Producing more from less – new metrics for sustainable agriculture in the UK

Birminghan, 16-17 January 2013

PLATAFORMA TECNOLÓGICA DE AGRICULTURA SOSTENIBLE

Technology Platform for Sustainable Agriculture in Spain

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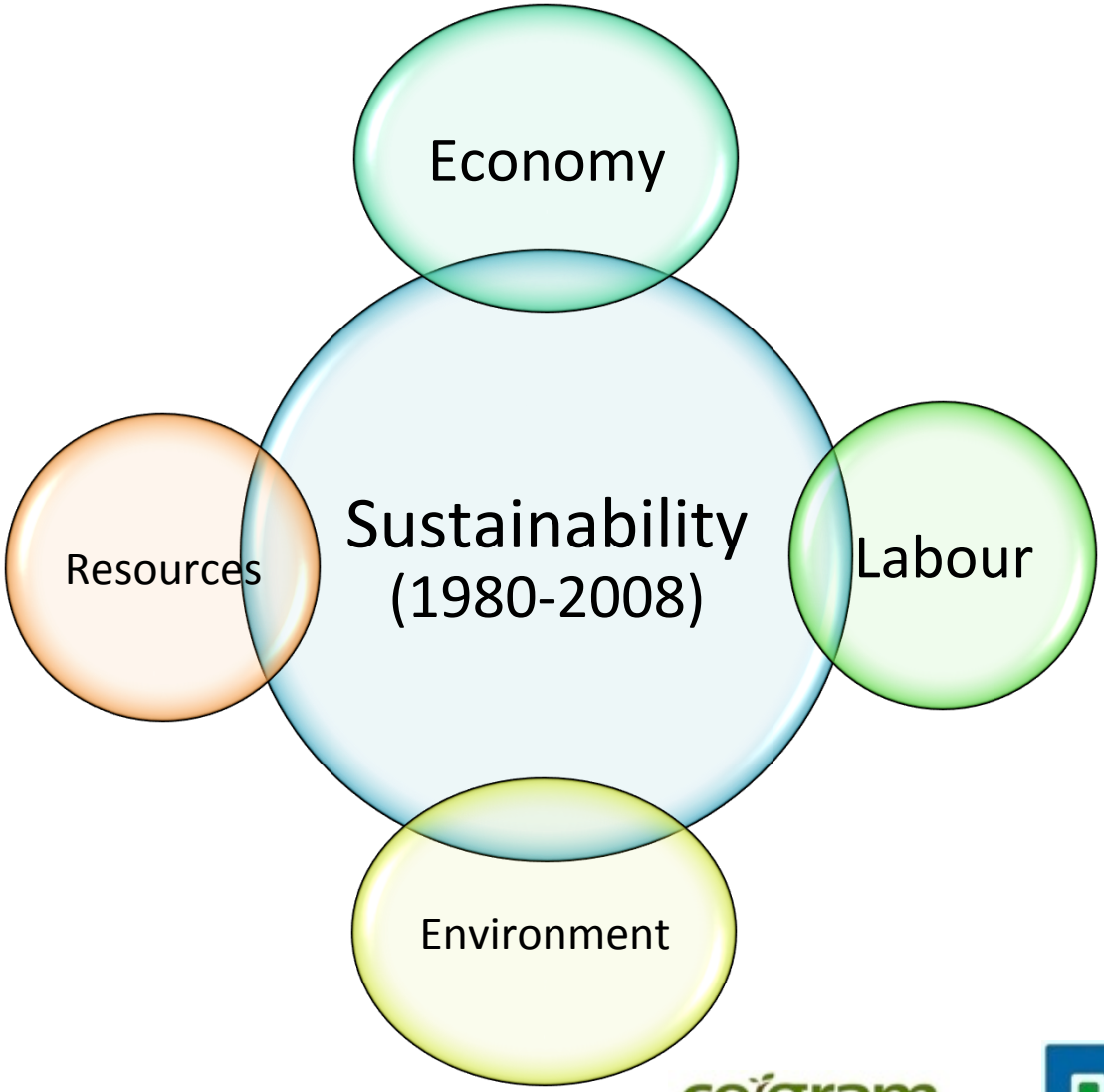
3. Results
   - Economic
   - Agricultural productions
   - Livestock
4. Conclusions

Objectives

- To calculate global sustainability indicators for Spanish agriculture over 30 years
- To identify sustainability indicators allow us to assess the impact of technology along food chain
- To quantify the evolution of indicators at national level

Approach


Economy
Resources
Sustainability
(1980-2008)
Labour
Environment

Approach

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- What are the **physical bases** of the main Spanish agricultural and livestock productions and how have they changed?
- How have the **agricultural economy** , **labour productivity** and **its contribution to agriculture** evolved?
- How have **basic food prices** behaved in comparison with other consumer prices ?

