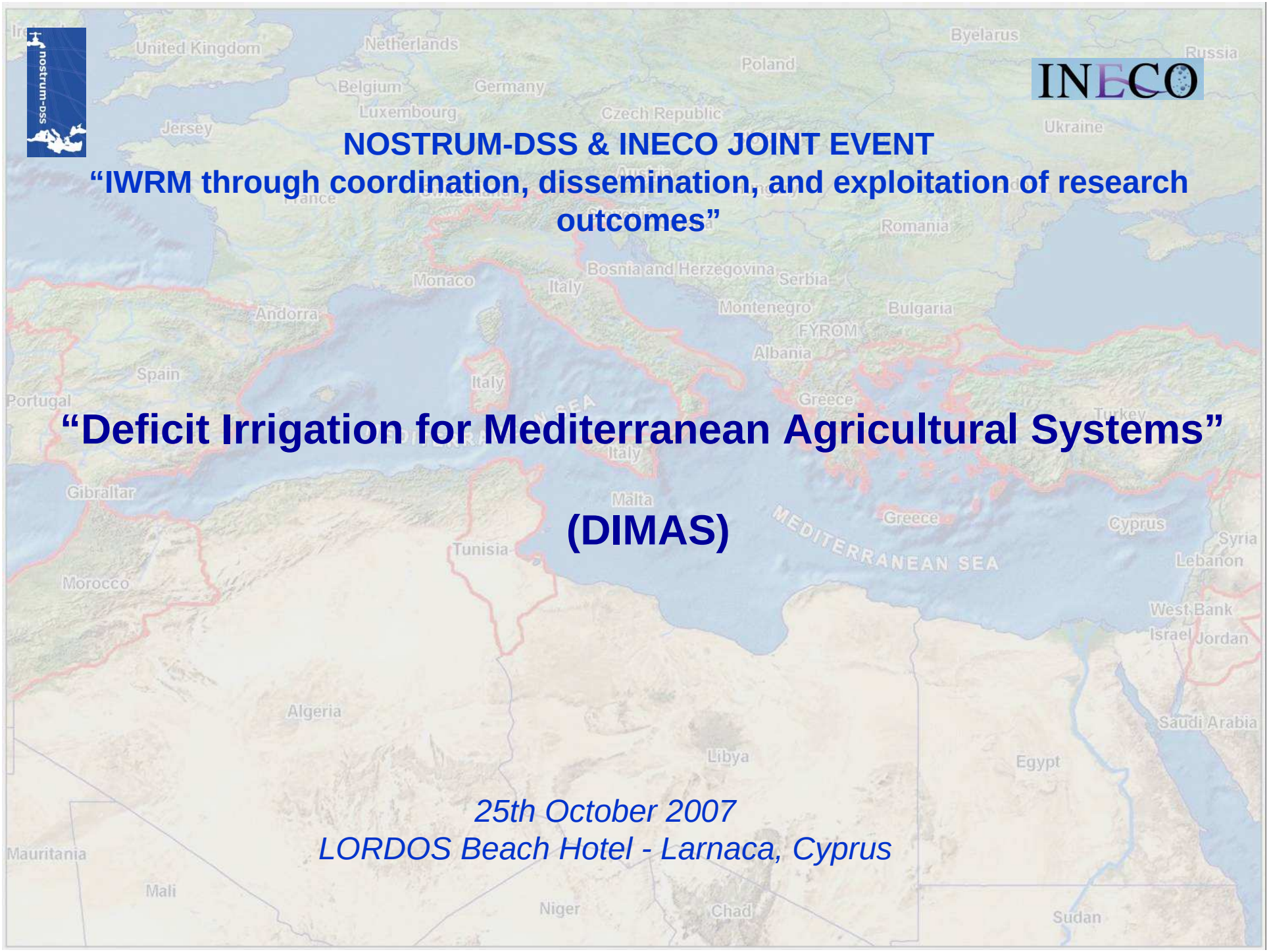


NOSTRUM-DSS & INECO JOINT EVENT

"IWRM through coordination, dissemination, and exploitation of research outcomes"

"Deficit Irrigation for Mediterranean Agricultural Systems"

(DIMAS)

25th October 2007

LORDOS Beach Hotel - Larnaca, Cyprus

INCO-III

INTERNATIONAL CO-OPERATION
WITHIN THE 6TH FRAMEWORK PROGRAMME (FP6)

FOR RESEARCH, TECHNOLOGICAL DEVELOPMENT AND DEMONSTRATION (2002-2006)

