



IRRIGATION ADVISORY SERVICE IN CASTILLA LA MANCHA (SPAIN) SIAR



Regional Center of Water
Research (CREA).
Castilla-La Mancha University.
Albacete.



Regional Department of
Agriculture. Toledo.



SPAIN

Semiarid region

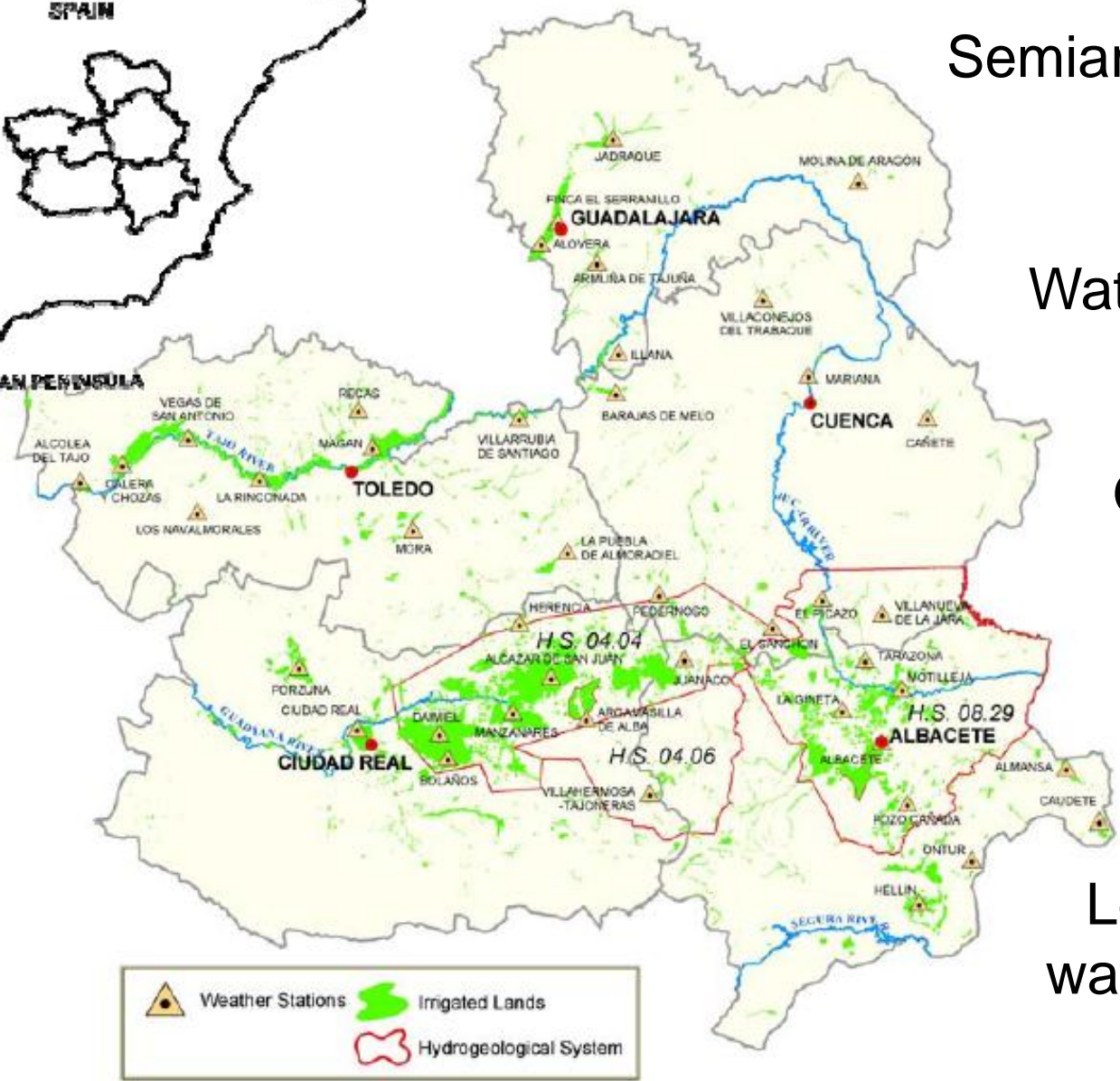
Water scarcity

Overexploited aquifers

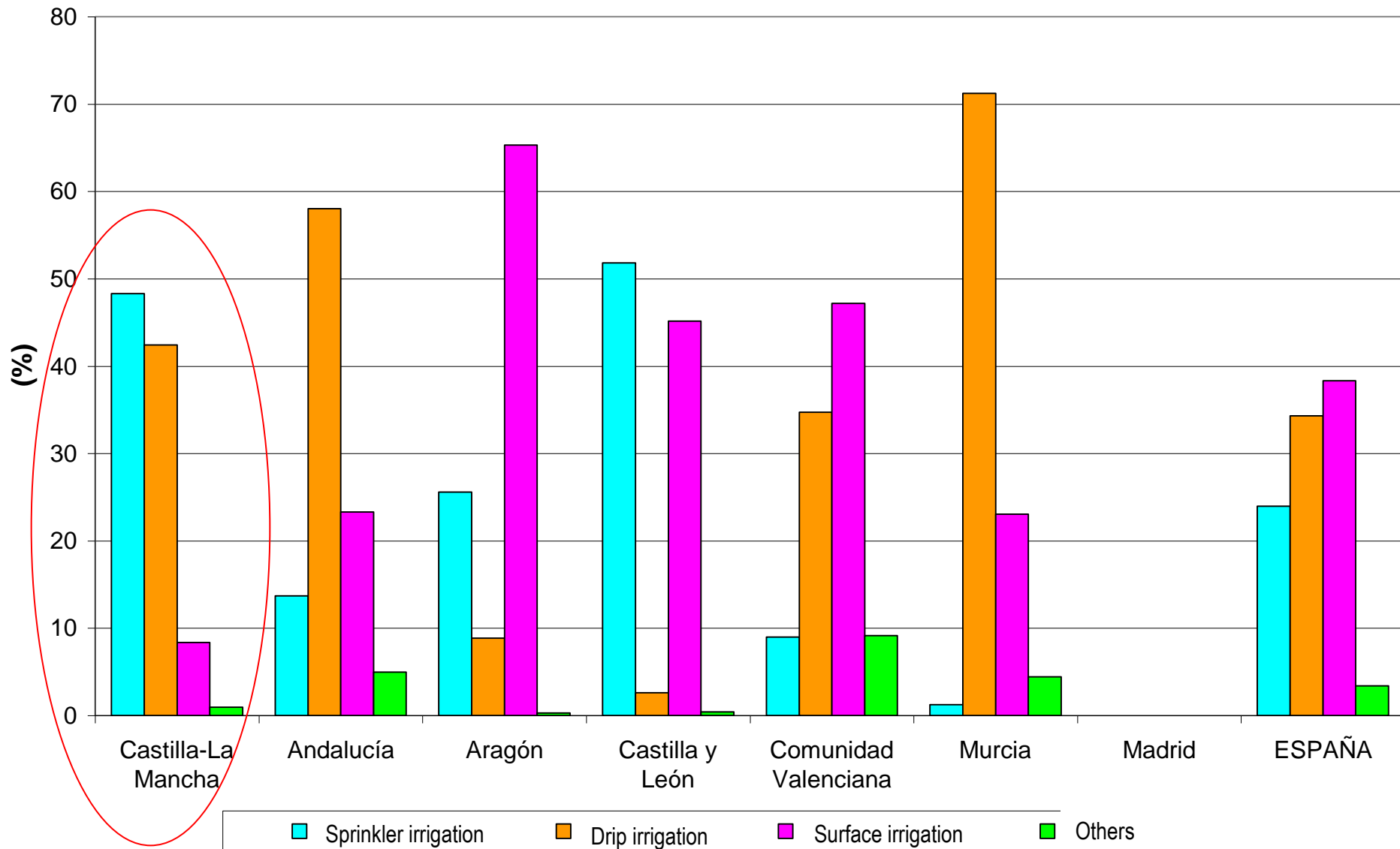
High energy cost

Low economic water productivity

IBERIAN PENINSULA



Percentage of area irrigated with different irrigation systems



Origin of the SIAR

- Farmers demanded the service under a new context of modernized irrigation systems
- In June 1999 was created the IAS in Castilla- La Mancha
- Coordinated by Regional Centre of Water Research and the Regional Department of Agriculture