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Approach

- Long term assessment (1980-2008)
- Wide geographical coverage
- Based in technical and scientific works
- Multidisciplinary research team

Approach

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Economy

- Income
- Employment
- Prices

Crops

- Yields
- Water Use
- Erosion
- Energy
- Emissions
- CO_2

Livestock

- Production/ efficiency
- Water Use
- Emissions (CO2 eq+ NO)

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Environmental indicators




Environmental Indicators

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Indicator	Land use	Water use [Total & Blue for Agriculture]	CO_2 CO_2 equiv. [livestock]	Energy[1]	Loss of soil	Carbon flux
Vegetable production	✓	✓	✓	✓	✓	✓
Livestock		✓	✓			

[1] Energy from farm machinery combustible used on the field

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VEGETAL PRODUCTIONS

Economic value (€) per unit of natural resource base – Olives

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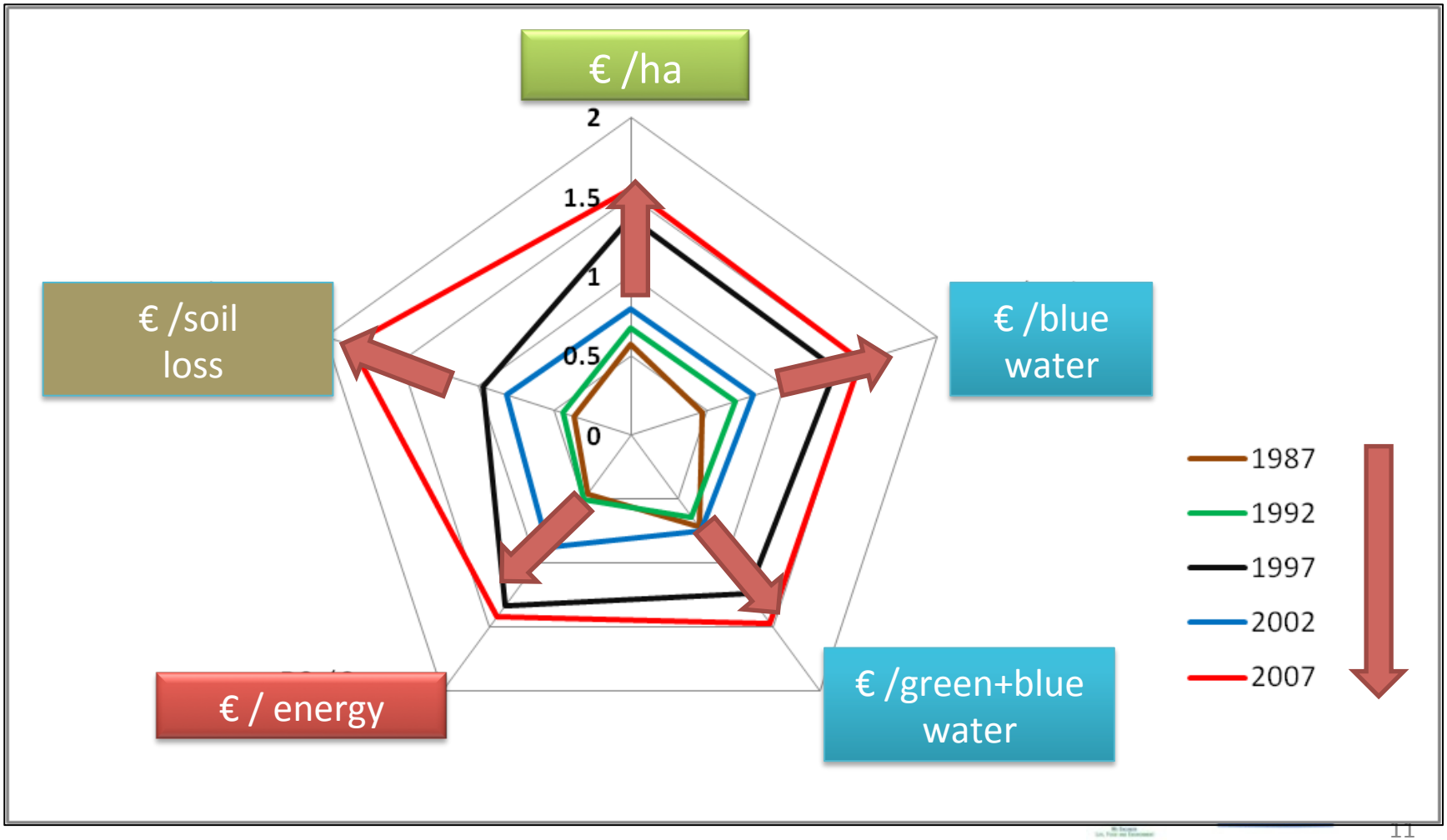
Normalized Indexes Olive groves