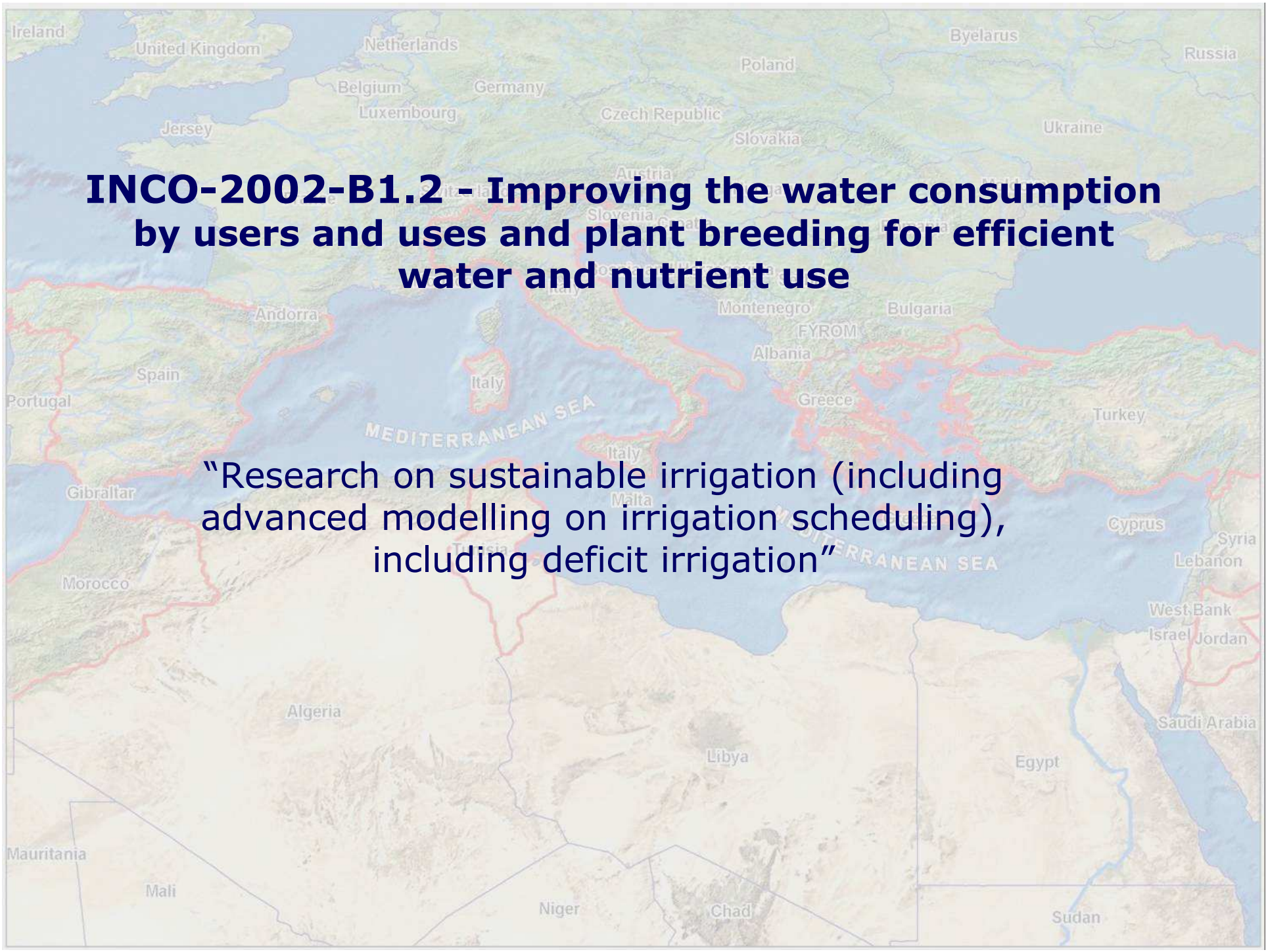
6th Framework Programme (FP6)

Project : **FP6-2002-INCO-MPC-1**

International Cooperation

Mediterranean Pertner Countries

Instrument:: STREP (Specific Targeted Research Project)



INCO-2002-B1.2 - Improving the water consumption by users and uses and plant breeding for efficient water and nutrient use

"Research on sustainable irrigation (including advanced modelling on irrigation scheduling), including deficit irrigation"

SIXTH FRAMEWORK PROGRAMME
FP6-2002-INCO-MPC-1

Contract nº INCO-CT-2004-509087

Project Coordinator: **Elías Fereres**

Organisation: **University of Cordoba**

Specific Targeted Research Project:

"Deficit Irrigation for Mediterranean Agricultural Systems" (DIMAS)

1 September 2004 – 31 May 2008

The objective of this project is 'to evaluate the concept of deficit irrigation (DI) as a means of reducing irrigation water use while maintaining or increasing farmers profits'

