Rosenberg International Forum on Water Policy

Water for food: Quantity and Quality in a Changing World

Zaragoza, Spain

June 2008

Water Policies in Spain:

Balancing water for food and water for nature

Consuelo Varela Ortega

Universidad Politécnica de Madrid (UPM), Spain

Some highlights of the RF → Key points

1. Get Management right	Maggie, Elias, ……
2. Policy is one thing, enforcing policy is the key issue	John B…
3. Water productivity can increase, complexity science , multidisciplinary	Elias …
4. Technology is right, institutions must evolve	John, Maggie, Hellen…
5. Scale matters, local-specific, context is critical	Hellen, Uriel, John …
6. Public participation, stakeholders, credibility legitimacy	Hellen, Margaret, John
7. Changes are Crisis-driven ….	Malin, Wendy…

Contents

1. Overview: Irrigation agriculture and water use in Spain
2. The policy context: Water and agricultural Policies
3. Complying with the EU policies
4. Down-scaling to the Regional perspective: a case study of groundwater irrigation
5. Concluding remarks

Main Issues:

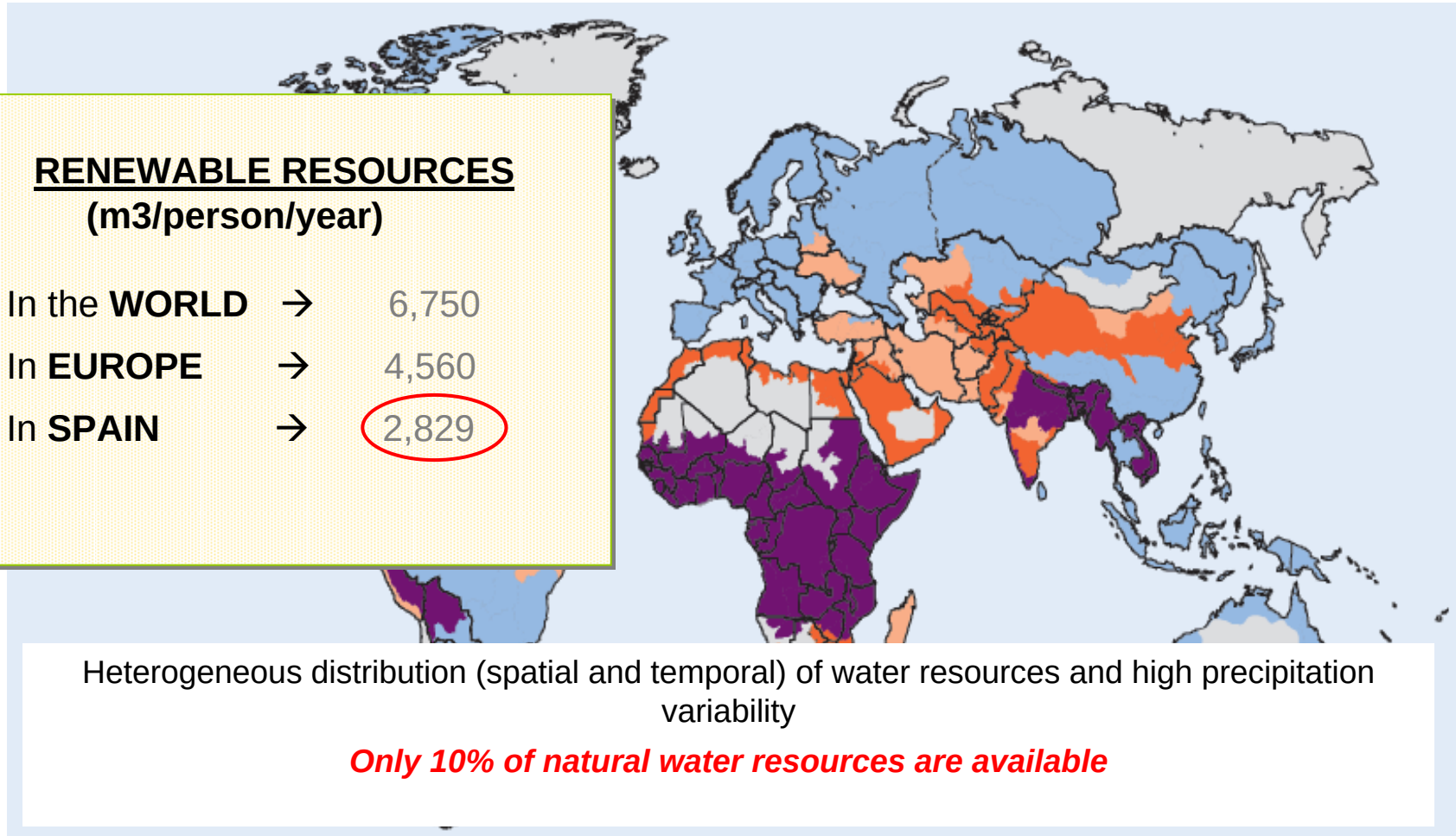
- Spain → Mediterranean (aridity, water stress, ..
  → EU (policies)
  → Difficult adaptation, dual objective in water
- Policy-driven determinants for irrigation expansion and water use
  → water policies, agricultural policies
- Clash between irrigation-based development and ecosystem protection
- Down-scale global EU policies to local actions
- Integration of water and agricultural policies

Water resources

Areas of physical and economic water scarcity

RENEWABLE RESOURCES
(m3/person/year)

- In the **WORLD** → 6,750
- In **EUROPE** → 4,560
- In **SPAIN** → 2,829



Heterogeneous distribution (spatial and temporal) of water resources and high precipitation variability

Only 10% of natural water resources are available

Little or no water scarcity

Approaching physical water scarcity

Physical water scarcity

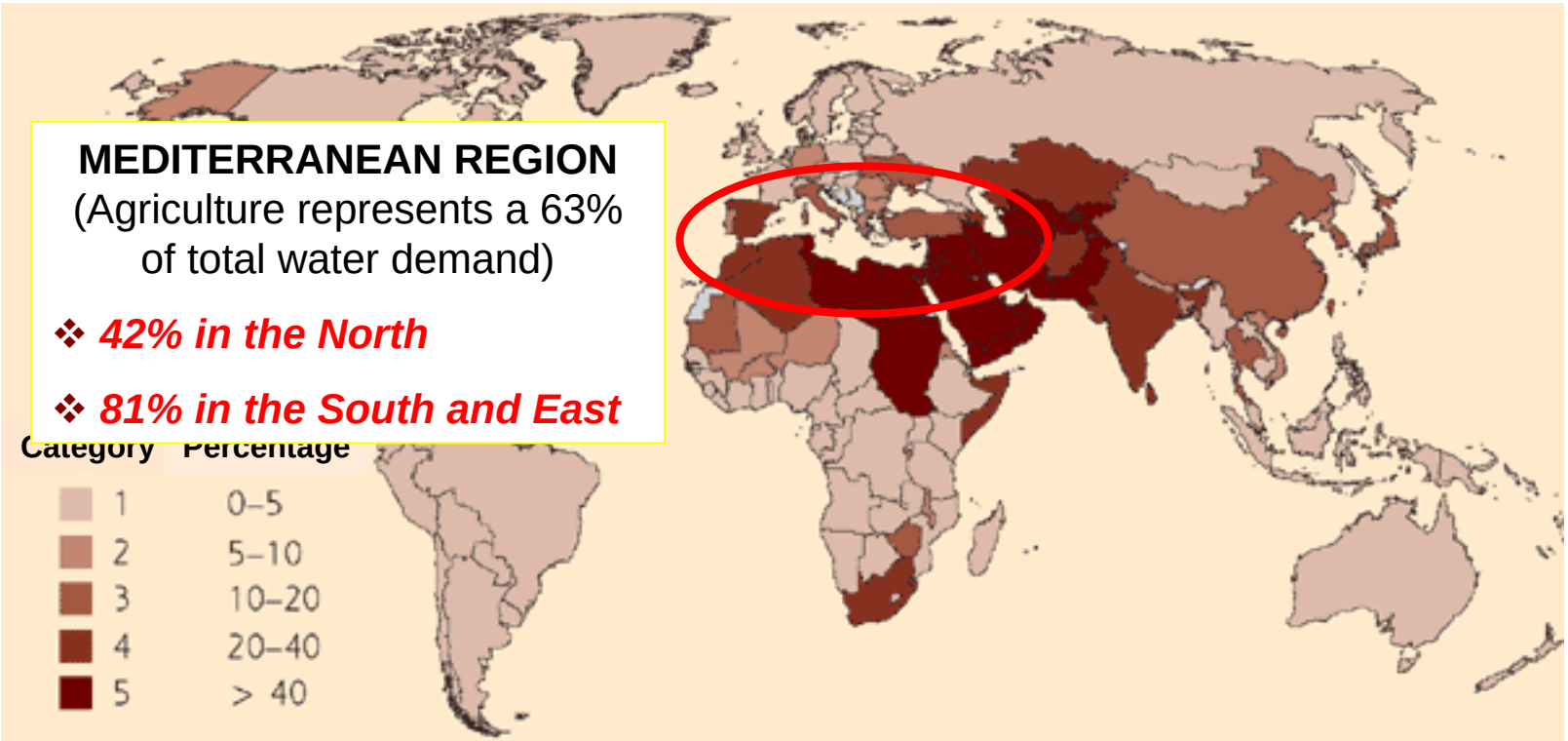
Economic water scarcity

No estimated

Source: Comprehensive Assessment of Water Management in Agriculture, 2007

Water and Agriculture

% Agriculture water withdrawals as percentage of renewable water resources



Source: FAO, 2002

Water and Agriculture

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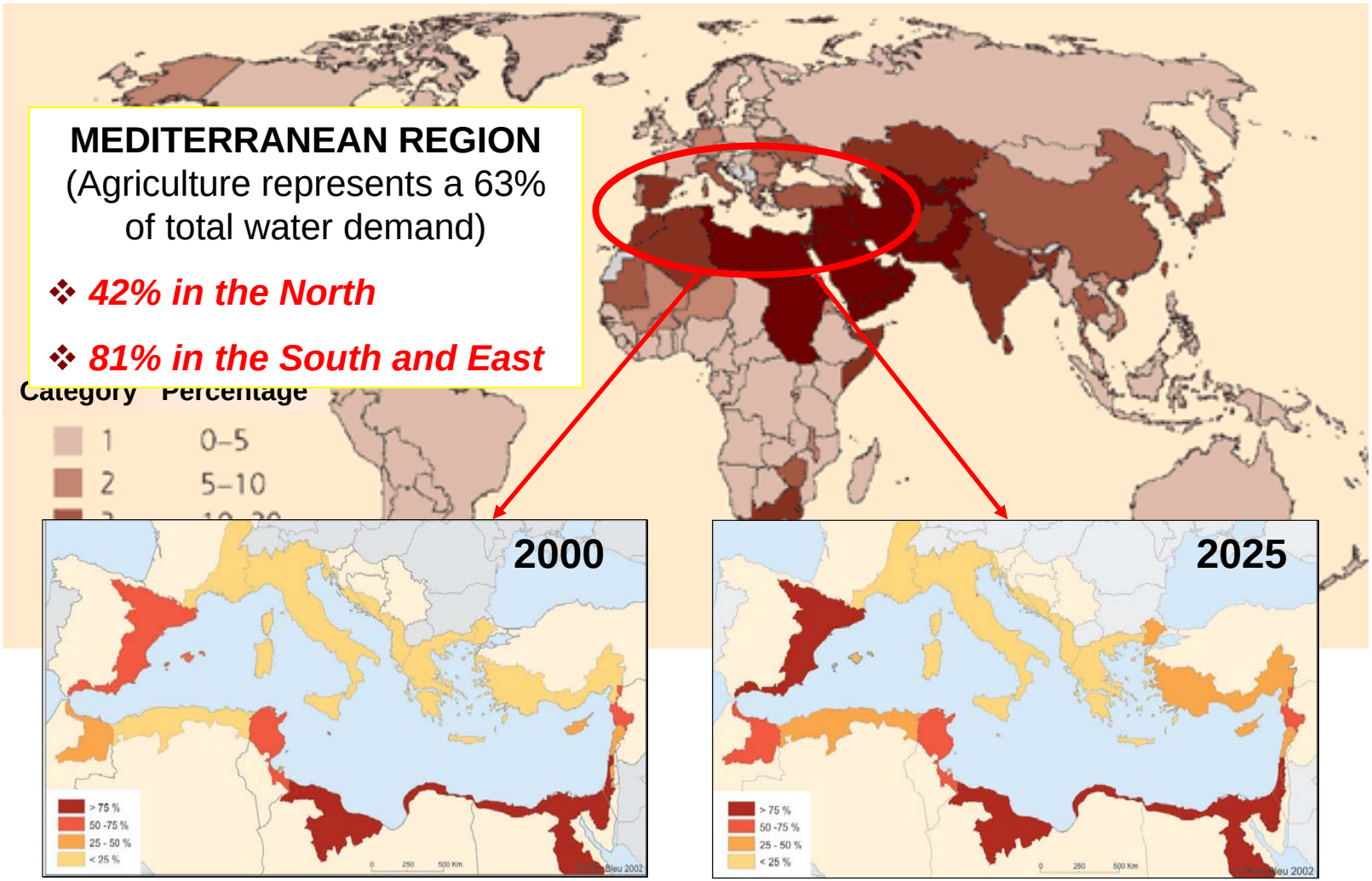
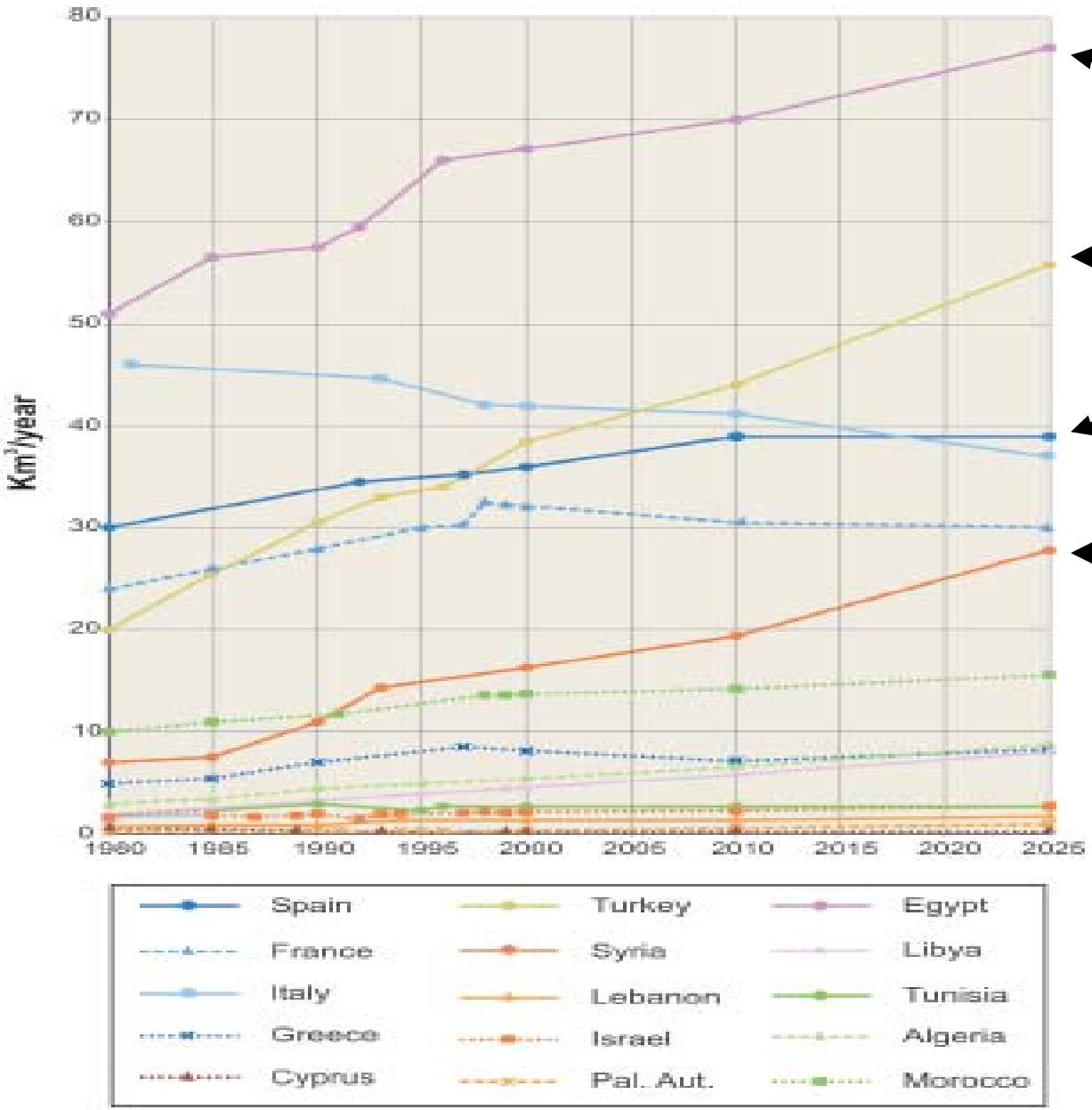


WATER EXPLOITATION INDEX

Source: Plan Bleu, 2005

Total water demand by country in the Mediterranean (1980 – 2025)



Source: Plan Bleu, 2005

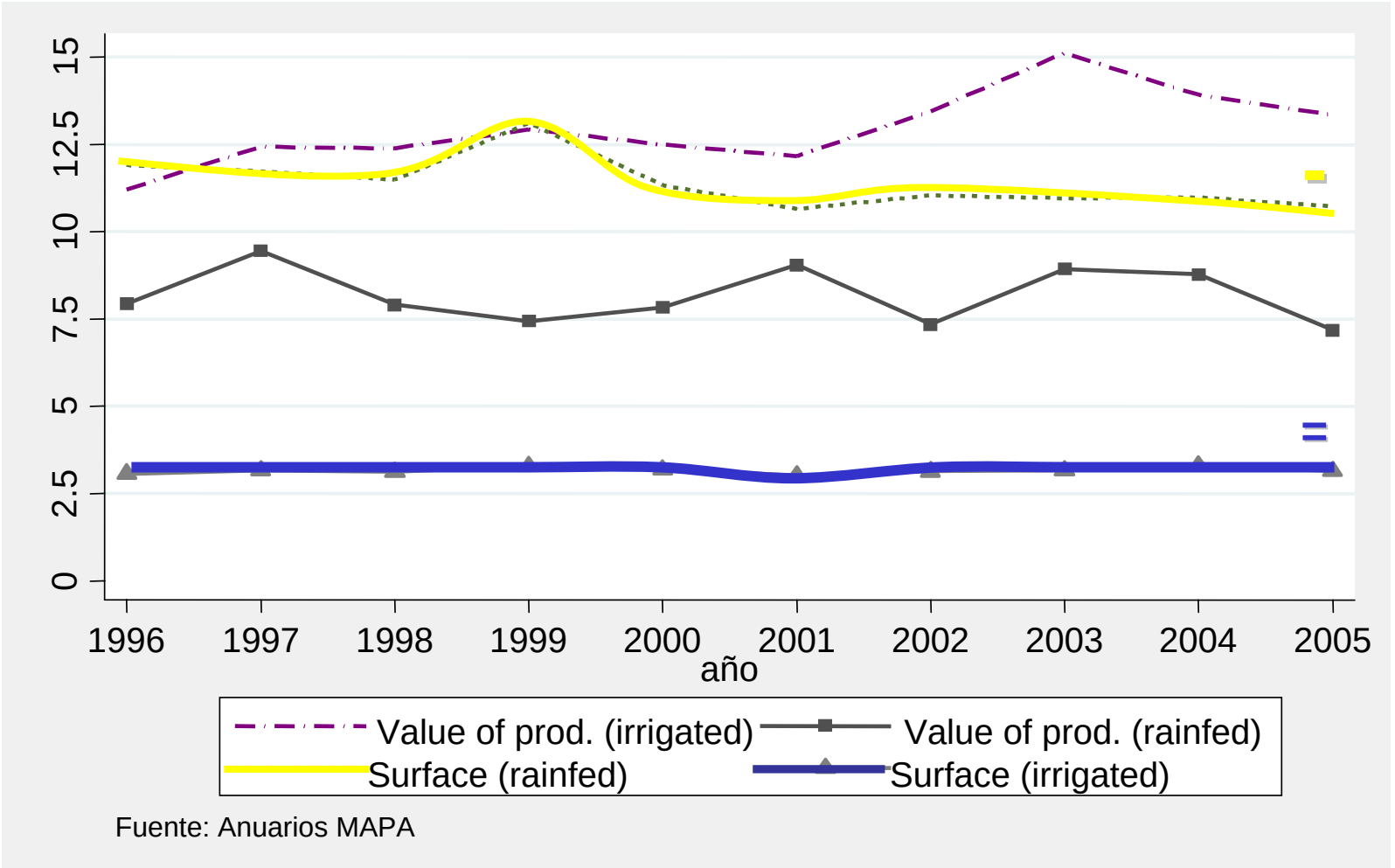
Mediterranean countries with unsustainable water production indices