Euros (1= average1980-2008)



Physical indicators

Resource base over physical production – Maize

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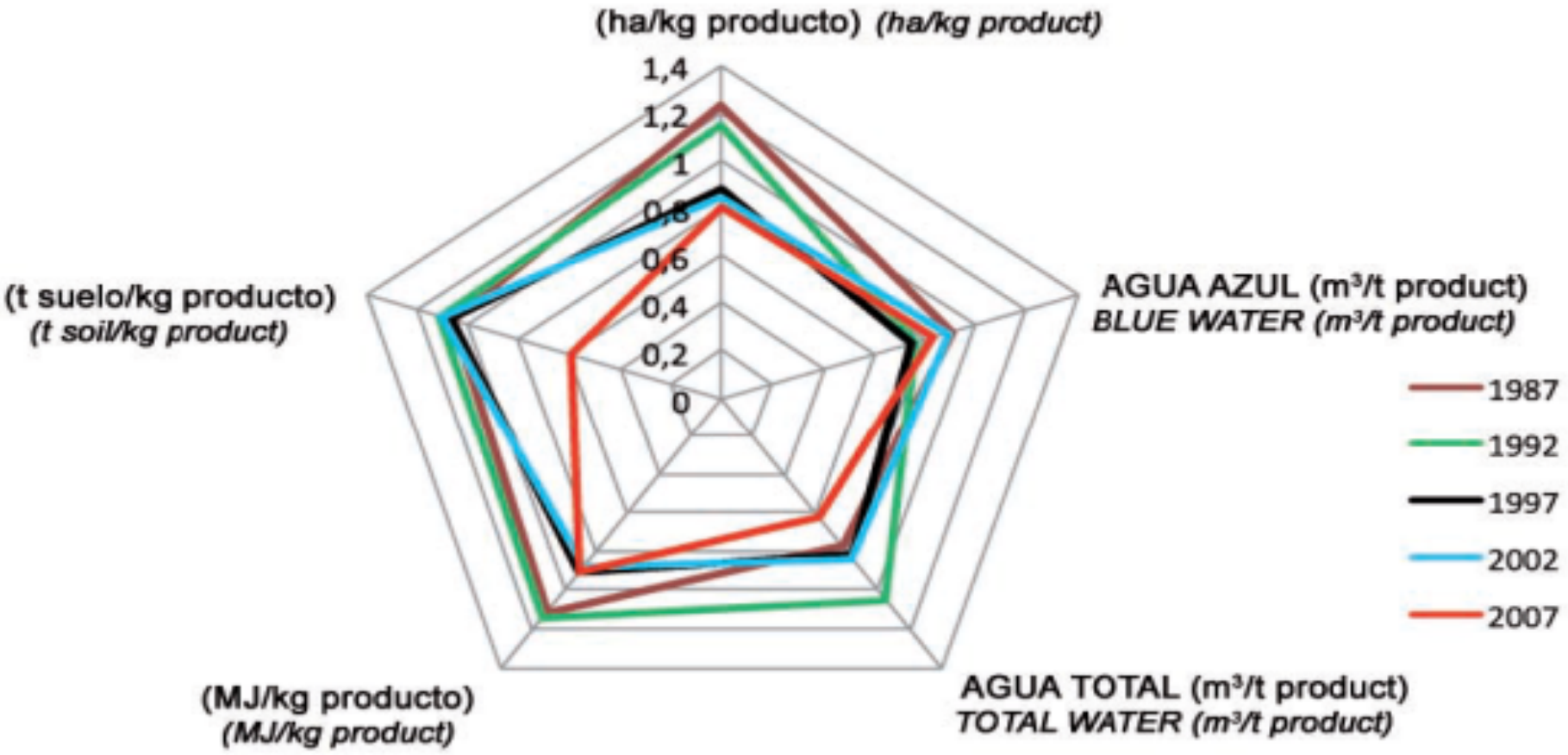