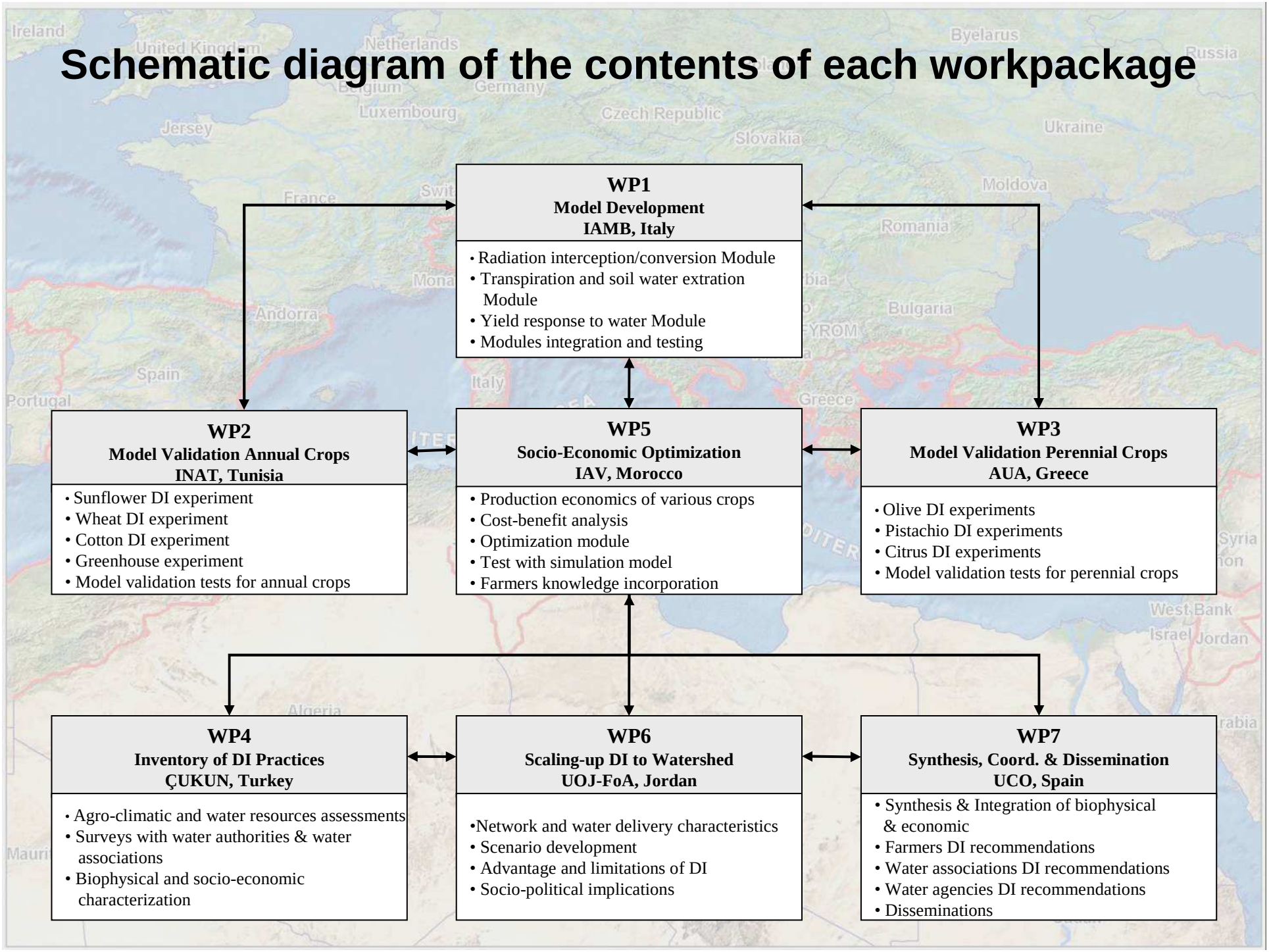
Partner Institutions and their focus

No.	Partner institution	Acronym	Country	Disciplinary focus
1.	Department of Agronomy, University of Cordoba	UCO	Spain	Water management, Modelling
2.	Agricultural Univ. Athens	AUA	Greece	Agro-ecology, Hydraulics
3.	Mediterranean Agronomic Institute. Bari	IAMB	Italy	Ecophysiology, Modelling
4.	University of Jordan, Faculty of Agriculture	UoJ-FoA	Jordan	Irrigation, Engineering
5.	Institute Agronomique Veterinaire Hassan II	IAV	Morocco	Economics, Sociology
6.	Institute Nationale Agronomique	INAT	Tunisia	Socioeconomics, Irrigation
7.	University of Çukurova, Faculty of Agriculture	ÇUKUN	Turkey	Ecophysiology, Irrigation
8.	Union Tunisienne de l'Agriculture et de la Peche	UTAP	Tunisia	Irrigation management
9.	Consortium of Bonifica of Capitanata	CBC	Italy	Irrigation management

The responsible partner for each workpackage

Work-package No.	Workpackage title	Partner No.
1.	Model development	3
2.	Model validation in annual crops	6
3.	Model validation in perennial crops	2
4.	Inventory of DI practices	7
5.	Economic optimisation	5
6.	Scaling up DI to the watershed	4
7.	Synthesis, integration, coordination, dissemination	1

Schematic diagram of the contents of each workpackage



The field research program was carried out in each Country with the following target crops:

	Experiments in:
Annual Crops:	
Cotton	Greece, Turkey
Wheat	Italy, Tunisia
Sunflower/sugar-beet	Spain, Morocco
Perennial Crops:	
Citrus	Jordan
Pistachio	Greece, Turkey
Olive	Spain, Tunisia

Partner	Field experiments (Crops)	Country
1. UCO	Sunflower, Olive	Spain
2. AUA	Cotton, Pistachio	Greece
3. (9) IAMB (CBC)	Sunflower, Wheat	Italy
4. UOJ	Citrus	Jordan
5. IAV	Sugar beet	Morocco
6. (8) INAT (UTAP)	Wheat, Olive	Tunisia
7. CUCUN	Cotton, Pistachio	Turkey

Common experimental design and data collection

Treatments:

- Full Irrigation (FI): 100% of ET_c
- 1st level of Deficit Irrigation (I-70): 70% of FI
- 2nd level of Deficit Irrigation (I-50): 50% of FI

Minimum data set:

- Daily climatic data (for the calculation of ET_c).
- Rainfall.
- Soil profile characteristics.
- Soil water content (from sowing to maturity).
- Evolution of crop cover (%).
- Total biomass production and yield.

Annual Crops

- Wheat

Tunisia

In figs 1 and 2 the yield and the IWUE for the wheat experiment in Tunisia are presented..

