilizer in agriculture, and its safe disposal incurs a high cost to the local authorities. The large dispersion of the textile SMEs would require small-scale, decentralized options rather than end-of-pipe solutions.

Wastewater treatment technologies to be assessed through EcoWater

Biological filtration through plant rhizome systems, constructed wetlands, artificial phyto-depuration by aluminosilicate materials

Dairy sector, Denmark

The Case Study for the Danish dairy sector ("*Assessment of eco-efficiency improvements in the Danish dairy sector through innovative use of water technologies, energy exploitation and utilisation of nutrients for crop production*") focuses on possibilities for increased eco-efficiency in water treatment and use, the storage and disposal of process water and the recovery/use of resources in effluent streams.

Currently, a key environmental issue in the dairy industry is the discharge of large effluents with high organic, nitrogen and phosphorus loads. The reduction of these loads can simply result from the use of effluents for producing biomass or agricultural crops. Such closed loop systems can contribute to groundwater conservation and the reduction of fertilizer inputs in agriculture. In this context, the Case Study will focus on assessing the improved performance and economic impacts of different alternatives for all actors involved.

Relevant technologies to be assessed through EcoWater

Water using dairy processing stages: Use of Clean-In-Place equipment (CIP)

Wastewater treatment: Pre-treatment of process water for increased energy efficiency of the overall waste handling, energy-efficient wastewater treatment, phosphorus recovery & utilization, on-line monitoring techniques for control of treatment technologies

Effluent Reuse: Technology for utilization of effluent for irrigation, choice of the right crops for biomass production and exploitation

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Cogeneration of electricity and thermal energy, the Netherlands

The Case Study concerns the Amsterdam-Rhine Channel (ARC), which is the primary source of cooling water for electricity production in the area, as well as the recipient water body of thermal discharges. Due to the wide variety of functions and uses of the ARC, ecological issues may arise during the summer, as a result of the increased water temperature and reduced flow. The need to maintain water temperature standards can result in a decrease of energy production or even plant shut-down, with significant economic consequences (e.g. electricity shortage).

The economically efficient enhancement of the overall sustainability of the water-energy system through innovative technologies is a priority of authorities and local actors. In this perspective, alternatives can concern the exploitation of the thermal energy of cooling, the post-usage of cooling water for different purposes, such as district heating and industrial use, achieving energy savings and reducing thermal pollution.

Relevant technologies to be assessed through EcoWater

Water abstraction: Technologies for the water-inlet system, improved pumping efficiency, smart pumping

Closed loop energy systems: Thermal energy recovery from the cooling water, storage of excess thermal energy in the subsurface, district heating

Closed loop water systems: Reuse of cooling water in municipal, recreational and production facilities

Real-time control of discharges: Application of DSSs for the real time control of thermal conditions of water in the ARC, in combination with thermal energy demands

Automotive Industry, Sweden

The Case Study (*"Meso-level eco-efficiency indicators for technology assessment in water use in the automotive industry"*) concerns the Volvo Group.

During the manufacturing process, many steps involve water usage, including surface finishing and painting applications, and result in wastewater that needs to be treated to high standards to meet environmental regulations. Many water streams are potential sources of energy, as a result of their increased temperature. Furthermore, water, chemicals and energy usage directly affect the economic and environmental impact of in the manufacturing process. Thus, potential savings through improvements, such as improved technologies for input water treatment, wastewater handling, recycling, recovery of energy and closed-loop processes, are a significant step towards eco-efficient solutions. The Case Study plans to address the above by focusing on the Volvo Trucks production facility in Umeå, Northern Sweden.

Relevant technologies to be assessed through EcoWater

Water treatment processes: Carbon filtration, zeolite or membrane softening, micro-filtration

Wastewater treatment: Metals treatment, advanced methods for the handling of wastewater streams from painting processes

On-site recycling for water and energy saving: Configurations for internal recycling, resource separation, energy recovery, closed-loop processes

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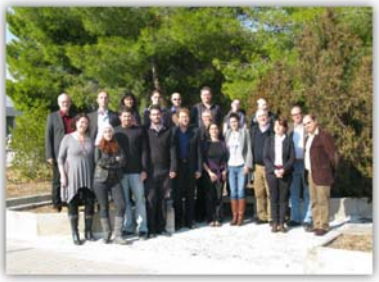
THE LAUNCH OF ECOWATER

EcoWater started officially on November 1st 2011; the Kick-Off Meeting was held within the first Project month, in Greece, at the campus of the National Technical University of Athens on 28-30 November 2011.



The EcoWater Kick-Off Meeting Participants

The meeting was attended by representatives of all Project Partners and the European Commission Scientific Officer. It was aimed at discussing the main concepts related to EcoWater, and at framing the research to be developed during the course of the Project.

