

*II Workshop Internacional de Inovações Tecnológicas na Irrigação
I Simpósio Brasileiro sobre Uso Múltiplo da Água*

Fortaleza, Brasil, 11-13 June, 2008

Modernization of irrigation systems: concepts and technologies

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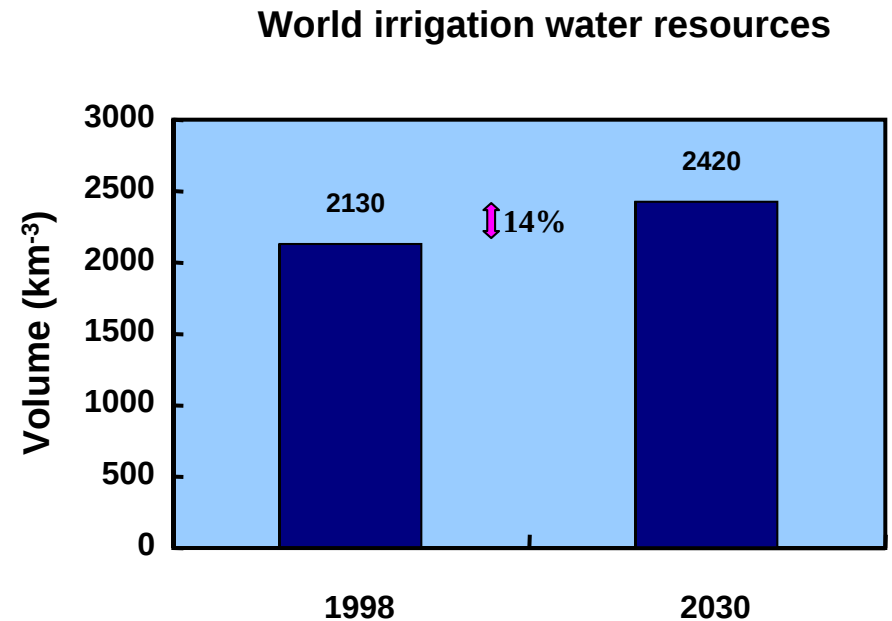
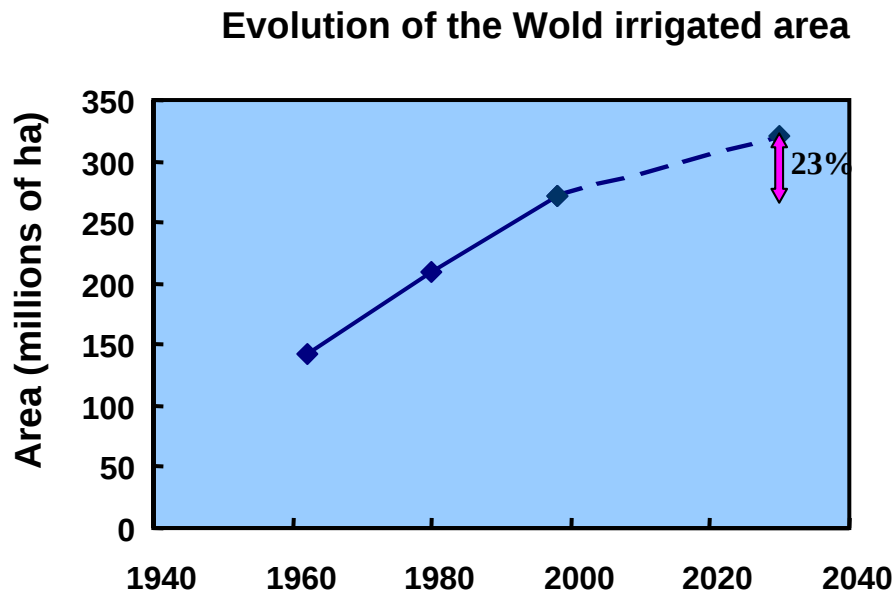
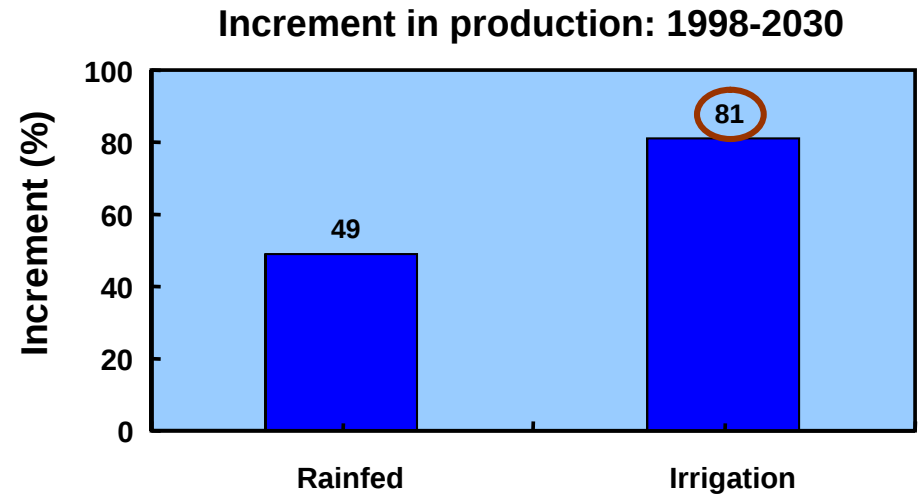
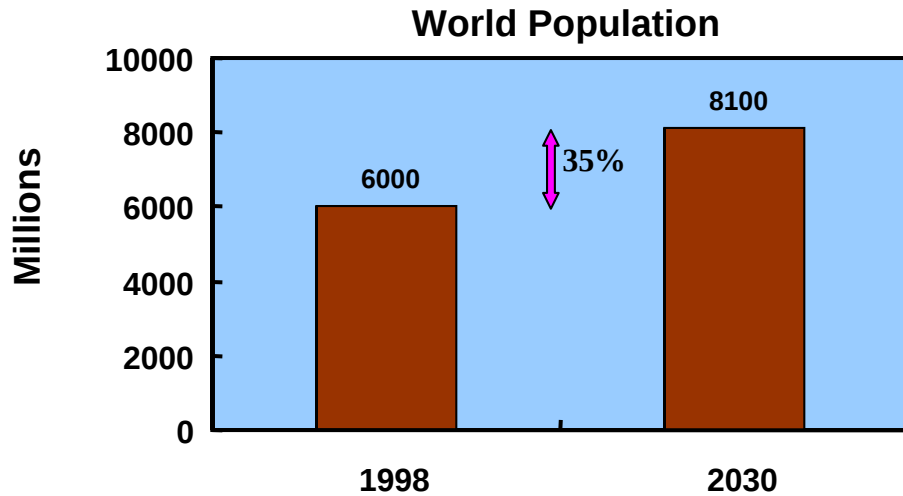
Córdoba, Spain



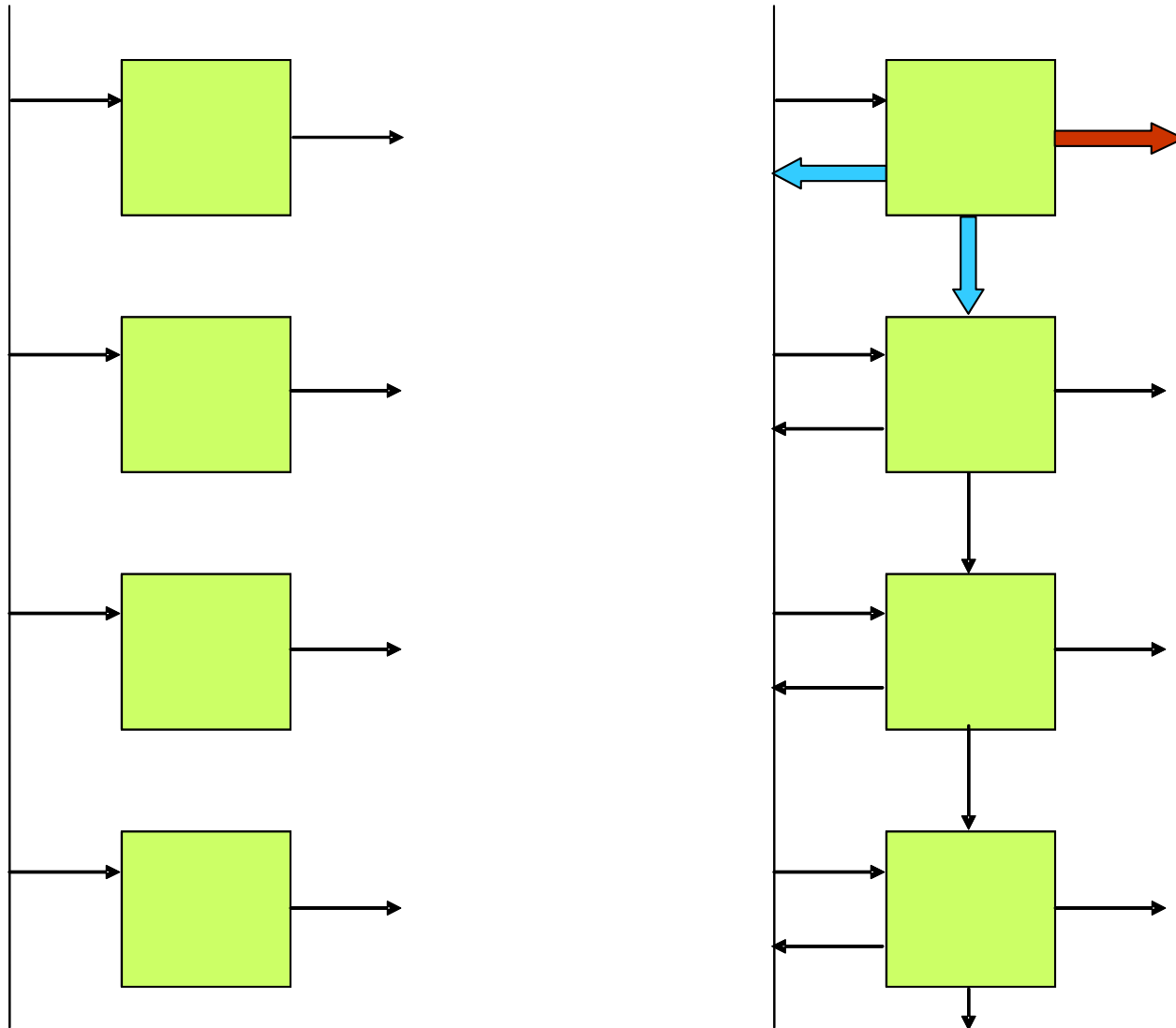
Good news?