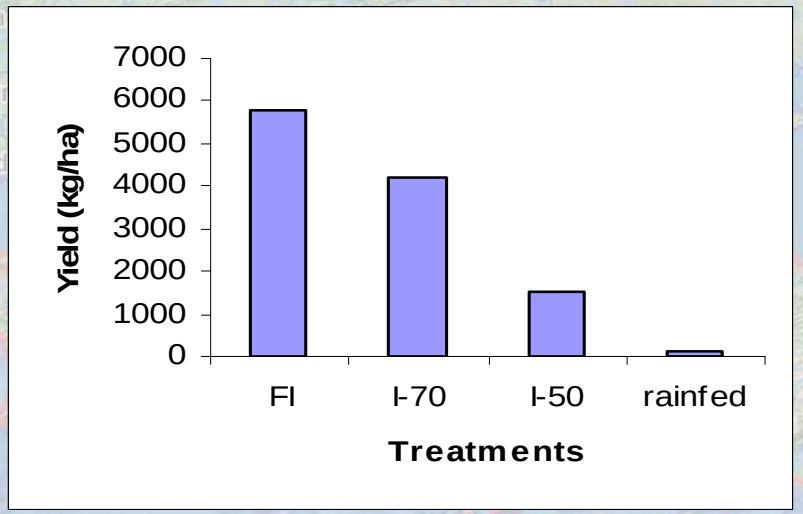


Fig. 1: Yield of wheat experiment for each treatment

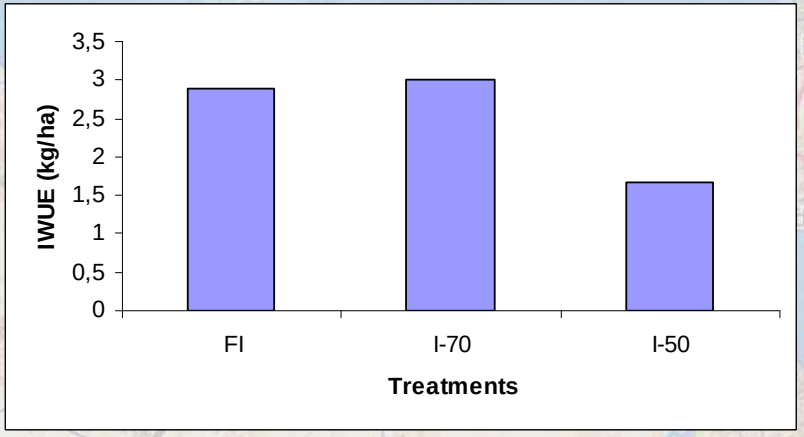


Fig. 2: IWUE values of wheat experiment for each treatment

Annual Crops

- Sunflower

a. Italy

In figs 3 and 4 the yield and the IWUE for the sunflower experiment in Italy are presented.

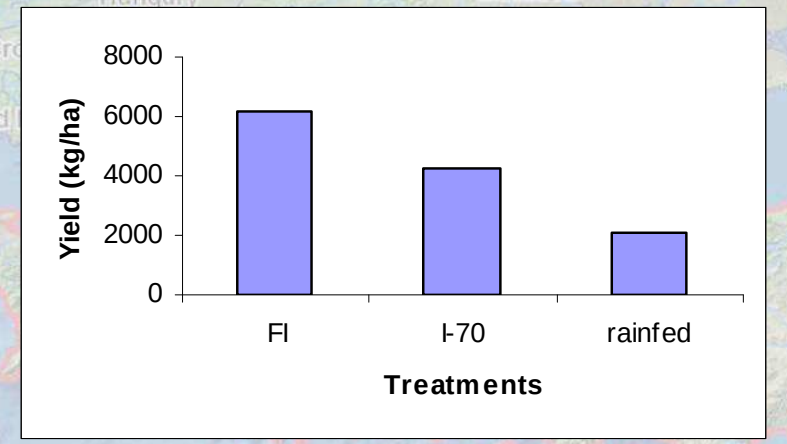


Fig. 3: Yield of sunflower experiment for each treatment

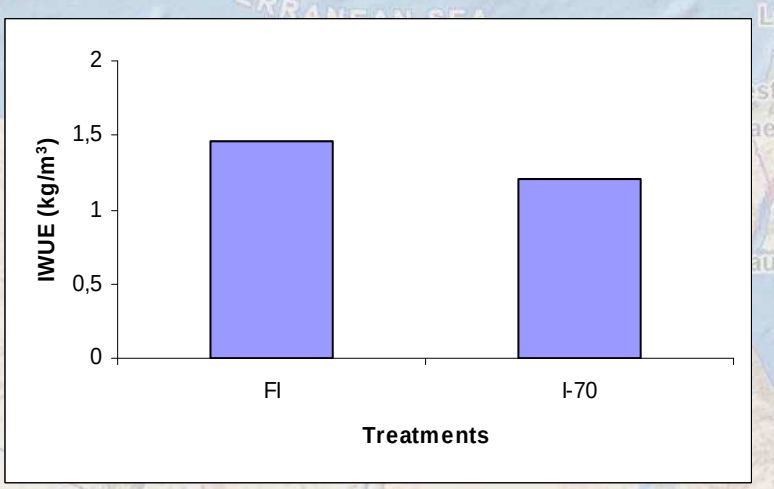


Fig. 4: IWUE values of sunflower experiment for each treatment

Annual Crops

- Sunflower

b. Spain

In fig.5 the yield for the sunflower experiment in Spain is presented.

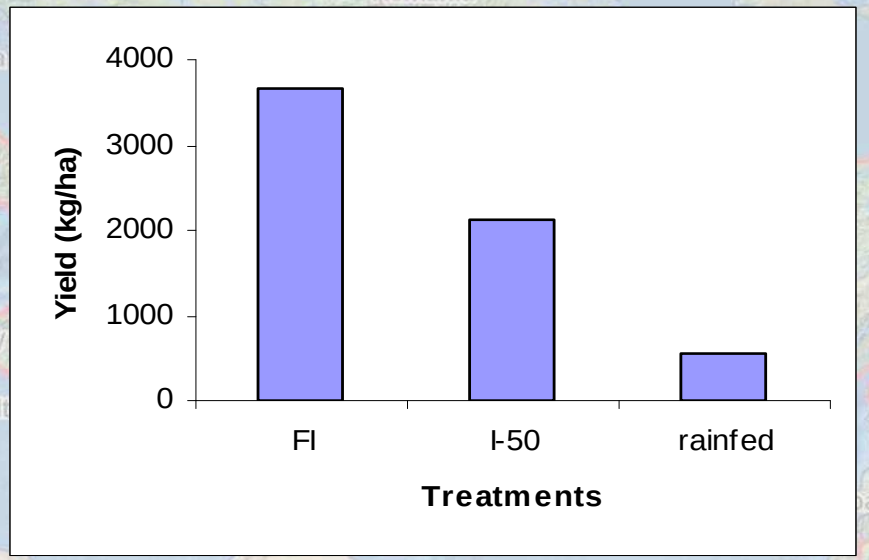


Fig. 5: Yield of sunflower experiment for each treatment

Annual Crops

- Cotton

a. Greece

In figs 6 and 7 the cotton yield and IWUE for the years 2005 and 2006 are presented.