- General guidelines and objectives
- contact with farmers
- climatic data acquisition



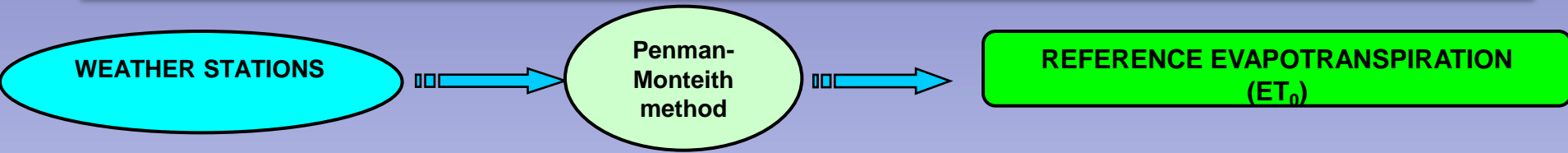
- Developed methodologies and protocols for advising farmers
- Visit irrigable areas and farmers' plots
- Perform irrigation systems evaluations

TRANSFERENCE AND TRAINING

Main guidelines

- Help farmers to achieve an **efficient and rational** use of the inputs in irrigation (*water, energy, fertilizers,...*)
- Scientific and technical **support** in order to make agriculture a **sustainable** activity, compatible with the environment
- To improve the use of **water and energy** resources
- **Subsidized** in a 100% by the Regional Government

Operation diagram (Methodology)



Network of weather stations

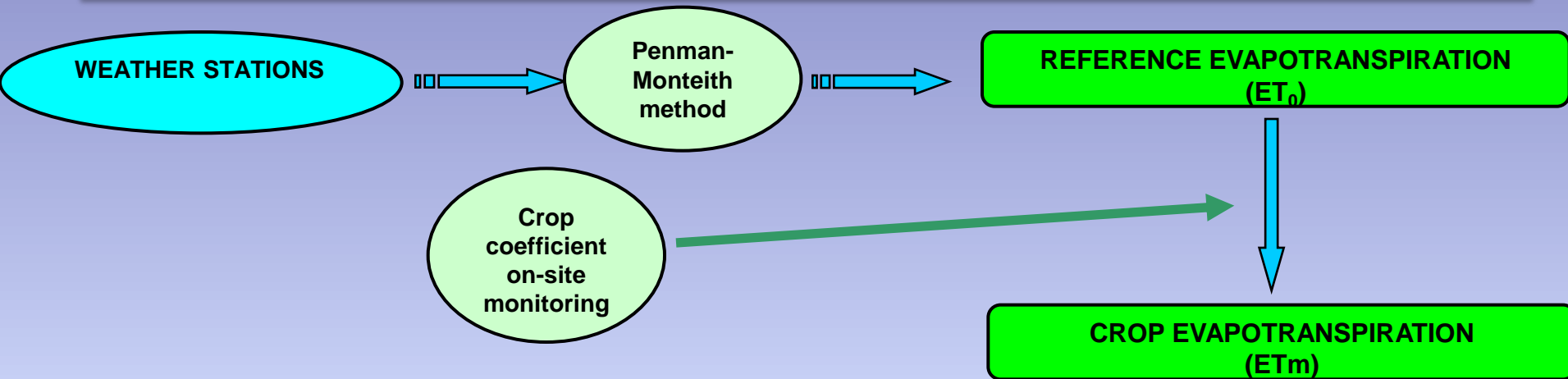


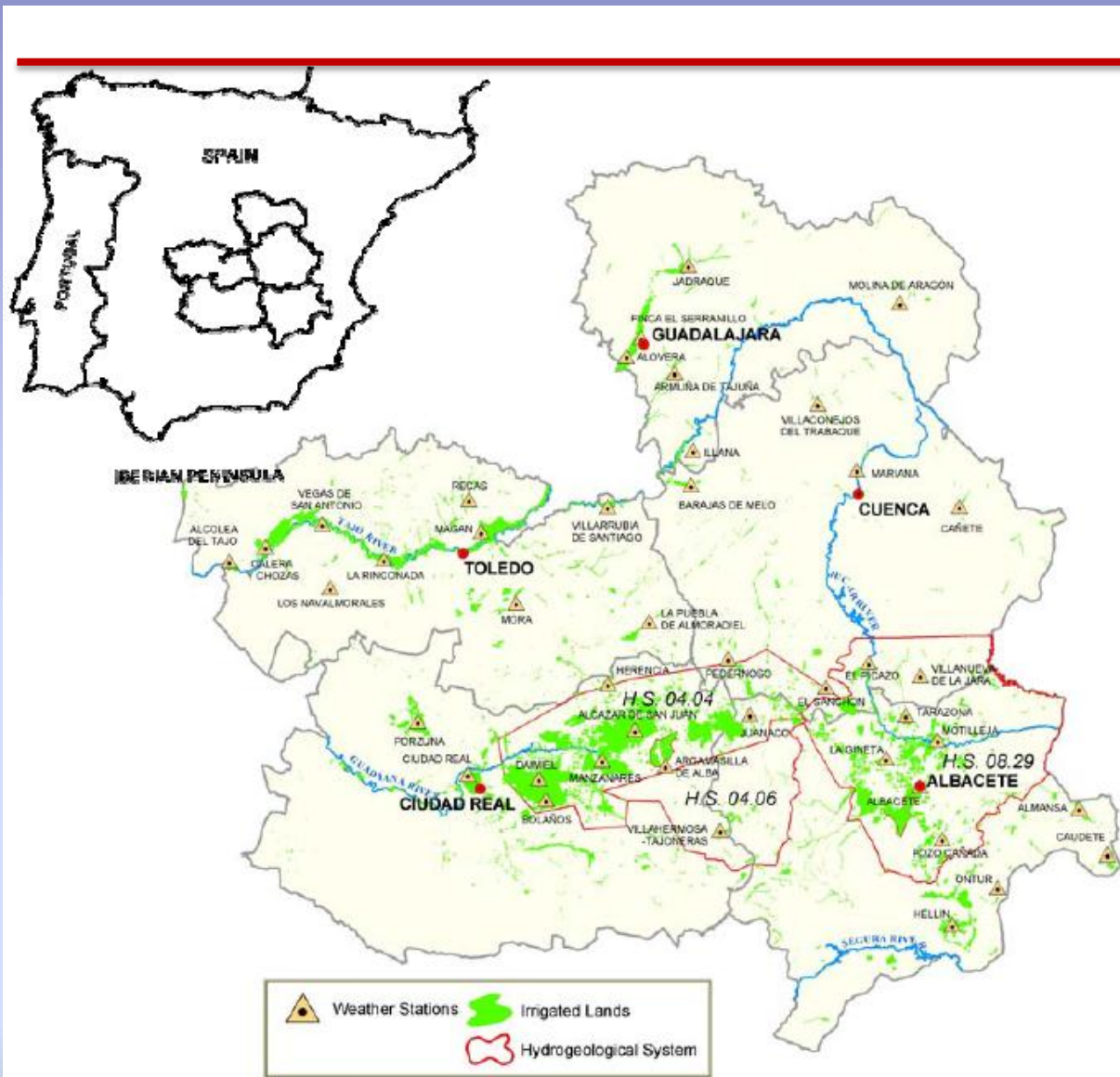
T^a , Hr, Total solar radiation, wind speed and direction, rainfall