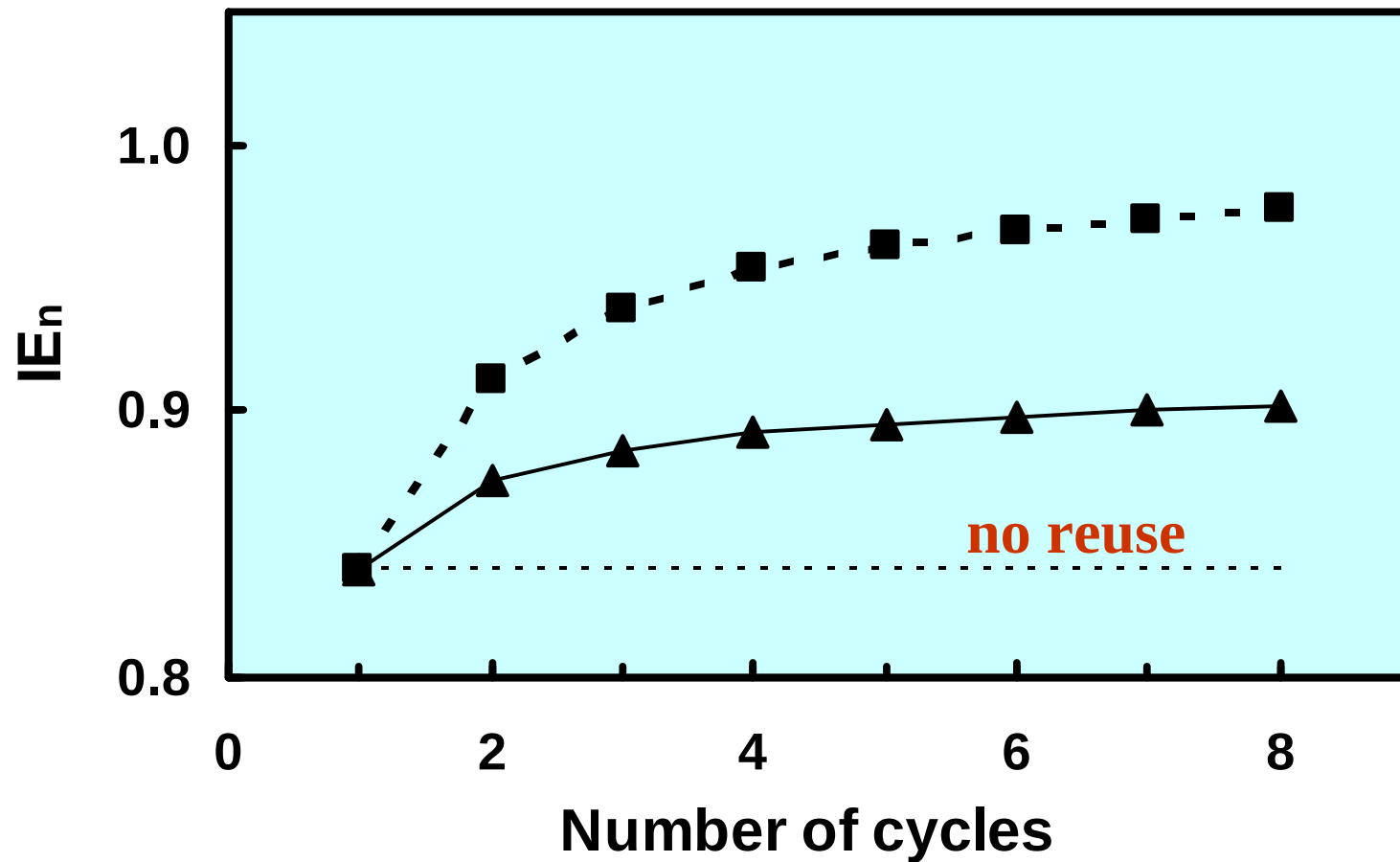
FAO study on 93 developing countries



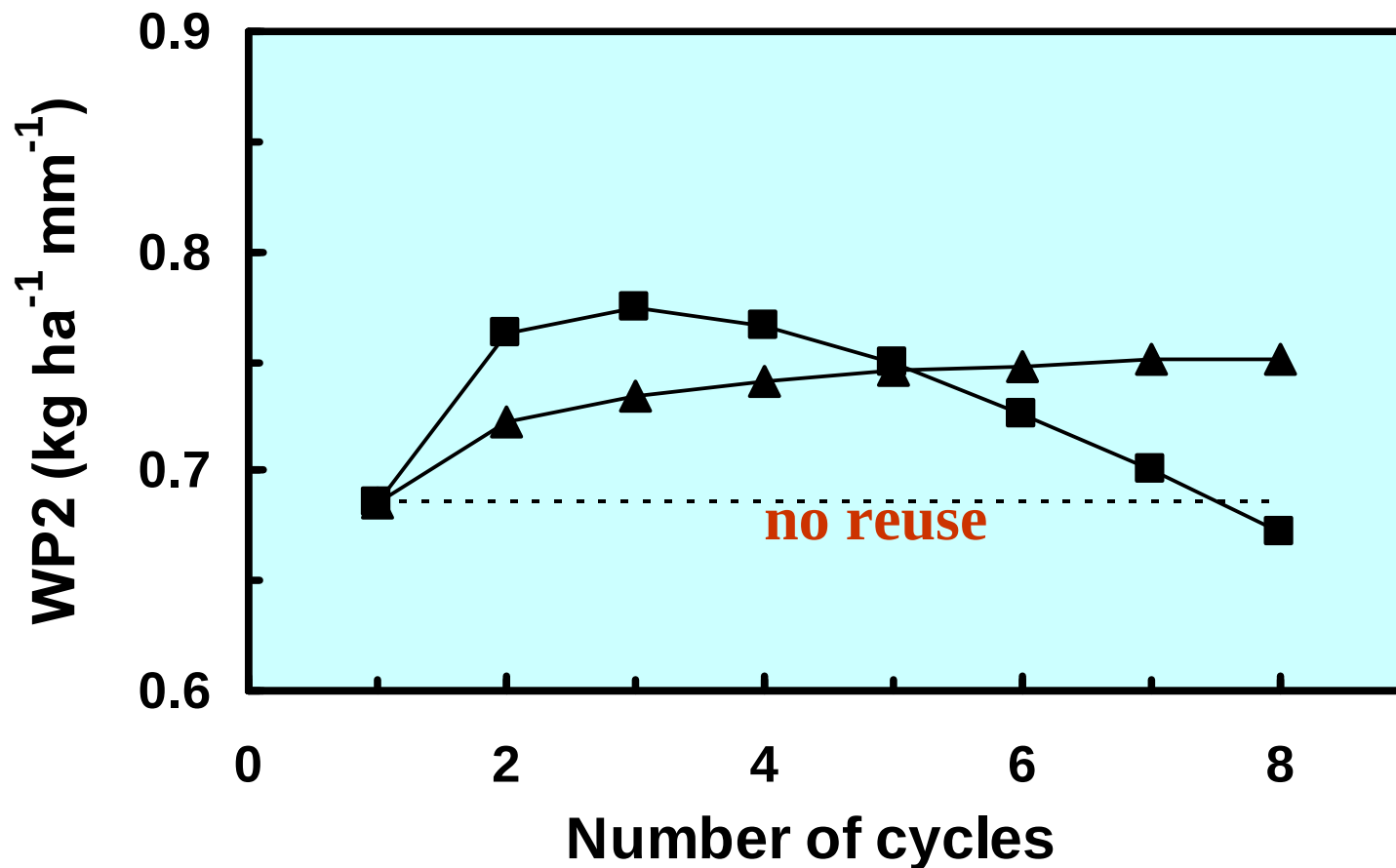
Irrigation in the context of Integrated Water Resources Management