Economic value (€) per unit of natural resource base – Maize

2008 *vs* 1980	ha/kg producto *ha/kg product*	Agua Azul (m^3/t producto) *Blue water (m^3/t product)*	Agua Total (m^3/t producto) *Total water (m^3/t product)*	MJ /kg producto *MJ /kg product*	t suelo /kg producto* *t soil /kg product**
Maíz / *Maize*	-49,08%	-35,03%	-20,11%	-26,79%	-17,07%

**En el caso del indicador toneladas de suelo/kg producto el periodo considerado es 1987-2008*
** Period taken into account for t soil/kg product indicator is 1987-2008*

Maize: Water consumption

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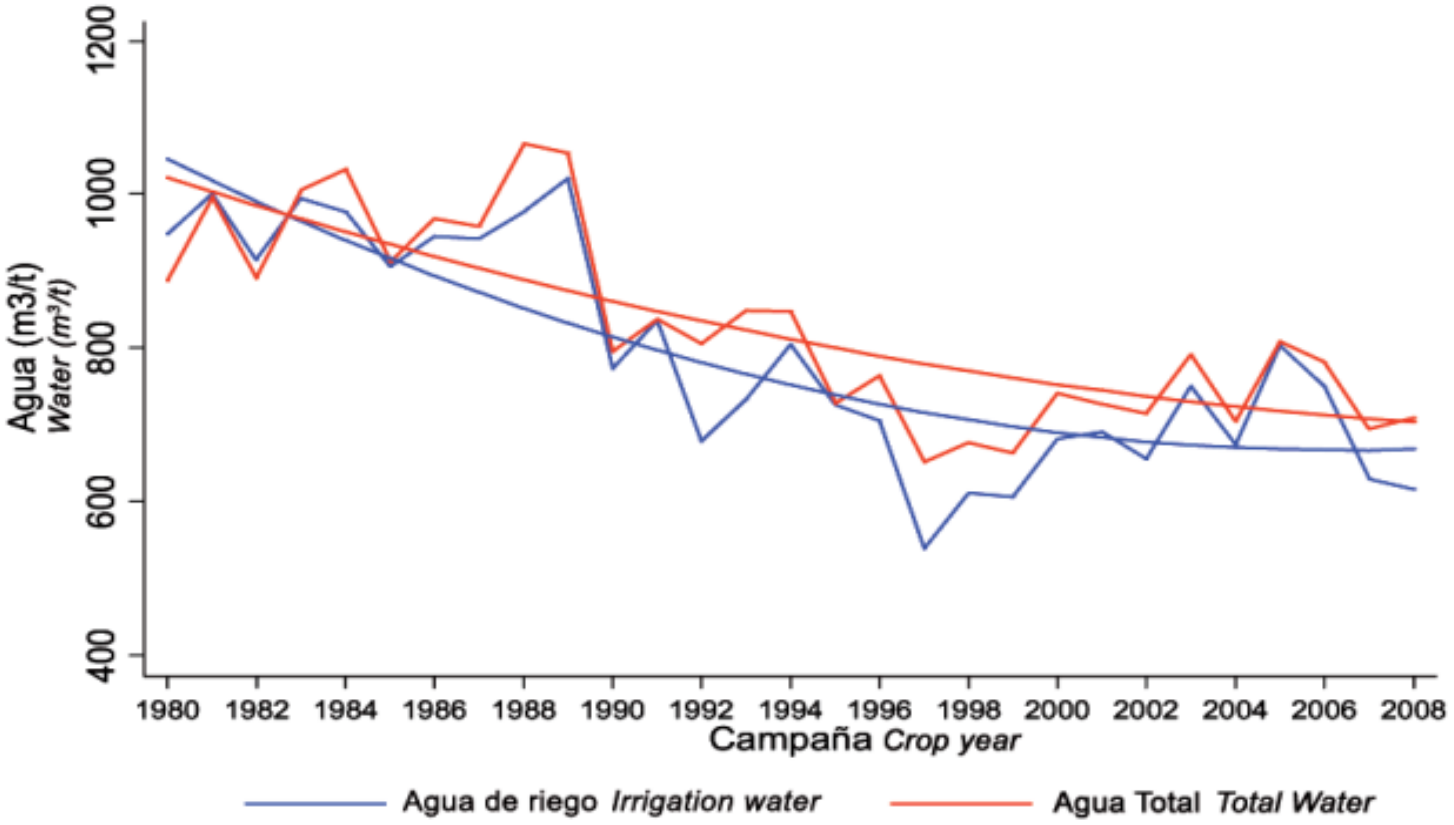
FIGURA 11. EVOLUCIÓN EN EL CONSUMO DE AGUA EN MAÍZ (m^3/t)