Network of weather stations



Operation diagram (Methodology)



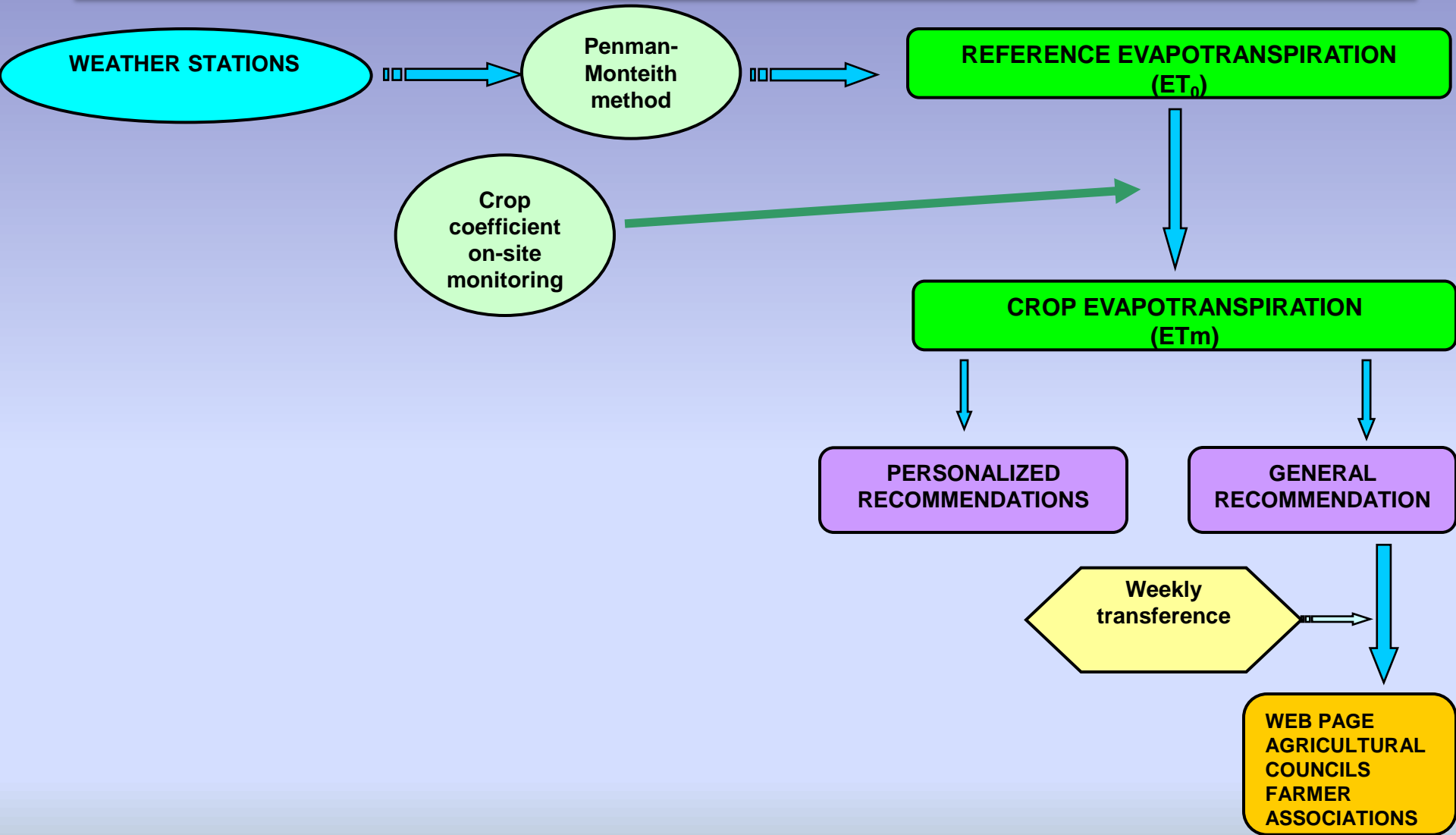


Headquarters:
Albacete

10 Agricultural
Engineers

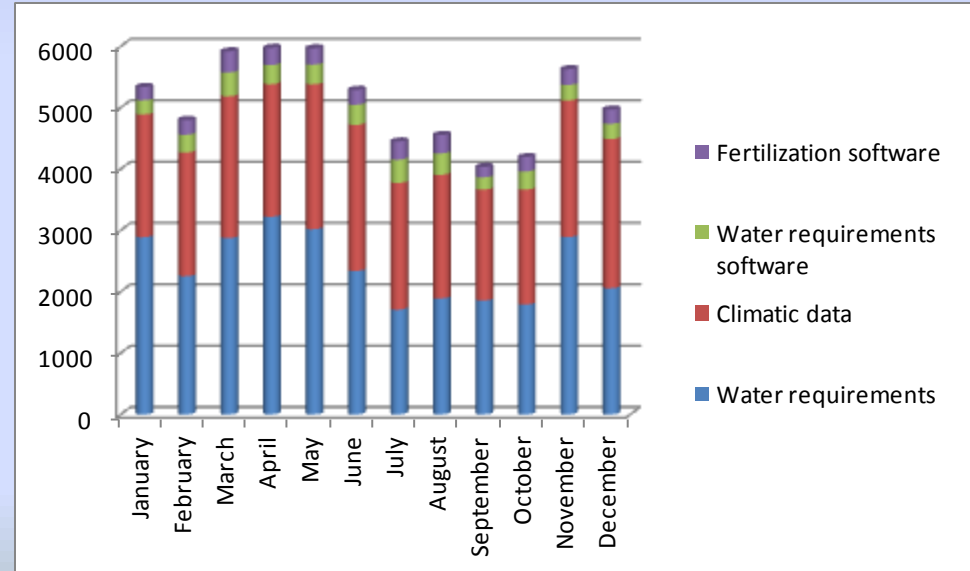
Several
collaborating
farmers in each
irrigable area

Operation diagram (Methodology)



Information transference

- **Website** of the Regional Centre of Water Research
 - <http://crea.uclm.es>
 - The most valued by farmers is related to the **water requirements**
 - Web includes other services:
 - Advice for fertilization
 - Meteorological data
 - Management tools



Information transference



INICIO

ESTACIONES

METODOLOGÍA

DATOS GENERALES

ENLACES

Servicios

Recomendaciones de Riego

Servicios Meteorológicos

Asesoramientos

Contacto

Programas

Mineralización

Reservas Hídricas



INICIO

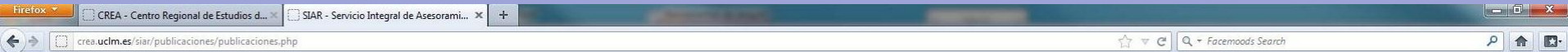


16 de Abril de 2010
INICIO RECOMENDACIONES DE RIEGO
CAMPAÑA 2010

- ¿Qué es el servicio integral de asesoramiento al regante (SIAR) de Castilla-La Mancha?
- ¿Cómo se gestiona el SIAR?
- ¿Qué servicios presta?
- ¿En qué zonas está implantado el SIAR?
- Cultivos sobre los que se asesora.
- ¿Qué información se suministra?
- ¿Qué medios utiliza para su difusión el SIAR?