Irrigation in the context of Integrated Water Resources Management



Irrigation in the context of Integrated Water Resources Management



Irrigation modernization

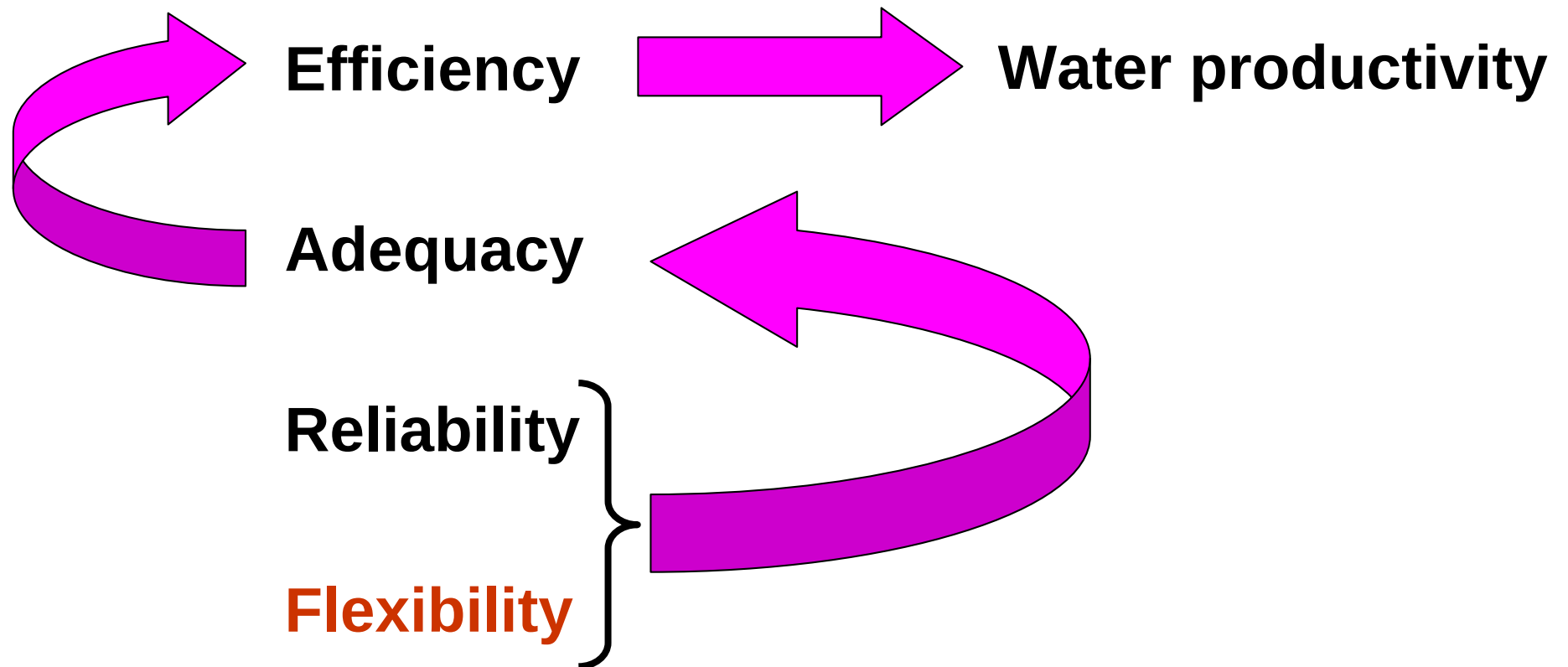
- “introduction of new physical structures and equipment ”
- “fundamental transformation of the management of irrigation water resources aiming to improve
 - ✓ the utilization of resources and
 - ✓ the service provided to the farmers”.
 - *efficiency* • *reliability*
 - *adequacy* • *flexibility*

Irrigation modernization

Flexibility and delivery concept

- | | |
|--------------------|---------------------|
| • Frequency | - Free |
| • Duration | - Restricted |
| • Flow | |

Irrigation modernization



Irrigation modernization

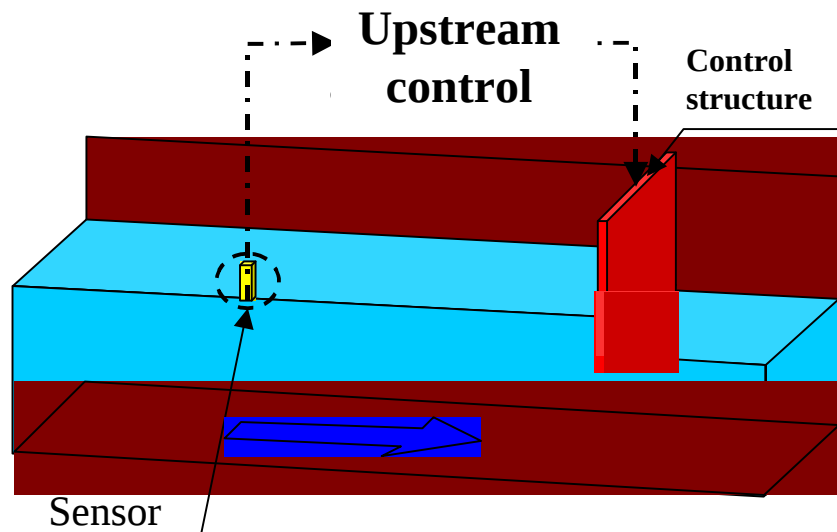
Flexibility and delivery concept

- | | |
|--------------------|---------------------|
| • Frequency | - Free |
| • Duration | |
| • Flow | - Restricted |

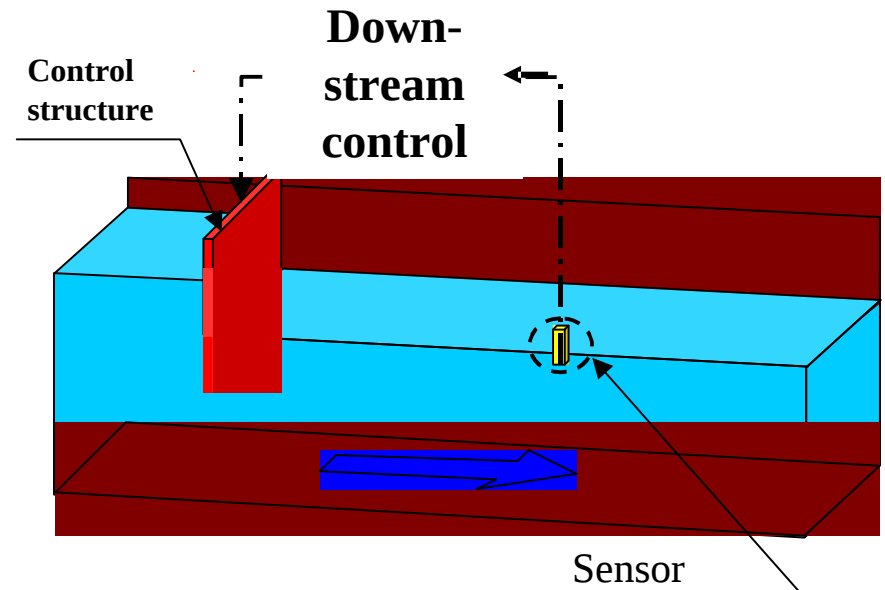
Free	➡	On-demand	➡	Demand driven
Restricted	➡	Rotation	➡	Supply driven

Irrigation modernization: the distribution system

Control concepts



Supply driven

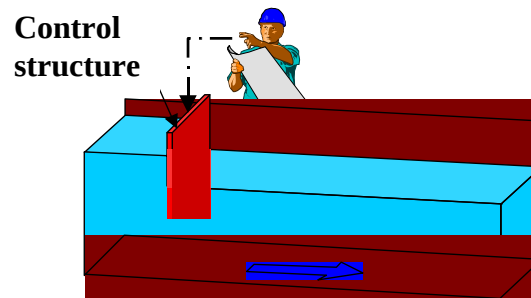


Demand driven

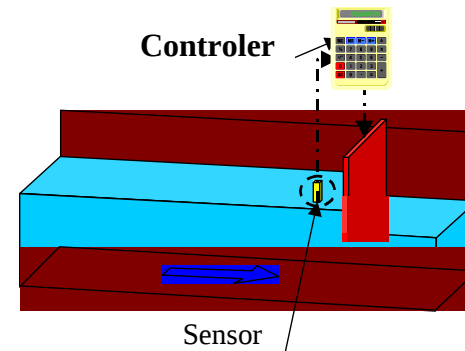
Irrigation modernization: the distribution system