Country	Overexploitation of renewable water resources (1) (in billion m3/year)	Water demand (2) (in billion m3/year)	Index of unsustainable water production % (1)/(2)
Spain	0.70	18.20	4
Malta	0.02	0.05	31
Cyprus	0.04	0.33	12
Israel	0.19	1.80	10
Palestinian territories	0.03	0.13	23
Egypt	0.00	66.0	0
Libya	0.77	2.24	34
Tunisia	0.18	2.27	8
Algeria	0.00	2.90	0

Source. Margat, Plan Bleu (2004)

A recent vision of the Spanish agriculture

Surface (M ha) and Value of production (1000 M €, year 2000)



Fuente: Anuarios MAPA

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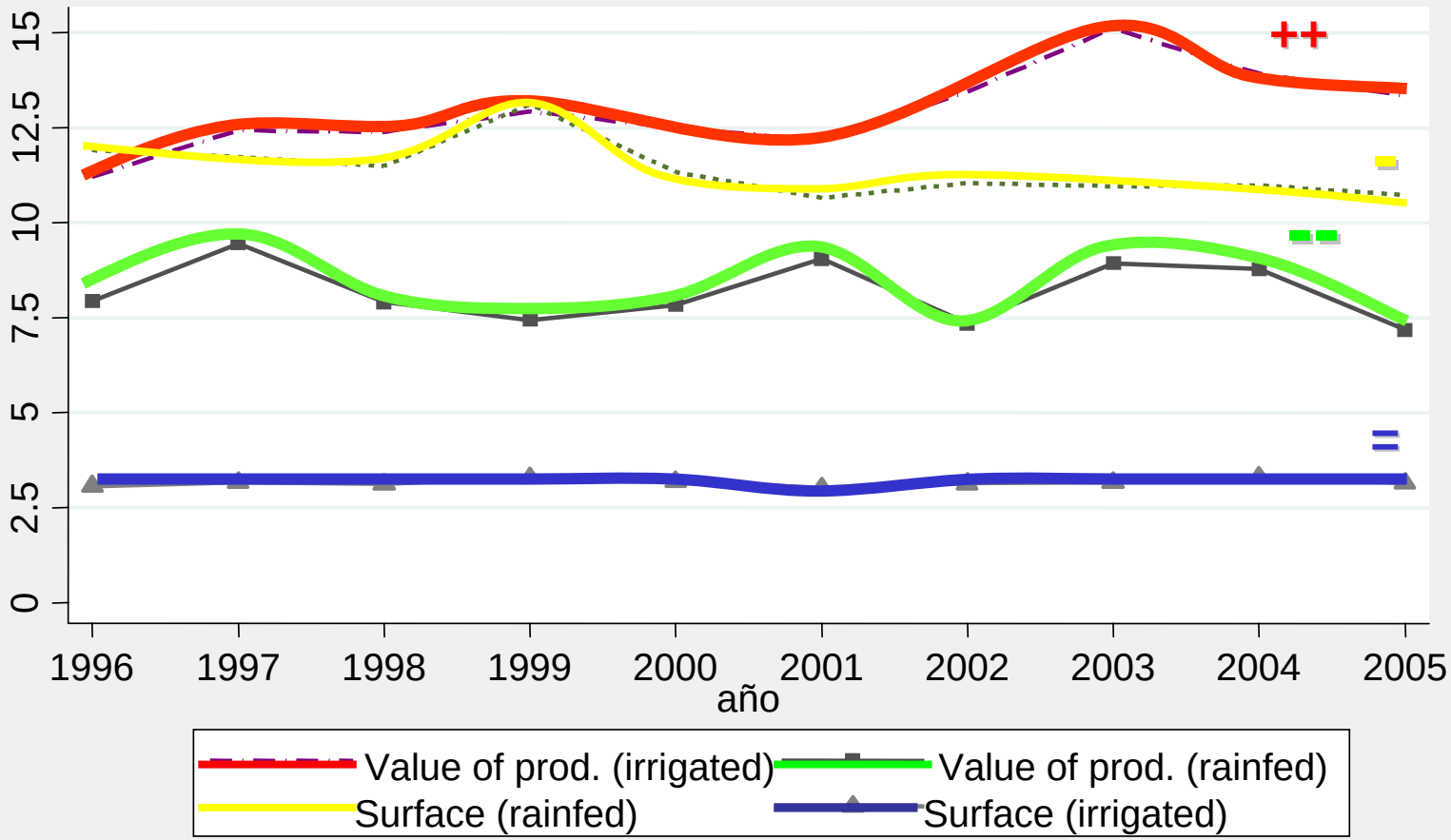


Fuente: Anuarios MAPA

Water and Agriculture

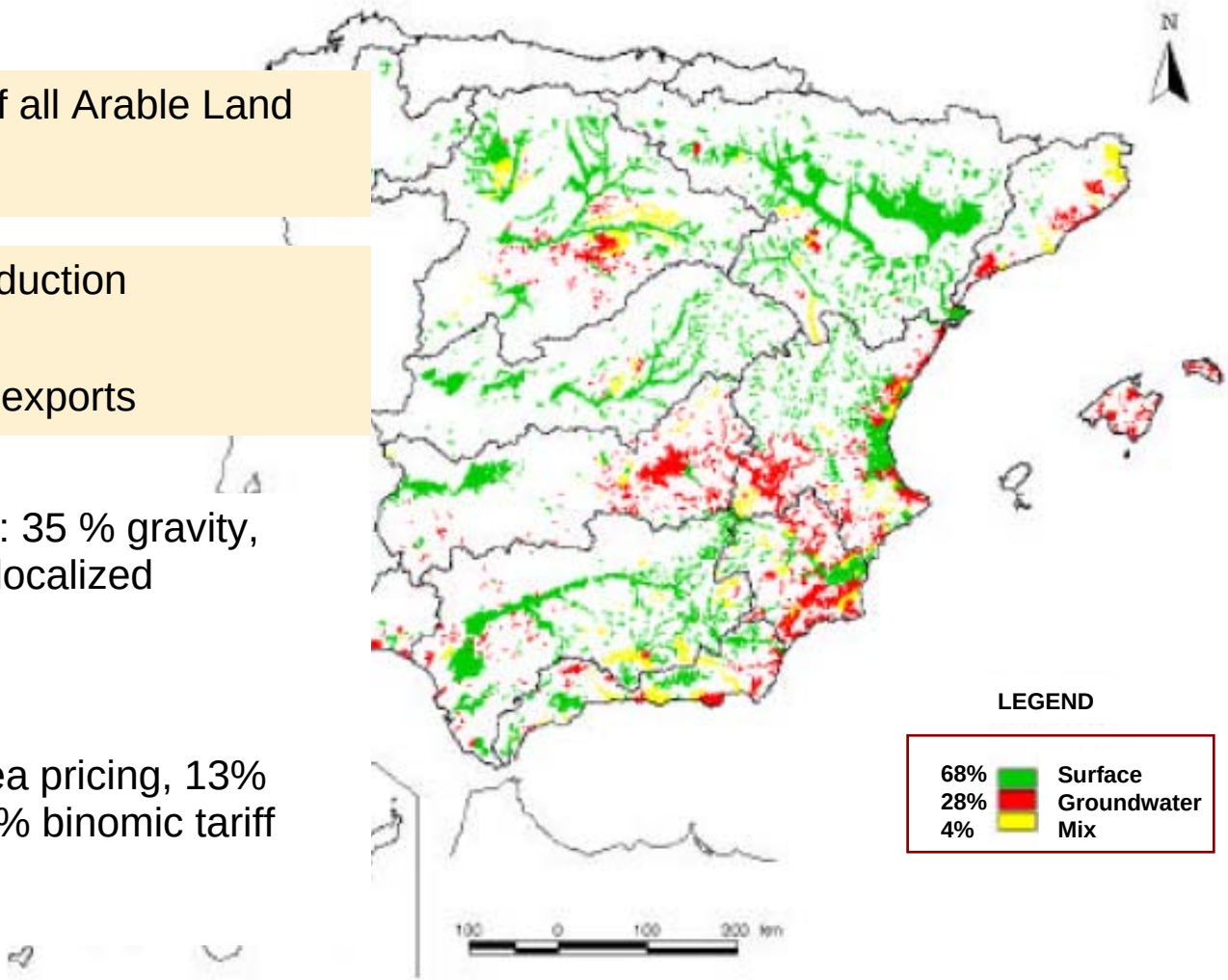
Agriculture → **80%**

- Extends over 15% of all Arable Land (3.6 M ha)

- 60 % of total A. Production
- 80 % of Total Farm exports

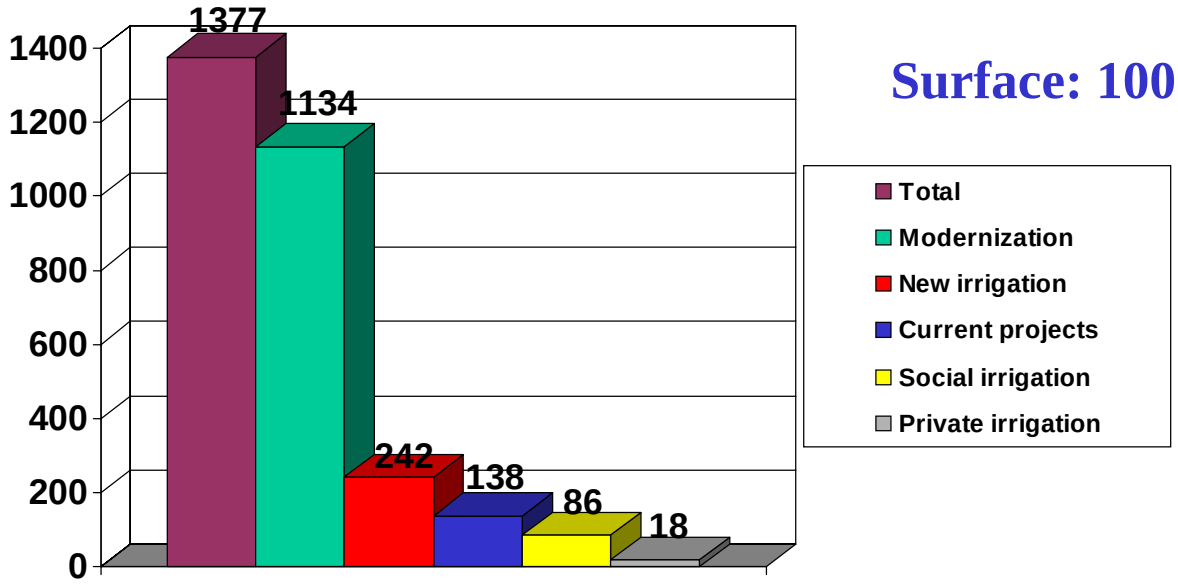
- Irrigation technology: 35 % gravity, 23% sprinkler, 42% localized

- Water tariff: 82% area pricing, 13% volumetric pricing, 5% binomic tariff

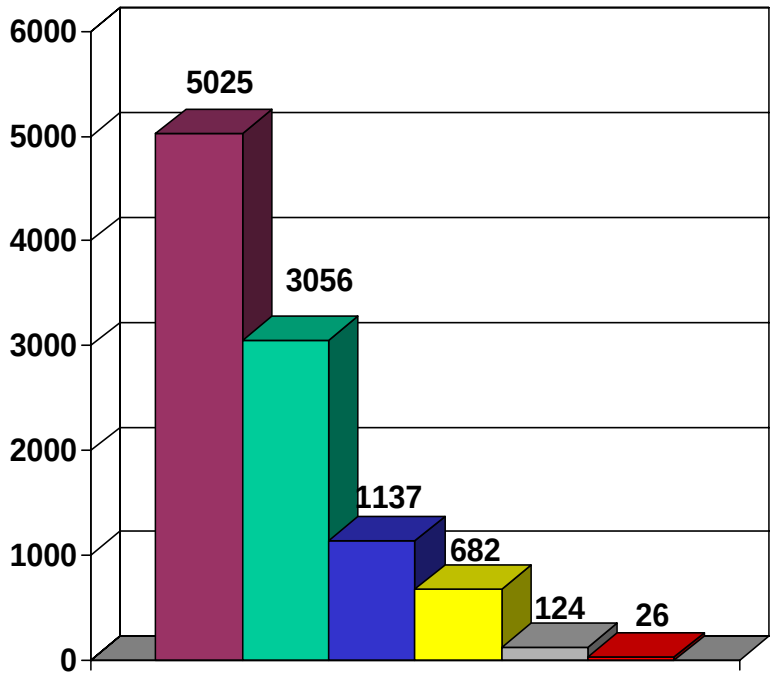


Source: MMA (PHN, 2002), MAPA (2006)

National Irrigation Plan (2002-2008)



Surface: 1000 ha



Budget: Million €

Source: MAPA 2007

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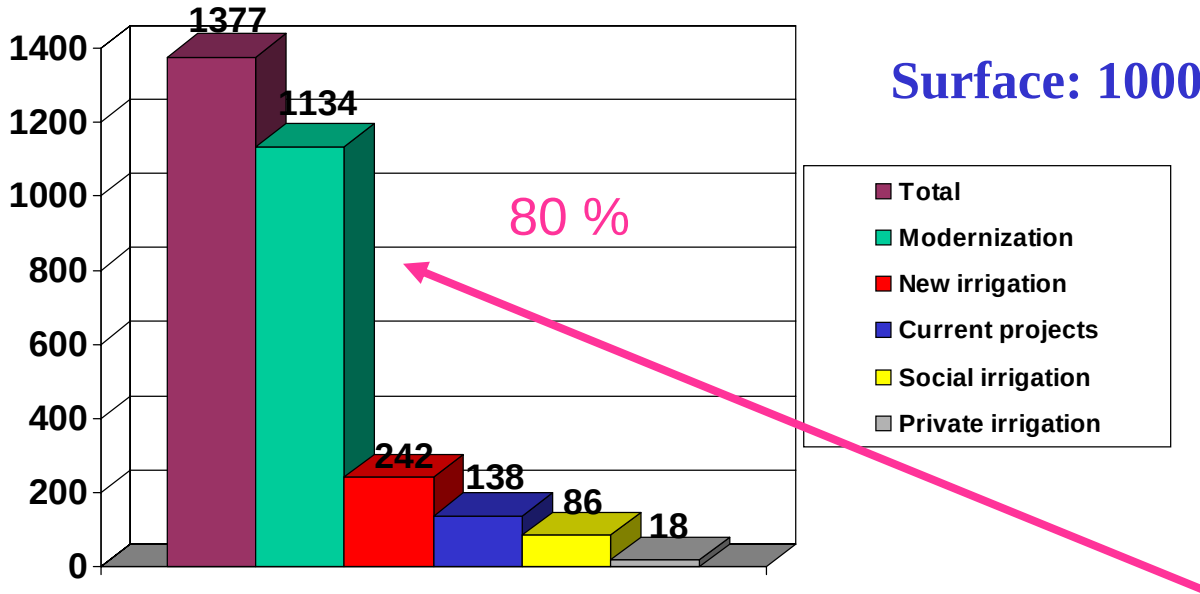
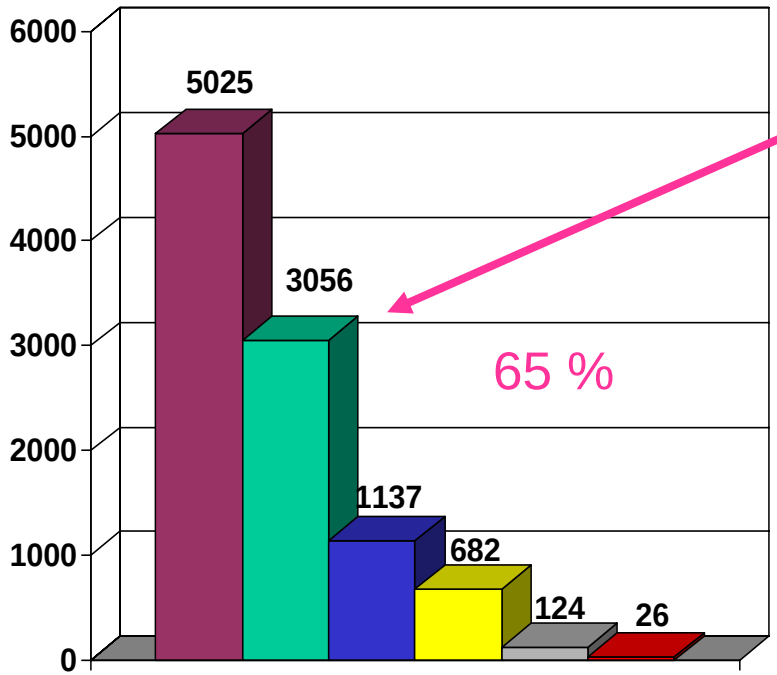


