

The Impossible dream?

The *Upper Guadiana system*:
Is It possible to Align Changes in Ecological Systems
with Changes in Social Systems

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Introduction: Starting at the end

Over a period of approximately 40 years (1970-2010)
more than 3,000 Mm³ have been abstracted from a 5,500 square km aquifer

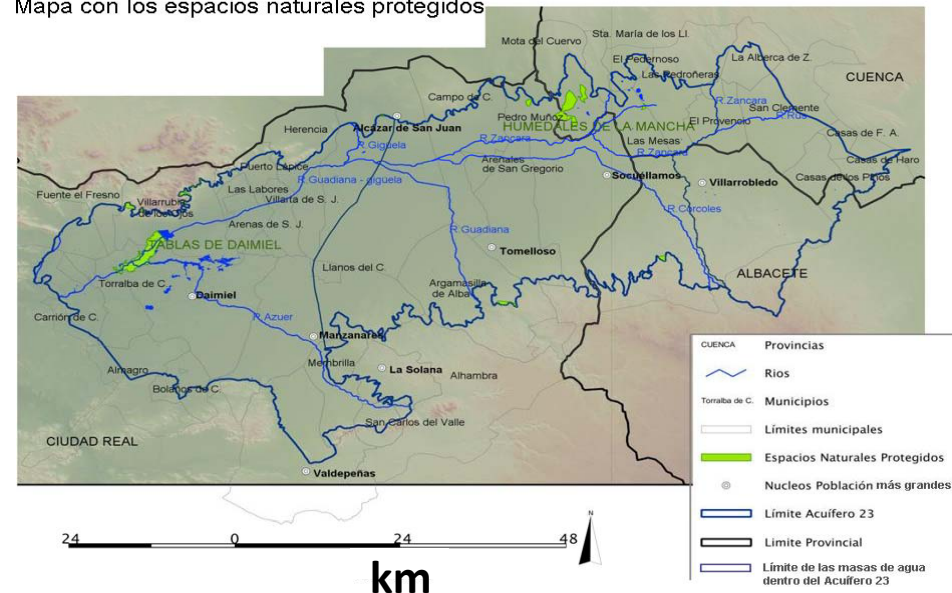


***This has facilitated socio
economic development...***

***... with clear environmental
externalities***



Mapa con los espacios naturales protegidos



MAB Reserve: 20% of the original area; very few of the wetlands
function naturally (those not dependent on the aquifer)

Water and 20th Century Development

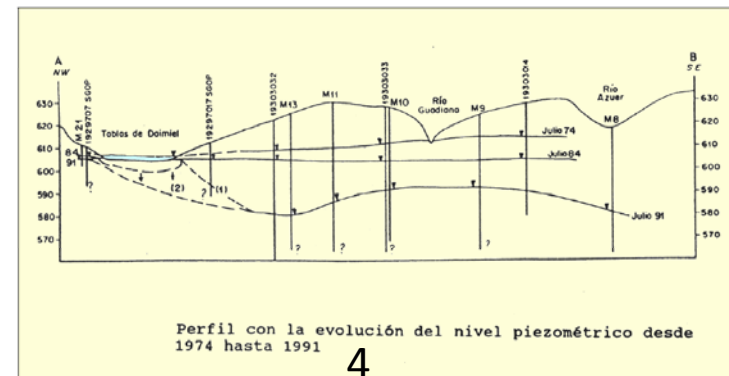
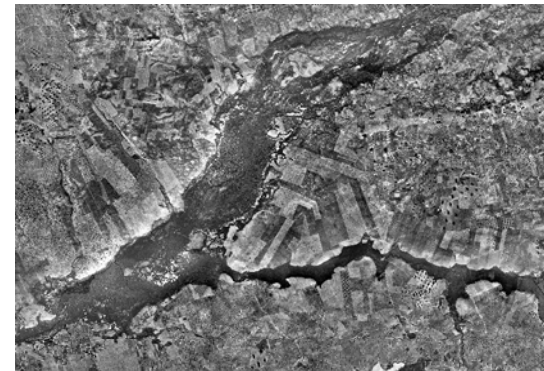
after the [Civil War 1939] almost lost half its population and then they discover groundwater and the opportunity to irrigate. (Elite Interview Mining Institute)

We were sinking in the 1960s, the people that stayed here necessarily had to change, they had to start a new development model (...). the development model had to change; the mistake was to adopt a model from the beginning of the [twentieth] century (Elite Interview NGO)

YEAR	IRRIGATED AREA	VOLUME ABSTRACTED (Mm3)
1974	31.166	205
1984	85.053	373
1990	123.321	576
2006	180.000-200.000	650-700

Why? Water as “wealth”