Classification of canal control methods

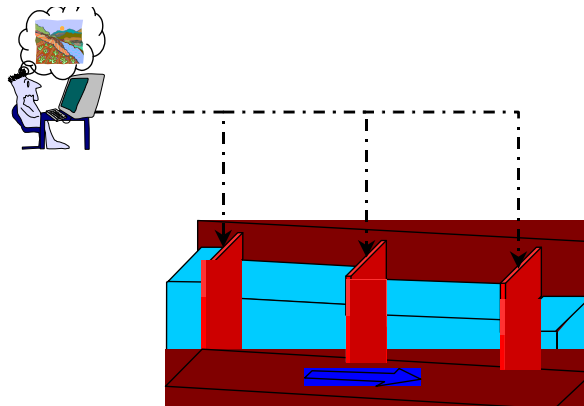
a) local manual



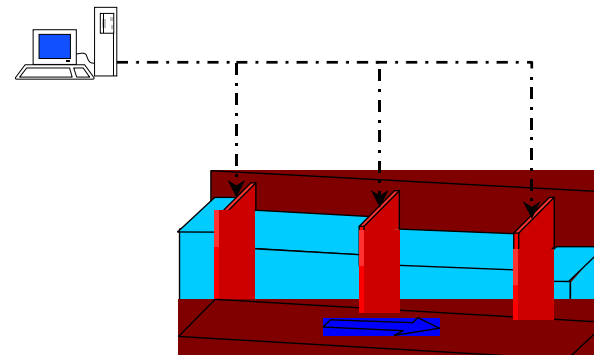
b) local automatic



c) centralised manual

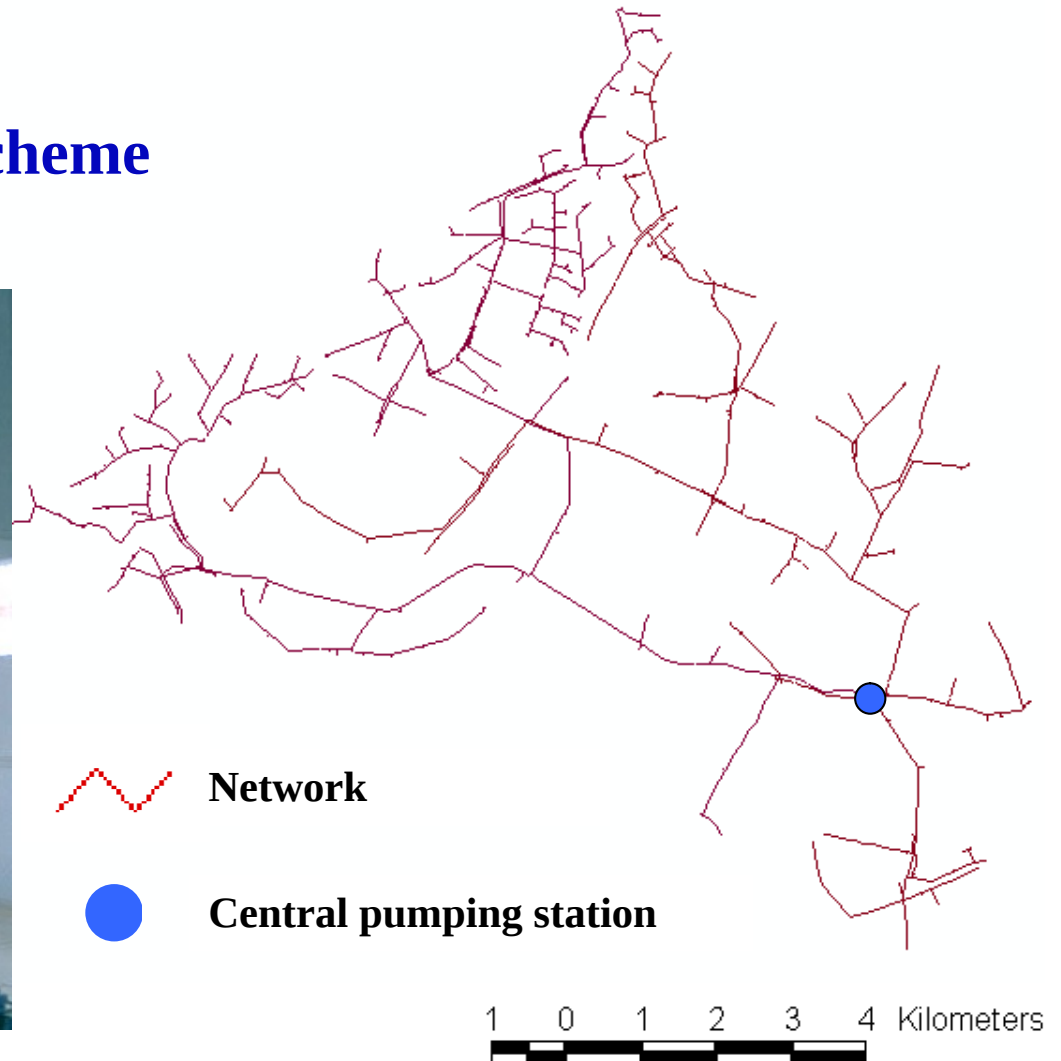


d) centralised automatic



Irrigation modernization: the distribution system

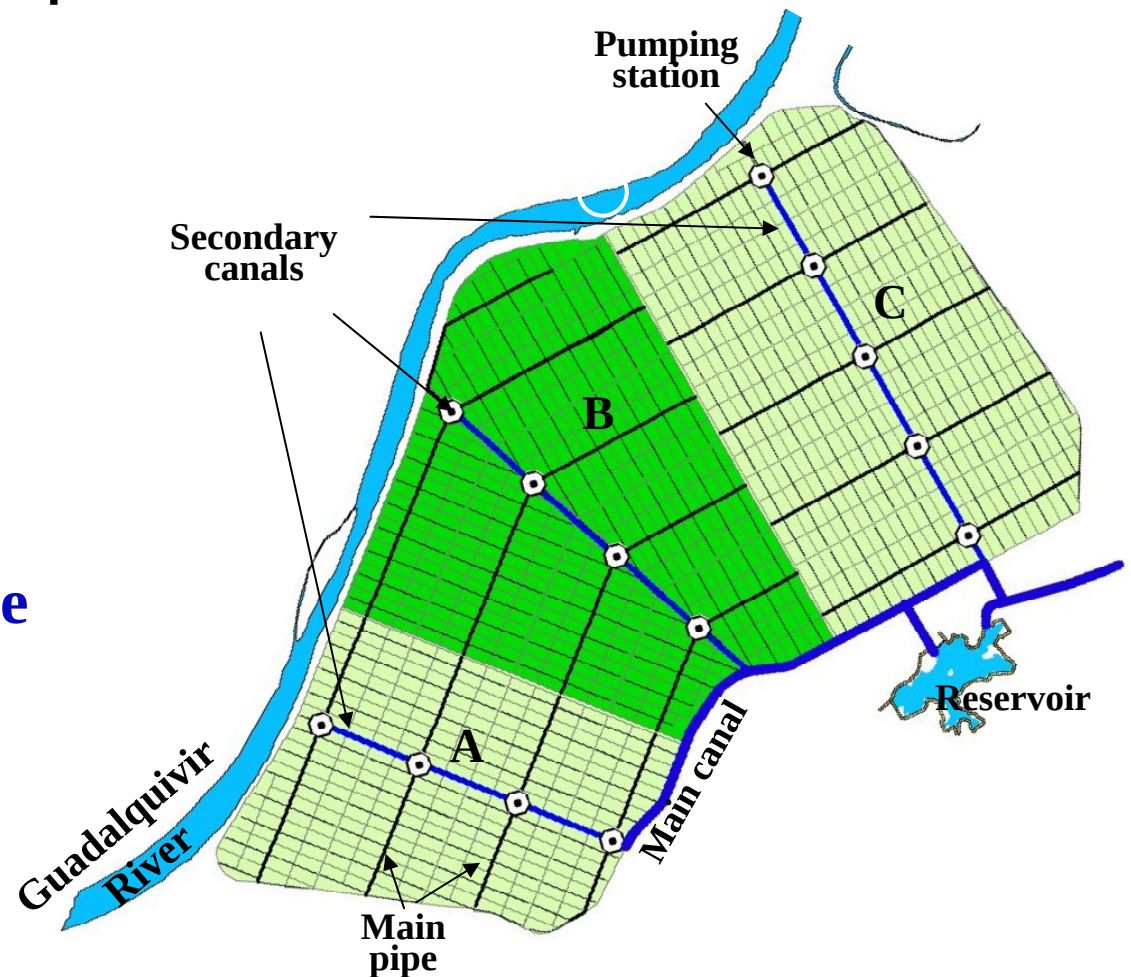
Genil – Cabra Irrigation Scheme



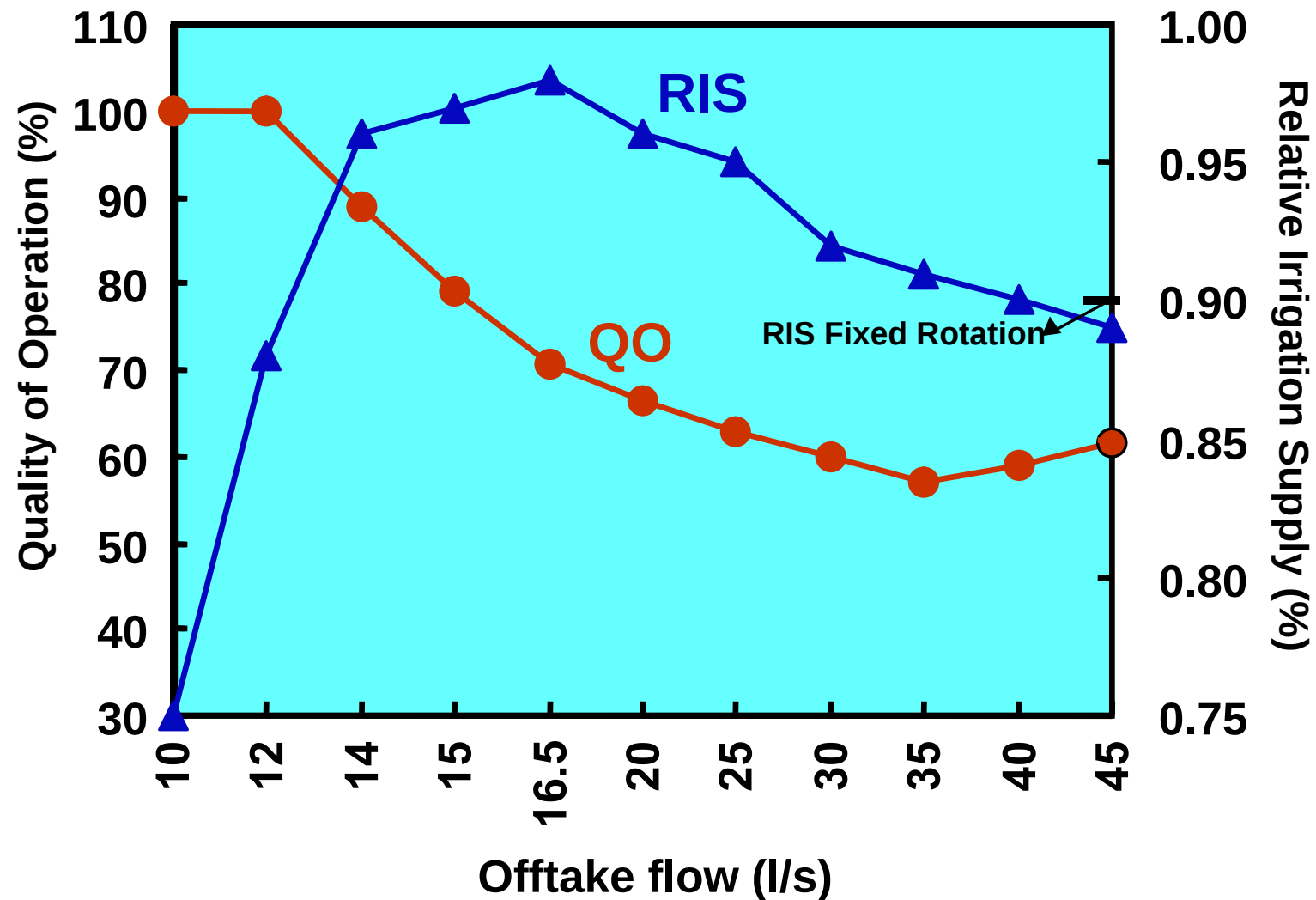
Irrigation modernization: the distribution system