Surface: 1000 ha

80 %

MODERNIZATION OF IRRIGATION SYSTEMS

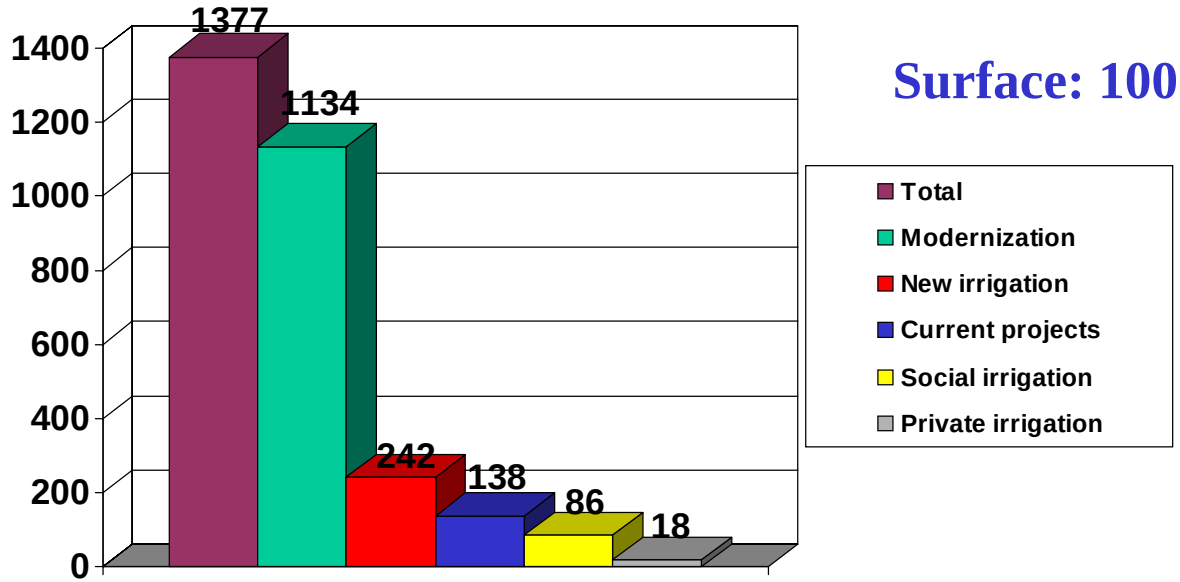


Budget: Million €

65 %

Source: MAPA 2007

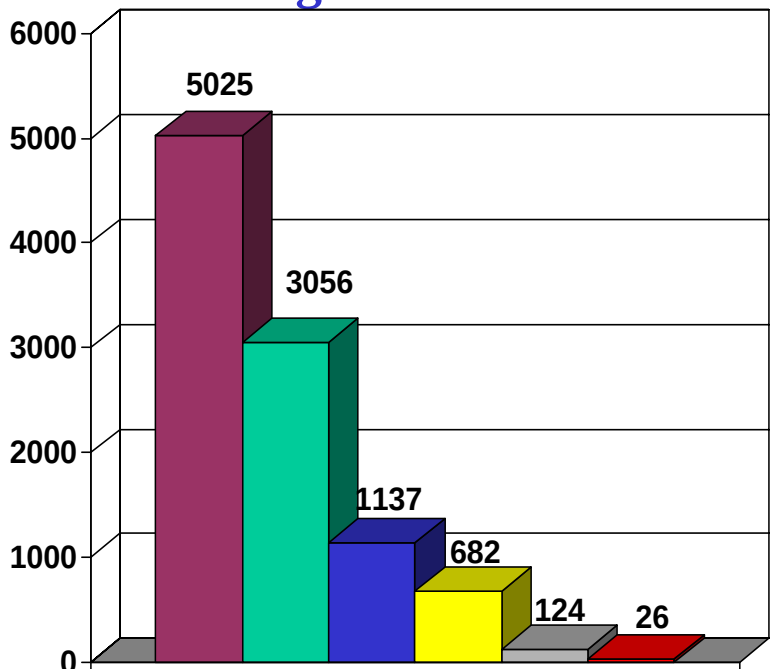
National Irrigation Plan (2002-2008)



Surface: 1000 ha

Objectives

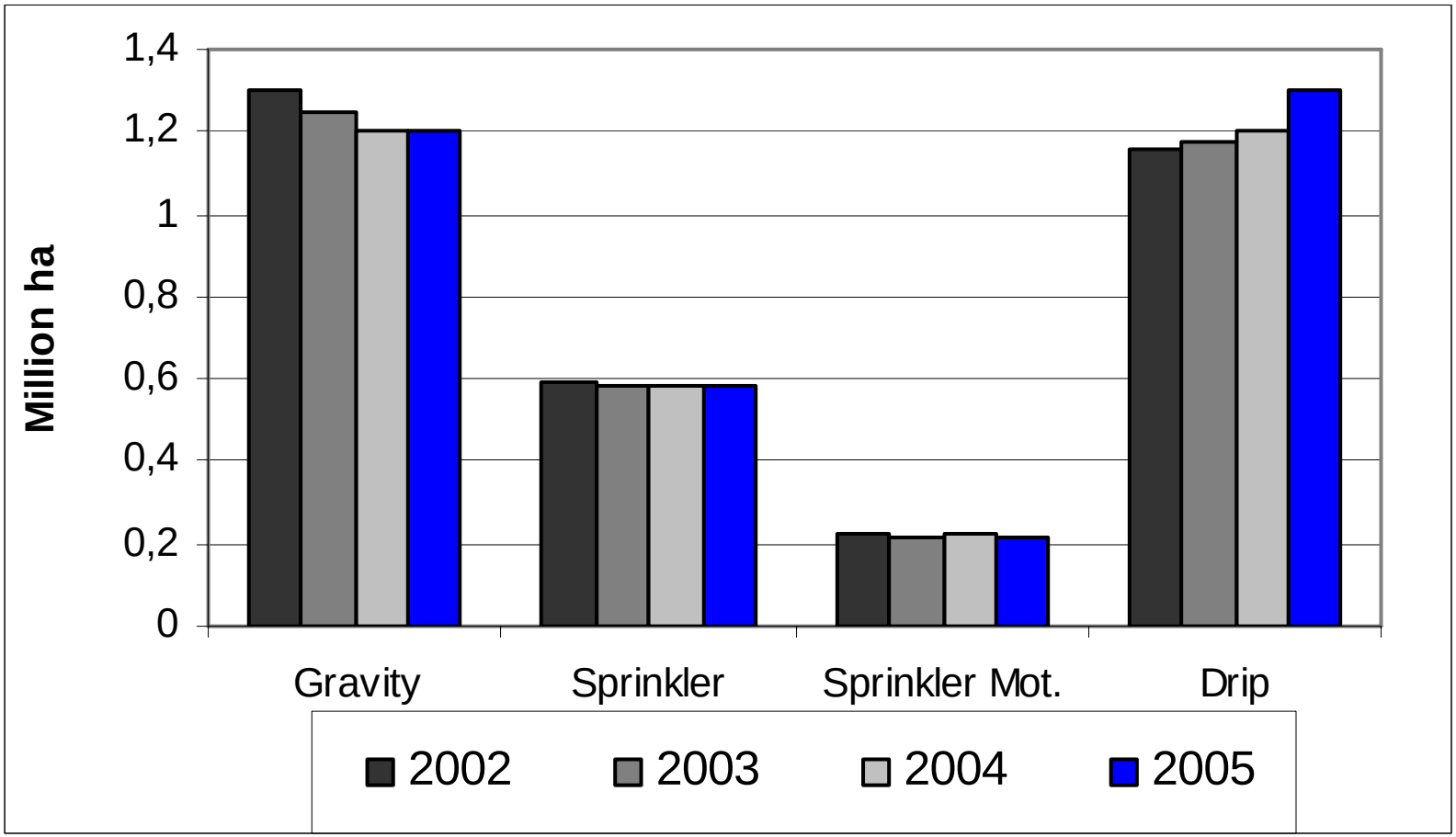
Budget: Million €



- Ecologic: water saving 1350 Mm3
- Water av. security → reduce risk
- Increase crop divers. & prodictiv.
- Employment, population stability
- Multifunctional agriculture

Source: MAPA 2007

Technological change: irrigation modernization



Source: MAPA 2007

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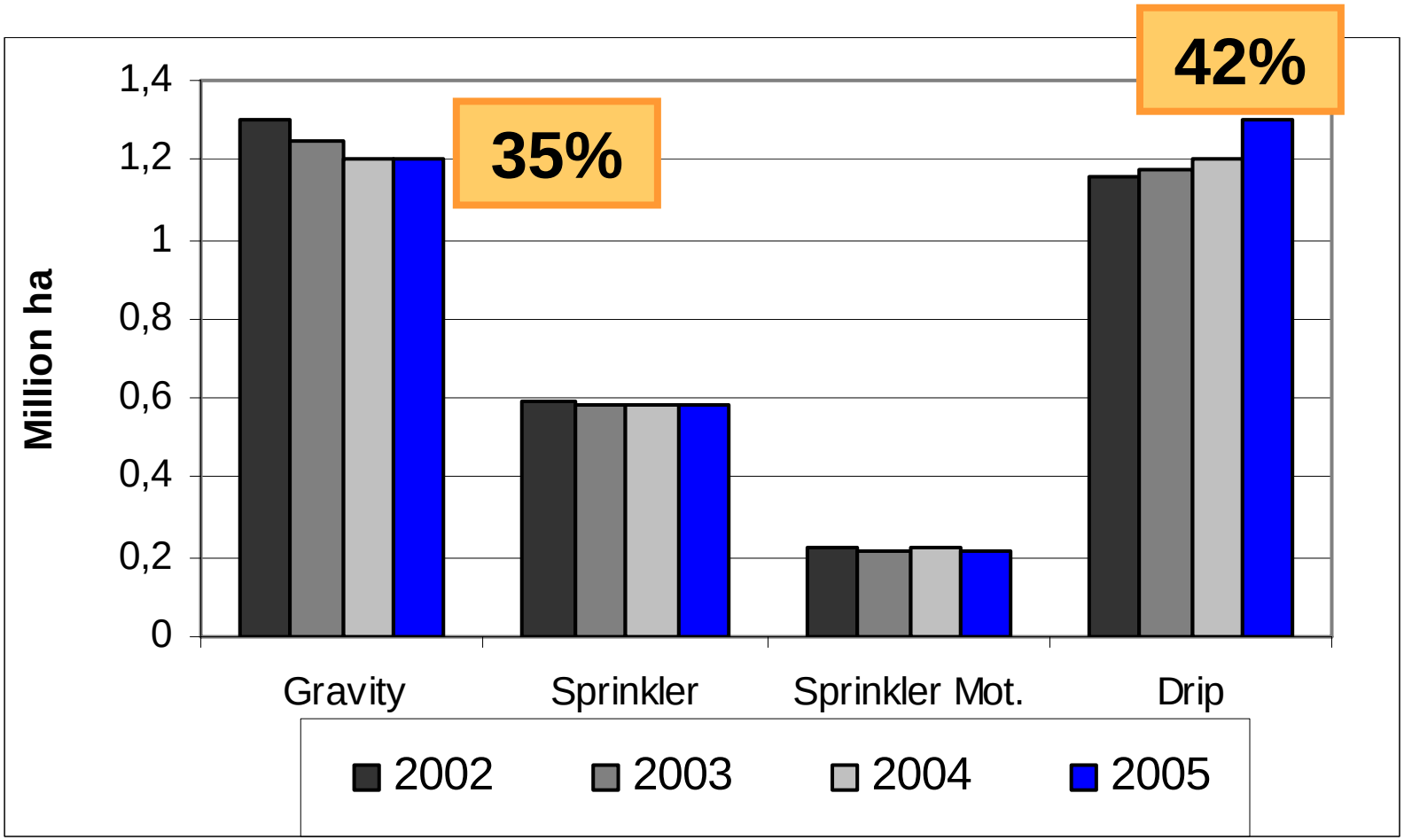

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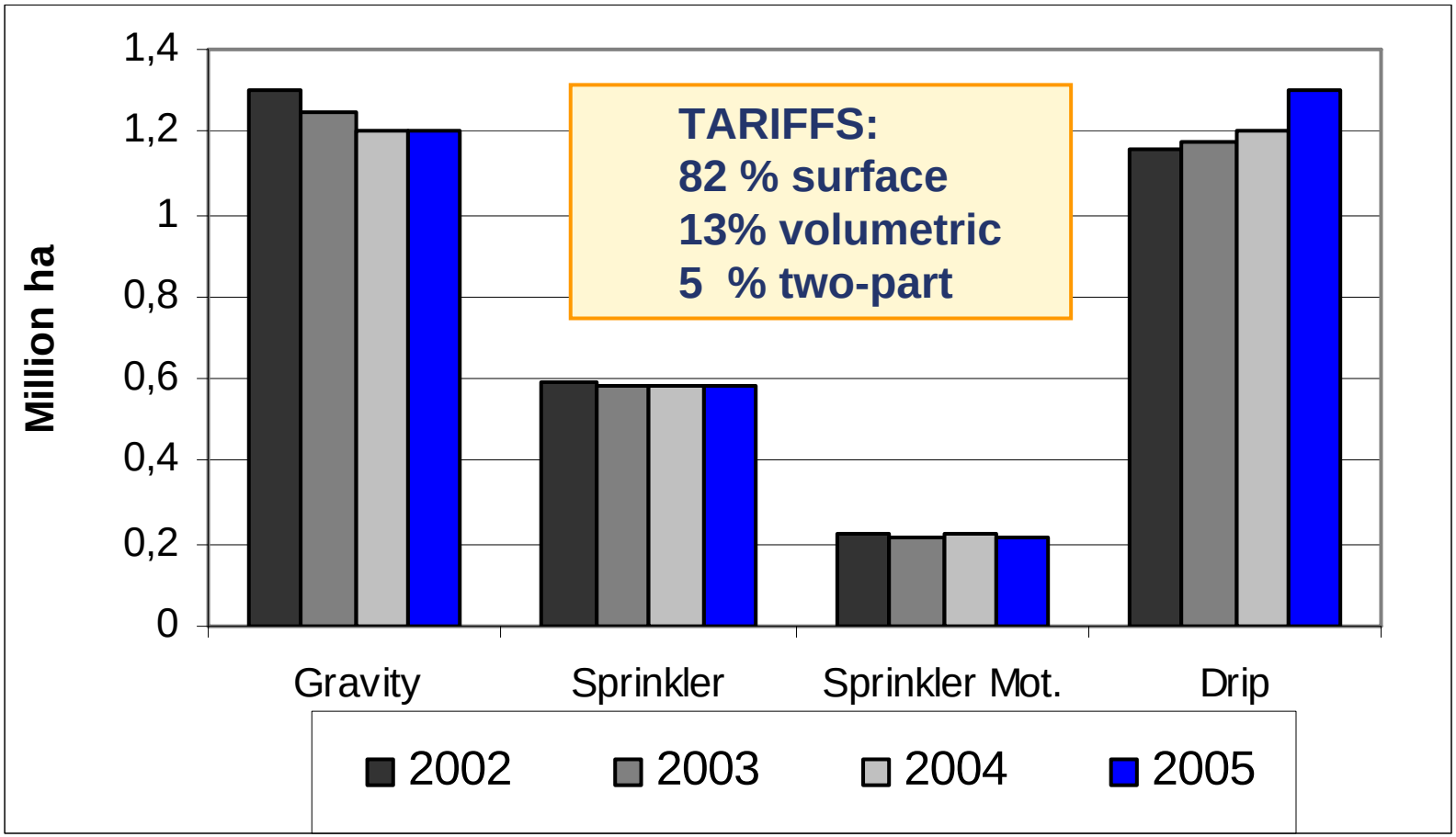
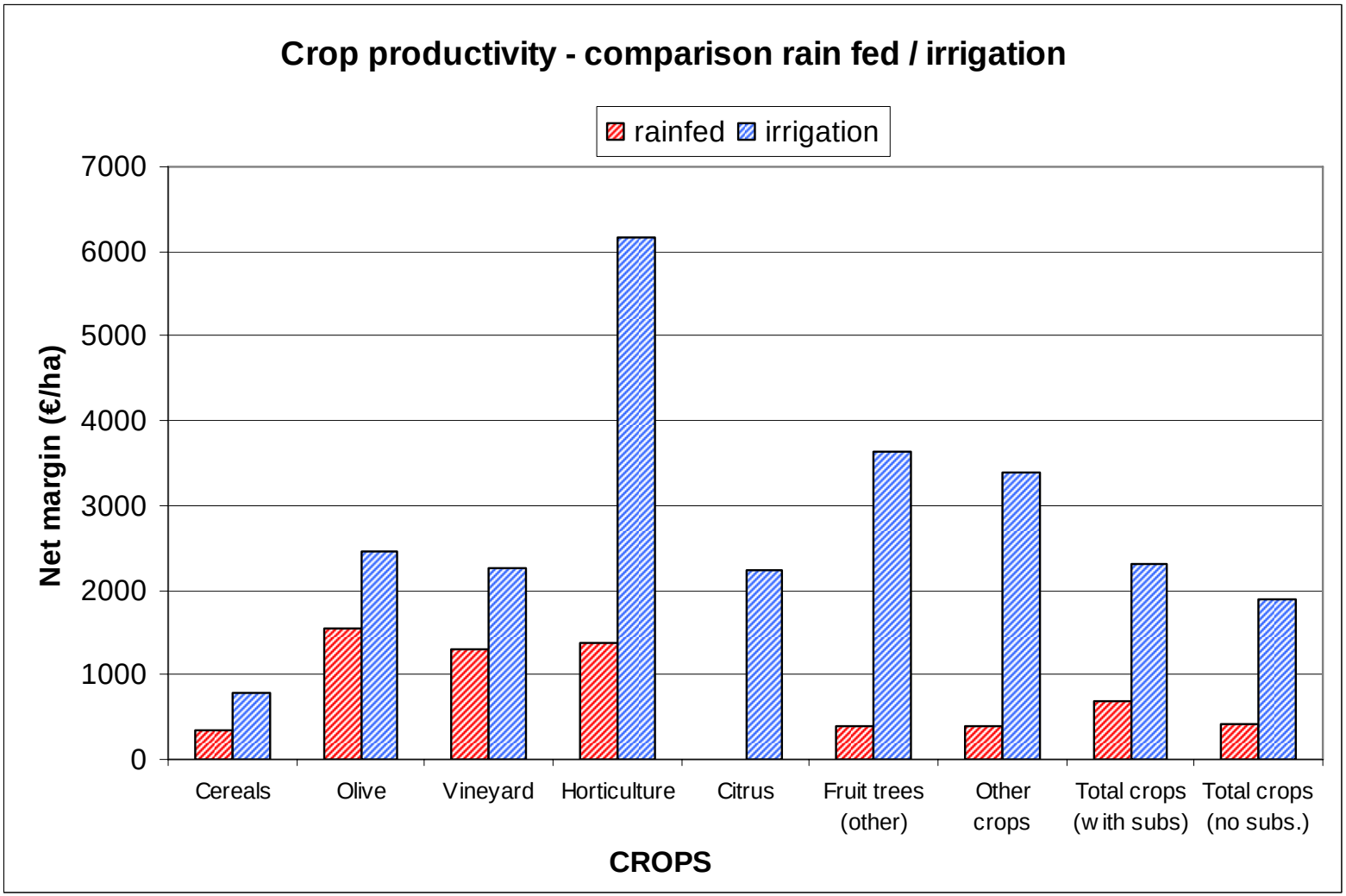
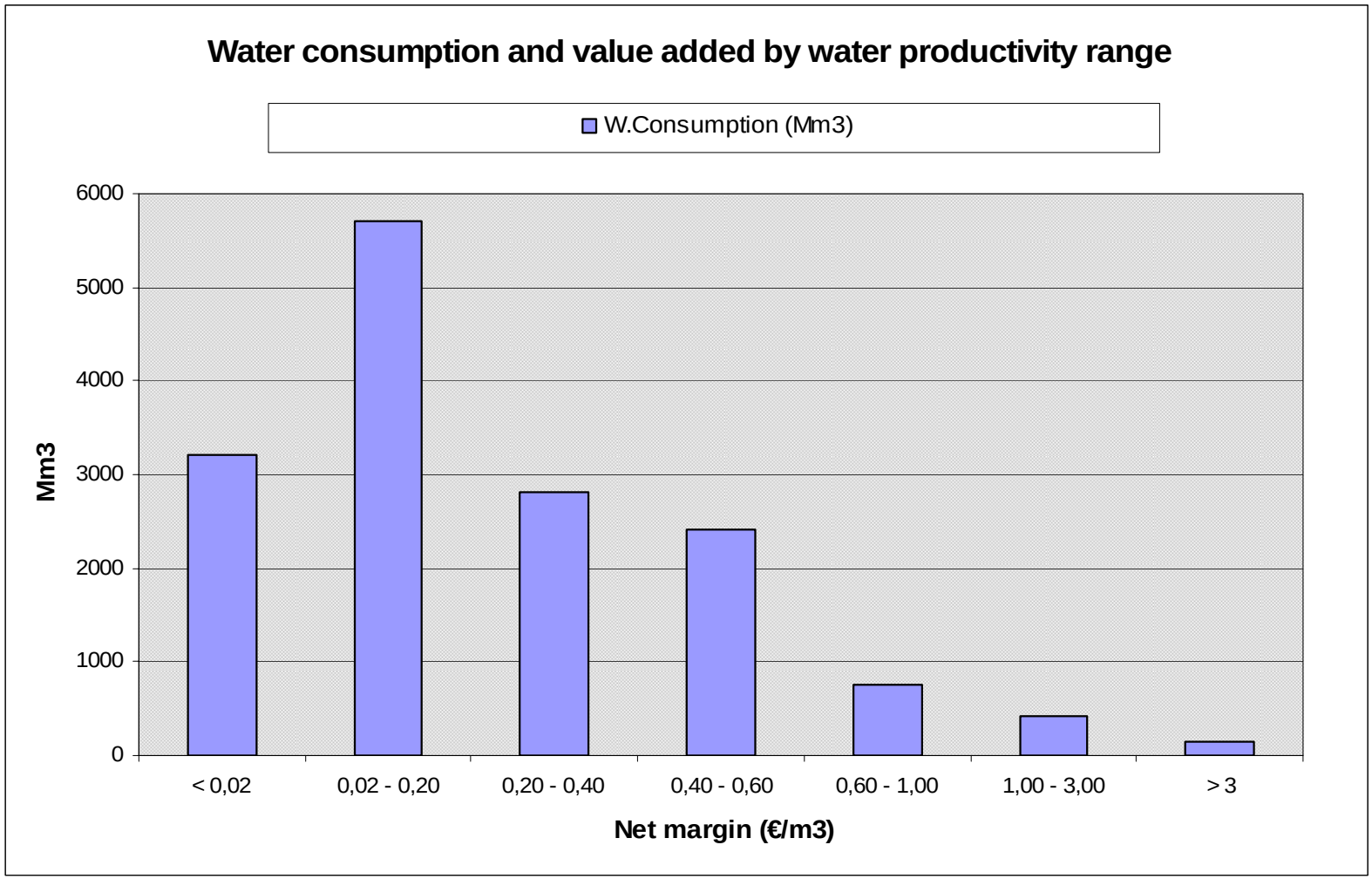