For this purpose, the Meeting began with a 1-day inter-Project workshop, where eco-efficiency metrics and broader policy objectives were discussed in relation to meso-level dynamics and technology uptake in value chains. The workshop also included an overview of requirements for the framing of the EcoWater Case Studies, and the outlining of steps for defining the boundaries of the analysed systems and for assessing systemic eco-efficiency improvements from technology uptake.

The 2nd day was mainly devoted to Case Study overview presentations and discussion on the features of each, in order to allow the early identification of specificities and potential outcomes on the cross-comparison of results and the development of policy recommendations.

Finally, the 3rd day involved Break-Out Groups, where the Case Study representatives discussed context-specific issues, eco-efficiency indicators applicable in each Case and eco-efficiency technologies to be assessed through the EcoWater tools. The meeting concluded with plenary discussions on the EcoWater dissemination activities and forthcoming tasks.

For more information please visit the EcoWater web> News and Events

FORTHCOMING EVENT

The next major EcoWater event is a local workshop dedicated to the Sinistra Ofanto Case Study. The event will focus on eco-efficiency indicators of relevance to the local irrigation system and irrigation water use, technologies to be assessed through EcoWater, and preliminary results for a baseline eco-efficiency assessment.

The Case Study workshop be co-organized with the 1st EcoWater Annual Meeting in Bari, Italy, which will also include consultation with the EcoWater External Advisory Board of experts, to evaluate project progress and outputs.

The event programme will be announced in late August 2012 through the EcoWater web site.

For further information, please contact:
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Prof. Dionysis Assimacopoulos, NTUA (EcoWater Coordinator): assim@chemeng.ntua.gr

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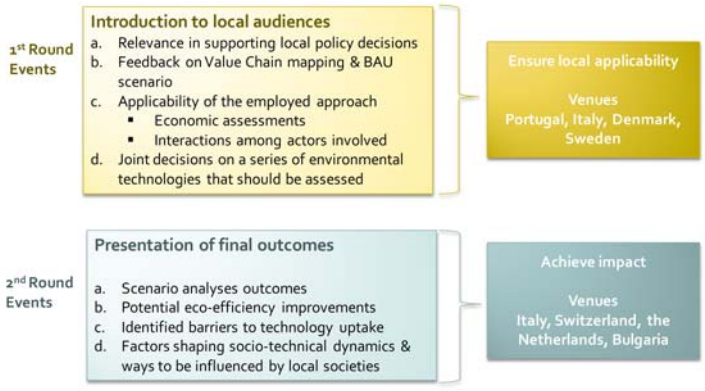
THE ECOWATER EVENTS

The development of durable science-industry-policy links, through the development of a Research Alliance, is a major objective of EcoWater. Targeted events to be organized by the Project span two geographical scales:

- At the local scale (individual Case Studies), workshops with local policy actors, decision makers and the private sector, will seek to inform project analyses, and ensure that results on indicators and technology assessment are relevant and useful to local contexts.
- At the EU and International level, three large-scale targeted events and the Final Project Conference will foster linkages with research initiatives, the Innovation Community, the Water Research and Technology Community, and the Policy Community, to ensure wide dissemination and transferability of the EcoWater results.

Local Case Study Workshops are organised in two rounds, where the objectives of each reflect the progress of the Project. The 1st round is aimed at introducing the Project and fostering feedback on appropriate indicators and environmental technologies that should be assessed in each Case Study. The 1st series of events has already been initiated through the Portugal Workshop for the Monte Novo Irrigation Scheme Case Study (see Page 11). The second event will concern the Sinistra Ofanto Case Study, and will be held in Bari, Italy in early October 2012, whereas the 3rd and 4th events will be held in Sweden and Denmark in March/April 2013.

The 2nd round is oriented towards the discussion on final outcomes from each Case Study, focusing on scenario analysis outcomes, potential eco-efficiency improvements in the studied systems, and identified barriers to technology uptake.



The frame of the EcoWater Case Study events

The 3 large scale targeted events will each address a specific audience, and focus on different aspects relating to meso-level eco-efficiency assessments. The first event, which will address existing and ongoing research initiatives on eco-efficiency is scheduled for December 2012. Subsequent events will target the engagement of the industrial and policy communities.

The EcoWater final conference will mark the end of the Project; through the presentation of the main Project outputs and results, it will be oriented towards the discussion of their applicability and the identification of next steps in terms of policy, industrial development and research.