- Lower Guadalquivir Valley, Spain
- Reclaimed land
- 15,000 ha and 1200 farms
- Sugarbeet, cotton, tomato

B-XII Irrigation Scheme



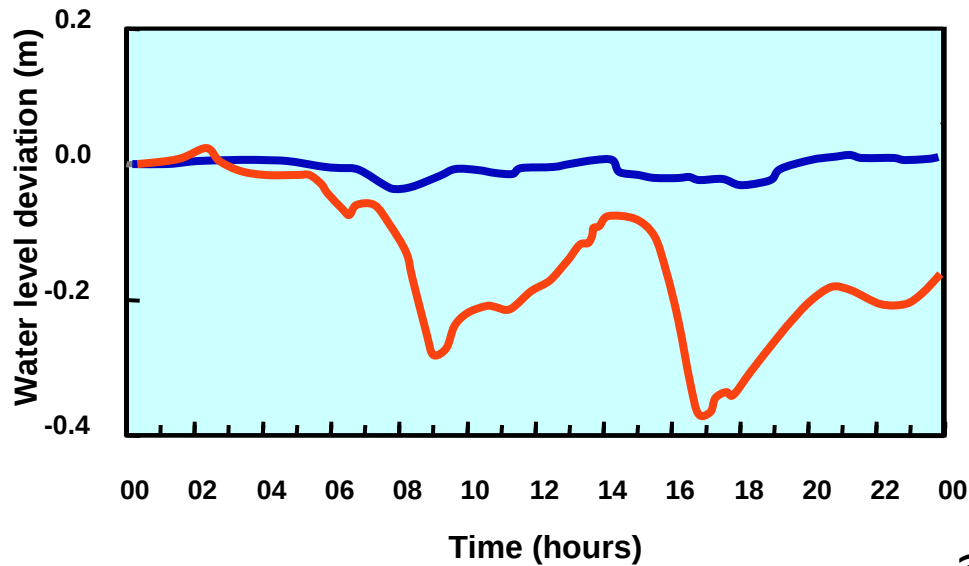
Irrigation modernization: the distribution system



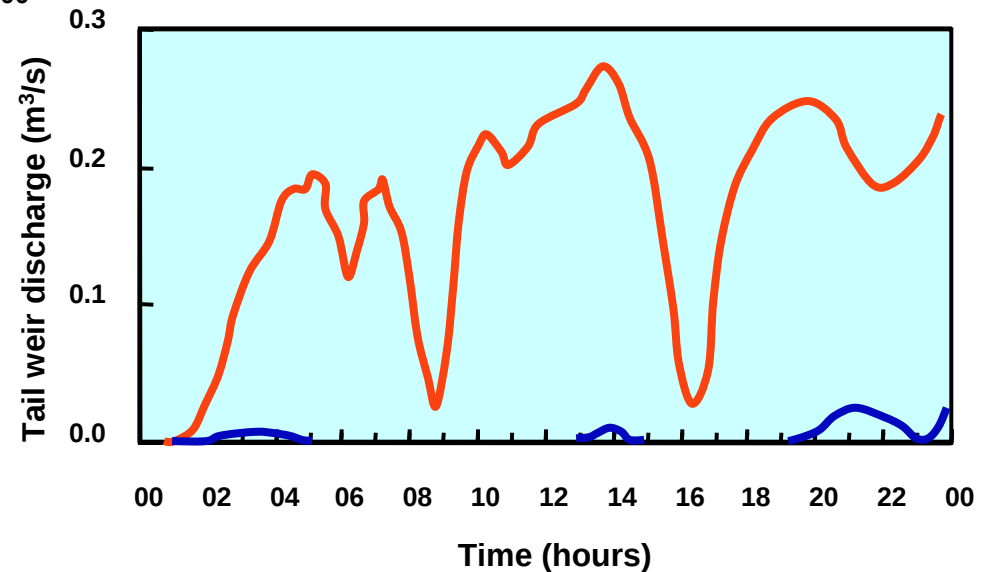
B-XII Irrigation Scheme



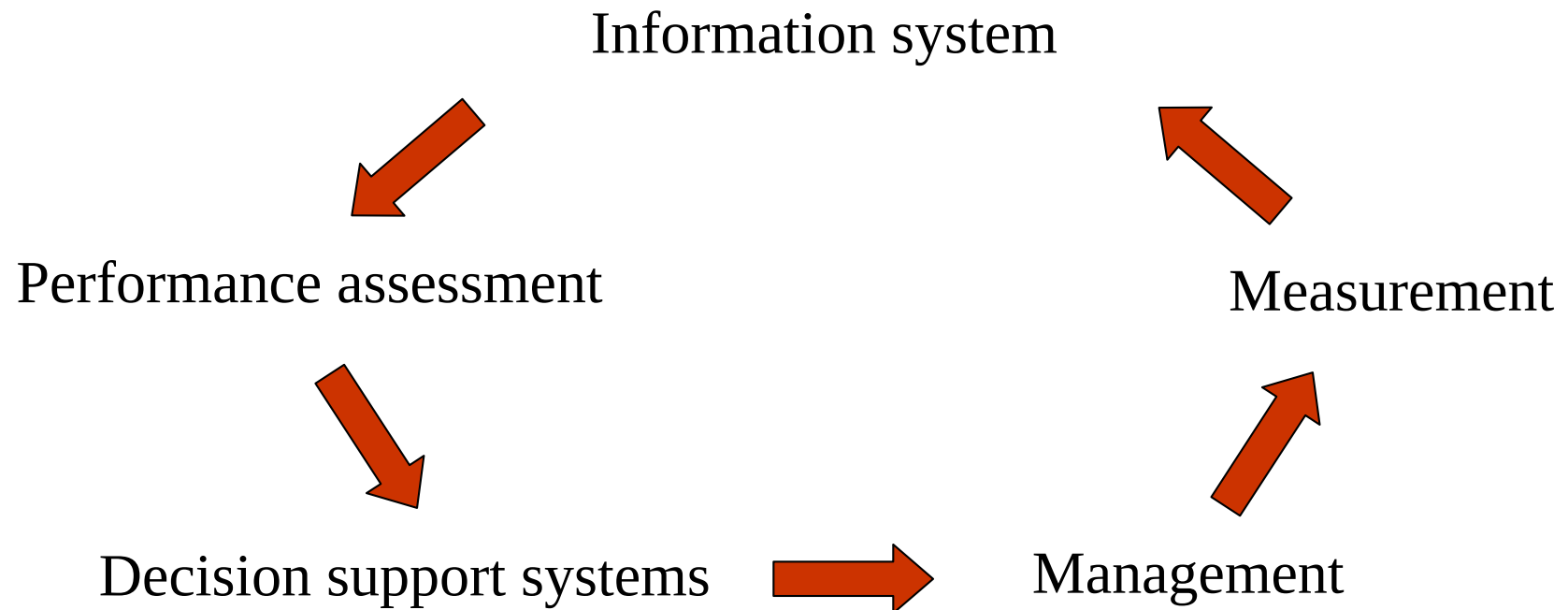
Irrigation modernization: the distribution system



B-XII Irrigation Scheme



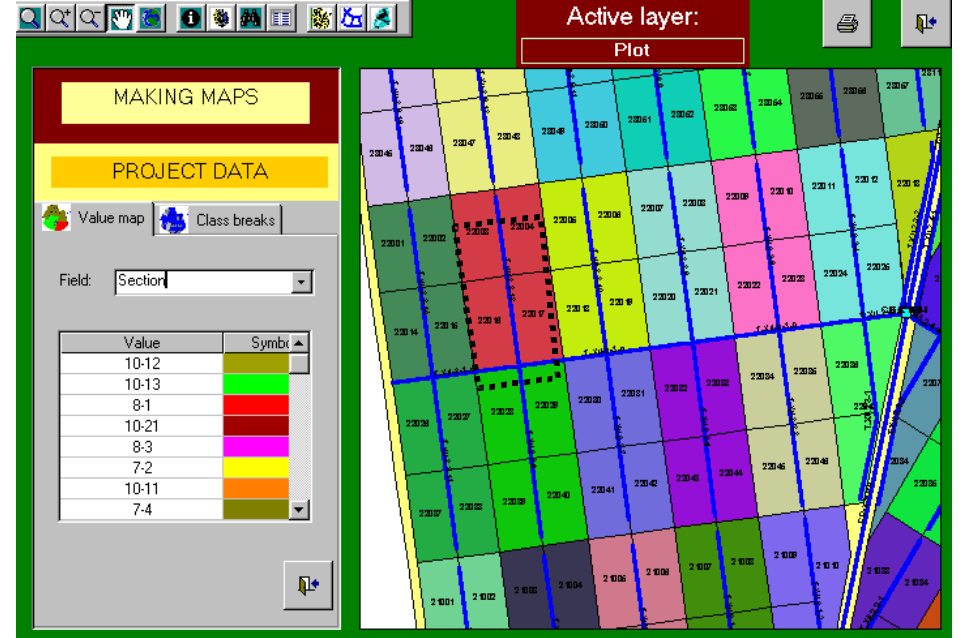
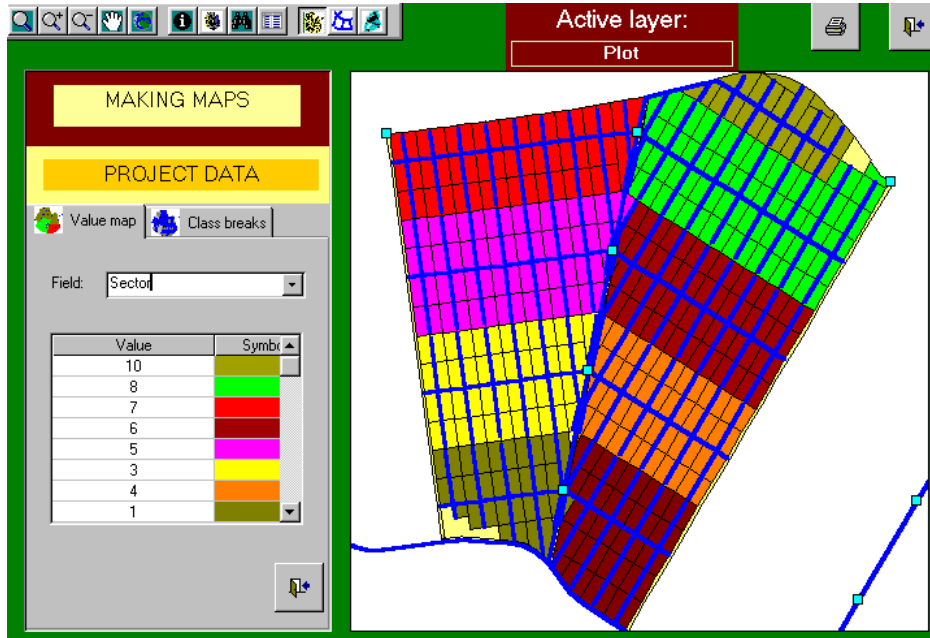
Irrigation modernization: management