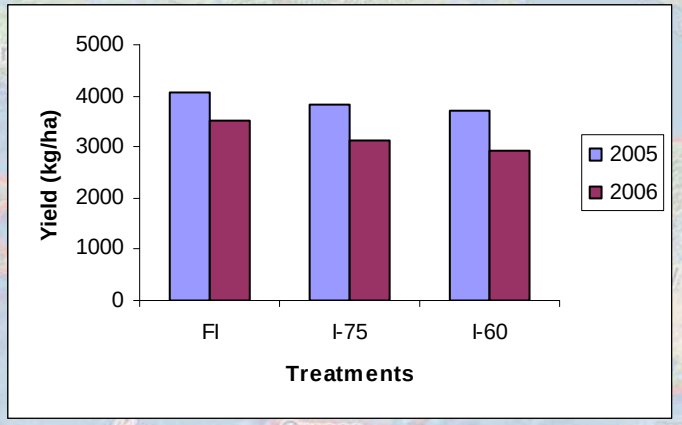


Fig. 6: Yield of cotton experiment for each treatment

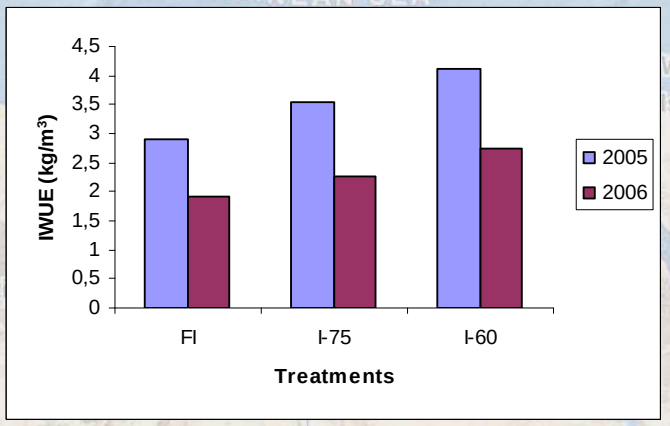


Fig. 7: IWUE values of cotton experiment for each treatment

Perennial Crops

- Citrus

Jordan

In figs 8 and 9 the citrus yield and IWUE for the years 2005 and 2006 are presented

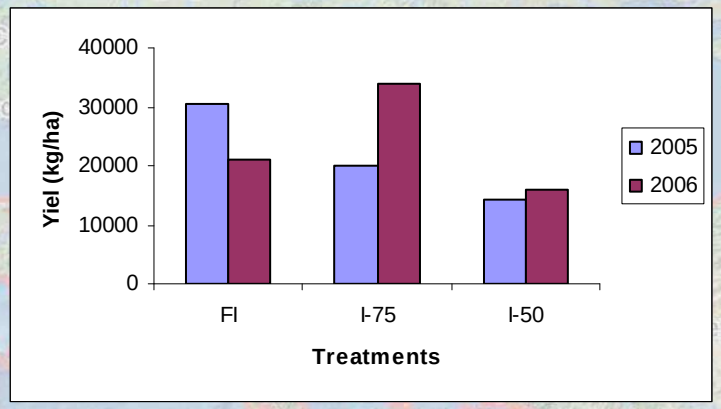


Fig. 8: Yield of citrus experiment for each treatment

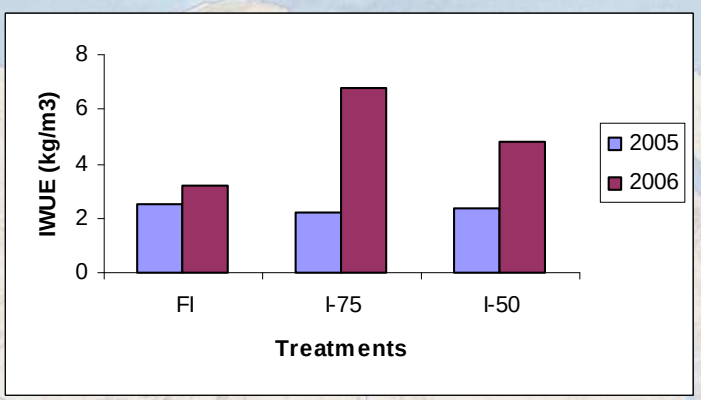


Fig. 9: IWUE of citrus experiment for each treatment

Perennial Crops

- Olive

a. Tunisia

In figs 10 and 11 the olive yield and IWUE for the years 2005 and 2006 are presented

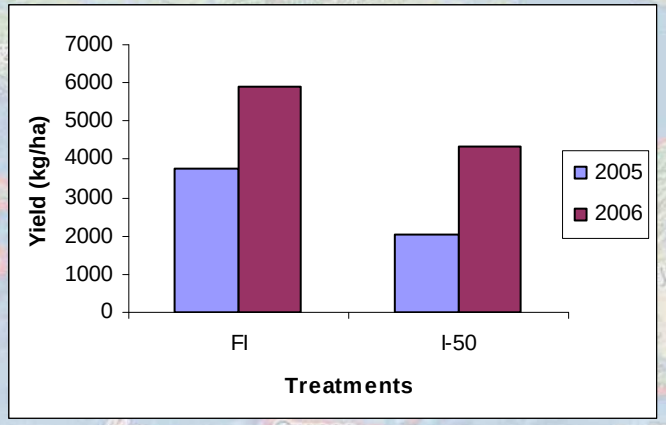


Fig. 10: Yield of olive experiment for each treatment

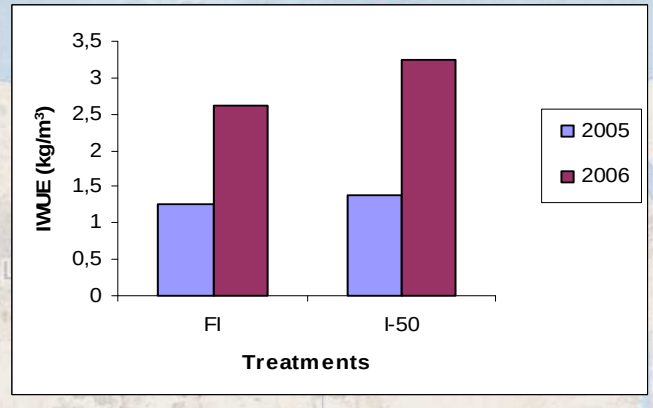


Fig. 11: IWUE of olive experiment for each treatment

Perennial Crops

- Olive

b. Spain

In figs 12 and 13 the olive yield and IWUE for the years 2005 and 2006 are presented