<http://crea.uclm.es>

Information transference



INICIO ESTACIONES METODOLOGÍA DATOS GENERALES ENLACES

Servicios

- Recomendaciones de Riego
- Datos Meteorológicos
- Publicaciones
- Contacto

Programas

- Fertilización Mineral
- Necesidades Hídricas



PUBLICACIONES DEL S.I.A.R.



Hoja informativa 20:
"Resultados del SIAR en la campaña de riego 2009"



Hoja informativa 19:
"El SIG-REG y los Planes de Gestión de entidades asociativas de riego en común en Castilla-La Mancha."



Hoja informativa 18:
"Resultados del SIAR en la campaña de riego 2008"



Hoja informativa 17:
"Eficiencia energética en instalaciones de riego"



Hoja informativa 16:
"Resultados del SIAR en la campaña de riego 2007"



Hoja informativa 15:
"El sistema integral de gestión del regadío (SIG-REG) en Castilla-La Mancha"



Hoja informativa 14:
"Resultados del SIAR en la campaña de riego 2006"



Hoja informativa 13:
"La automatización del riego"



Hoja informativa 12:
"Resultados del SIAR en la campaña de riego 2005"



Hoja informativa 11:
"Fertirrigación"



Hoja informativa 10:
"Resultados del SIAR en la campaña de riego 2004"



Hoja informativa 9:
"Nuevas tendencias en sistemas de riego: características técnicas de diseño y manejo"

Information transference

CULTIVOS HERBÁCEOS EXTENSIVOS

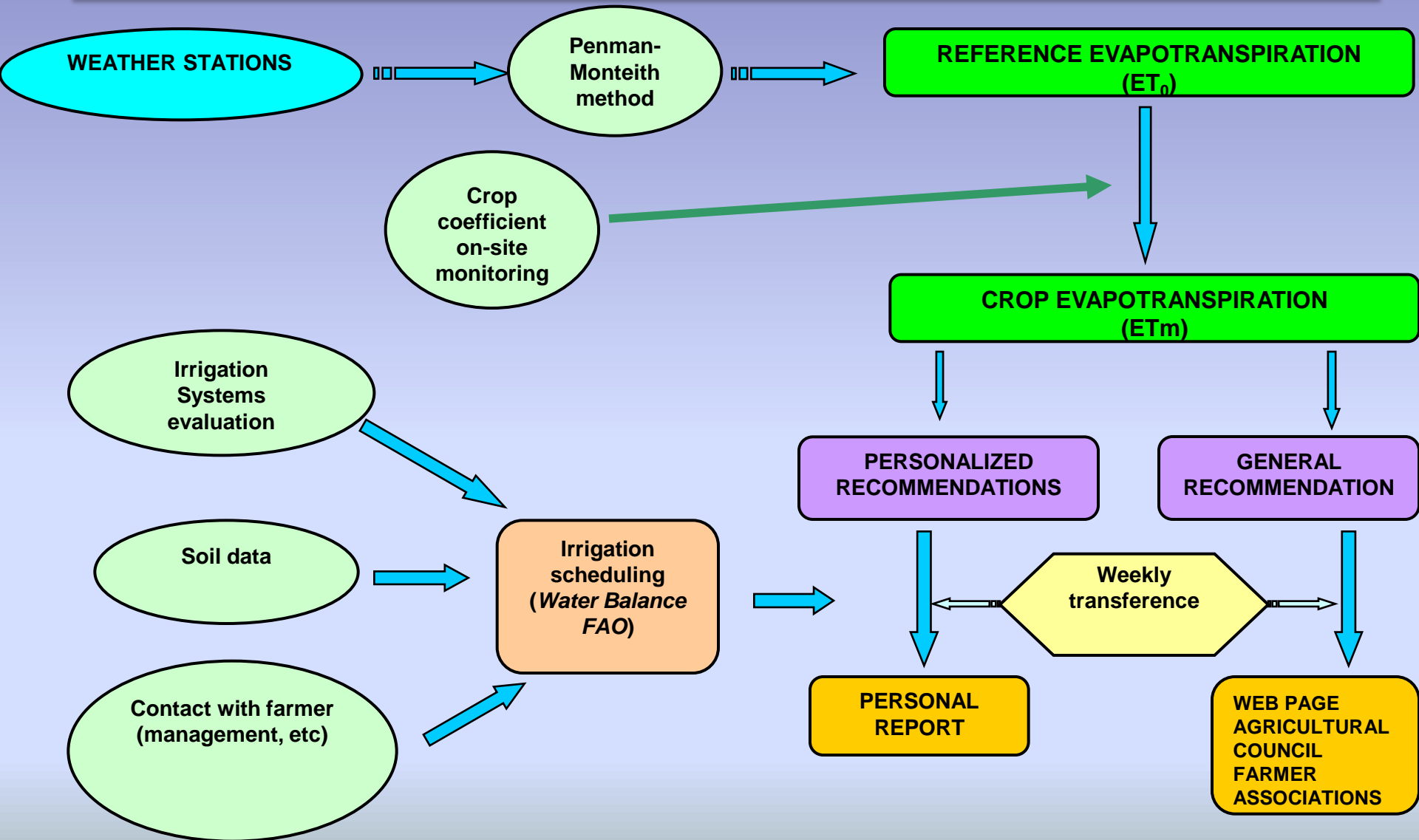
(Evapotranspiración del Cultivo)

FECHA	ET _o (mm)	CEBADA (mm)	TRIGO (mm)	ALFALFA (mm)	GIRASOL (mm)
Semana (10/04-16/04)	13,6	9,3	8,0	5,8	-
Semana (17/04-23/04)	21,3	17,2	15,2	18,5	-
Semana (24/04-30/04)	24,4	22,4	20,7	29,0	-
Semana (01/05-07/05)	29,9	31,0	29,4	35,3	-
Semana (08/05-14/05)	24,9	27,4	27,6	10,7	-
Semana (15/05-21/05)	32,9	36,2	37,8	27,8	-
Semana (22/05-28/05)	30,8	33,9	35,5	36,7	-
Semana (29/05-04/06)	34,2	31,3	35,4	40,4	-
Semana (05/06-11/06)	27,6	12,9	21,1	12,2	11,0
Semana (12/06-18/06)	37,7	-	19,5	31,3	17,5
Semana (19/06-25/06)	38,3	-	-	45,6	23,9
Semana (26/06-02/07)	37,4	-	-	44,1	29,1
Semana (03/07-09/07)	41,0	-	-	17,8	38,2
Semana (10/07-16/07)	39,2	-	-	32,7	39,2
Semana (17/07-23/07)	38,8	-	-	46,2	38,8
Semana (24/07-30/07)	40,2	-	-	47,5	40,2
Semana (31/07-06/08)	35,8	-	-	15,4	35,8
Semana (07/08-13/08)	29,8	-	-	24,5	29,4
Semana (14/08-20/08)	32,2	-	-	38,4	27,7
Semana (21/08-27/08)	30,0	-	-	35,5	21,9
Semana (28/08-03/09)	30,2	-	-	12,9	18,0
Semana (04/09-10/09)	26,7	-	-	22,0	12,3
Semana (11/09-17/09)	18,0	-	-	21,3	-
Semana (18/09-24/09)	13,2	-	-	15,5	-
Total acumulado (mm)	728,1	221,6	250,2	667,1	383,1