Irrigation Maintenance and Operations Learning Process

Irrigation modernization: management

SIMIS



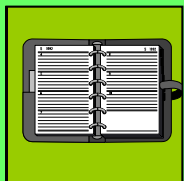
B-XII Irrigation Scheme

Irrigation modernization: management

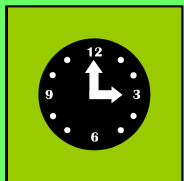
Water Management



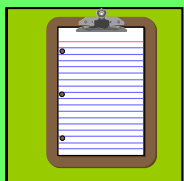
Crop Water Requirements



Irrigation Plan



Water Delivery Scheduling



Water Consumption

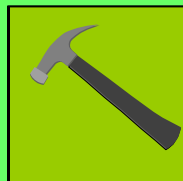
Financial Management



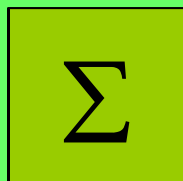
Accounting



Water Fees

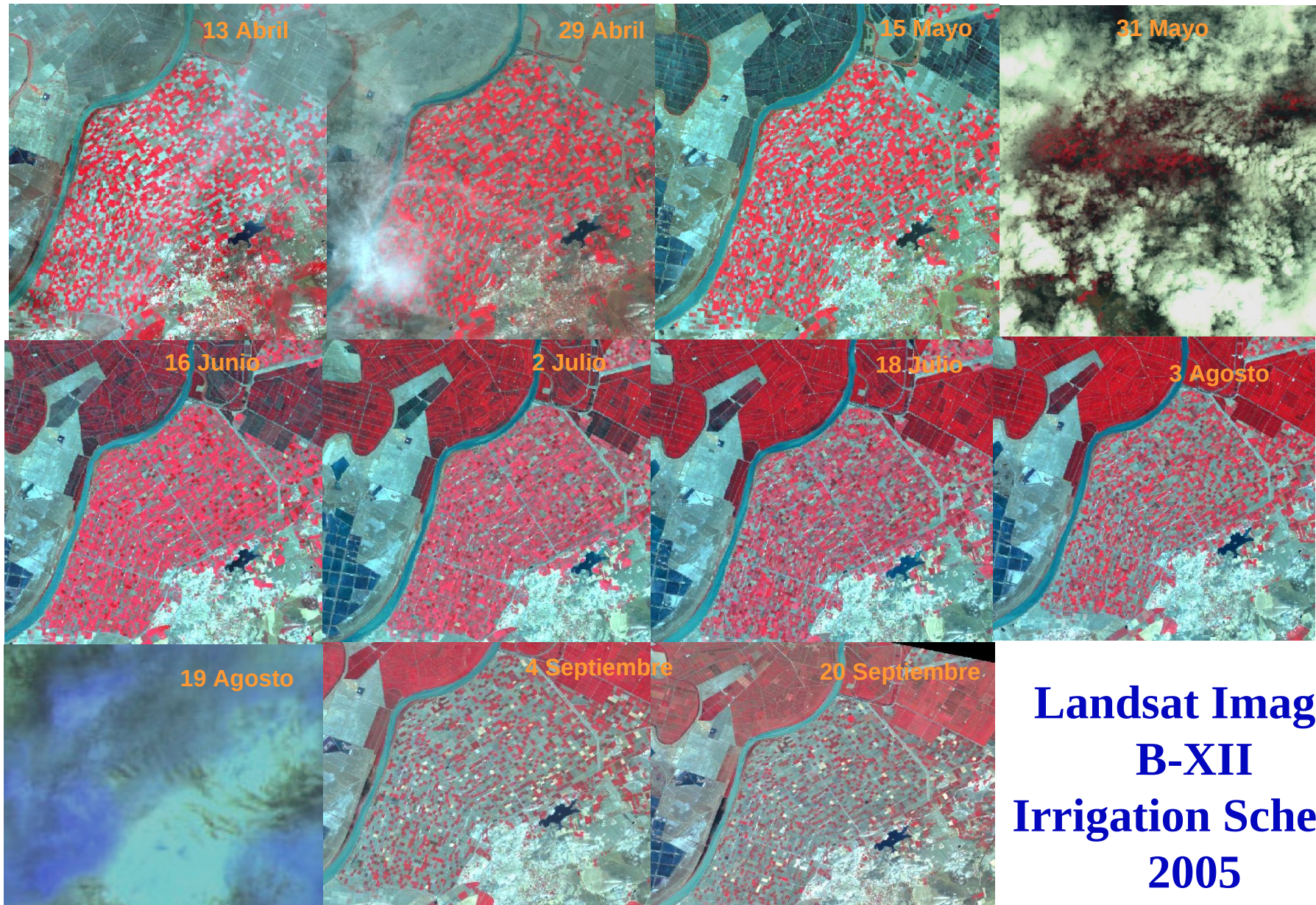


Maintenance



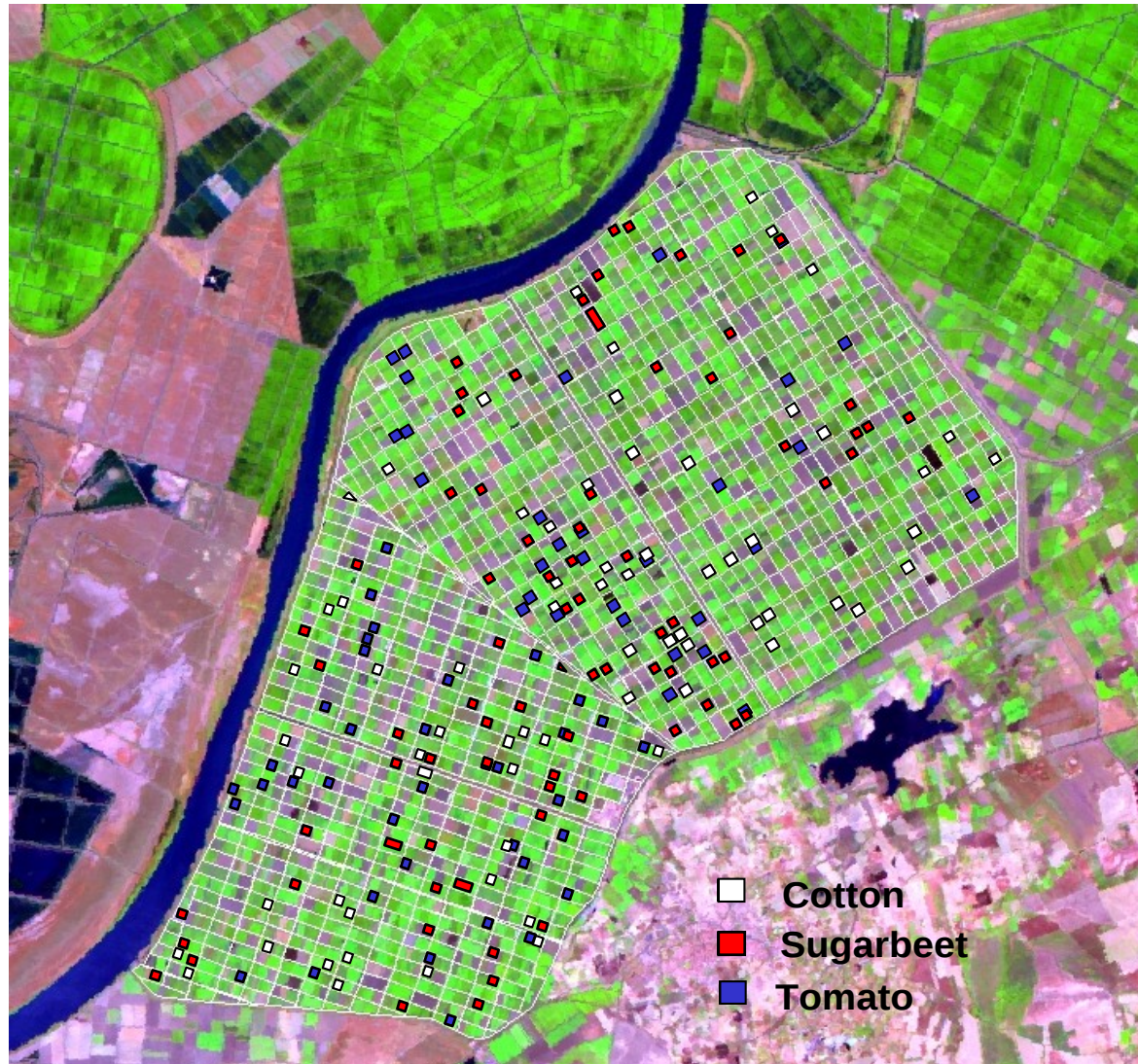
Performance Indicators

Irrigation modernization: management



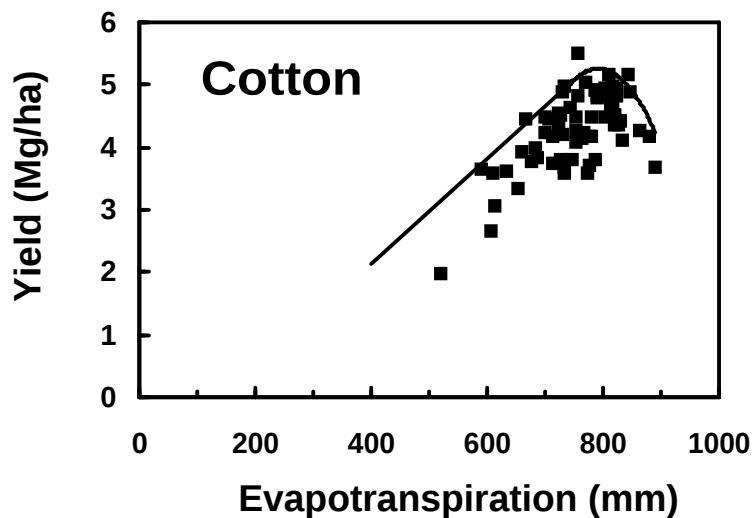
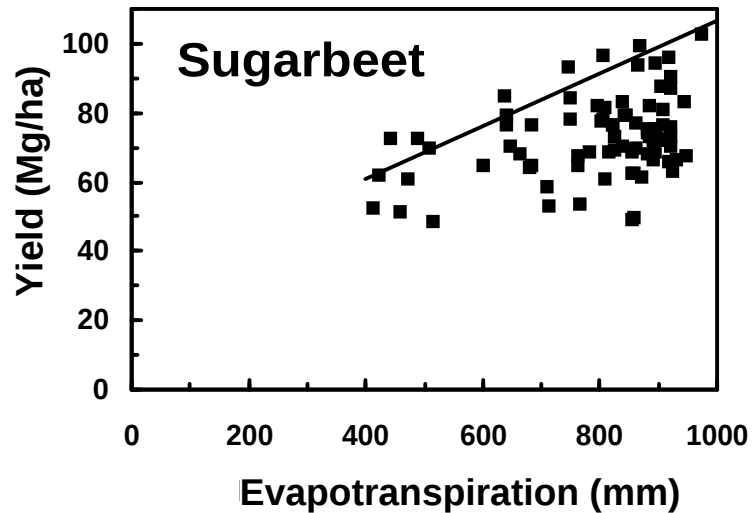
**Landsat Images
B-XII
Irrigation Scheme
2005**

Irrigation modernization: farm level

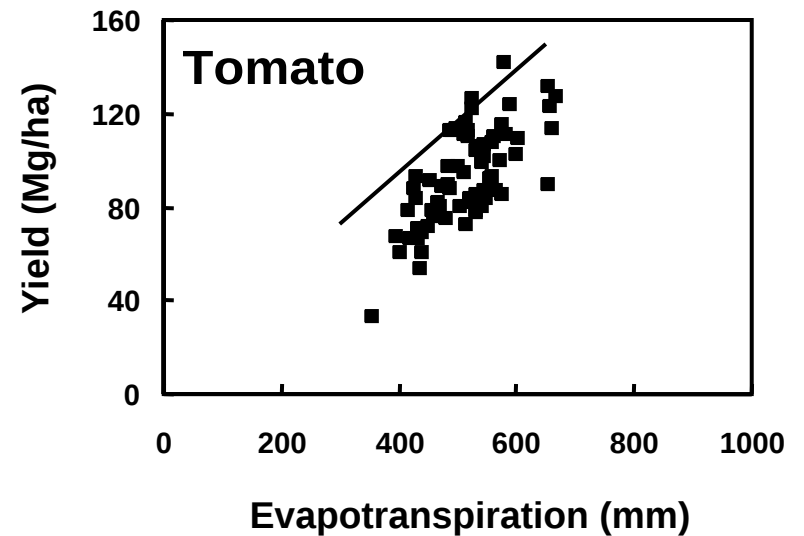


**B-XII
Irrigation
Scheme**

Irrigation modernization: farm level

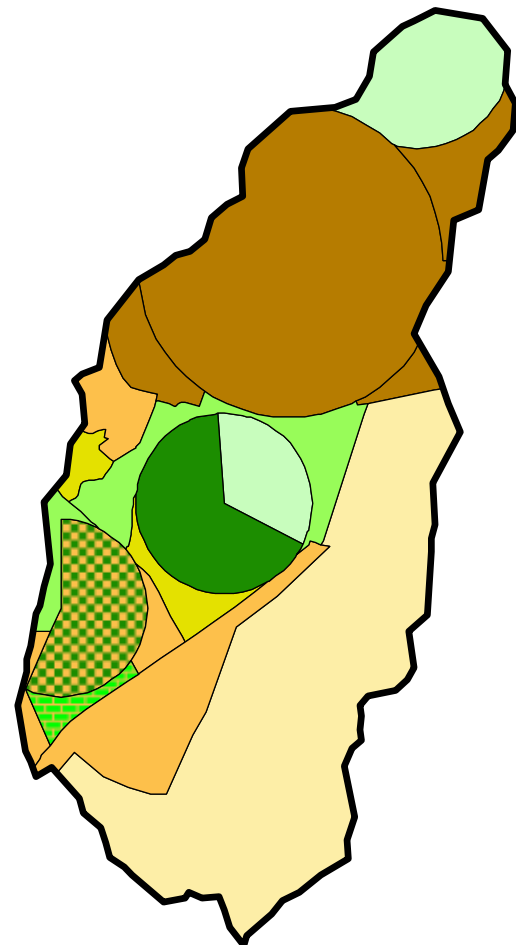
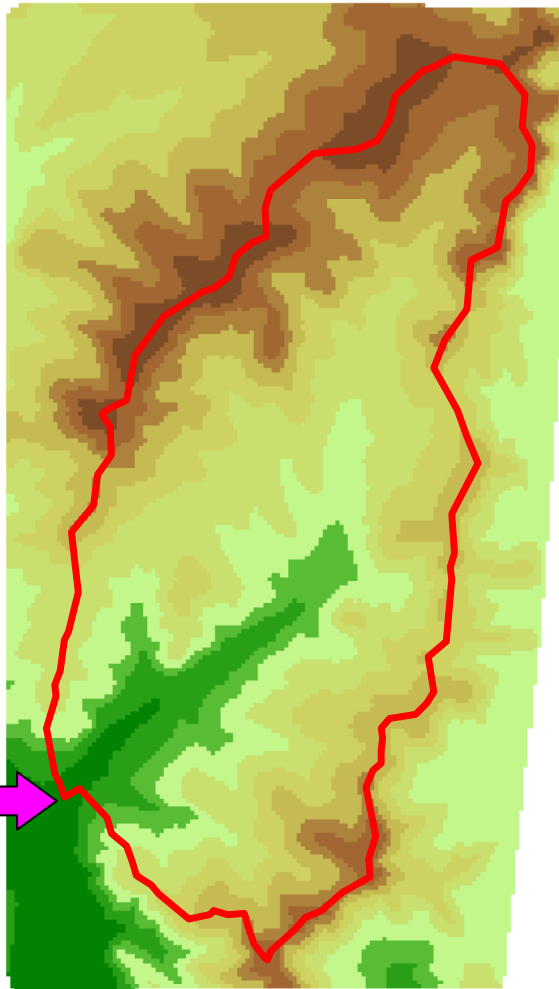
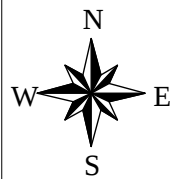


