



# ICARUS

## *IWRM for Climate Change Adaptation in Rural socio-ecosystem in Southern Europe*

# POLICY brief

### INTRODUCTION

#### The project

The ICARUS project focuses on **water** and **climate change adaptation** in **agriculture in Southern Europe**. The project aims at increasing the efficiency of water use in agriculture by analysing the different dimensions of sustainable water management and by identifying and assessing innovative adaptation strategies, practices and tools for saving water in irrigated production systems. Case studies of the project are the Venice Lagoon Watershed (Italy), the Jucar river basin (Spain), and Central Alagarve (Portugal).

### PURPOSE OF THIS SCIENCE-POLICY BRIEF

#### Agriculture and climate change

Contribution to:

- the understanding of biophysical, socio-economic, and institutional changes and how they impact on agricultural water management, particularly in a context of more frequent droughts and water scarcity;
- the improvement of decision-making processes by exploiting digital bi-directional communication;
- introduction of climate change perspective into the practice of IWRM, via the evaluation of adoption of climate change adaptation strategies in agriculture.

### POLICY FOCUS

#### EC and climate change adaptation

In April 2009, the European Commission presented a White Paper “Adapting to climate change”, laying out a European framework for action to improve Europe's resilience to climate change, emphasising the need to integrate adaptation into all key European policies and enhance co-operation at all levels of governance.

⇒ yet, on the ground rural development policies still lag behind in terms of adoption of a climate change dimension into a IWRM framework

The ICARUS project promotes the integration of climate change adaptation policies into IWRM policies.

Moreover, the European Commission Communication on Water Scarcity & Drought (WS&D) set as main objectives, amongst others:

- Allocating water and water-related funding more efficiently
- Improving drought risk management
- Considering additional water supply infrastructures
- Fostering water efficient technologies and practices
- Fostering the emergence of a water-saving culture in Europe
- Improve knowledge and data collection

⇒ however, through consultations with several experts, practitioners, stakeholders, and governmental agencies, several limits still emerge for an effective decision-making process which maximise knowledge produced in various sectors and potentials for cooperation of different actors.

The ICARUS project highlights that through a sound characterisation of not only needs and priorities of end beneficiaries (ie. farmers), but also of their business as usual, policy funding can be directed towards the most options for an optimal management of the water resource.

## PROJECT KEY OUTPUT

### From autonomous to planned adaptation

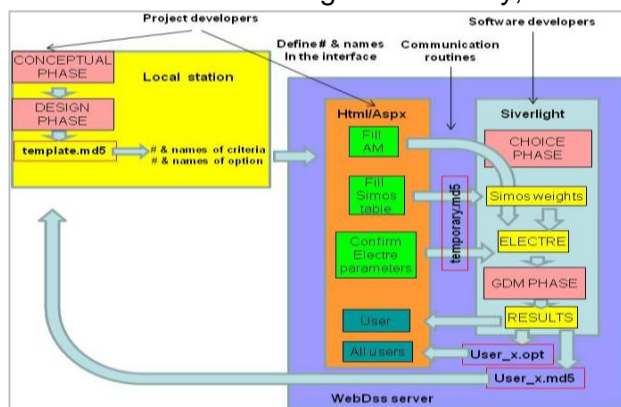
The project explored first scenarios of change, then drivers and processes of change, and finally it assessed an array of adaptation options in the agricultural sector. Overall, climate scenarios and economic scenarios show that by 2025 rainfall will decrease, temperature increase, and GDP growth will suffer a halt.

Farmers involved revealed that a great deal of autonomous adaptation is already occurring, which range from improved efficiency in farming technologies, increased irrigation intensity, introduction of irrigation, diffusion of groundwater exploitation,

changing crops and/or crop management, and specialisation in non-food related agricultural activities, such as energy production from biomasses. However, the adoption of the technologies at farmers' level is dependent on a wide array of factors (farmer's age, full or part-time dedication, cropping pattern, generational relief, training, etc.) which shall be taken into consideration when designing ad hoc policies.

The main output of the project is an **online decision support system** (mDSSweb, in Figure), for the integrated management of supply and demand for water resources. In the ICARUS project, mDSSweb was applied to involve

farmers and Irrigation Boards in the analysis of possible adaptation strategies for the agricultural system in the case studies, under the condition that water conservation is more and more necessary. Specific strategies for each case study were evaluated according to several criteria, which covered social, economic, and environmental dimensions of the problem at stake, plus perceptions of overall feasibility and long-term durability. mDSSweb is a valuable tool for policy-makers, as it is highly flexible, easily adaptable to different contexts, and its online nature allows the involvement of hundreds of stakeholders, whose view are crucial for the success of policy design and implementation. Moreover, it permits the overcoming of temporal and spatial barriers, simplifies linguistic barriers, and eases knowledge and experience transfer.



## LIMITATIONS IDENTIFIED BY ICARUS

### Gaps identified in present policy-making processes

The main policy limitations identified by the ICARUS project were discussed with several experts during the project's final conference, "Dialogue on water resources from research to livelihood impacts"\*. In particular:

1. The potential of models and economic policy instruments is well recognized in the research/academic environment, while it is often considered with scepticism by general public and policy makers. This is often due to **gaps in communication** between the two spheres, but also to specific problems, such as researchers not considering very important dimensions of local cultural background.
2. Limits in communication produce a cascade of negative effects, including the **lack**

**of trust** between science and policy making. Building trust requires well established interaction mechanisms and time. Often only implementing institutions can create the necessary conditions for long term perspectives, as they have different time constraints than research institutes.

