THE UPPER GUADIANA CASE

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INDEX

• Introduction
• The previous legal Framework to 1985
• Evolution until end of 80’s
  • Declarations of "Aquifer Overexploitation"
  • 1992 Income Compensation Plan
  • 2000 National Hydrological Plan
  • Water Framework Directive
  • 2008 Upper Guadiana Special Plan
  • Guadiana District Management Plan (River Basin Hydrological Plan) 2009-2015
• Quantitative status evolution since the declaration of overexploitation
• Conclusions
Introduction
Introduction

Groundwater flow diagram between Aquifers

Surface and Groundwater Water Flow
Surface Water Flow
Groundwater Water Transfer to other basin

Cuenca río Bañuelos
E. Vicario
EA-103 Puente Morena
EA-8 Balbuena
EA-24 Puente Navarro
Fosa Moral-Aldea
Depresión Intermedia
C. Tajo
C. Júcar
C. Guadalquivir

Rio Guadiana
Rio Jabalón
Introduction

Tablas de Daimiel

Lagunas de Ruidera
The previous legal Framework to 1985

- Ancient 1879 Water Law, groundwater as a private property.
- New 1985 Water law: groundwater public domain
- Allowed existing groundwater abstraction to continue, required register.
- Tens of thousands Registration applications (abstraction would far exceed available renewable resources).
Evolution until end of 80’s

• From the 50’s to the 70’s, channelling and drying of wetlands to transform into farmlands

• In the 70’s, intensive growth of irrigated areas from La Mancha Aquifers

• In the mid 70’s, significant groundwater table depletion.

• In the mid 90’s the storage deficit of La Mancha Occidental aquifer 4,000 hm$^3$. 
Evolution until end of 80’s
Evolution until end of 80’s

• Economic growth.
• Depletion of groundwater levels affected wetlands ecosystems.
• Campo de Montiel aquifer area, important social conflicts and violent.
• Water quality degradation.
• National and regional Administrative Bodies overwhelmed.
Evolution until end of 80’s

Natural pattern groundwater flow (1976-IGME).
Free Discharge Tablas de Daimiel area

Modify pattern groundwater flow (2005-CHG)
No Discharge Tablas de Daimiel area:
Central depression
Declarations of "Aquifer Overexploitation"

• 1985 Water Law: depleted aquifers to be declared overexploited.
• Mancha Occidental and Campos de Montiel aquifer declared.
• Aquifers declared, managed through Abstraction Plans:
  – annual maximum abstractions.
  – Banned Drilling new wells.
  – Irrigation Farmer Associations Extraction Committees were created.
• Social opposition against restrictions. Farmer Associations demanded compensation.
• Abstraction restrictions were not properly controlled and prohibitions about new drilling of wells were not observed (illegal situations).
• Administrative Bodies lack of human and technical means.
1992 Income Compensation Plan

• First agro-environmental programs of the EU Common Agricultural Policy.

• Objective: reduce abstraction and recovery of wetlands

• Farmers required to use less water, abandon water-intensive crops, reduce fertilizer and pesticide use.

• Compensation to farmers for income losses

• Proposed for five years, investment €96 million, and extended to 10 years (about €180 million).

• Slight Abstractions reduction and water-intensive crops such as maize and beet almost disappeared.
1992 Income Compensation Plan

- Nevertheless early 90’s intense drought caused water table depletion.
- In the second half of the 90’s groundwater table rose (heavy rainfall strongly contributed).
- The Plan was not definitive: paid for a temporary renounce to water but it did not create a permanent sustainable agriculture or new economic activities.
- Lack of coordination among Administrative Bodies, and a lack of human and technical means to control.
- Decrease in employment and economic activities (although famers incomes increased),
- Illegal abstractions on going.

• The 1998 Hydrological Plan, required by Spanish water law.
• Objective satisfy socio-economic activities water.
• This Plan recognised the situation in the Upper Guadiana, and included
  – Overexploitation declarations.
  – Limited abstraction and banned new rights over groundwater.
  – Proposed increase control on abstractions.
  – Anticipated possible internal and external aquifers recharge.
• Plan studied the Upper Guadiana water deficit, and asked for other solutions to the National Hydrological Plan.
National Hydrological Plan

• National Hydrological Plan coordinates basin Plans, and solves aspects they cannot.

• The National Hydrological Plan 2000 did not consider a water transfer to Upper Guadiana, but restriction and management measures.

• Established to develop a new Upper Guadiana Special Plan, to go further in management measures (restricted abstraction).
Water Framework Directive

• Water Framework Directive main objective to achieve a good status of surface and groundwater bodies in 2015, throughout a participative management planning process.