The land of honey: Tablas de *Daimiel* National Park



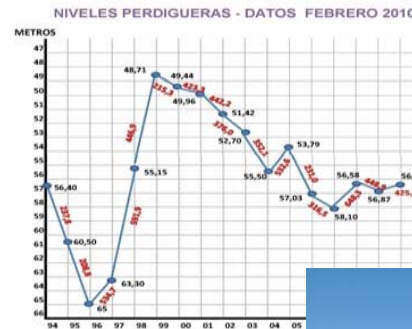


Fundación
Marcelino Botín

OBSERVATORIO DEL AGUA
WATER OBSERVATORY

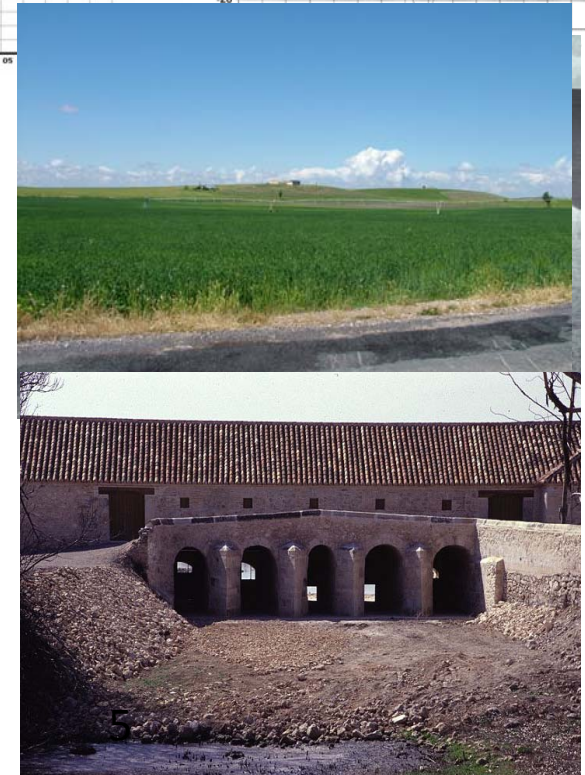
Cultural/Natural heritage

The Drop in aquifer levels (> 35m in some areas) no natural discharge (PNTD) and the disappearance of the Guadiana river is one of the biggest natural disasters in our country (Ruiz de la Hermosa Director PNTD, 2010)



Don Quixote: The Cave of Montesinos Capítulo XXIV, parte II

Guadiana vuestro escudero, plañendo asimesmo vuestra desgracia, fue convertido en un río llamado de su mesmo nombre; el cual cuando llegó a la superficie de la tierra y vio el sol del otro cielo, fue tanto el pesar que sintió de ver que os dejaba, que se sumergió en las entrañas de la tierra; pero como no es posible dejar de acudir a su natural corriente, de cuando en cuando sale y se muestra Valor de donde el sol y las gentes le vean”.

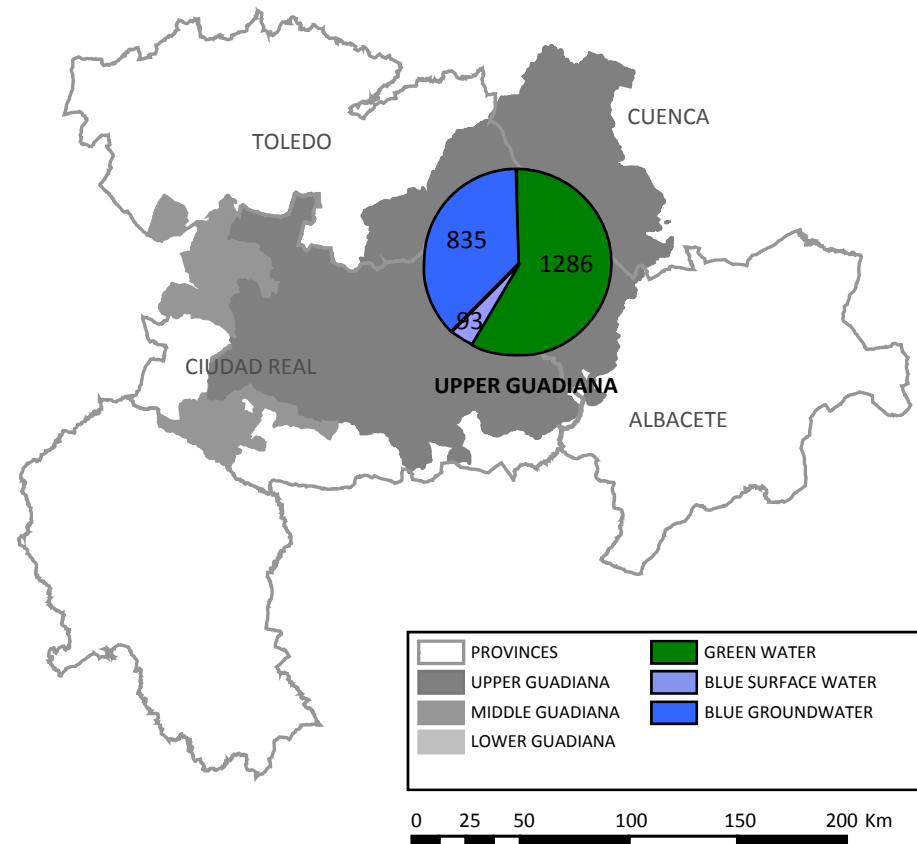


Retrospective analysis: extended water footprint

Agricultural use of water resources in the Guadiana (Mm^3/year) (2001)