Source: MAPA 2007

Water productivity comparisons between rainfed and irrigated agriculture



Water consumption and value-added by water productivity range



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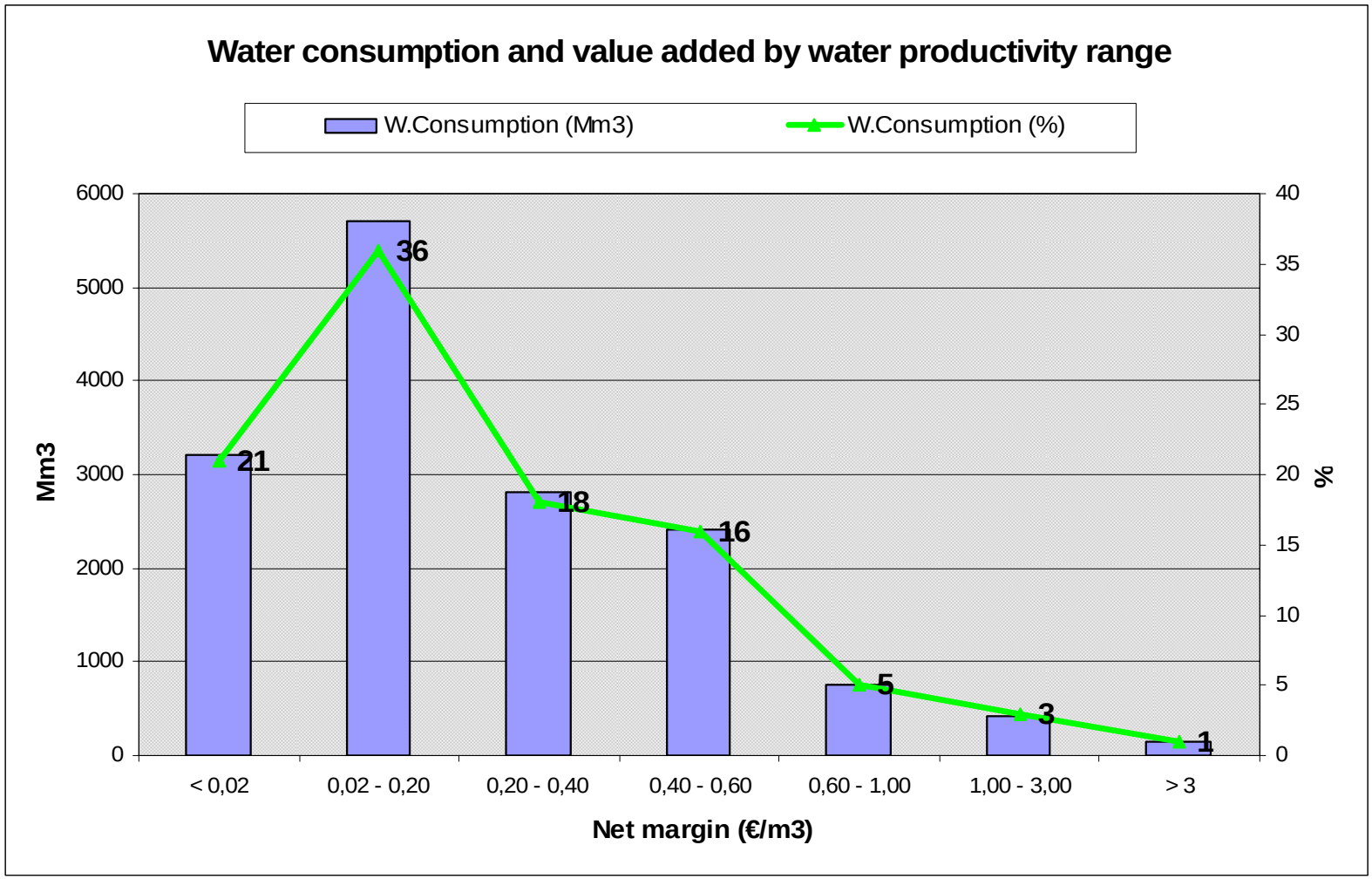

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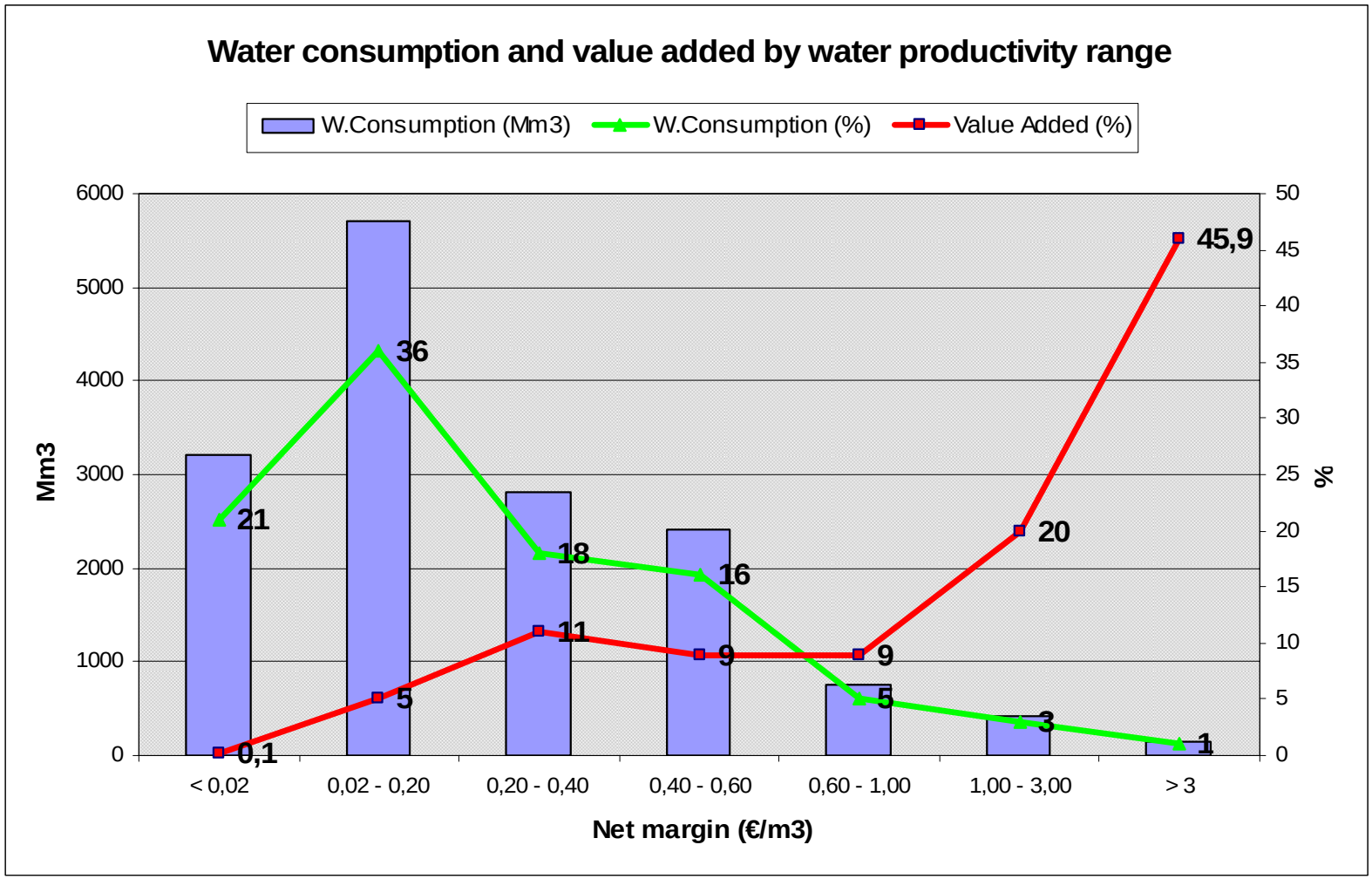
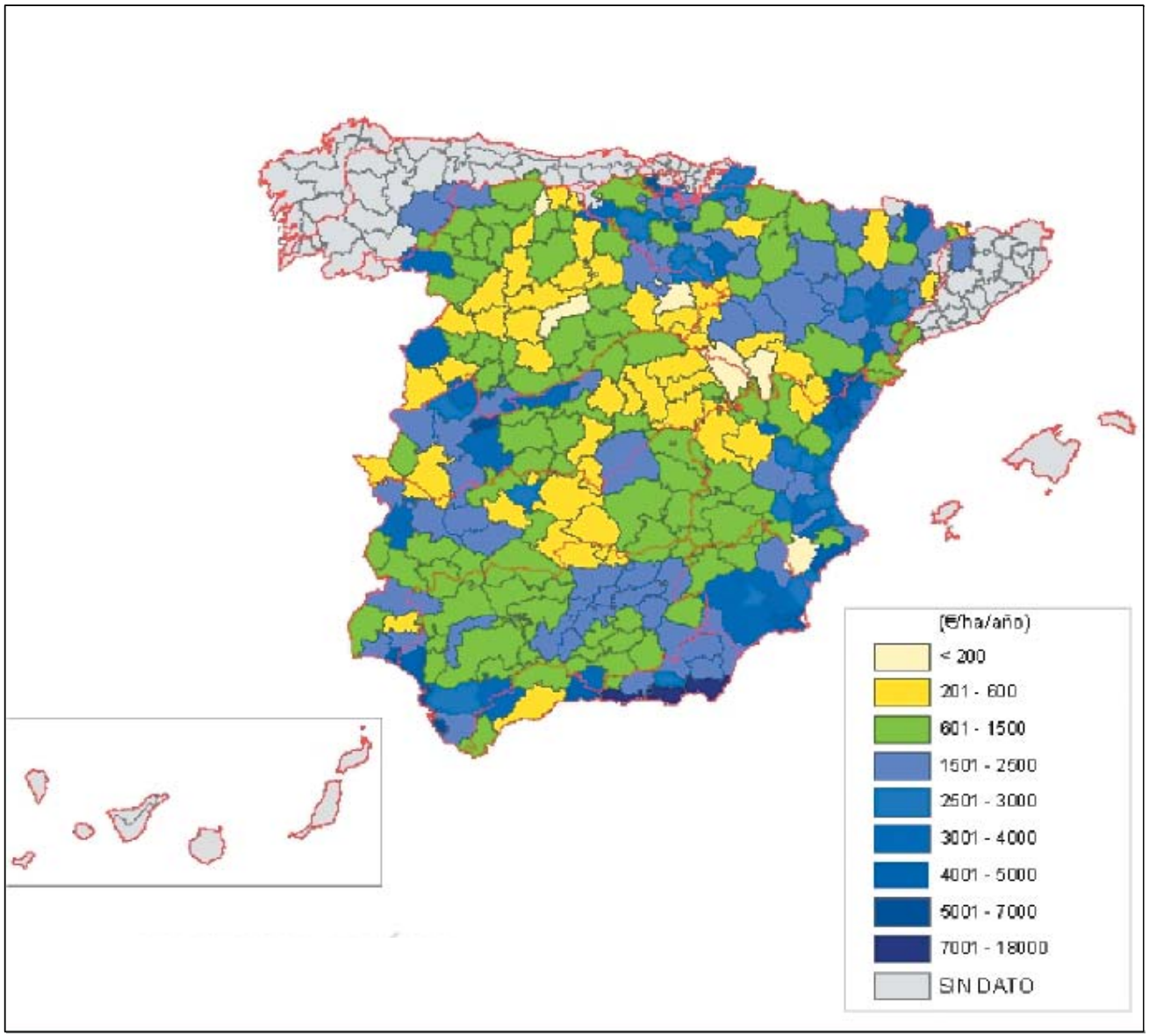


Productivity of irrigated crops (€ /ha) (average values of prices and yields for the period 1997-2002)



Source: MMA (2007)

The EU policy context: water and agricultural policies

AGRICULTURAL POLICIES

CAP Reform 2003

WATER POLICIES

Water Framework Directive, 2000

The EU policy context: water and agricultural policies

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Sustainable & competitive Agriculture

- **Direct aid payments decoupled** from production
- **Single farm payment** (per farm)
- **Cross-compliance mechanisms**→ direct payments are subject to compliance with environmental regulations
- **Rural Development Programs**

WATER POLICIES

Water Framework Directive, 2000

Sustainable use of water resources & Good ecological status of all waters(2015)

- **River Basin Organization** as management unit
- Planning and **integrated management** of all water resources → RBMP
- **Cost recovery**, polluter pays principle
- Transparency and **public participation**

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Multifunctional
Competitive
Environmentally sustainable
Adaptable to new challenges (i.e. climate change)

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CAP 'HEALTH CHECK' 2009…

- Water management
- Climate change
- Biofuels

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National Policies

IRRIGATED AGRICULTURE

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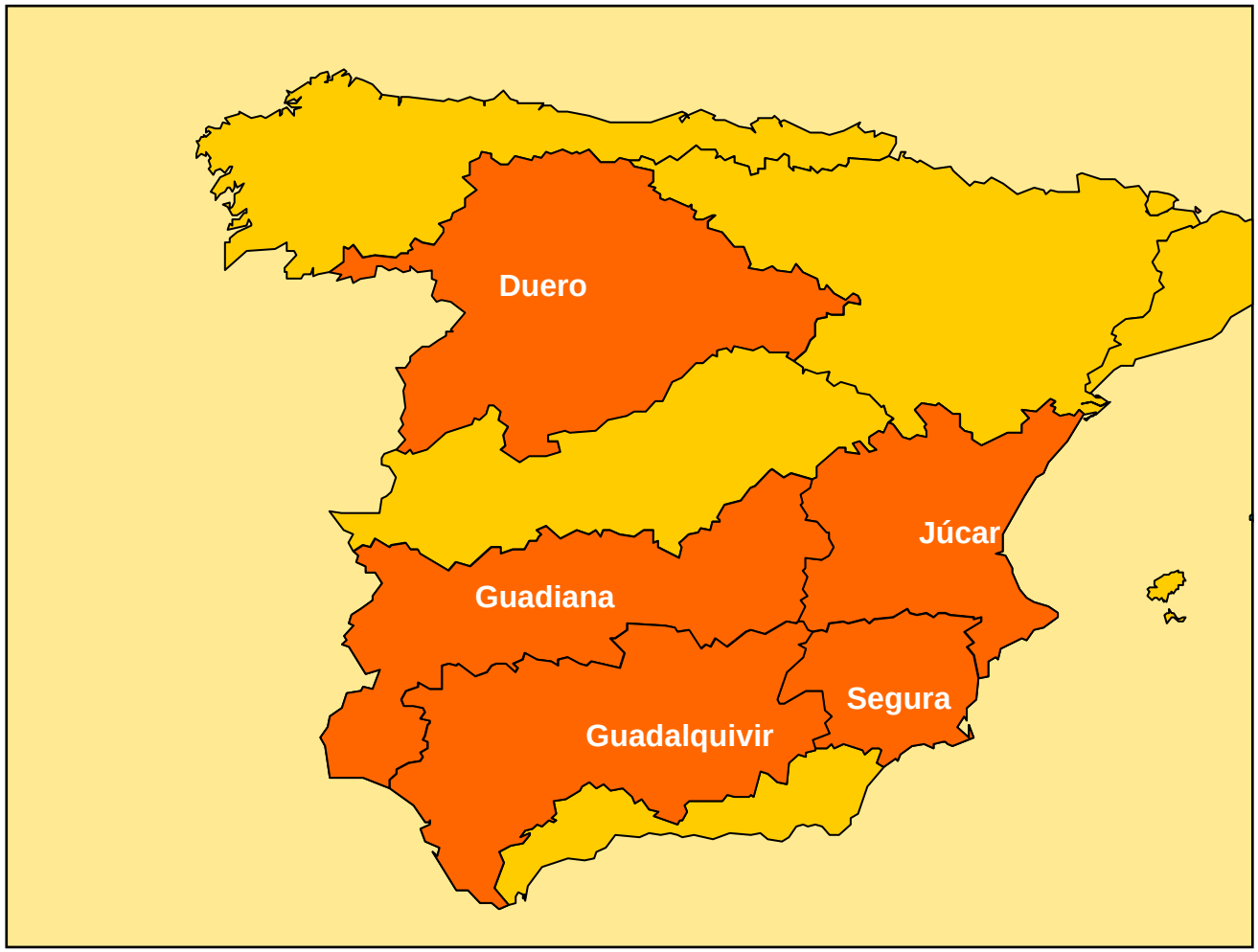
The EU Water Framework Directive

- Quality-driven:
- ..”This Directive aims at maintaining and improving the aquatic environment in the Community. This purpose is primarily concerned with the quality of the waters. Control of quantity is an ancillary element in securing good water quality and therefore measures on quantity, serving the objective of ensuring good quality, should also be established …” (pre. 19)
- Difficulty for the RBA to comply with two objectives:
  - SPANISH → Guarantee water availability to all users
  - EU WFD → Good ecological status of all waters
- Effects on irrigated farms ?