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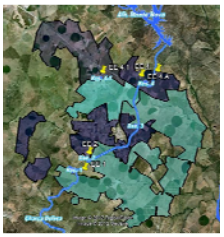
THE PORTUGAL WORKSHOP

The first of the local Case Study workshops of EcoWater was organized in Évora, Portugal on the 20th April 2012. The event concerned the EcoWater Case Study on the Monte Novo Irrigation Scheme, and framed in the concept of the 1st round of EcoWater Case Study events. Thirteen (13) local actors attended the event, from the Alqueva Development and Infrastructures Company (EDIA), the River Basin Authority and the Regional Directorate of Agriculture and Fisheries of Alentejo, the Technical and Operational Center for Irrigation (COTR), the Monte Novo Irrigation Scheme Users Association, the Fundação Eugénio de Almeida (FEA) and other farmers.

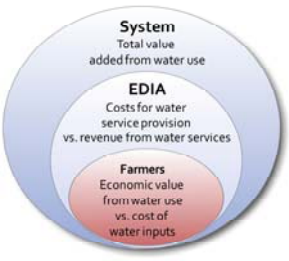
Following from a general presentation on EcoWater and its research context by Prof. D. Assimacopoulos, Prof. R. Maia of UPORTO described the main elements of the Monte Novo Irrigation Scheme, and the focus of the Case Study analysis, which concern:



Irrigation Blocks of the Monte Novo Scheme

- The overall eco-efficiency performance of an irrigation scheme, which is relatively recent, but where opportunities for improvement exist;
- The impacts on the eco-efficiency of the system which result from the transitioning from rainfed to irrigated agriculture; and
- New technologies and strategies for irrigation water use and agricultural development.

Next, J.C. Gomez of EDIA provided information on the technical characteristics of the Monte Novo Irrigation Scheme, and emphasized on the current framework for the monitoring of environmental parameters in the area. Despite the development of the scheme and progress in terms of connections, there is a lot to be done in order to identify the non-irrigated areas, determine the corresponding reasons and search for solutions.



Framework for the EcoWater economic assessments

The discussion that followed concerned potential eco-efficiency indicators and economic analysis aspects relevant to the Monte Novo Irrigation Scheme. The former can include energy and water use, emissions to air, soil and water, and the intensity of agricultural production inputs, such as fertilizers and pesticides. Local actors suggested to also study soil erosion, which can affect agricultural productivity in the near future. Economic assessments can concern the interaction among the EDIA and local farmers, particularly regarding the way through which pricing policies affect water use and adherence to irrigation for large and small-scale activities.

Potential technologies that could be employed to enhance economic output and improve environmental performance were outlined by J. Maia of COTR. Suggestions emphasised on variable tariffs for water and energy saving, on the change in agricultural and irrigation practices/methods and on the enhancement of economic output through more intense cultivation. The workshop event was concluded with a preliminary eco-efficiency assessment for the Monte Novo Irrigation Scheme, based on the Systemic Environmental Analysis Tool— SEAT, so as to illustrate the follow-up research and data collection tasks.

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EcoWater

Meso-level eco-efficiency indicators to assess technologies and their uptake in water use sectors

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RECENT ECOWATER RELEASES

During its first 6 months, EcoWater has developed the following publicly available Deliverables:

- Review and selection of eco-efficiency indicators to be used in the EcoWater Case Studies

The report is a literature overview on the available academic and policy literature, information and knowledge on eco-efficiency indicators and assessment methodologies. It concludes on a framework for the structuring of eco-efficiency indicators for the EcoWater Case Studies, and on criteria to guide their selection process.

- Technology inventory design and specifications

The Deliverable presents the structural design of the technology inventory of EcoWater, which will be used for collecting and systematizing information on innovative environmental technologies and practices, focusing on technology economic parameters, technology environmental parameters and technology efficiency parameters. The inventory will form part of the EcoWater Toolbox, one of the key Project outputs.

- Review of existing frameworks and tools for developing eco-efficiency indicators

The review describes existing frameworks and tools for eco-efficiency assessment, focusing on their relevance to the EcoWater context. Existing models and tools are discussed in terms of possibilities for integration in a web-based environment, flexibility and adaptability, ease of use, and relevance to meso-scale and technology scenario formulation and assessment, in order to guide the development of the EcoWater eco-efficiency analytical tools.

In addition to the above, a prototype of one of the EcoWater tools, the Systemic Environmental Analysis Tool-SEAT has been developed. The SEAT, which will form part of the EcoWater Toolbox, focuses on the representation of stages and processes in water service systems, and assesses resource and material flows, in order to provide input for the calculation of the environmental component of eco-efficiency indicators. The SEAT prototype has been made available for testing among the Partners of EcoWater.

If you wish to obtain a copy of the prototype Systemic Environmental Analysis Tool, please contact the EcoWater Coordinator

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