B-XII Irrigation Scheme

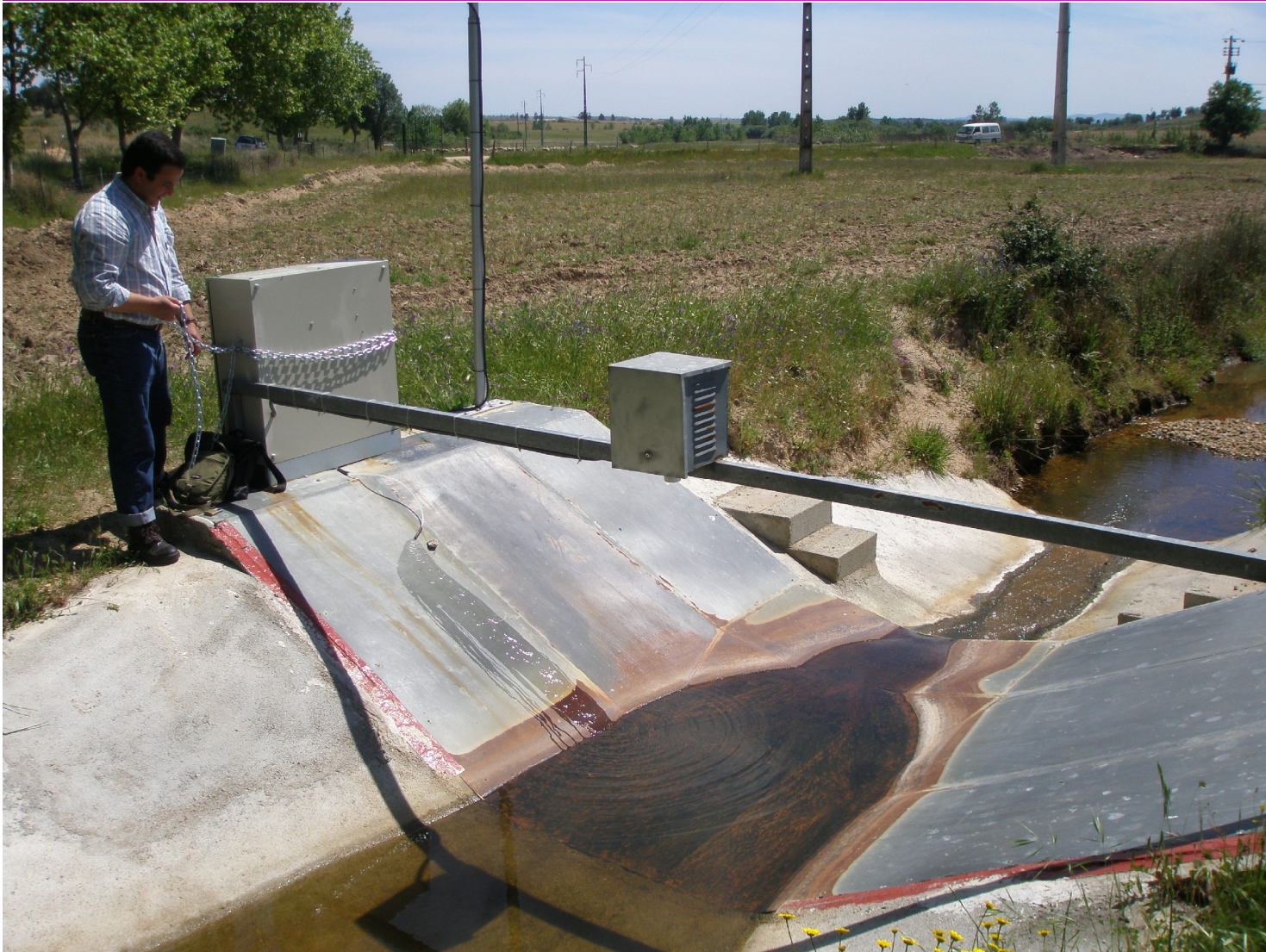


(González-Dugo, Mateos, 2008)

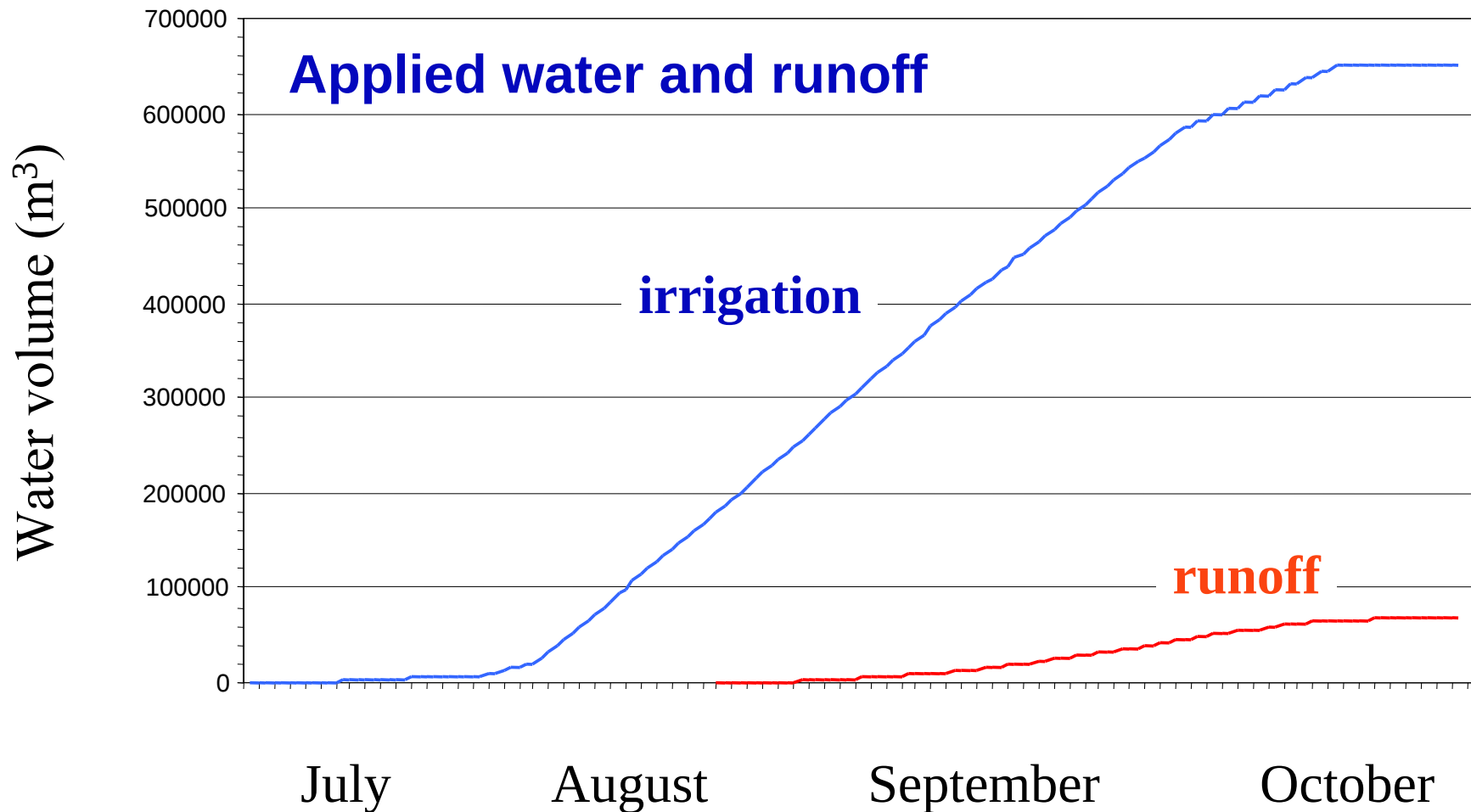
Irrigation modernization: environmental sustainability



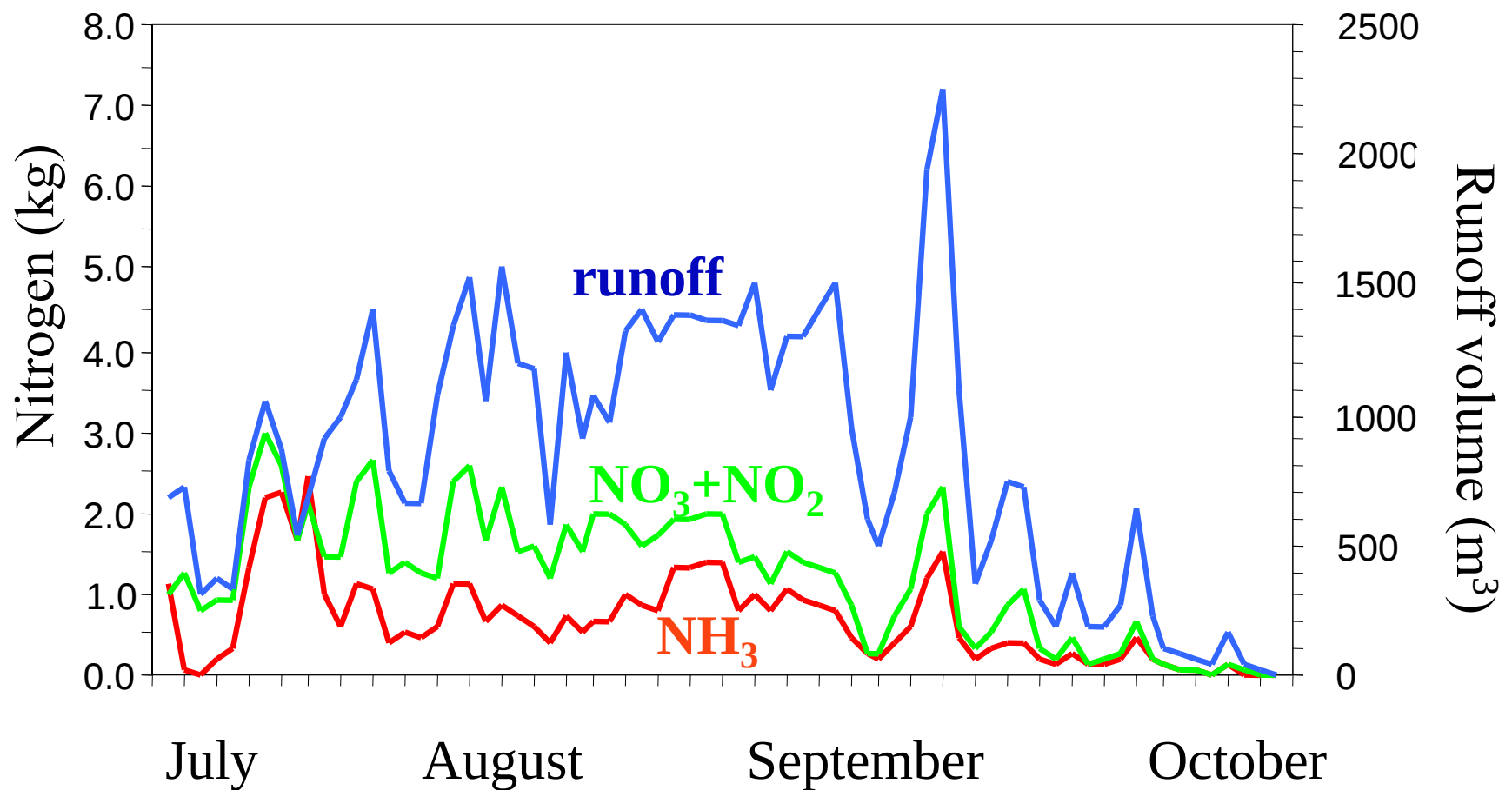
Irrigation modernization: environmental sustainability



Irrigation modernization: environmental sustainability



Irrigation modernization: environmental sustainability



Obrigado!