Effect of cost recovery of the WFD in other Spanish Irrigation areas



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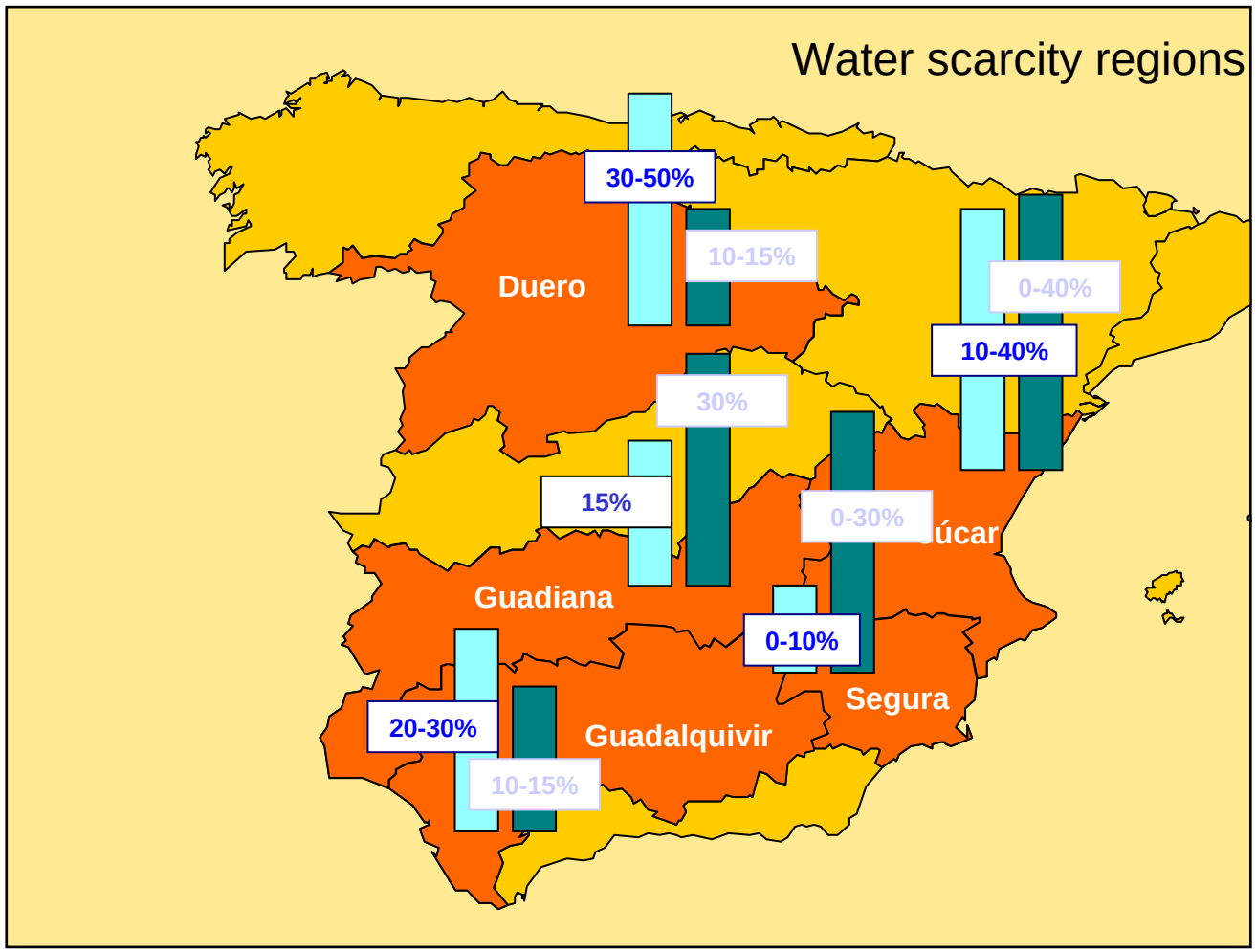
Water demand reduction (%) Income loss (%)



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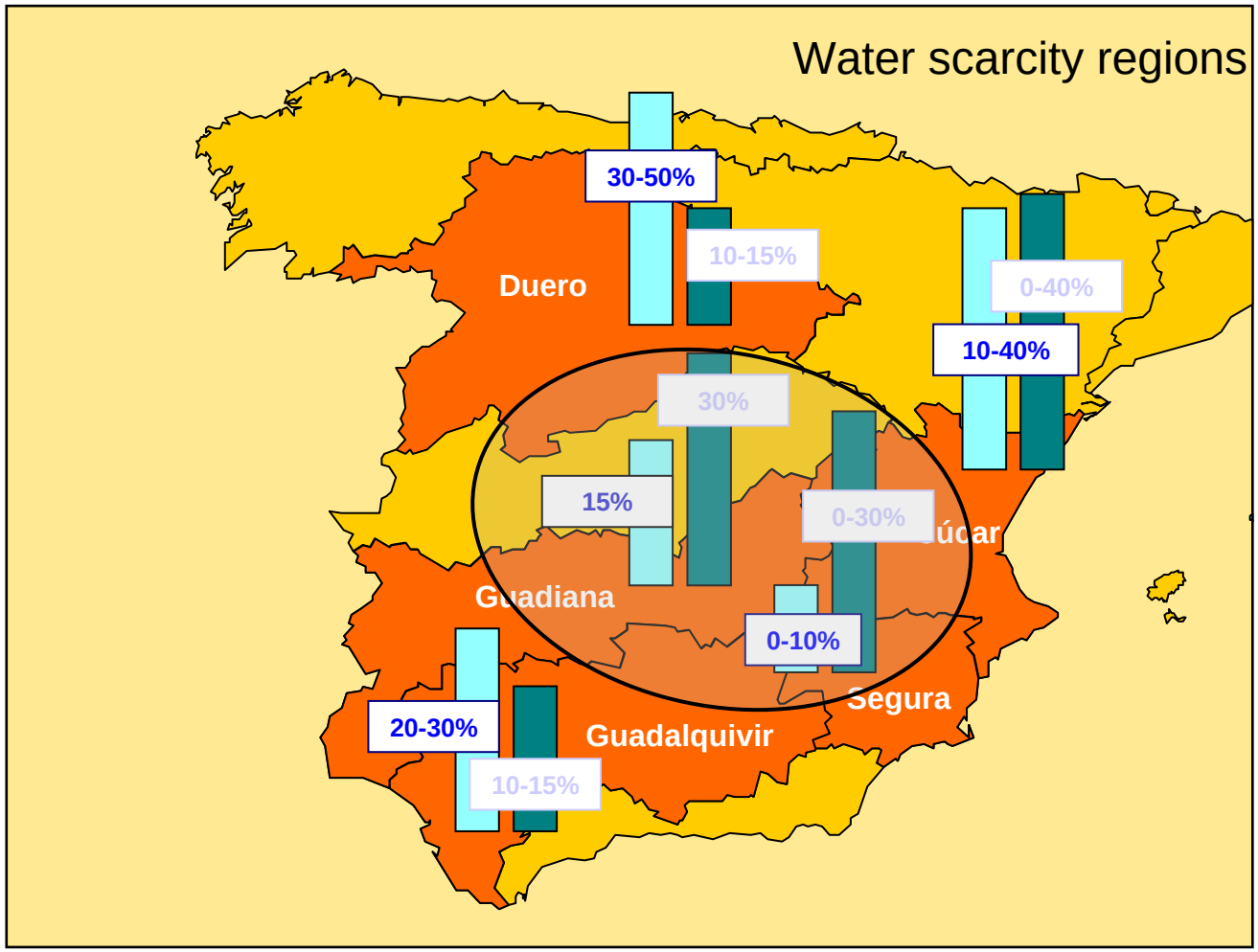
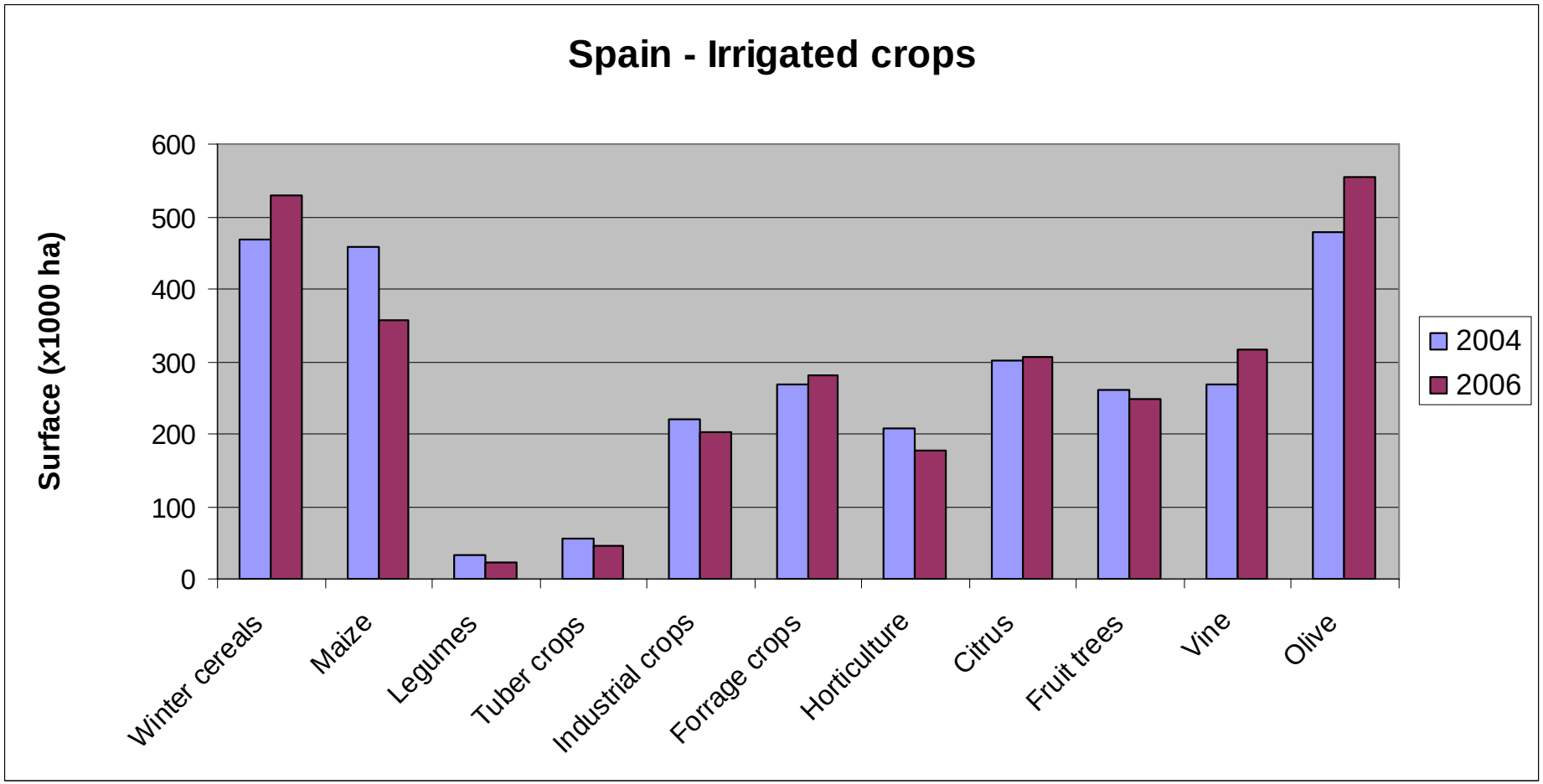


THE EU COMMON AGRICULTURAL POLICY (CAP)

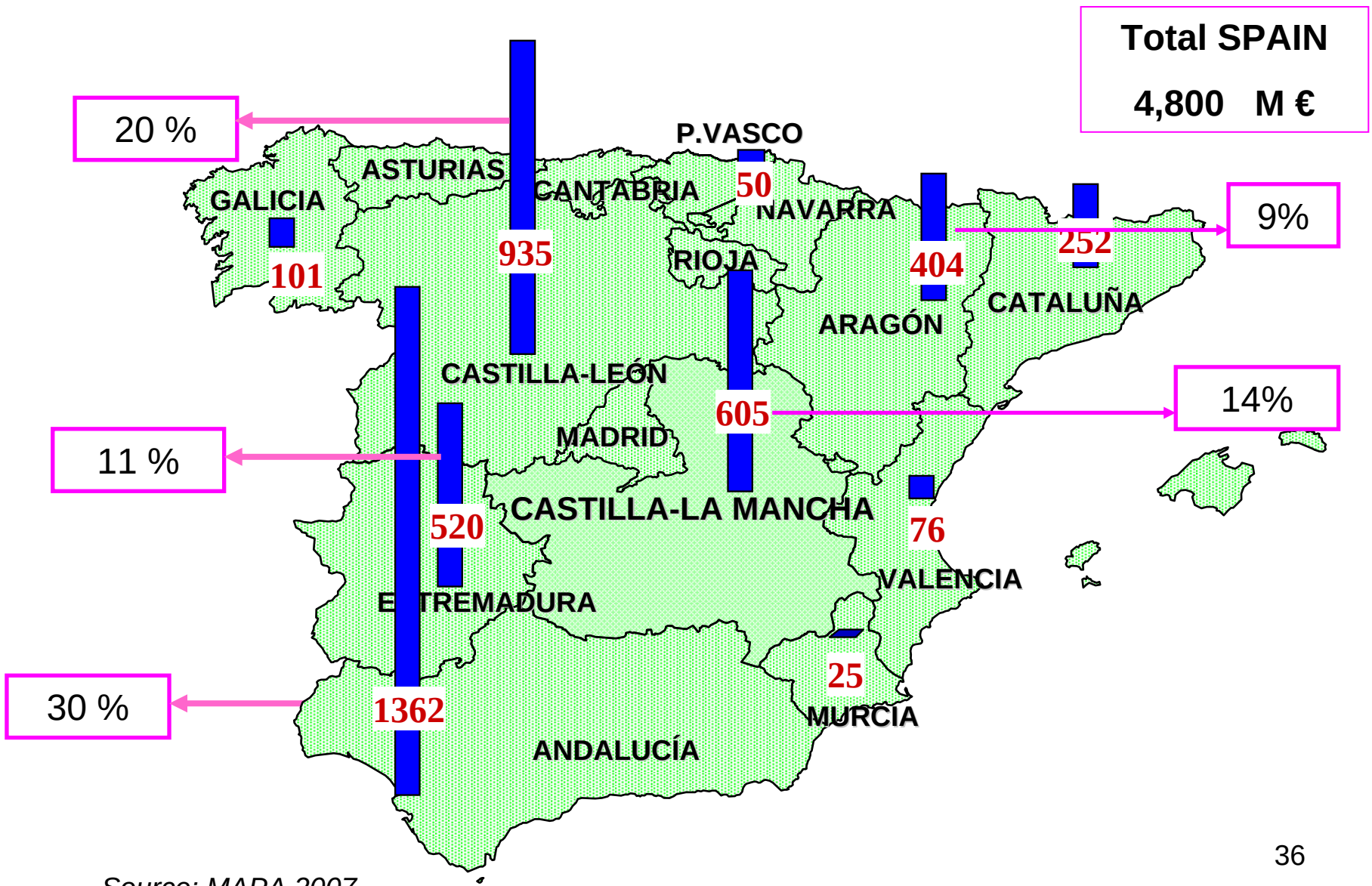
- Effects on land use and cropping patterns
- Can the CAP reform induce water savings?
- The ‘water dimension’ of the CAP

Effects of the CAP reform: Changes in crop surface



Source: Data from MAPA (2007)

REGIONAL DISTRIBUTION OF CAP DIRECTPAYMENTS 2006 (M €)



Source: MAPA 2007

The Common Agricultural Policy: effects on water use

POLICY		POLICY OBJECTIVE	POLICY INSTRUMENT	ENVIRONMENTAL EFFECTS	SOCIETAL EFFECTS
CAP	**CAP Luxembourg Reform 2003 2005…**	▪ Multifunctional & Competitive agriculture ▪ Farm income stability ▪ Environmental sustainability ▪ Reinforce Rural development	▪ Single farm payment decoupled from production ▪ Payments reduction: modulation ▪ Cross Compliance schemes: payments tied to environmental regulations	▪ Increase in extensive productions and low water demand crops ▪ Lower water use in some regions ▪ Higher environ.sust. ▪ Control of water consumption	▪ Decrease in farm income (decrease in DP) ▪ RD Regional-specific programs ▪ Regional disparities
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CROSS COMPLIANCE IN THE CAP 2003

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<tr><td>ANIMAL HEALTH
•Food-&-mouth disease, swine vesicular disease, blue tongue disease</td><td>REGISTRATION OF ANIMALS
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CROSS COMPLIANCE IN THE CAP 2003

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CROSS COMPLIANCE IN THE CAP 2003

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Down-scaling global policies to regional actions

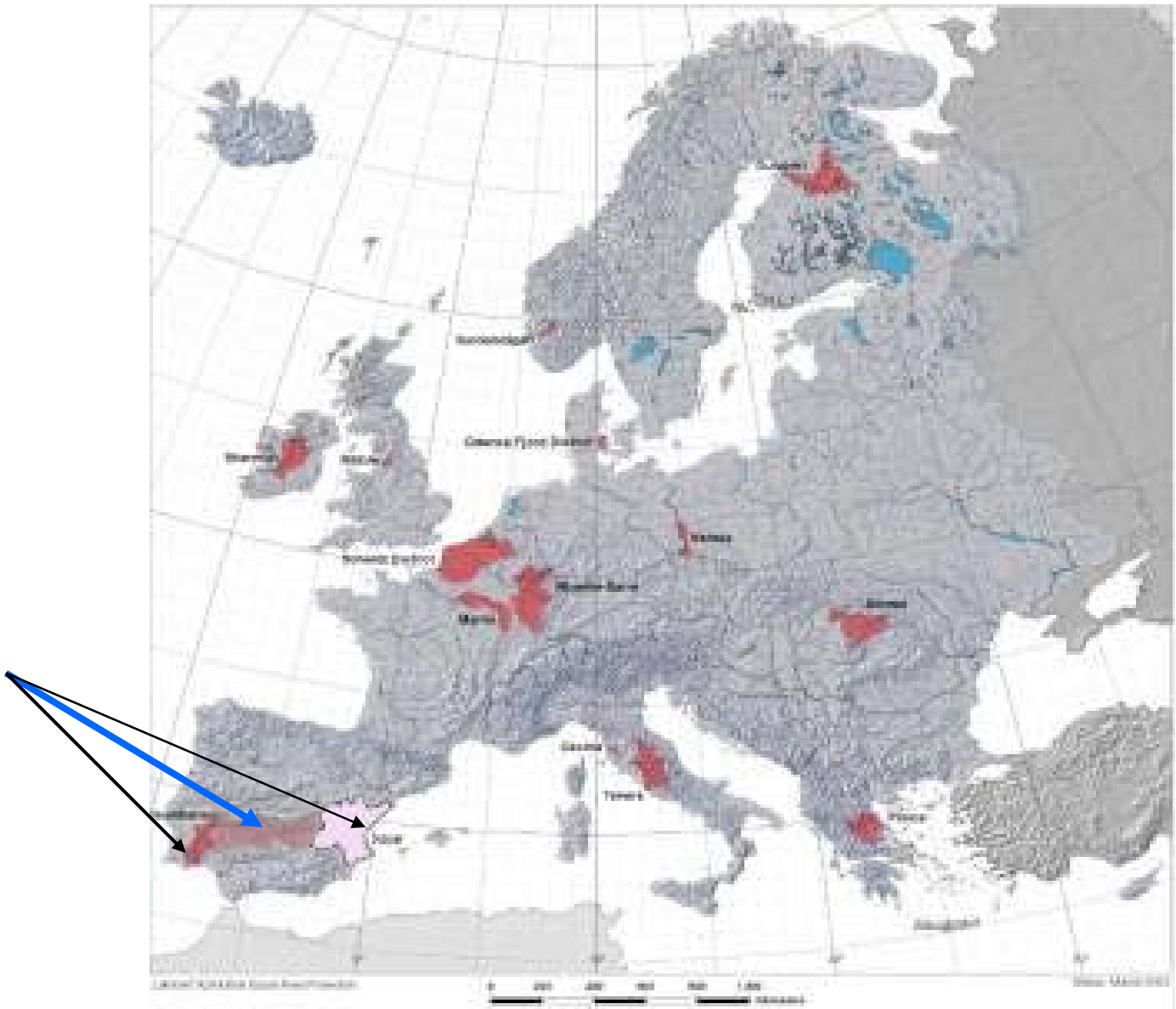
- CASE STUDY:

  The Upper Gaudiana Basin, region of Castilla-La Mancha

- **NEWATER** (New approaches to adaptive water management under uncertainty) (2005-2009) www.newater.info
  - IP, 43 research teams, 18 countries, 7 basins (Europe: Rhine, Elba, Tisza, Guadiana. Africa: Nile, Orange. Asia: Amuradya)

    → integrated and adaptive water resources management, multidisciplinary perspective (ecological, economic, social institutional), stakeholder participatory process

The WFD Pilot Basins

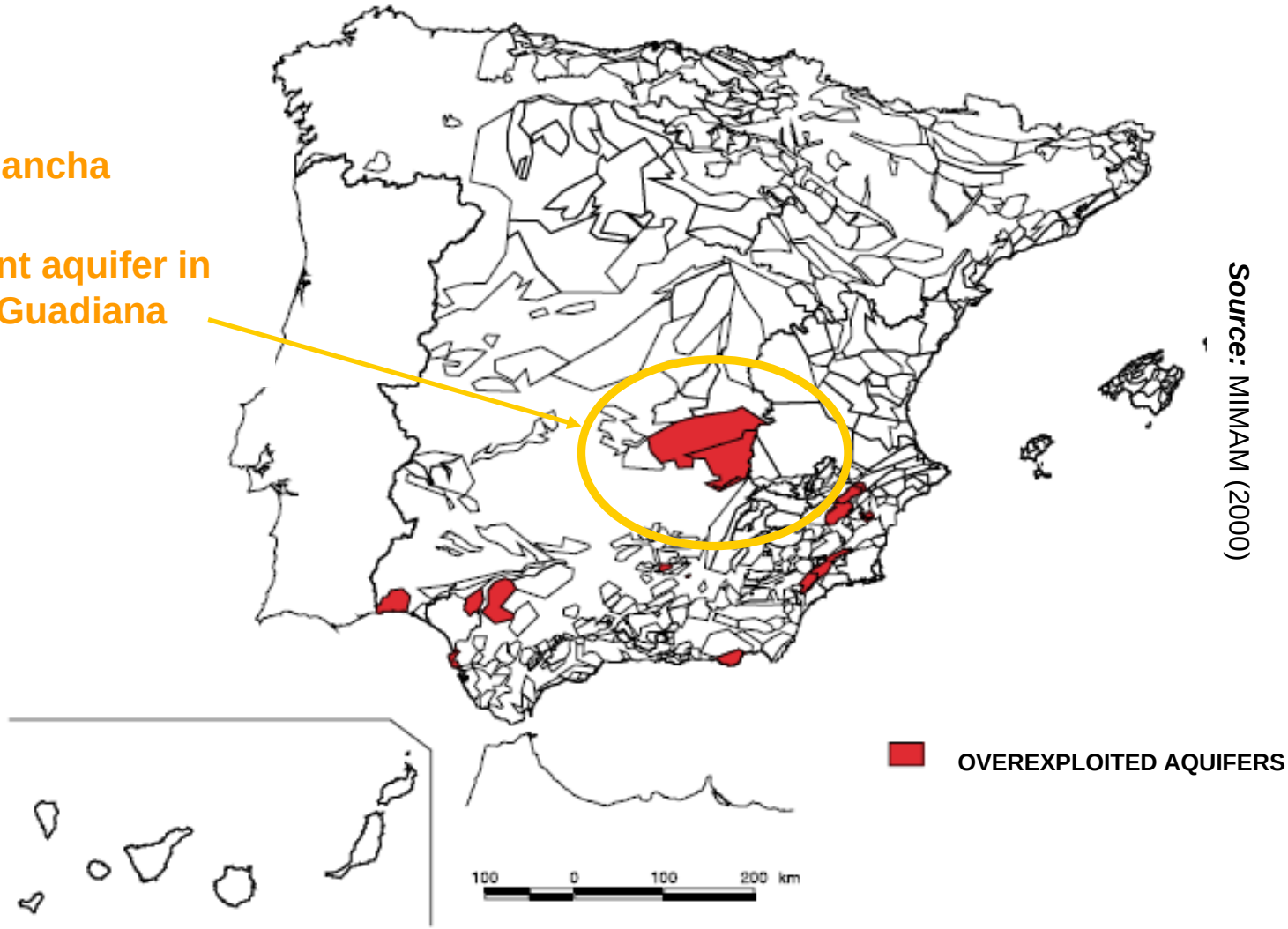


Groundwater overexploitation in the Upper Guadiana basin

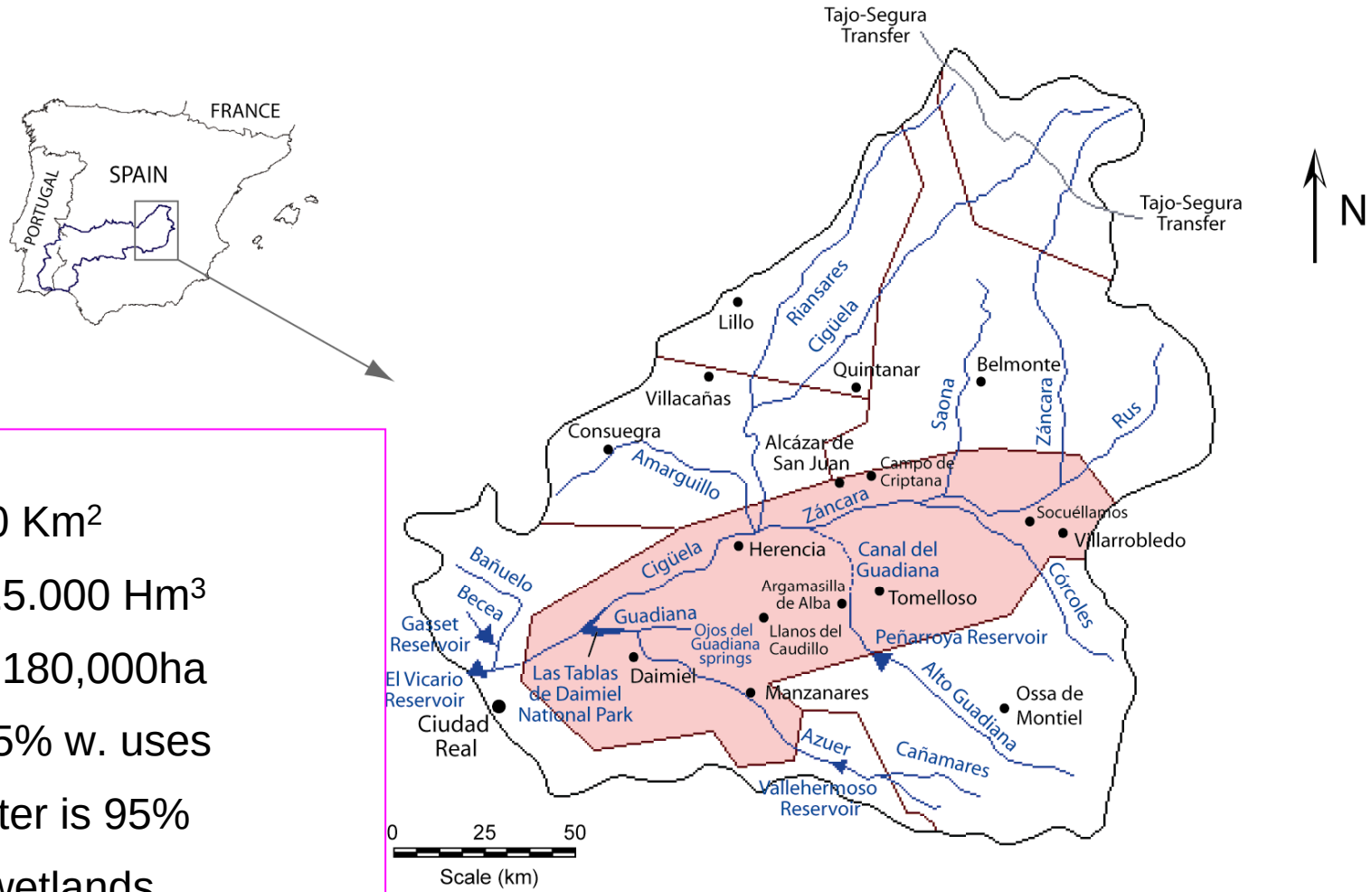
- **ecosystem / socio-economic sustainability ??**

Western La Mancha Aquifer:

most important aquifer in the Upper Guadiana Basin



AREA OF STUDY: The Western La Mancha Aquifer
(Upper Guadiana River Basin)



- Area: 5.500 Km^2
- Capacity: 15.000 Hm^3
- Irrigation ± 180,000ha
- Irrigation 95% w. uses
- Ground water is 95%
- RAMSAR wetlands
- UNESCO biosphere reserve
- Irrigation-based development

Fuente: Martínez Santos P., Llamas R. (2005)

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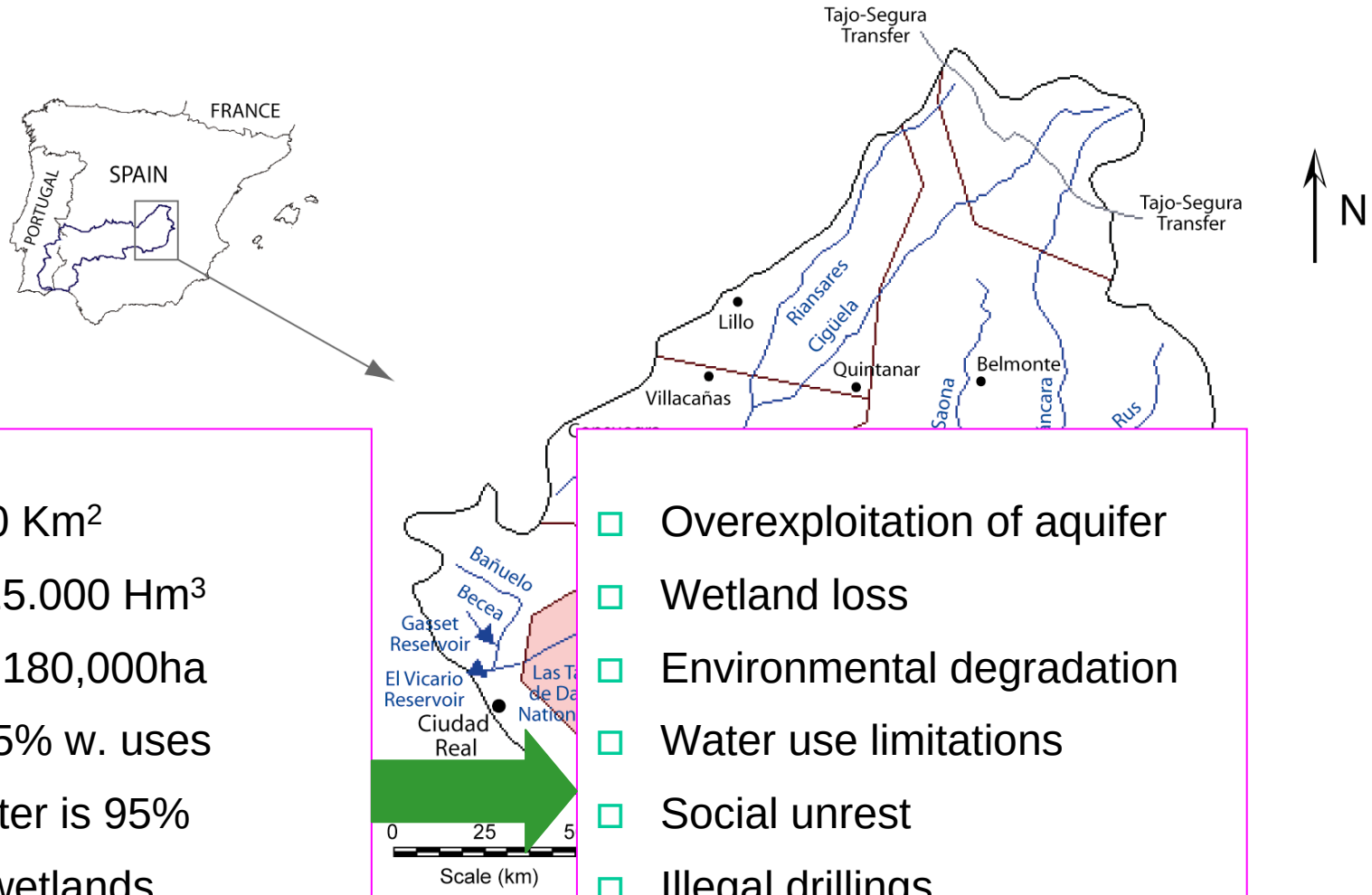

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- Overexploitation of aquifer
- Wetland loss
- Environmental degradation
- Water use limitations
- Social unrest
- Illegal drillings
- Difficult policy enforcement


ARAD

“TABLAS DE DAIMIEL” NATIONAL PARK (Ramsar Wetlands)

The policy context in the Upper Guadiana basin:

- **Policy context → Actions taken → one objective and 2 instruments**
  - **National Policy: Water Management Regime (Water use restrictions) (1991….)**
    - **Water Quotas → compulsory**
  - **EU policy: CAP Agri-Environmental Program → Income compensation for reducing water use (1993 ...2007)**
    - **Water Quotas + Income compensation → Voluntary**

- **New developments: policy-driven solution?**
  - **WFD**
  - **Special Plan of the Upper Guadiana: Water Bank, Purchase of water rights, land use measures (forestation, rainfed farming…) (2007 – 2027)**

The policy context: centralized management

Water policies have not been capable to attain water conservation targets

– **Water abstraction Plan (National Policy, 1991)**

- Water quotas: reduction from 5000 → 2000 m3/ha
- Compulsory
- No compensation of income loss

→

- Unsuccessful
- Social unrest
- Farmers' litigations

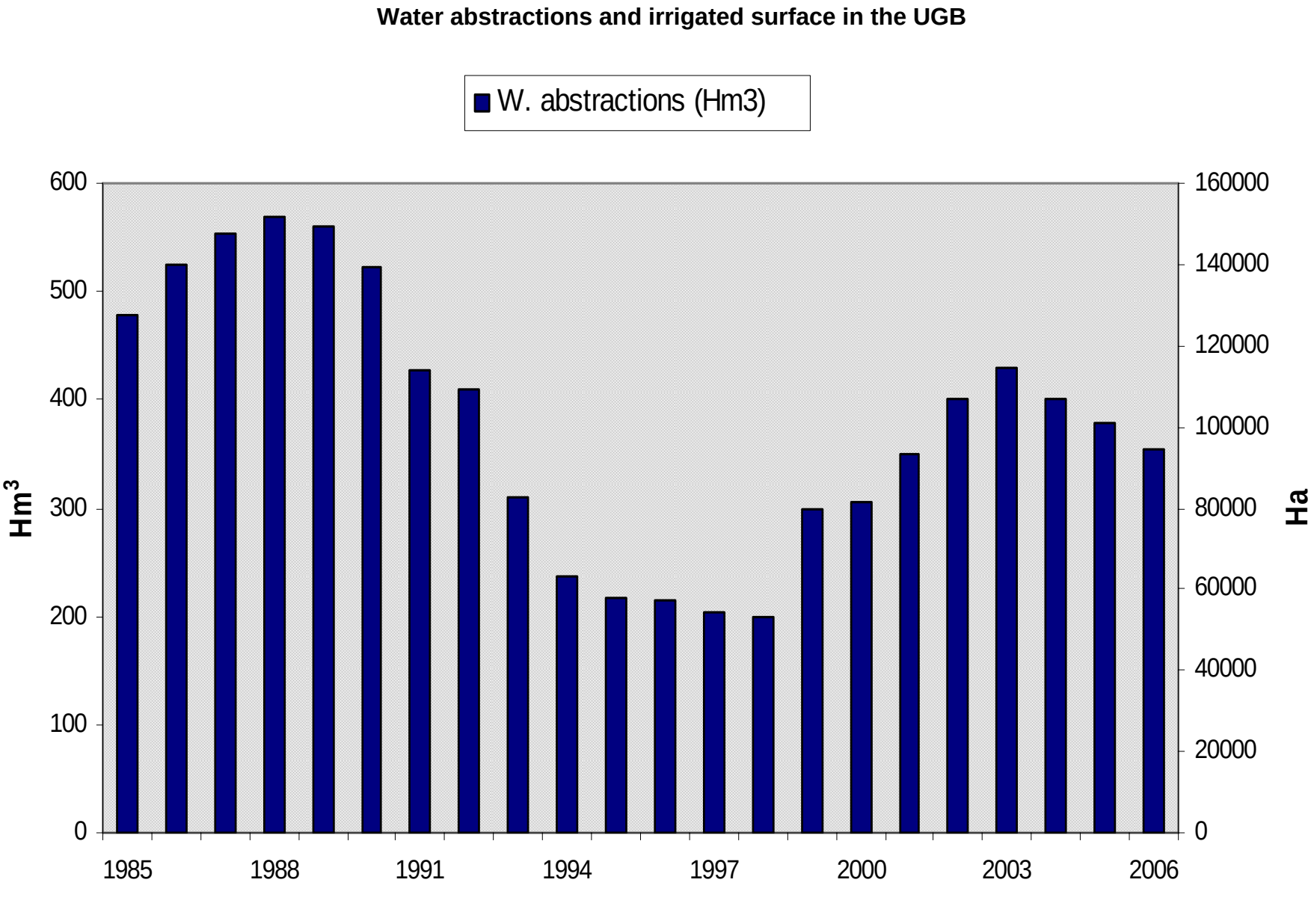
– **Agri-Environmental Program (CAP, 1993…..)**

- Water quotas: % reduction (50-70-100%)
- Voluntary
- Compensation of income loss

→

- Highly successful
- Reduction of social conflicts
- Low cost-effectiveness

Source: Varela-Ortega (2007)