CHART 11. *WATER CONSUMPTION EVOLUTION FOR MAIZE (m^3/t)*



*Fuente: Anuarios de Estadística Agraria (MARM). Agencia Estatal de Meteorología

Source: Agricultural Statistical Yearbooks (MARM). National Meteorological Agency.

Maize: Energy use

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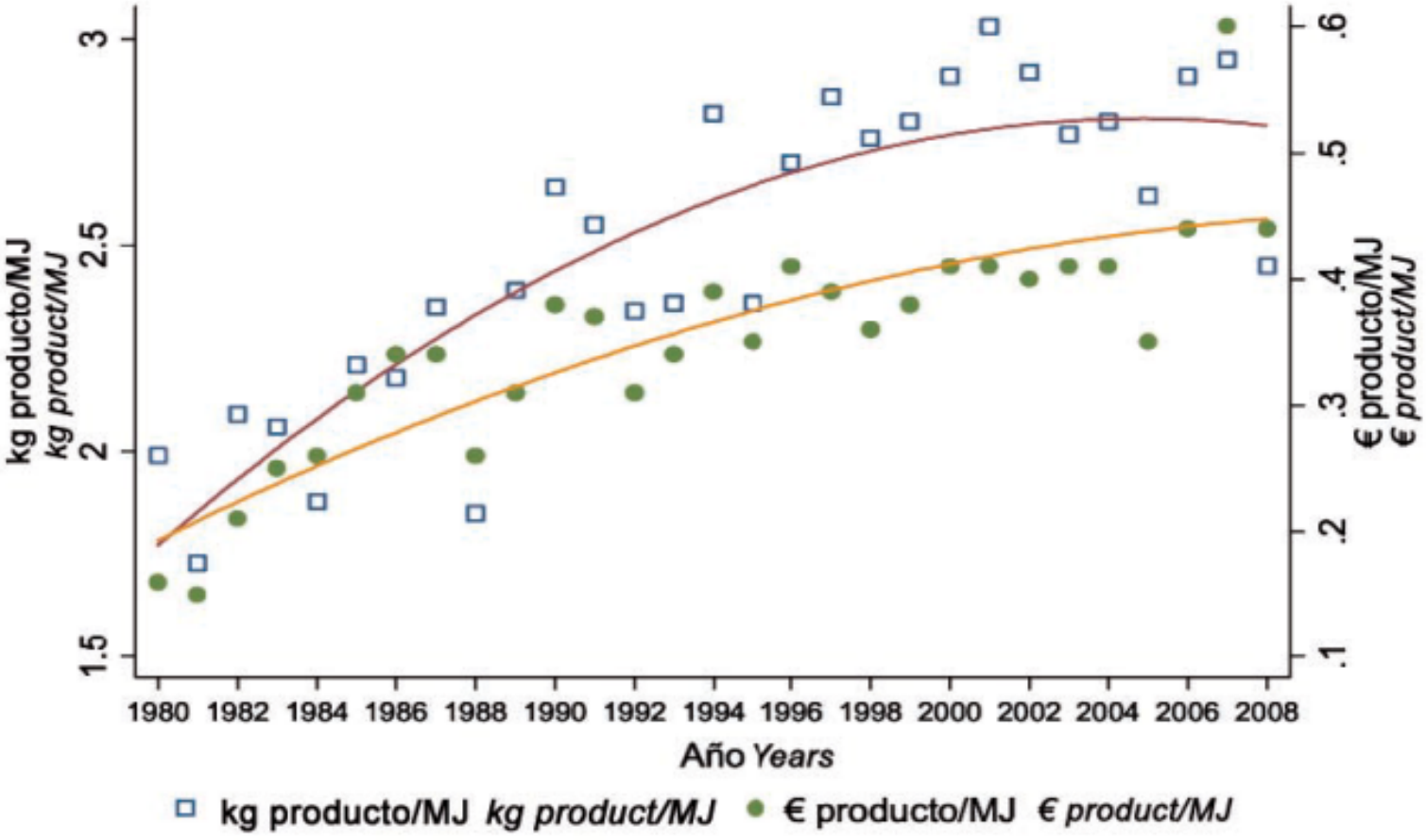
FIGURA 14. INDICADORES DIRECTOS DE ENERGÍA EN EL MAÍZ