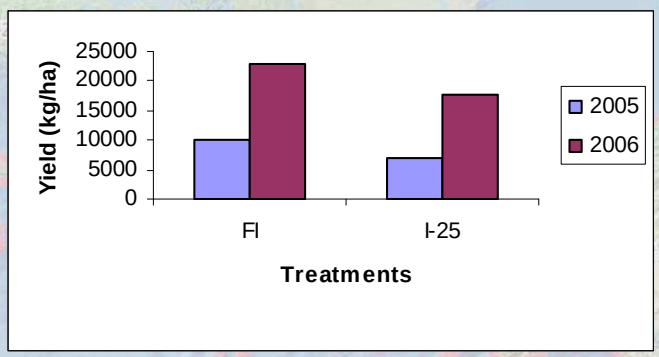


Fig. 12: Yield of olive experiment for each treatment

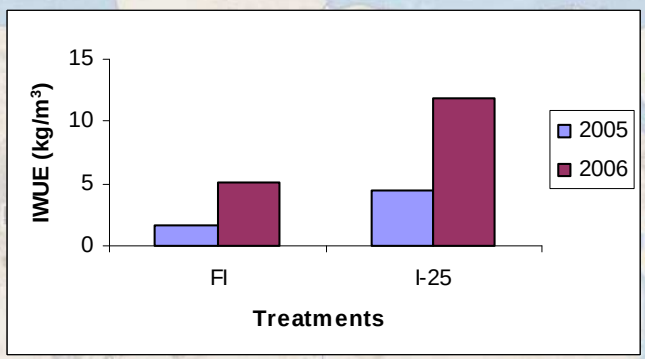


Fig. 13: IWUE of olive experiment for each treatment

Perennial Crops

- Pistachio

Greece

In figs 14 and 15 the yield and the IWUE for the pistachio experiment in Greece are presented

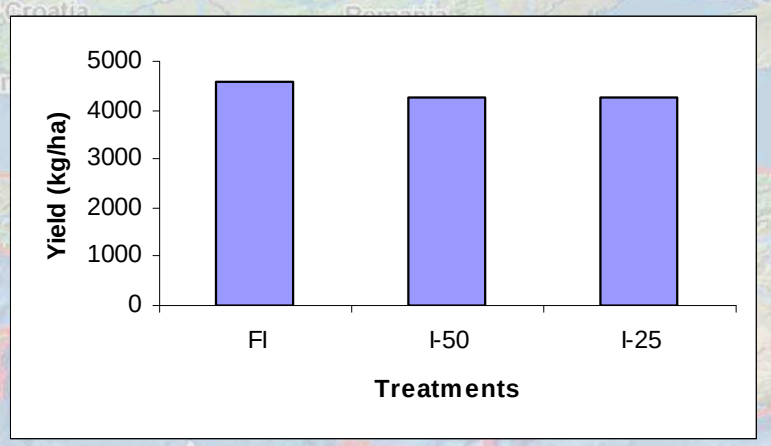


Fig. 14: Yield of pistachio experiment for each treatment

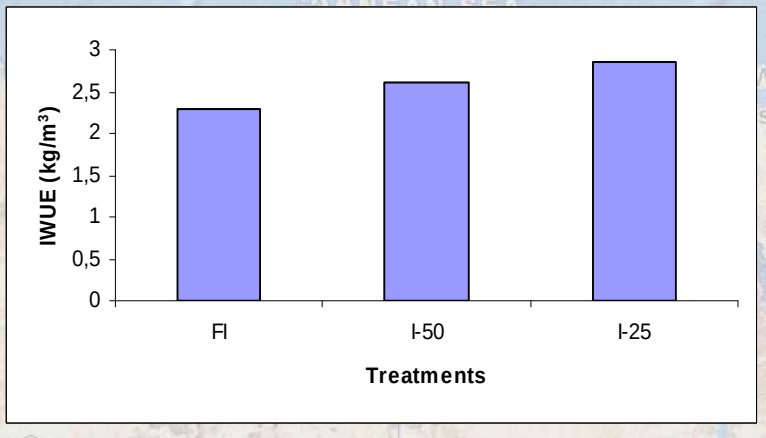


Fig. 15: IWUE of pistachio experiment for each treatment

AQUACROP

The objective of the first package is the development of an innovative simulation model for Deficit Irrigation design and for yield prediction in water-limited situations. Specifically, the model has three components:

- Simulation of crop growth
- Transpiration
- Yield response.

AQUACROP

A first prototype of crop growth model, called **AquaCrop**, has been completed in the FAO headquarters in Rome in collaboration with a group of international experts and DIMAS partners including CIHEAM – Mediterranean Agronomic Institute of Bari (IAMB).