Water abstractions and irrigated surface in the UGB
W. abstractions (Hm3)
Hm3
Ha
600
500
400
300
200
100
0
160000
140000
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1985
1988
1991
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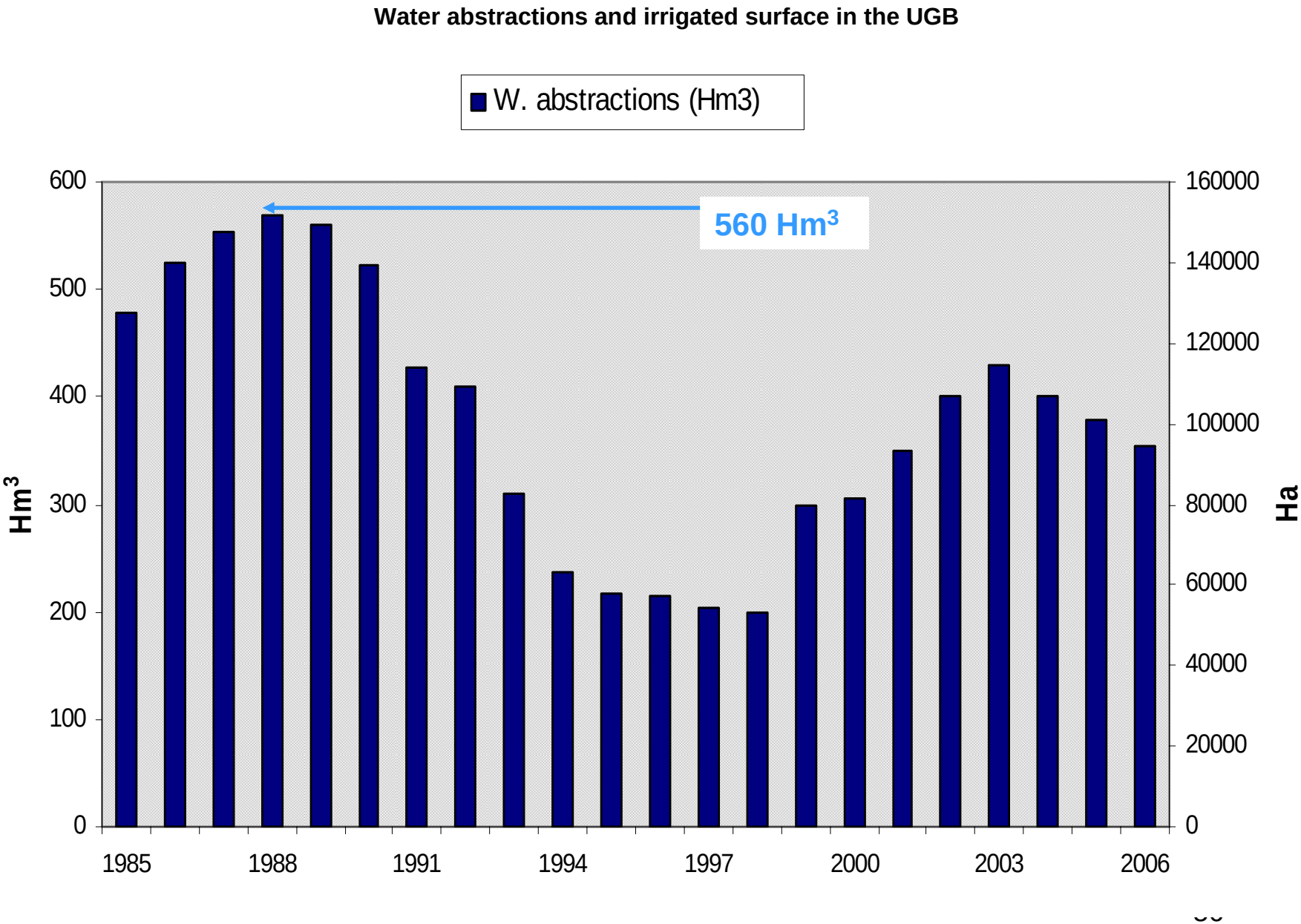
2003
2006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560 Hm3
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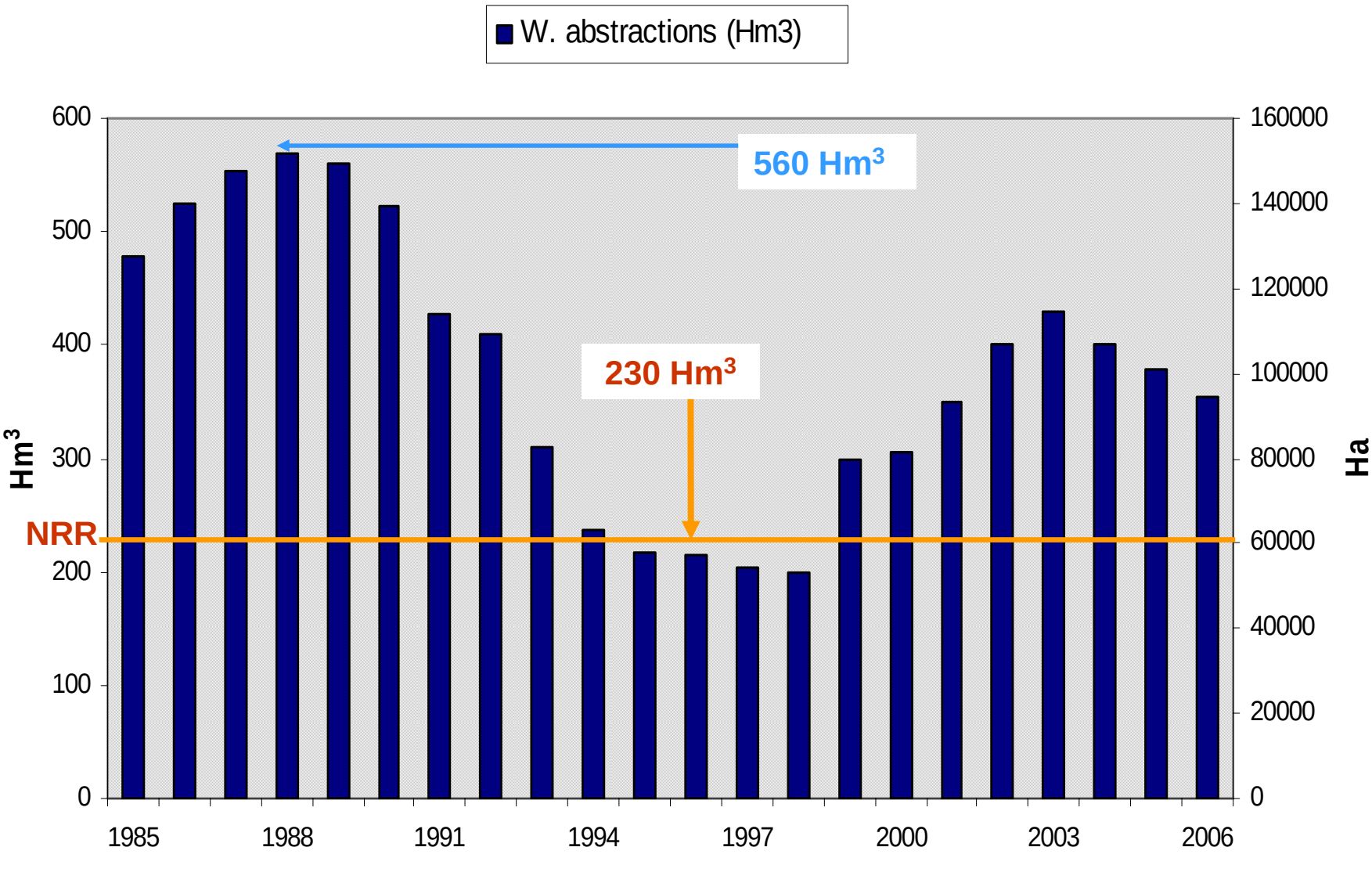

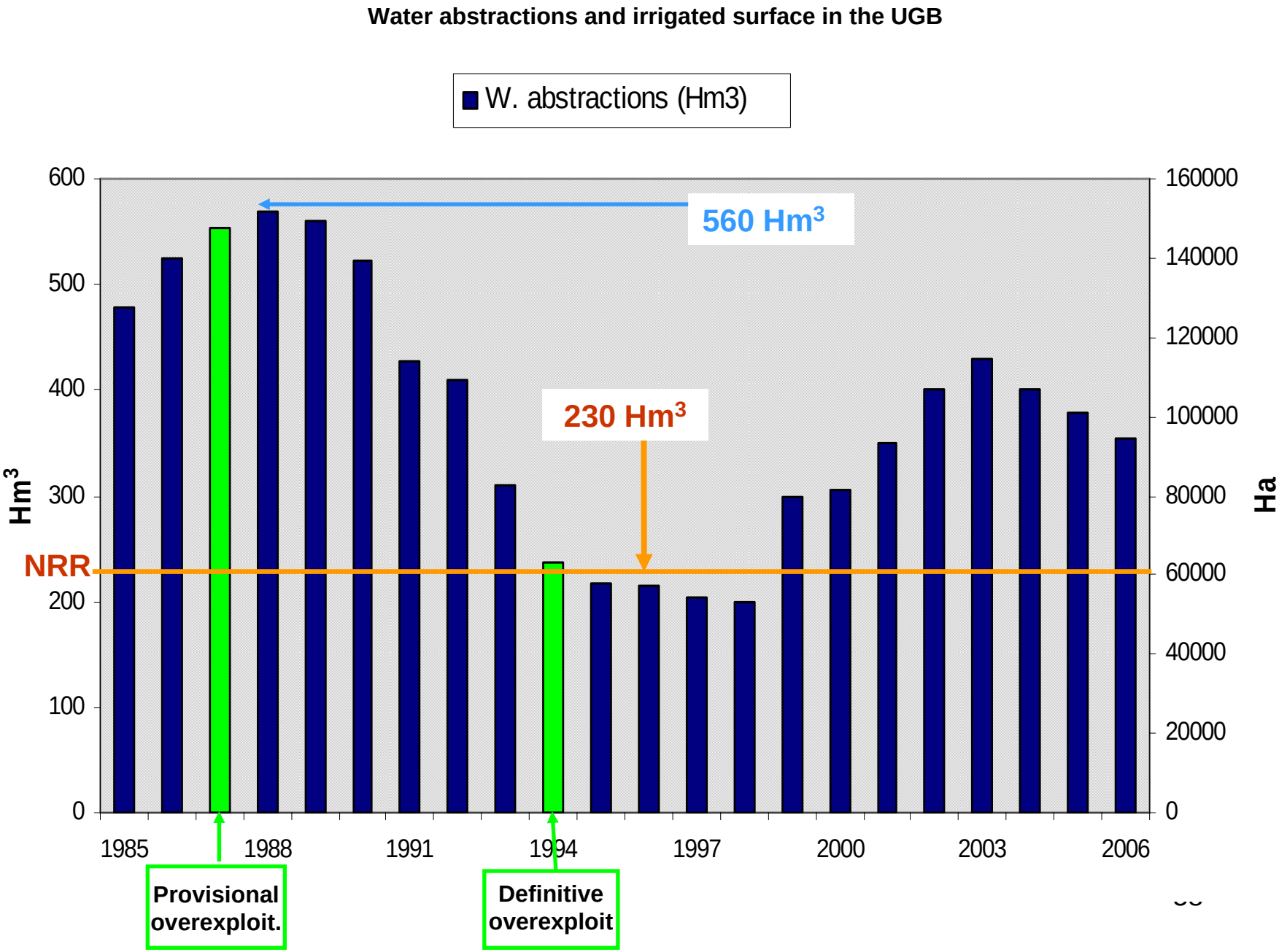
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Ha
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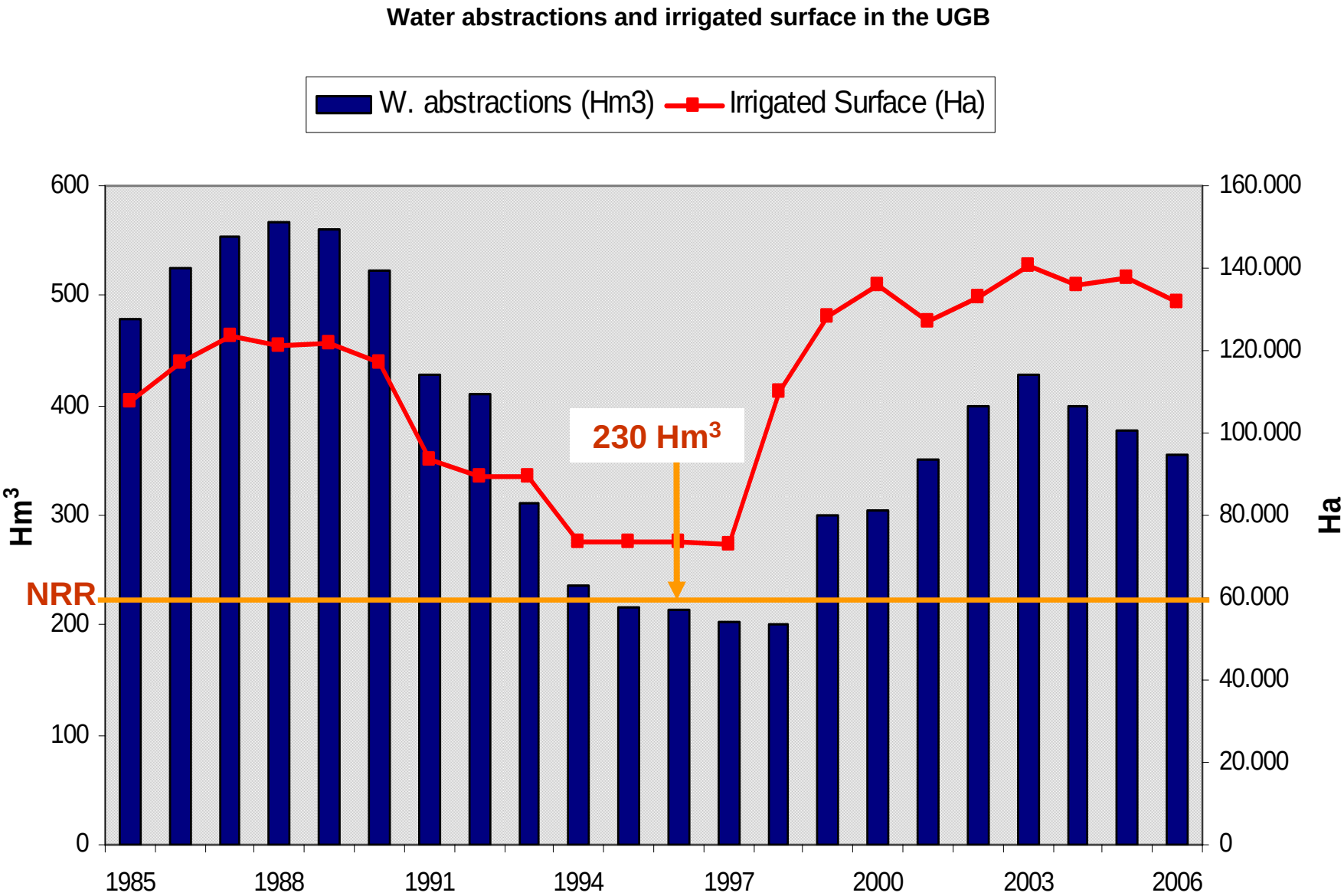
230 Hm3
NRR
1985
1988
1991
1994
1997
2000
2003
2006
Provisional overexploit.
Definitive overexploit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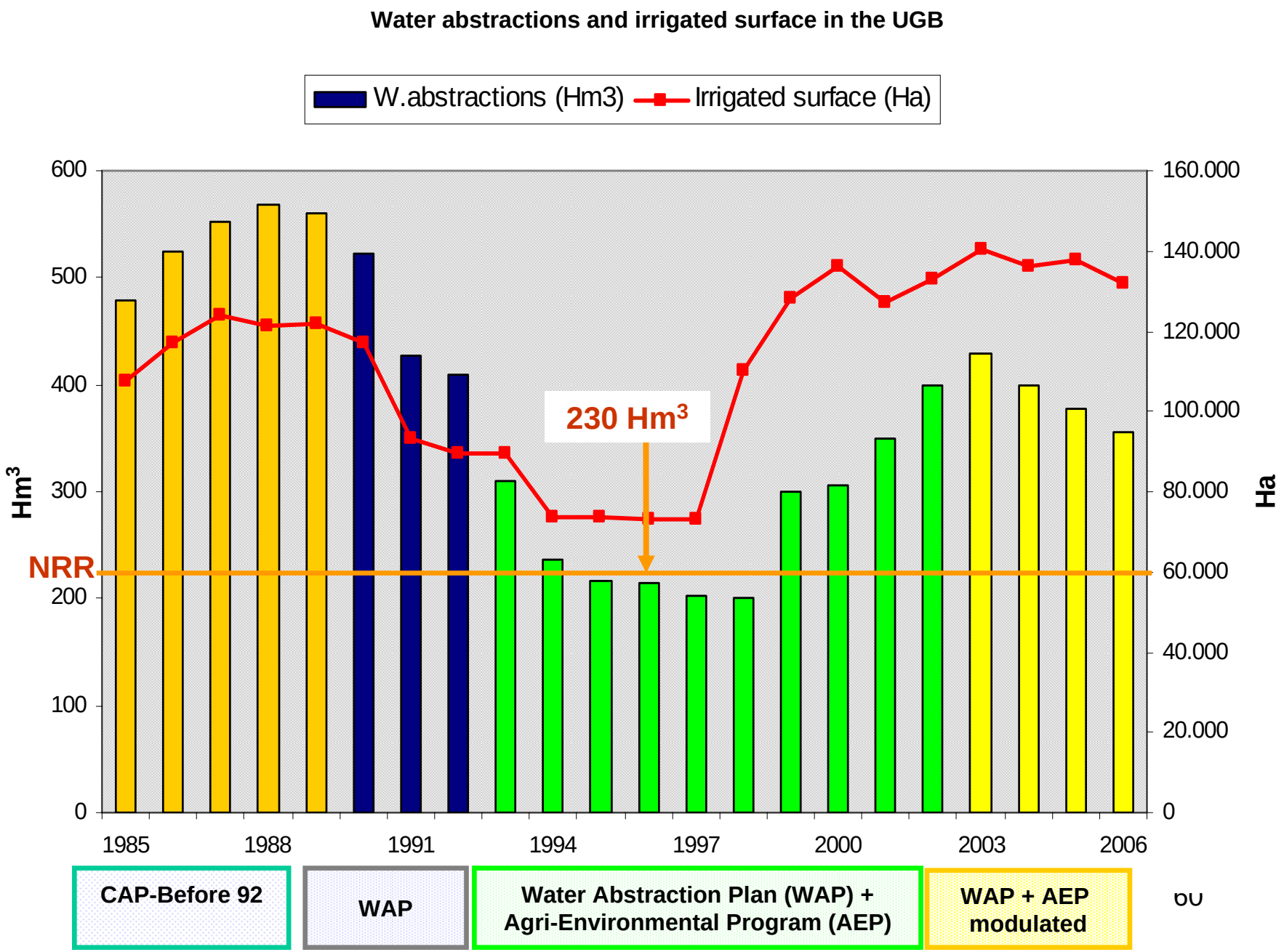
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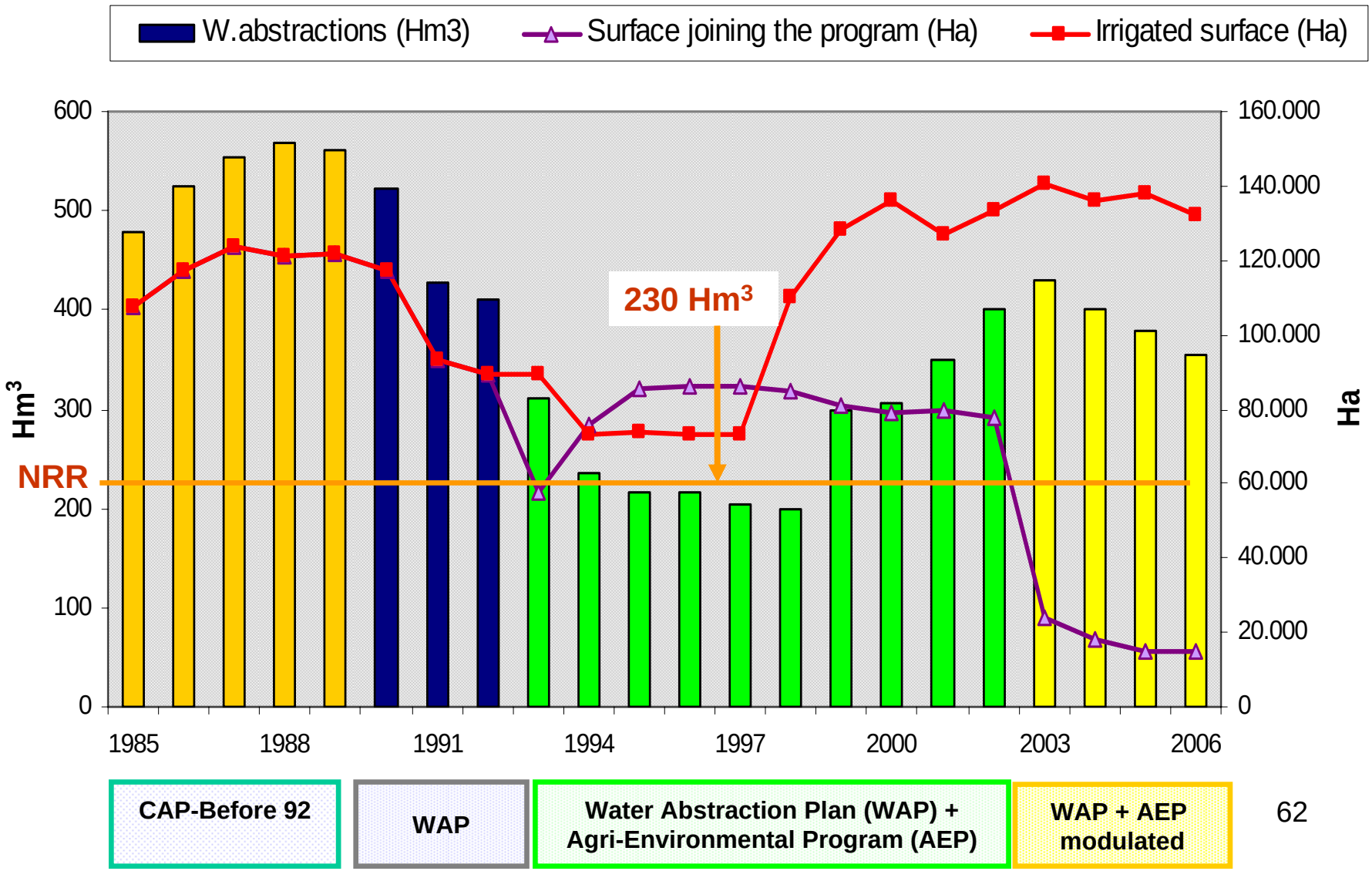
CAP-Before 92
WAP
Water Abstraction Plan (WAP) + Agri-Environmental Program (AEP)
WAP + AEP modulated