3. Quite often, the **knowledge produced by the academic/research environment is not fully exploited** by the potential beneficiaries, for different reasons, including very importantly their limited involvement in research design and implementation, which determines as a consequence that the needs of the latter are not taken adequately into consideration by the former.
4. In order to be effective, coordination should include methodologically sound and efficient approaches to manage **participatory process** for the involvement of broad groups of stakeholders, as a prerequisite for improving communication, building trust and increasing impacts.

## RECOMMENDATIONS

### Proposals for an effective and sound policy-making

On the basis of the limitations identified above, ICARUS recommends the following:

- ✓ The need emerges to bring to the surface the gap in the **communication** path from academia to institutions to final users and vice versa. The potential role and usefulness of research products and advanced tools, such as models, should be demonstrated in real world conditions, and their potential for improving business-as-usual should then emerge, an example being management and communication of uncertainty, which shall not be concealed but instead brought into decision-making practices.
- ✓ Platforms for **long lasting collaboration and trust building** should be established to provide the basis for effective knowledge transfer. The role of long term demonstration cases is paramount, for building trust about for example the potentials of innovative tools or policy mechanisms.
- ✓ New research funding mechanisms should carefully consider mechanisms to strengthen the links and increase potentials for **cooperation** between Universities and Research Centres – Institutions – Users. There should be no will to make social and economic interests to control scientific activities, but instead to have a voice in identify specific needs and conditions for operational implementation of expected outcomes, since the very early stages of research projects.
- ✓ **Participation** is not an option, is a must as the sense of ownership is fundamental for the successful of any development project and policy implementation. Not only pilot and demonstration projects and dissemination activities are very important, but also the potential of Web 2.0 should be fully exploited, as internet is a powerful tool to involve beneficiaries and setup efficient interactions with the academia.
- ✓ Therefore, the need emerges to identify approaches to improve the **coordination and integration** of assessment methods. It has been shown that the consideration of efficiency of water use in agriculture should be revised by including the consideration of a much longer chain of connected use for food production, energy, ecosystems, etc. For example, any approach to improve water efficiency should address also the fate of food products, including consideration of the water footprint of the huge amount of food wasted every day, as a part of the integrated cycle of an efficient resource use.
- ✓ An innovative concept of **efficiency** has been identified as a crosscutting dimension of water management, which requires new methodological efforts to be able to track it all along the biogeochemical cycle of water, across several sectors, such as agriculture, energy and buildings, but also through the ecosystems.

## ADDITIONAL TECHNICAL/SCIENTIFIC INFORMATION

A couple of comments left by farmers and policy-makers on the web platform:

*This platform is a powerful tool for collecting opinions and exchanging experiences*

*These results are very useful for maximising policy-making efforts, from design to implementation efficacy*

### FURTHER INFORMATION ON THE ICARUS PROJECT:

**Starting/Ending date of project:**  
September 1<sup>st</sup>, 2010 to December 31<sup>st</sup>, 2012

### Participating agencies/institutes:

Euro-Mediterranean Centre for Climate Change (CMCC)  
[Coordinator]  
*Isola di S.Giorgio Maggiore, Venice, Italy*  
[www.cmcc.it](http://www.cmcc.it)

Universidad Politécnica de Valencia  
- Centro Valenciano de Estudios del Riego (UPV)  
Camí de Vera s/n  
46022 – València (Spain)  
<http://www.upv.es/cver/>

Investigação e Administração S.A. / Instituto de Investigação Científica e Tecnológica da Universidade Atlântica (EIA-UATLANTICA)  
*Antiga Fábrica da Pólvora de Barcarena*  
2730-036 Barcarena  
[www.uatlantica.pt/investigacao.html](http://www.uatlantica.pt/investigacao.html)

**Programme:**  
EC IWRMnet

Behind mDSSweb: [www.netsymod.eu/mdss](http://www.netsymod.eu/mdss)

mDSSweb template: [www.tiamasg.org/icarus/sawEN](http://www.tiamasg.org/icarus/sawEN)

Strategic report on DIALOGUE ON WATER RESOURCES FROM RESEARCH TO LIVELIHOOD IMPACTS

## SELECTED RELATED PROJECTS/ACTIVITIES

NOSTRUMdss: Network on gOvernance, Science and Technology for sustainable water ResoUrce management in the Mediterranean.  
The role of Dss tools – coordinated action

Water2Adapt: Resilience enhancement and water demand management for climate change adaptation, IWRMnet project, 2010-2012

ClimWatAdapt: -Climate Adaptation – Modelling water scenarios and sectoral impacts

Climate-adapt: European Climate Adaptation Platform

\* The “DIALOGUE ON WATER RESOURCES: FROM RESEARCH TO LIVELIHOOD IMPACTS” was born out of an effort to disseminate and build on solutions developed for reducing water insecurity and contributing to sustainable development in the Mediterranean Area. The event, organised by the Euro-Mediterranean Centre on Climate Change, in collaboration with Fondazione Eni Enrico Mattei, Ca’ Foscari University of Venice and Food & Agriculture Organisation, built on the results of two European IWRMnet projects, ICARUS and Water2Adapt.

<http://www.cmcc.it/research/research-projects/icarus-1/icarus>