Economic water productivity ($\text{€}/\text{m}^3$):

- 1.5 - 15 vegetables
- 1 - 3 vineyards
- 0.5 - 1 olive trees
- 0.1 - 0.2 cereals



Source: Aldaya and Llamas 2009

Social and Environmental “groundwater” banking: *a structural water rights re-allocation on equity and efficiency grounds?*

Ecological restoration = water

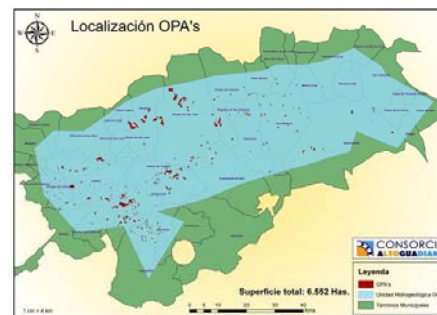
- Aim: reduce abstraction from 440 Mm³ to 200 Mm³: recover wetlands (WFD 2000)
- Re-fill the 3000Mm³ by 2027



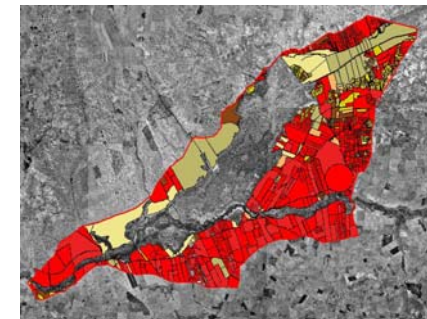
Social restoration = water?

Land and water rights

- Water: 130 Mm³ water rights (260 paper rights) re-allocated 70%/30%
- Land: park periphery



Location of water rights
purchased (40Mm³ in 3 years
(Calleja, 2010)



Land purchased in park
perimeter

The Flip side (“wicked problems”)

- **complex, with clusters of interrelated problems; dynamic, high levels of uncertainty**
- **many production and consumption externalities; needs multiple disciplines and inter-disciplinarity**
- **diverse legitimate competing values and interests requires trade-offs and multiple decision criteria**
- **solutions for one group generates other problems intractable for any single organisation**
- **improvements require a broad societal response by scientists, service agencies and civil society**

(Smith, 2007)

PEAG	Plan	Result
Budget	810 Meuros	•Budget 380 Meuros by 2010; •Budget issued 104 Meuros •Budget spent 83 Meuros
Mm3	Target 130 Mm ³	Bought 30 Mm ³ (effective 15) i.e. 5.3 million per Mm ³

5000 m euros (PEAG) for 2% of Spanish territory (810 MEuros for purchase of water rights to re-allocate)

Social restoration: Catalyzing change

Long term robust and self-sustaining socio-ecological systems

➤ Option 1: Special Upper Guadiana as end

Problem: Perverse subsidies:

- 1. Direct (CAP payments)
- 2. Indirect (alcohol production)

➤ Option 2: Special Upper Guadiana as facilitator not an end but a catalyst for change.

- 1. gradual weaning the regional economy from perverse external subsidies;
- 2. need to de-couple political rents from water (clientelistic).
- 3. Public subsidies for public goods₉ (WWF/Adena)

The impossible dream?

A process of socio-ecological restoration

1. Reduce blue water use (less cereals, more high quality vines, less area)- true “water savings”
2. Conjunctive use of green and blue water?
3. Allocate water equitably between all users (*first in time first in right?*: Park???- historical water rights? Customary rights?)
4. Diversify the economy? Self-sustaining “green economy”?
5. Payment for environmental services? (who pays?)
6. Any other options? **SUGGESTIONS/IDEAS WELCOME**



WINDOW OF OPPORTUNITY OF CAP REFORM? OR MORE OF THE SAME?

Better to presume more of the same

– WHAT IS THE BEST TACTIC THEN???



The Impossible dream

Alice laughed: "There's no use trying", she said; "one can't believe impossible things".

"I dare say you haven't had much practice", said the Queen. "When I was younger, I always did it for half an hour a day. Why, sometimes I've believed as many as six impossible things before breakfast".

Lewis Carroll – Alice through the Looking Glass

Thank you!

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