Evolution of the EU income compensation program in the Upper Guadiana basin (1993-2006)

Level of Water consumption reduction	Compensation payments €/ha			
	1993	1997	2001	2003 …2006 modulation
50%	156	164	179	1-40 ha → 209 40-80 ha → 125 > 80 ha → 63
70%	258	271	296	
100%	360	379	414	1-40 ha → 518 40-80 ha → 311 > 80 ha → 155

Water abstractions and irrigated surface in the UGB



Case study results

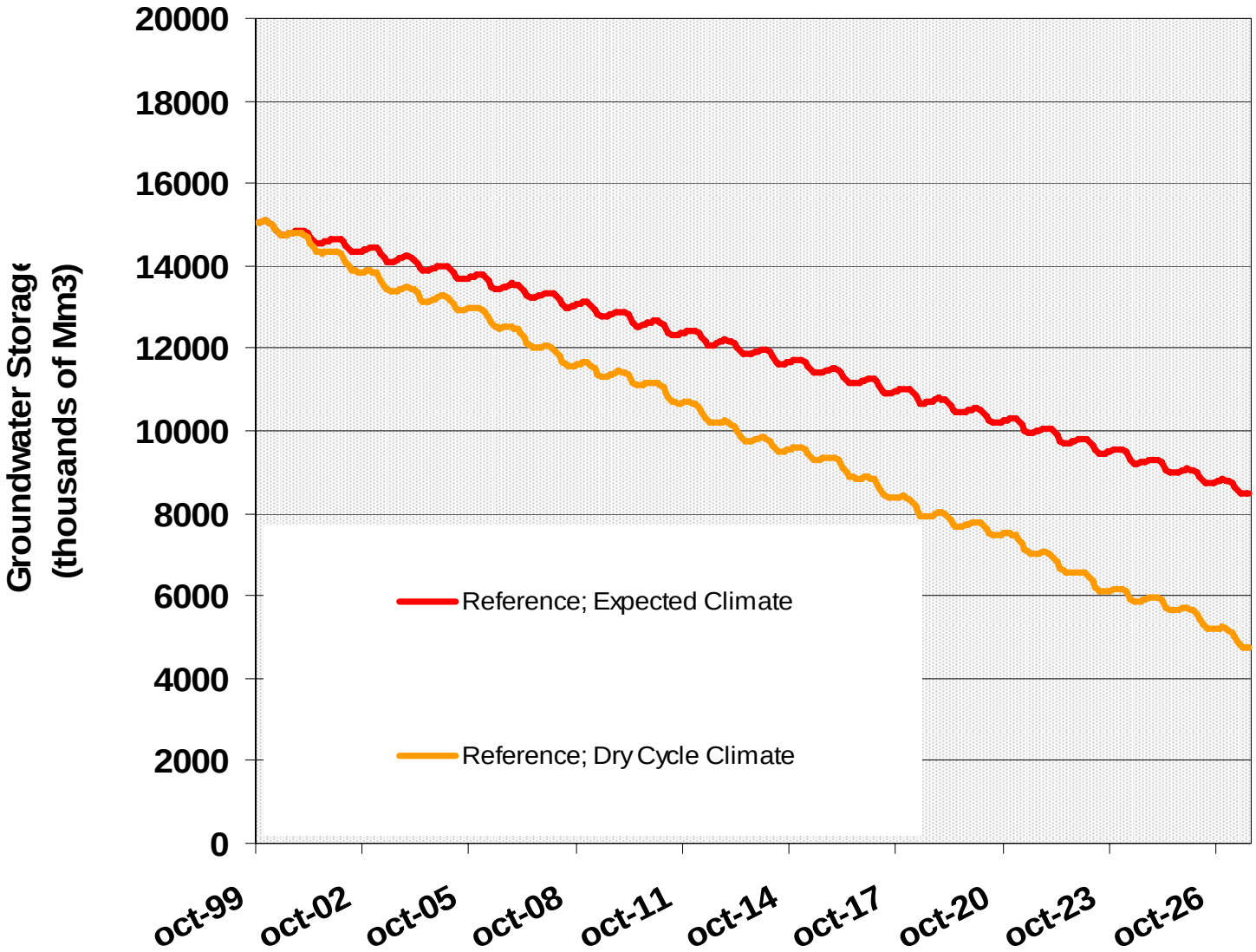
- **The NEWATER project**
  - Integration of an economic - hydrology modeling
- **The CAP programs**
- -AEP compensation: 0.16 – 0.20 €/m3
- -W dual value: 0.87

- **PEAG - (Special Plan of the Upper Guadiana**) (2007….2027) (5,000 M €)
  W savings . 272 Mm3

- → Purchase of water rights (Water rights Exchange Center)
- → closing up illegal wells
- → legalization of illegal wells
- → other measures: forestation , rainfed farming…

- Projections to 2027 → the aquifer's recovery path

WEAP Model: Groundwater storage



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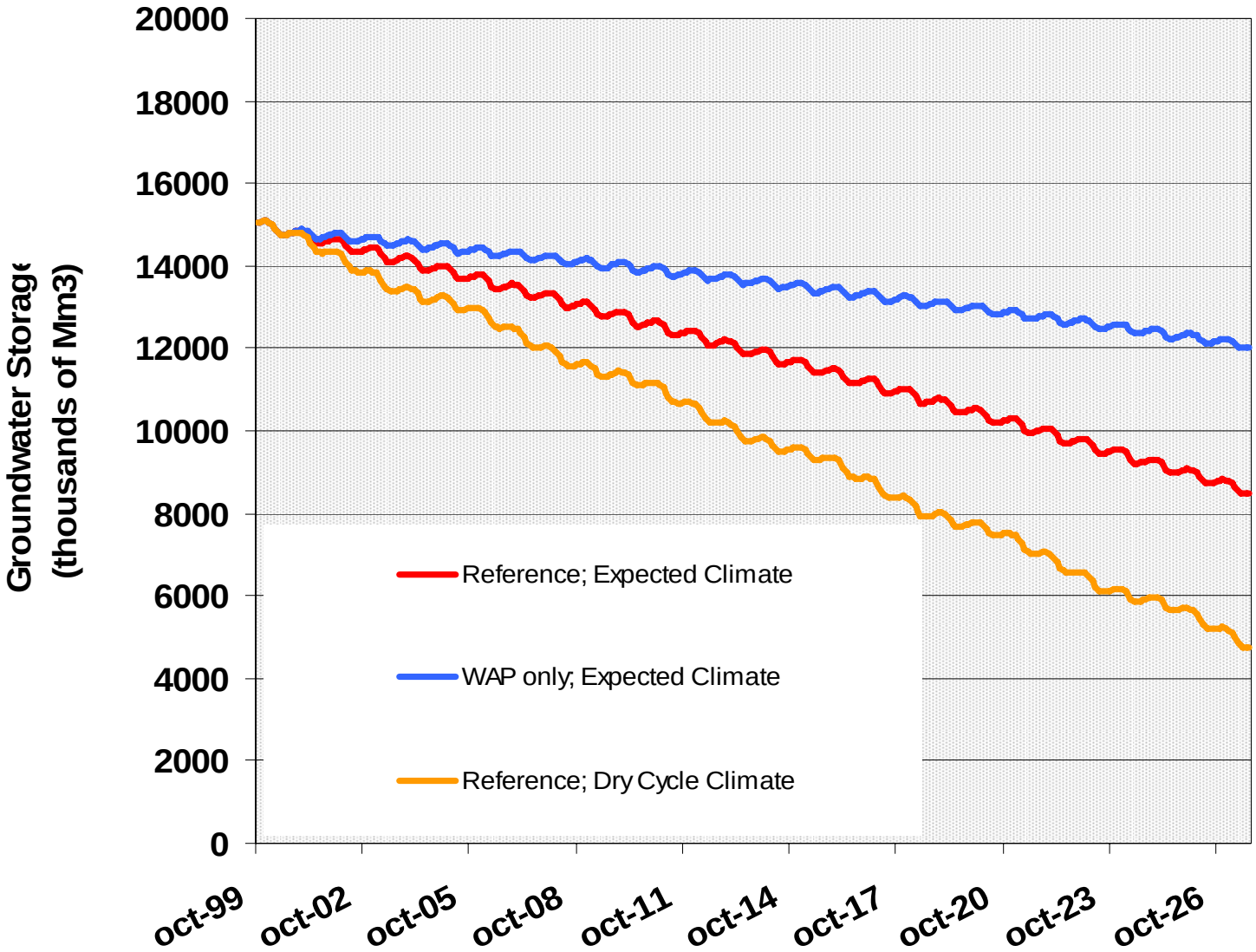

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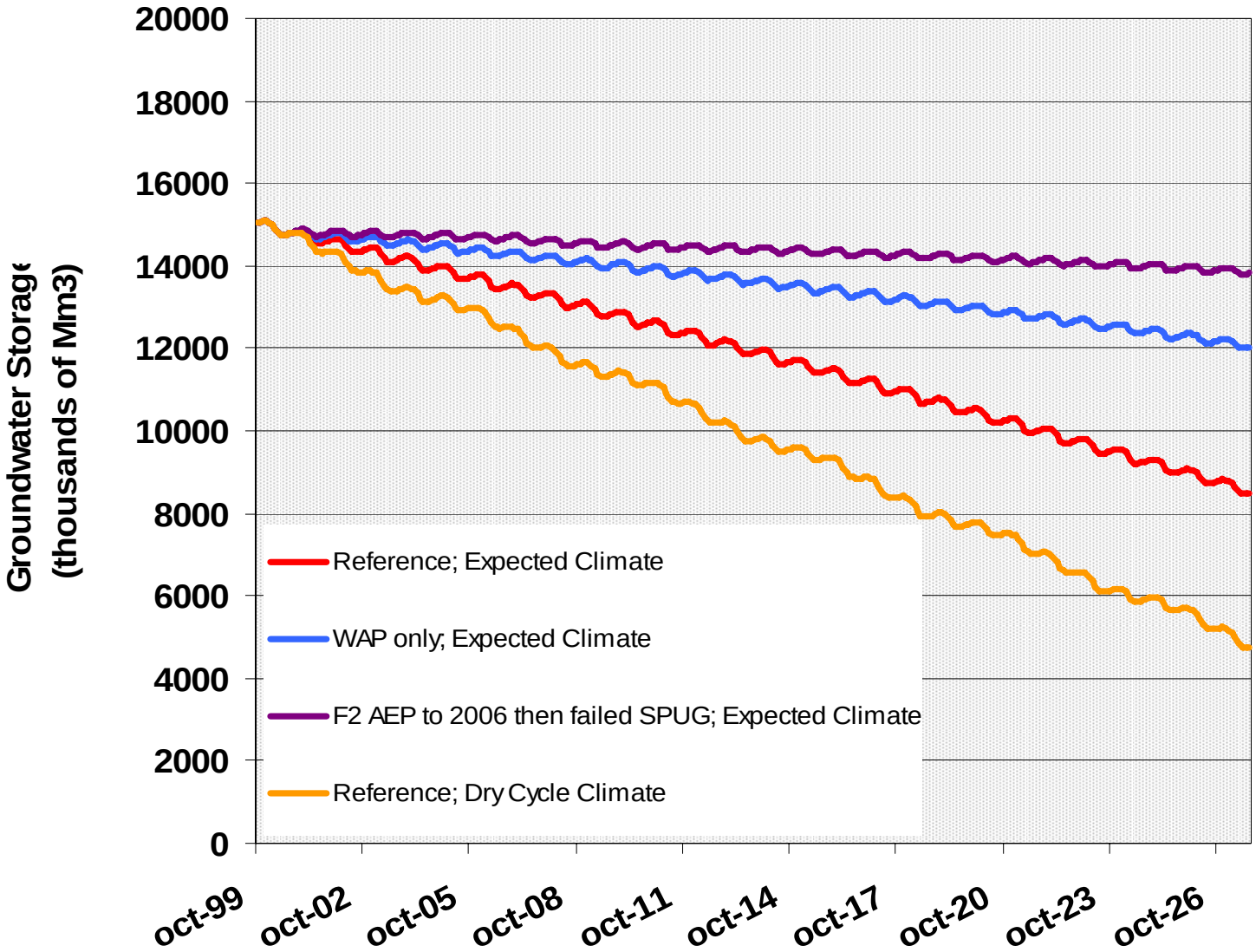

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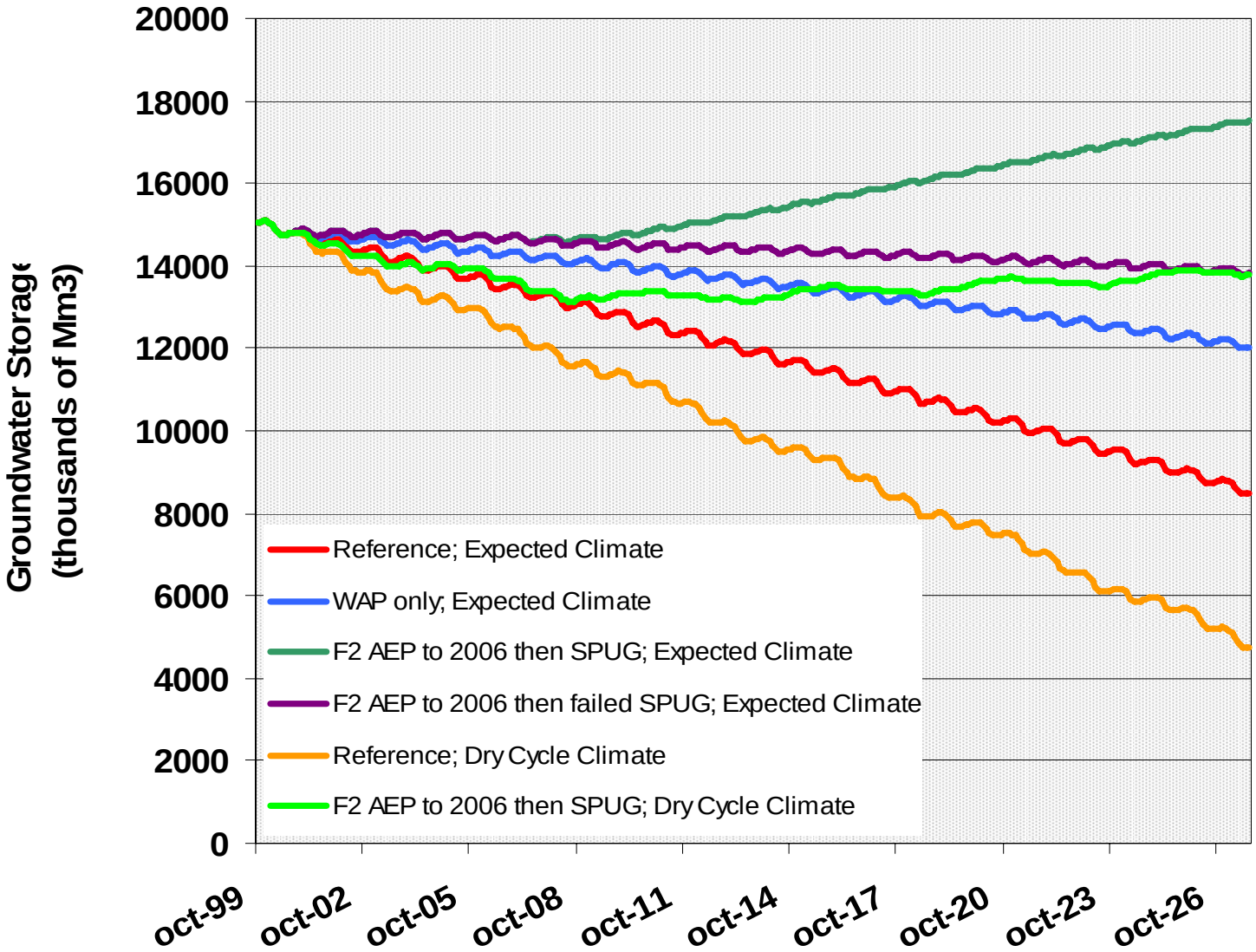

CONCLUSIONS

- Spain has an added difficulty adapting to quality-driven EU water policies
  - → public participation and stakeholder involvement may help (RBMP)
  - → adaptation of RBA
- Irrigation modernization will not attain water savings unless institutional development comes in (w.rights exchanges…
- Encourage new more flexible water demand instruments: water rights exchanges, purchase of WR

CONCLUSIONS

- CAP and water:
- → Crop shift, water use may not change
- → Tendency to reinforce environmental requirements
- → The future reform: Include water management and CC
- Approximation of CAP and WFD

- Policy integration and cohesion:
- → administrative coordination
- → enforcement, legitimization, credibility
- → public transparency and participation

THANK YOU FOR YOUR IDEAS AT THE RF!