CHART 14. *DIRECT ENERGY INDICATORS FOR MAIZE*



* Fuente: Elaboración propia *Source: Own calculations.*

Maize: Yields

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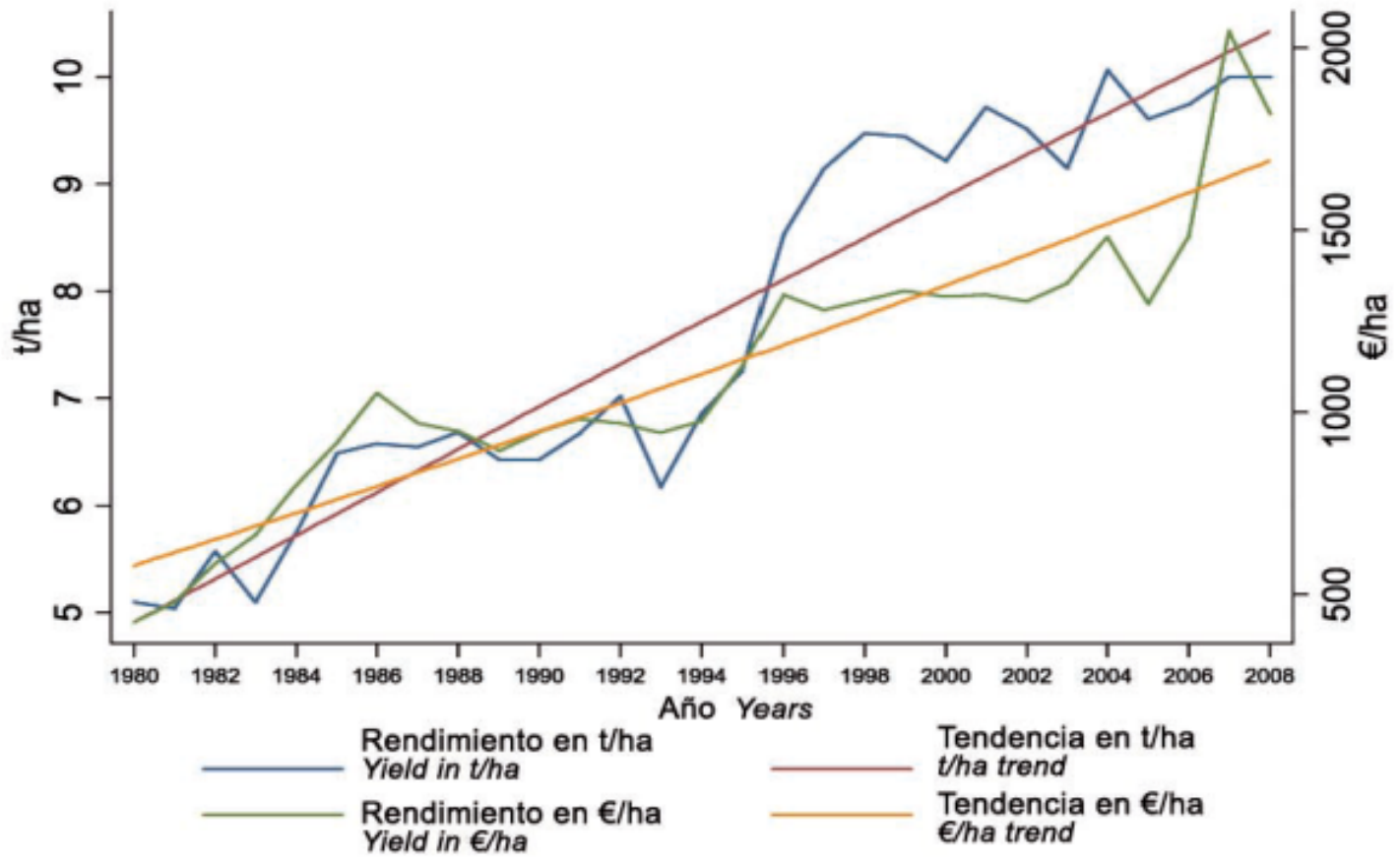
FIGURA 7. EVOLUCIÓN DEL RENDIMIENTO EN MAÍZ (t/ha; €/ha)