• WFD defines the good status of groundwater bodies as *the good quantitative and chemical status and the good status of the surface ecosystems related to groundwater bodies* (see Mancha Occidental-Tablas de Daimiel and Campos de Montiel-Lagunas de Ruidera).
Upper Guadiana Special Plan

• The 2008 Upper Guadiana Special Plan was required by 2000 National Hydrological Plan:
  – A comprehensive plan.
  – To be a permanent and definitive solution.
  – Endowed with sufficient means.
  – Good coordination required among Administrative Bodies (water, environment, agriculture, and socio-economic development).
  – Wide public participation (The Plan was adopted with a broad consensus).

• Its main objectives were:
  – Achieve a good status of water bodies.
  – To overcome existing structural water deficit.
Upper Guadiana Special Plan

• The measures of UGSP were:
  – Transformation of private water rights (ancient law) into licenses (new law).
  – Agreements for transfer of water rights (reallocation).
  – Purchase of water rights (70% to the recovery of water bodies, 30% to allocate water rights to farmers).
  – Program of management and control measures.
  – Environmental Program.
  – Aid Program for Farmers Associations and environmental education.

• The total budget was 3,000 M€, to be financed by the Central Government (with no European Funds).
Upper Guadiana Special Plan

• Other complementary Programs (different financing):
  – Urban water supply, drainage and waste treatment Program.
  – Agricultural Development Program (to less water consuming crops).
  – Socio-economic development Program (to promote new sectors).

• The implementation of UGSP was very limited (crisis):
  – Transformation of private water rights.
  – Purchase of water rights (14 hm$^3$), devoted totally to vineyard farms.
  – Installation of water-metering devices.
  – Aid agreement with Farmer Associations, education measures.
  – Socio-economic and Agricultural Programs were not carried out at all.
Upper Guadiana Special Plan

• UGSP implementation was severely criticized:
  – Groups of economic interest considered unfulfilled investments.
  – Environmental groups considered its implementation partial and opaque.
  – Environmental and socio-economic Program were not carried out.
  – UGSP too ambitious and unrealistic for a context of crisis.
  – People call for reforms (focus on management and restriction measures, with no cost).

• A struggle between the two most important political parties in the region.
Guadiana District Management Plan 2009-2015

• The Guadiana District Management Plan objectives:
  – To satisfy socio-economic water resources demands (traditional Spanish planning objective)
  – To achieve the good status of the water bodies (new WFD objectives).

• The Plan submitted to public consultation included the UGSP, as a basic measure to achieve these goals.

• During the public consultation process:
  – UGSP was severely criticized and a deep review requested.
  – It was asked for consider water transfer from other basins.
Guadiana District Management Plan 2009-2015

• As a result Guadiana District Management Plan:
  – the review of the UGSP and
  – suggests to the National Hydrological Plan a possible transfer.

• The new District Plan includes a set of hydrological management measures with no cost:
  – Transformation of private water rights into public licenses.
  – Water right-exchange system (private contracts).
  – New risk situation declaration of not achieving objectives of good status to all groundwater bodies (Upper Guadiana).
  – Centre for the Exchange of Water Rights.
Guadiana District Management Plan 2009-2015

- This Management Plan meant a major scientific and technical knowledge advance.
- A hydro-geological model of all Upper Guadiana groundwater bodies implemented, which:
  - let define available water resources in each groundwater body,
  - a tool for the decision making (ordinary management)
  - according to model results, with restriction measures, achieve a good quantitative status in the period 2015-2021.
Quantitative status evolution since the declaration of overexploitation

- There are two main periods of groundwater depletion, followed by two partial recovery periods.
  - 1979-1993 period, level declined significantly (falling further during the 1990-1995 drought). Total drawdown was 42 m by the mid 1990s. Severe environmental damage.
Quantitative status evolution since the declaration of overexploitation

- Wet 1996-1999 period, a 20 m recovery.
- 2009 to 2012 wet period, a new and important water table rising (21 m).

Huge recovery, faster and larger than previous recovery.
Conclusions

• Cycles of groundwater level fluctuation and environmental problems,

• Swing of successive regulations and action plans,

  Continuous conflict in the area.

• Regulations restricting water abstraction and the penalties, on the one hand,

• Water savings incentives and the support measures on the other,

  Water consumption & slight shift to water-effective crops.
Conclusions

• Although the quantitative status of water bodies has improved
  – governance problems persist
  – ongoing social conflict,
  – social participation is limited,
  – economic growth is doubtful, and
  – general environmental status is not good.

• A definitive solution seems far. New plans will continue.
THANK YOU VERY MUCH FOR YOUR ATTENTION