Information transference

- **Website** of Regional Department of Agriculture and Regional Centre of Water Research
 - <http://crea.uclm.es>
 - The most valued by farmers is related to the crop **water requirements.**
 - Web includes other services:
 - Advice for fertilization
 - Regional meteorological data
 - Management tools
- **Email and FAX.** to agricultural councils, water user associations, ...
- **Workshops.** to present SIAR and other services
- Newspapers, radio and local tv

Operation diagram (Methodology)



Solid set systems evaluations



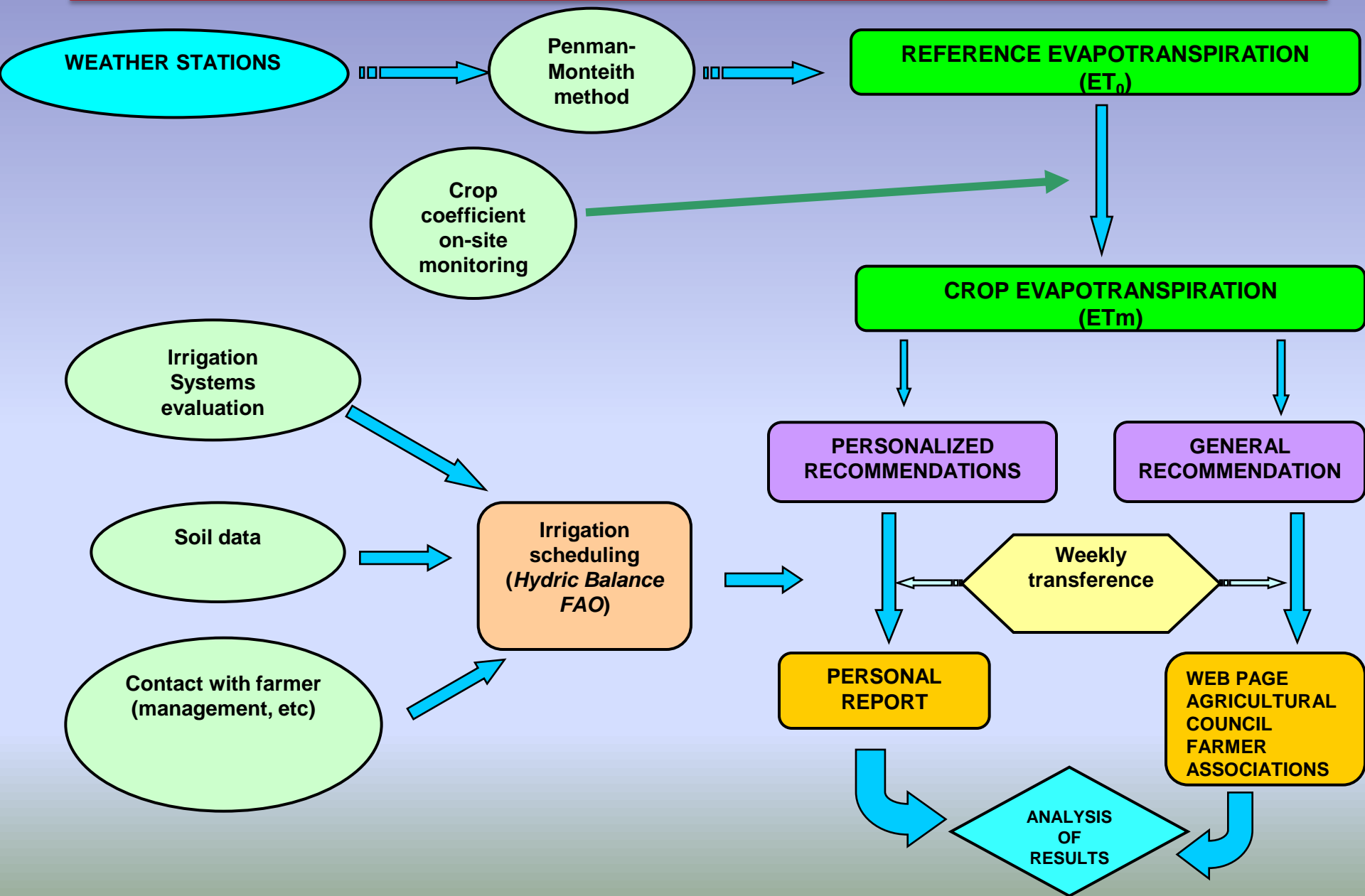
Center pivot systems irrigation evaluations



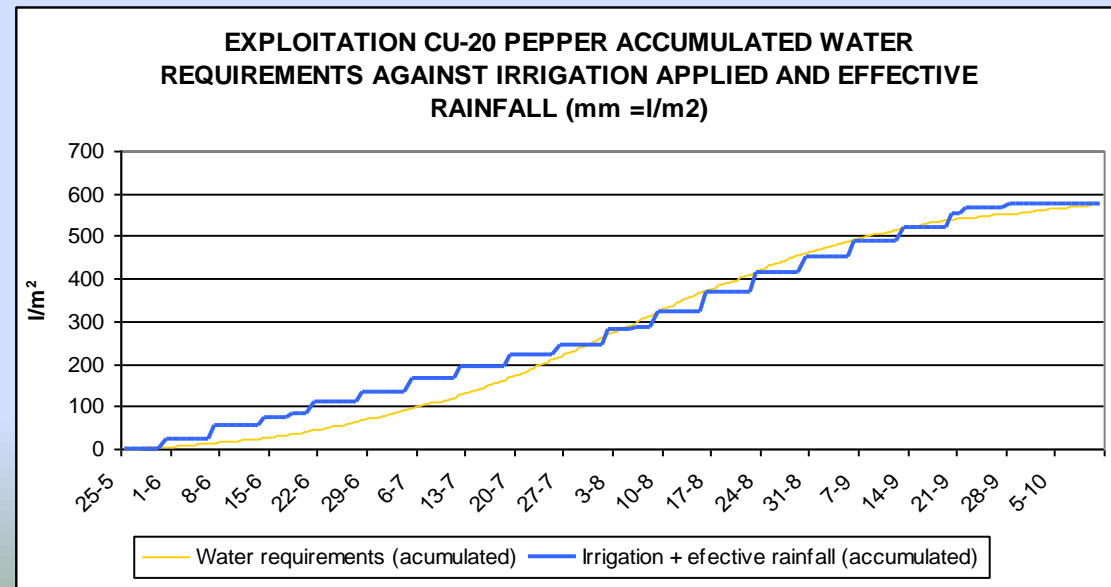
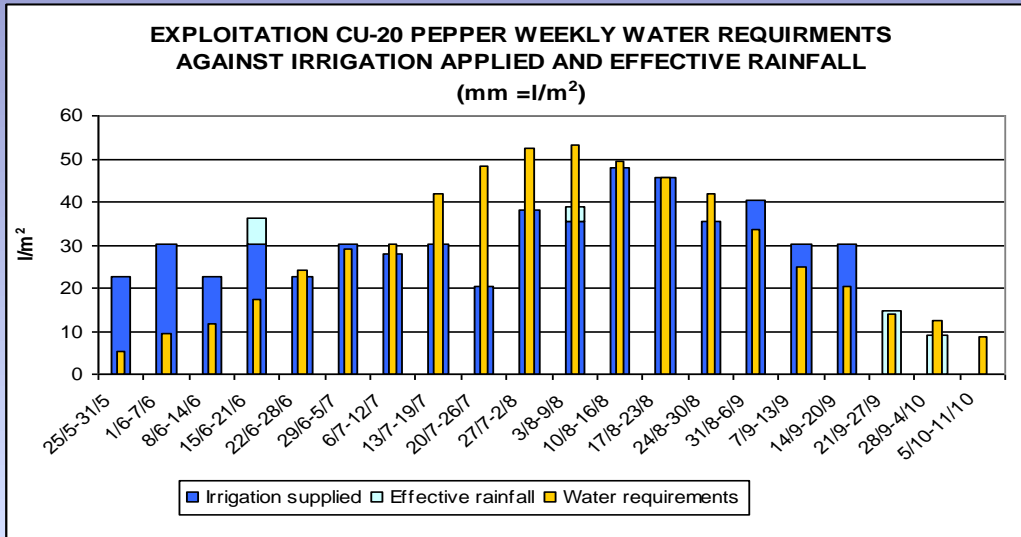
Drip irrigation evaluations