AQUACROP

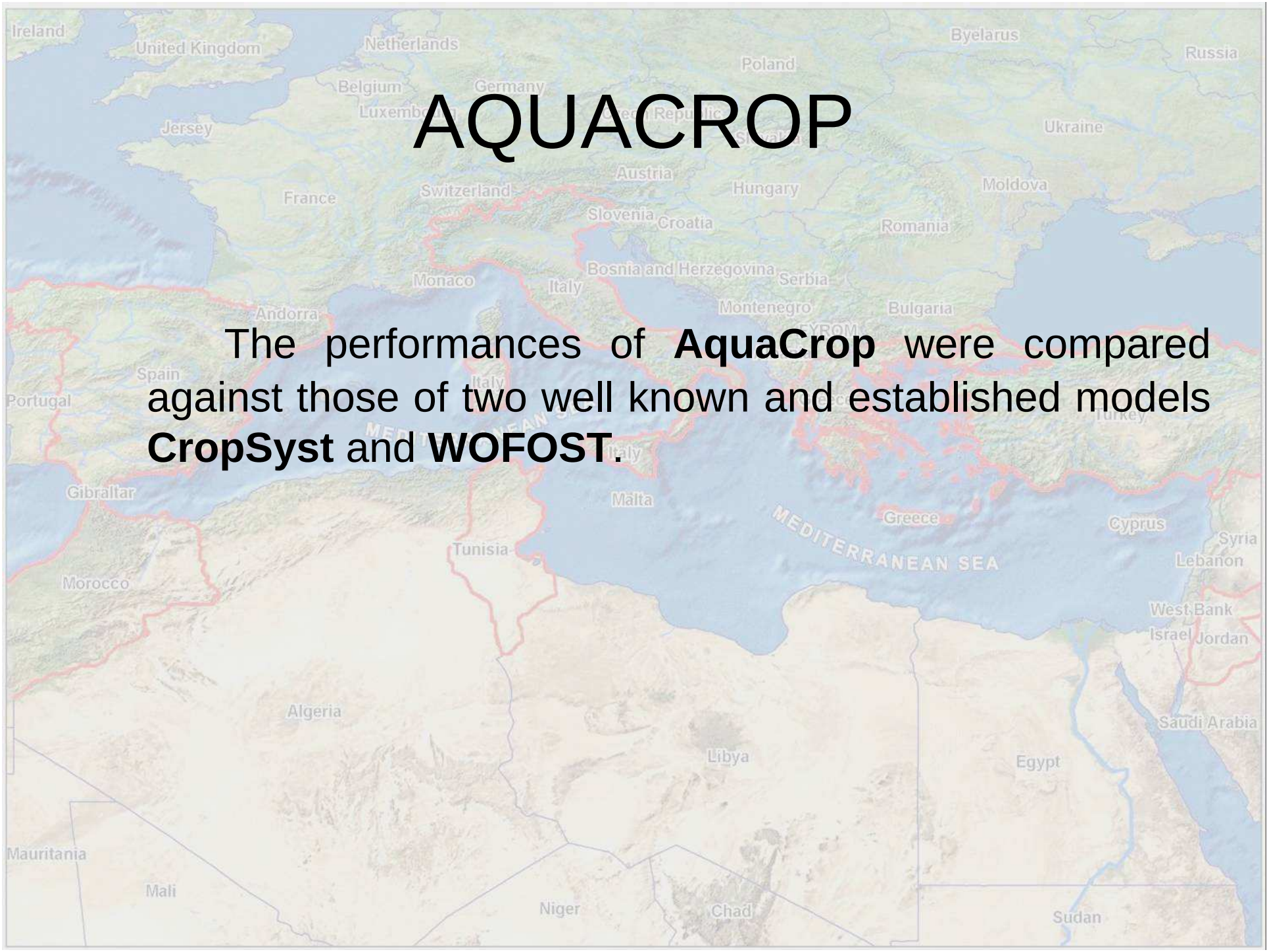
AquaCrop is a biophysical dynamic crop growth model that uses minimum number of parameters and input data allowing the simulation of yield response to water under both optimal and deficit irrigation supply and rainfed conditions.

AQUACROP

The driving force of the crop growth model is the water productivity function based on transpiration estimate as a function of canopy cover and water uptake by plant. In such a way, the model avoids the calculation of leaf area index and other detailed parameters and physiological processes.