CHART 7. *MAIZE YIELD EVOLUTION (t/ha; €/ha)*



* Fuente: Anuarios de Estadística Agraria del MARM *Source: Agricultural Statistical Yearbooks (MARM)*

Environmental Indicators: Trends

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Evolución porcentual de los indicadores medioambientales para el periodo 1980-2008

Evolution in percentage terms of environmental indicators, period 1980-2008

	ha/kg producto *ha/kg product*	Agua Azul (m^3/t producto) *Blue water (m^3/t product)*	Agua Total (m^3/t producto) *Total water (m^3/t product)*	MJ /kg producto *MJ /kg product*	t suelo /kg producto* *t soil /kg product**
Maíz / *Maize*	-49,08	-35,03	-20,11	-26,79	-17,07
Melón / *Melon*	-60,35	-57,46	-40,77	-9,09	-50,00
Naranjo / *Orange tree*	-33,73	-51,61	-46,31	-78,95	-53,57
Olivar de aceite / *Olive tree*	-29,29	-45,40	-18,67	-48,66	-47,25
Remolacha / *Sugar beet*	-52,83	-46,82	-35,71	-69,57	-64,29
Tomate / *Tomato*	-52,30	-34,24	-30,97	-12,50	-52,00
Trigo / *Wheat*	-32,41	-23,53	14,13	-52,79	-42,44

* *En el caso del indicador toneladas de suelo/kg producto el periodo considerado es 1987-2008*

* *Period taken into account for t soil/kg product indicator is 1987-2008*

Trends of yields 1980-2008

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CROP	INCREASE 1980/2008	CROP	INCREASE 1980/2008
Wheat	50%	Melon	250%
Barley	50%	Tomato	120%
Maize	100%	Olive groves	108%
Sugar Beet	120%	Vineyards	70%
Sunflower	50%	Citrus groves	25%