Operation diagram (Methodology)

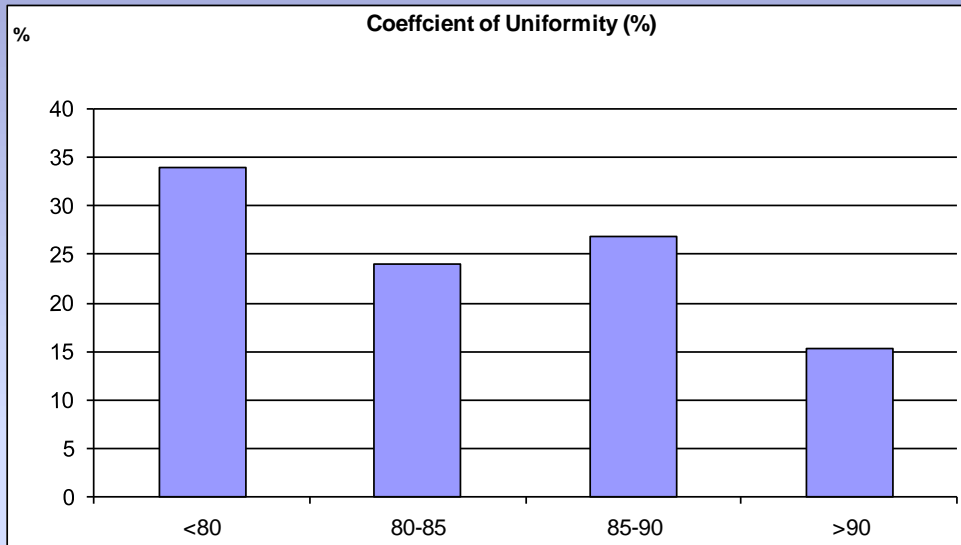


Results: Crop water requirements

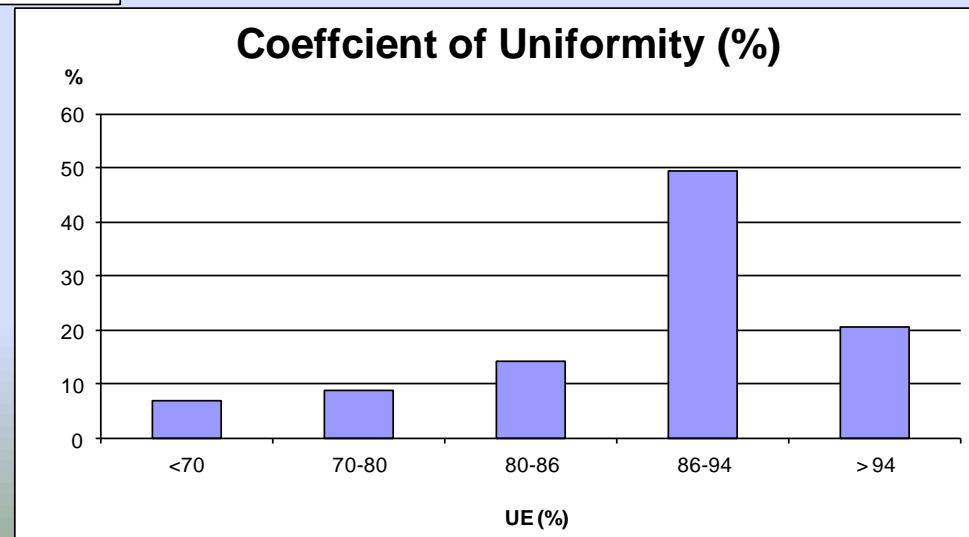
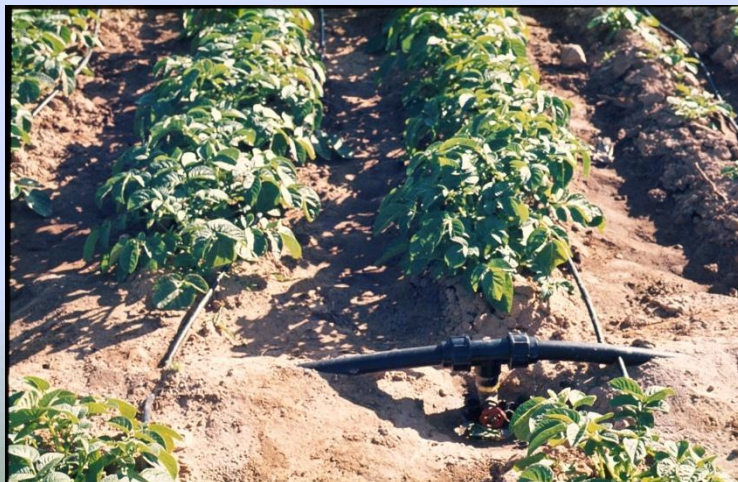


Results: Irrigation systems evaluations

Sprinkler irrigation system.
1999-2009 (~325 systems)



Drip irrigation system.
1999-2009 (~500 systems)