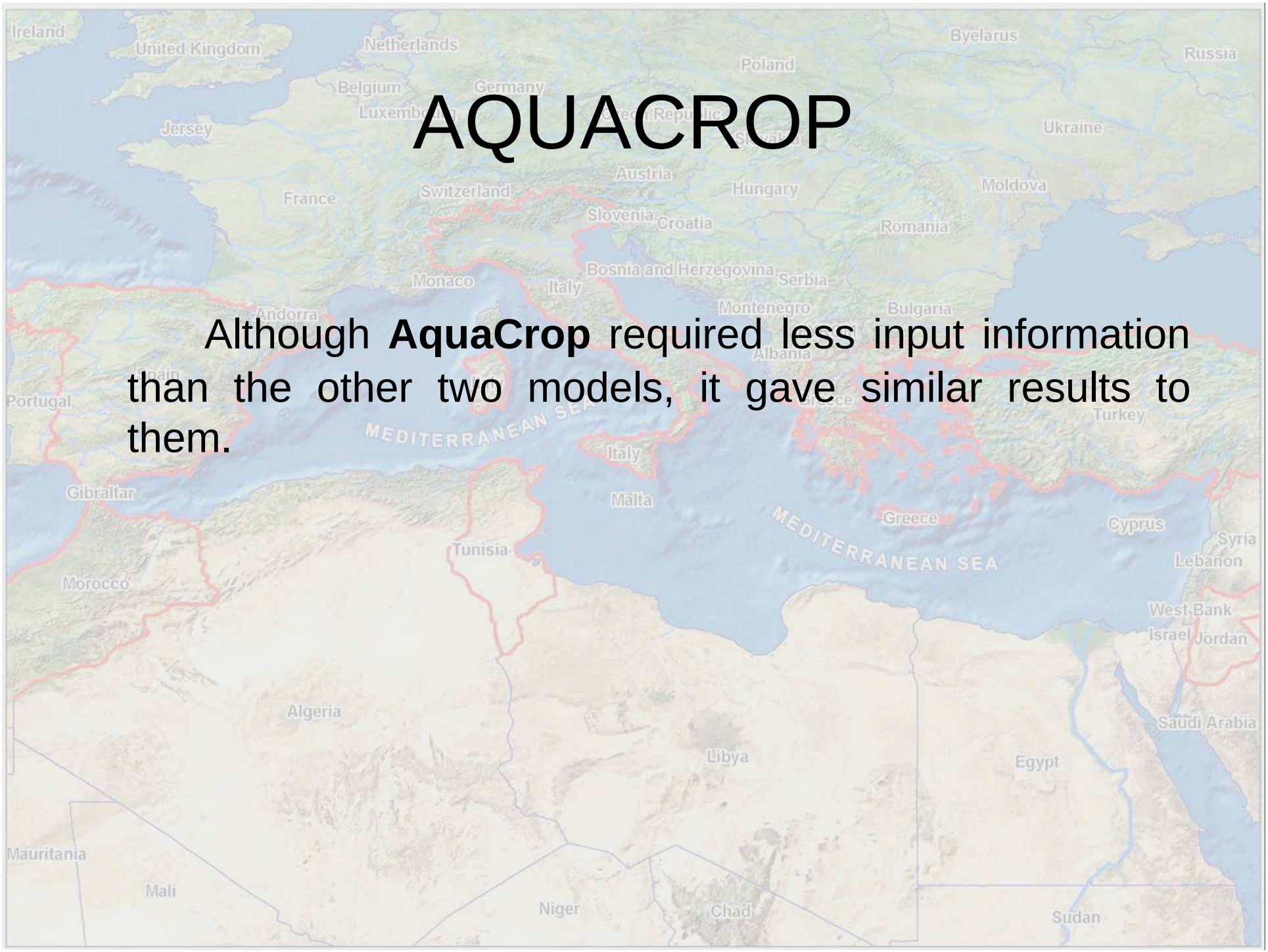
AQUACROP

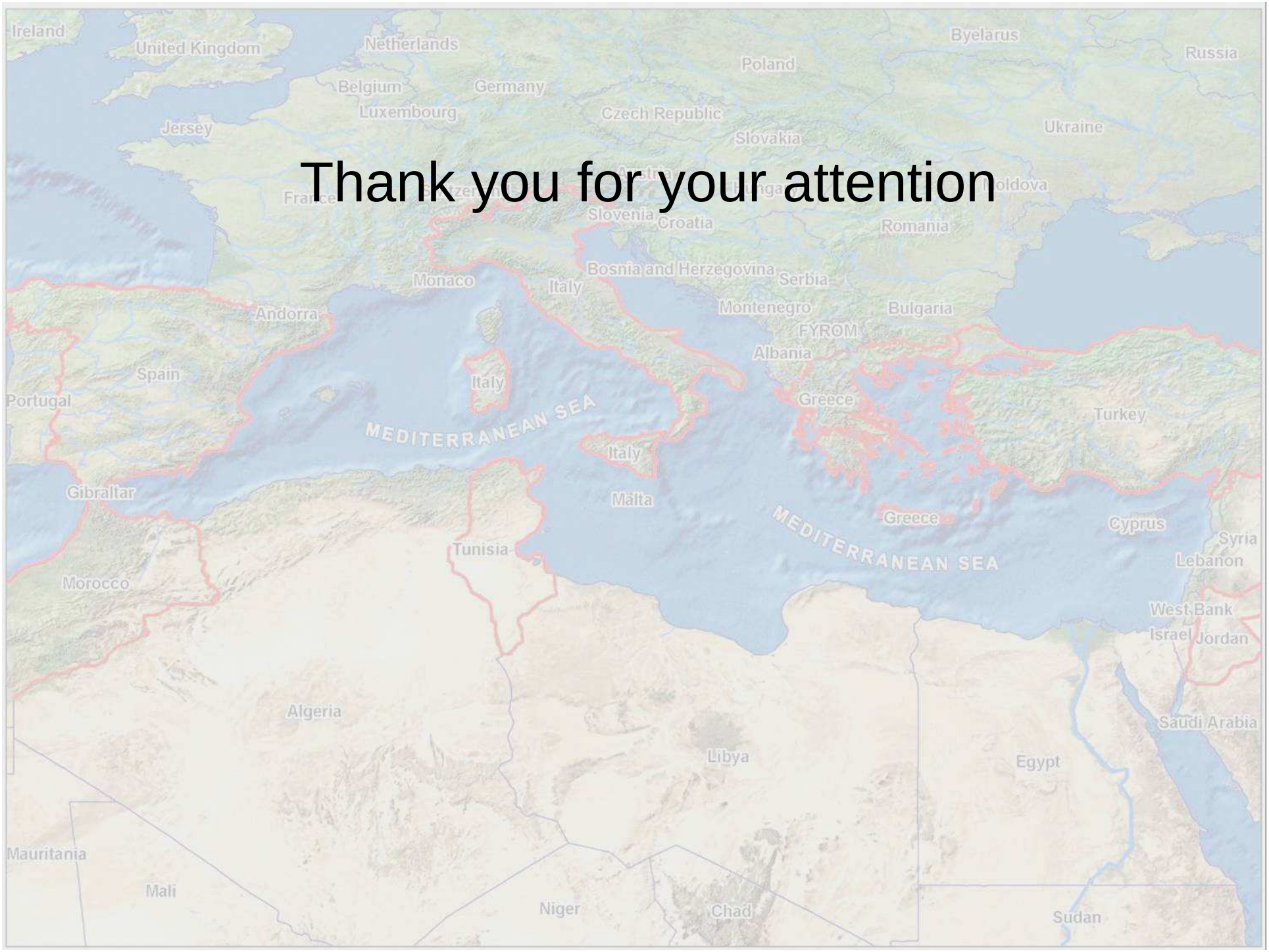
The performances of **AquaCrop** were compared against those of two well known and established models **CropSyst** and **WOFOST**.



AQUACROP

Although **AquaCrop** required less input information than the other two models, it gave similar results to them.

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