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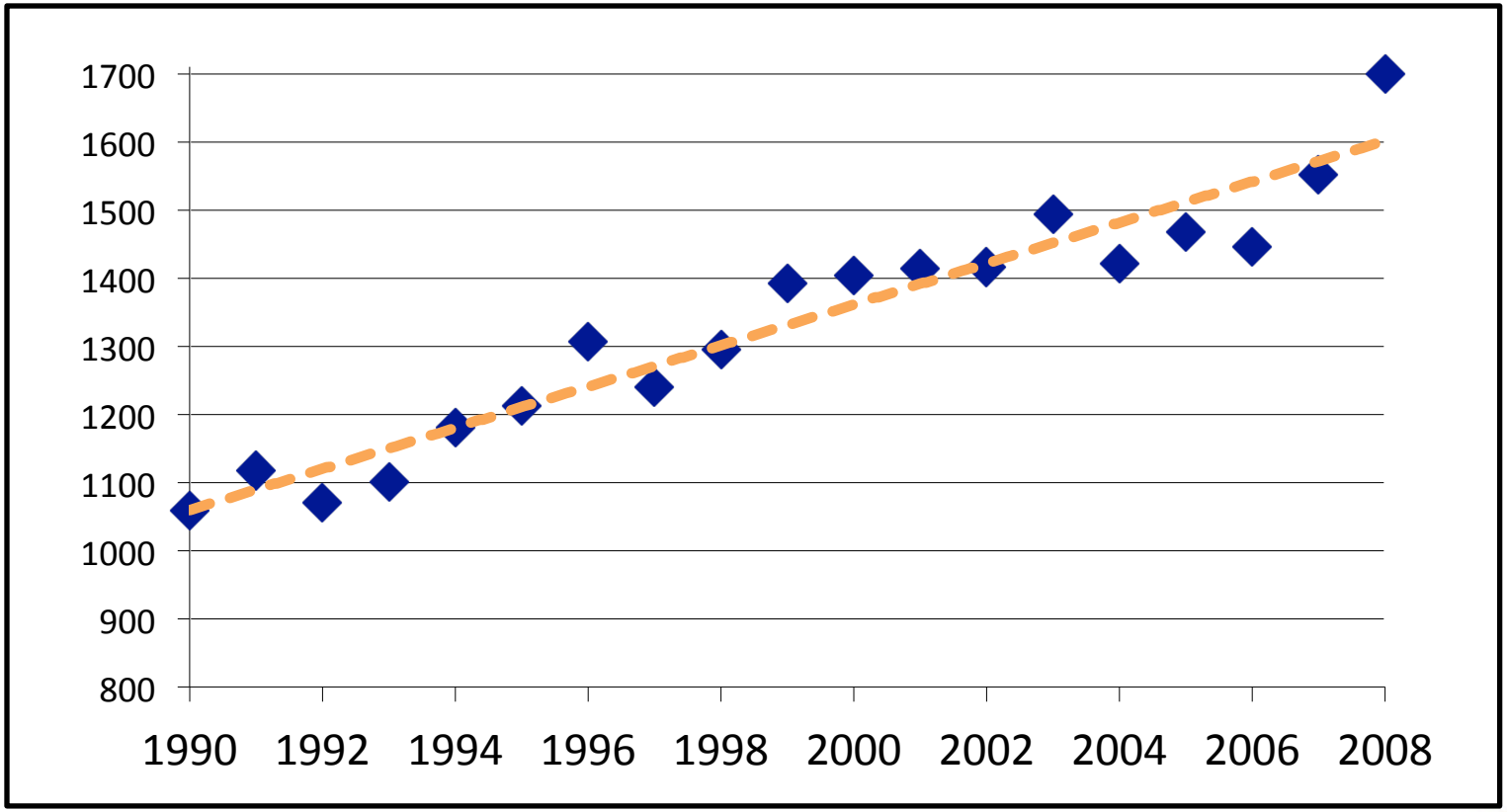
LIVESTOCK PRODUCTIONS: PRODUCTIVITY, WATER AND EMISSIONS

Pork

Productivity: Kg meat/sow



Water consumption and emissions

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CHART 18. *WATER CONSUMPTION AND GREENHOUSE GAS EMISSIONS PER UNIT OF PRODUCT IN THE PORK AND POULTRY SECTORS DURING THE STUDIED PERIOD*

	Reducción porcentual período 1990-2008 *Percentage reduction 1990-2008*
CONSUMO DE AGUA / *WATER CONSUMPTION*	
Por kg carne porcino / *Per kg pork*	**21.54 %**
Por kg carne pollo / *Per kg chicken*	16.15 %
Por kg de huevos / *Per kg eggs*	3.50 %
EMISIONES GEI / *GREENHOUSE GAS EMISSIONS*	
Por kg carne porcino / *Per kg pork*	**17.85 %**
Por kg carne pollo / *Per kg chicken*	12.50 %
Por kg de huevos / *Per kg eggs*	4.34 %

CONCLUSIONS

Conclusions (I)

- The technological improvements have made possible the access to safe and affordable food.

- Producer prices have grown (much) less than consumer prices

Conclusions (II)

- Agricultural productions require significantly less natural resources than 20 or 30 years ago.

- It is not possible to improve sustainability without improvements in efficiency.

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Thank you

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