Other services provided by the SIAR

Other services provided by SIAR

- Energy analysis of the irrigation systems



Electrical network analyzer

Absorbed power and power factor



Ultrasound flow – meter

Discharge

Other services provided by SIAR

- Energy analysis of the irrigation systems



Pressure transducers

Head pressure

Water level probes

Dynamic watertable level



Other services provided by SIAR

- Energy analysis of the irrigation systems

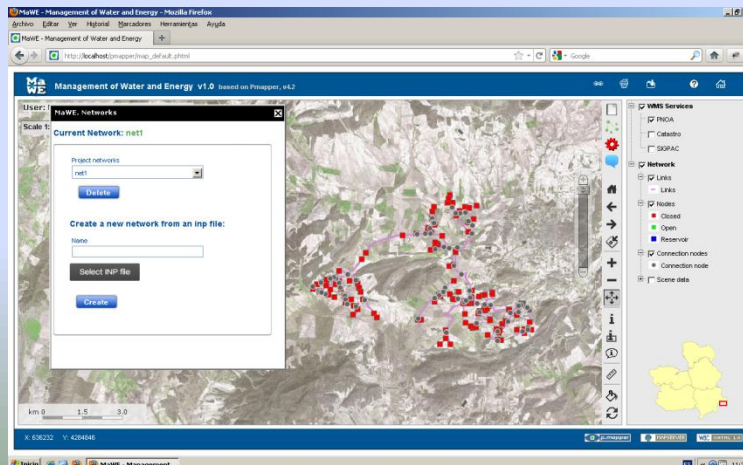
Developed software for energy analysis



Analysis of wells



Analysis of pumping stations

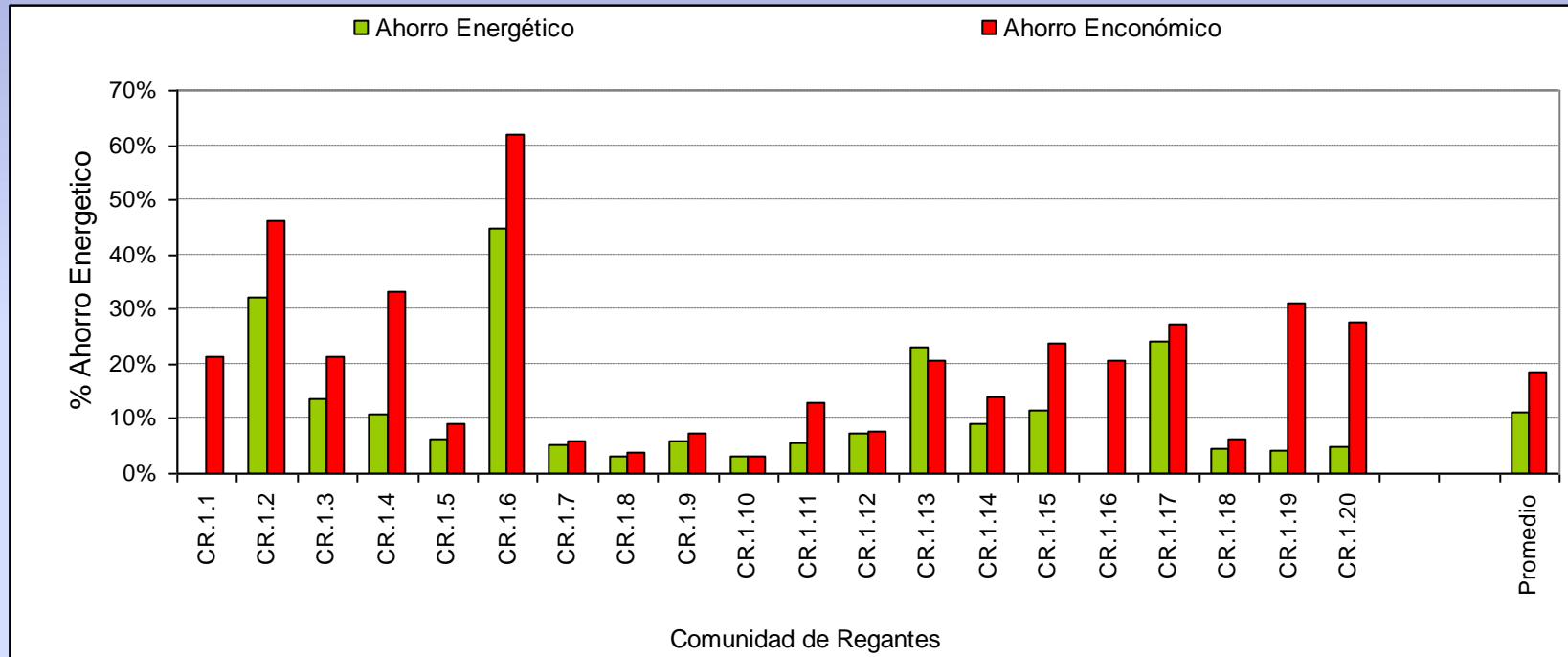


Web-based software for collective irrigation networks analysis

Other services provided by SIAR

- Energy analysis of the irrigation systems

Energy and economic savings



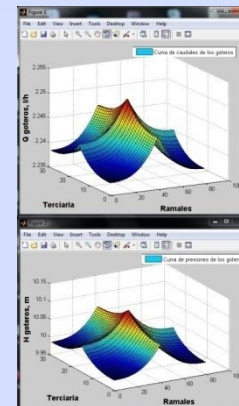
Average energy saving: 11.0%

Average economic saving: 18.5%

Other services provided by SIAR

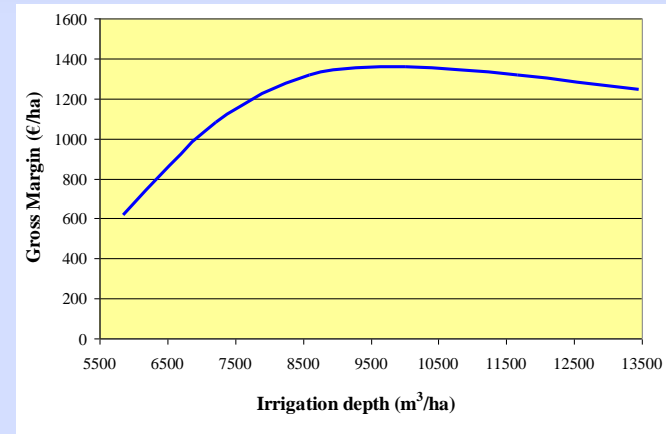
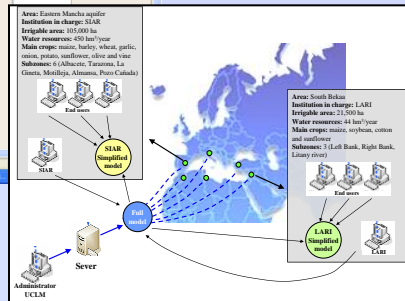
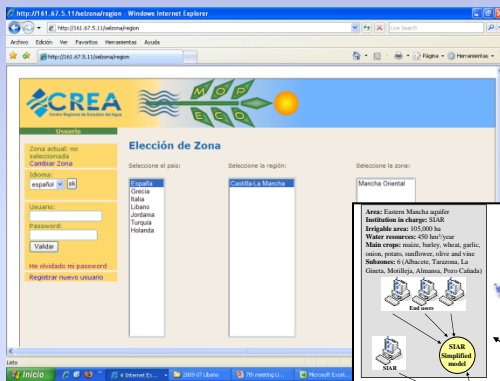
- Energy analysis of the irrigation systems
- Optimisation of the design and management of the systems for the distribution and application of irrigation water (sprinkler and drip irrigation).

Autocad
QGIS



Other services provided by SIAR

- Helping to determine optimal cropping pattern considering RDI techniques (web-based tool)

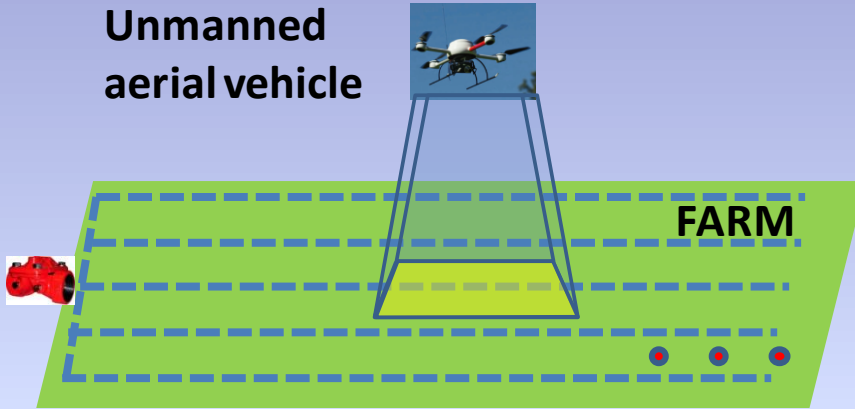


www.mopeco.uclm.es

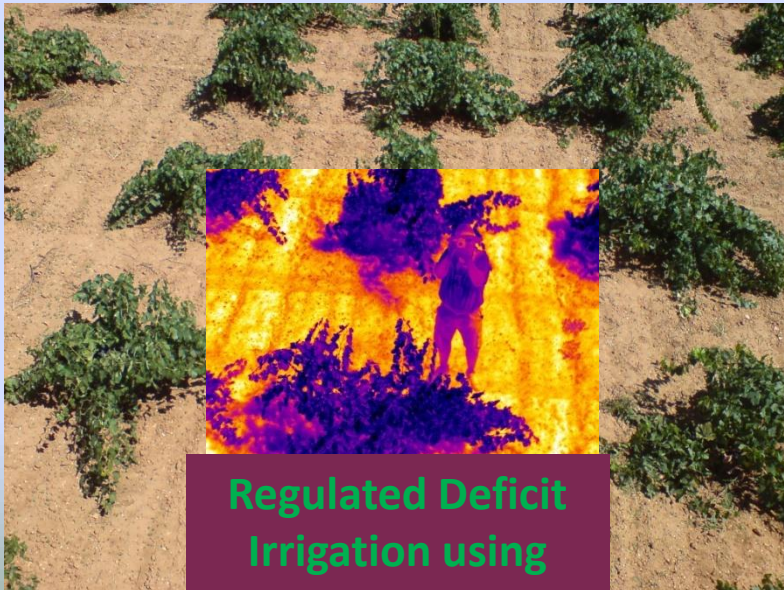
Applied research that would be transferred through the IAS in a near future

Very-high resolution remote sensing

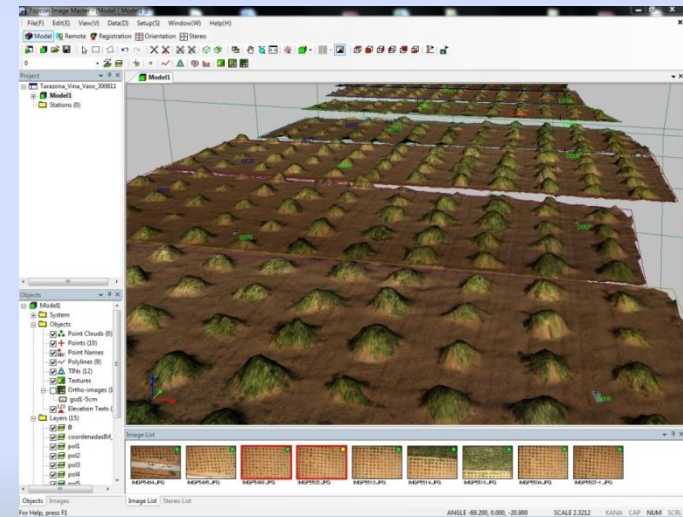
Unmanned
aerial vehicle



Crop growth and
development
RGB and NDVI



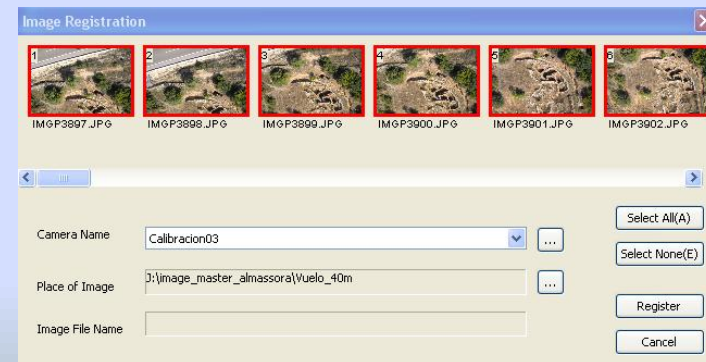
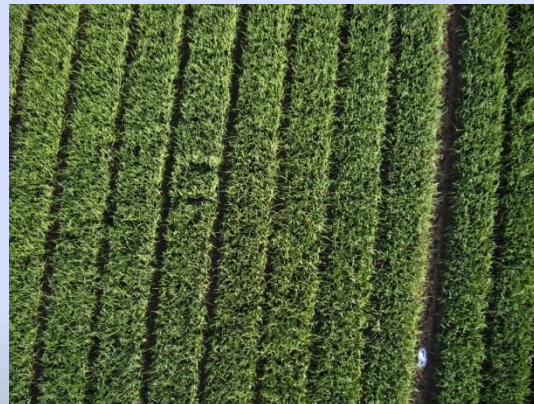
Regulated Deficit
Irrigation using
thermal images



Biomass
production

Very-high resolution remote sensing

- Development of flight planning software
- Methodology for georeferencing UAV images
- Photogrammetry



Deficit irrigation in crops

- Different irrigation depths
- Measurement of soil moisture, water depth, climatic conditions, biomass, LAI, ...
- A base for advising farmers and proposing measures of water and energy saving

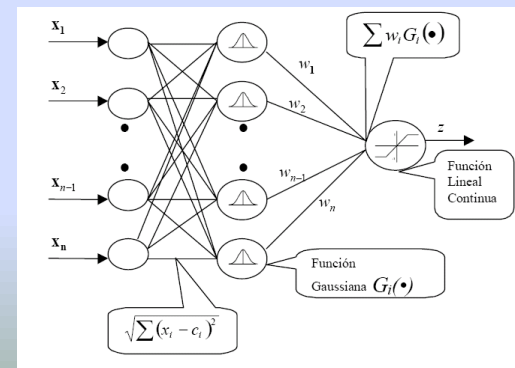


Forecasting of crop water requirements

- Forecasting crop phenology using thermal time
- Forecasting reference evapotranspiration
- Irrigation scheduling on real time

Forecasting of crop water requirements

- Development of a software to forecast ETo, named FORETo, based on general climatic variables prediction
- Determination of proper methodologies and extreme temperatures of each crop to calculate thermal time



Conclusions

Conclusions

- **Differences in the management** of irrigation between the pilot areas: irrigation tradition, availability and costs of resources, etc
- A higher **acceptance** in those areas with an elevated cost of the application of the irrigation water
- **Well-managed systems**, however, better formation and information for farmers is necessary
- Implication of the **water users Associations**, agricultural councils and other associations
- Useful tool to transfer the results obtained in **research works**
- Maintain the **SIAR** activity in the **future**