

Fundación Marcelino Botín | OBSERVATORIO DEL AGUA WATER OBSERVATORY

RE-THINKING PARADIGMS: WATER AND FOOD SECURITY
 4th Marcelino Botín Foundation (MBF) Water Workshop
 Santander, 22-24 September 2009

Present and future roles of water and food trade in achieving food security, reducing poverty and water use (part II) :

DOWNSCALING TO A COUNTRY CASE-STUDY PERSPECTIVE

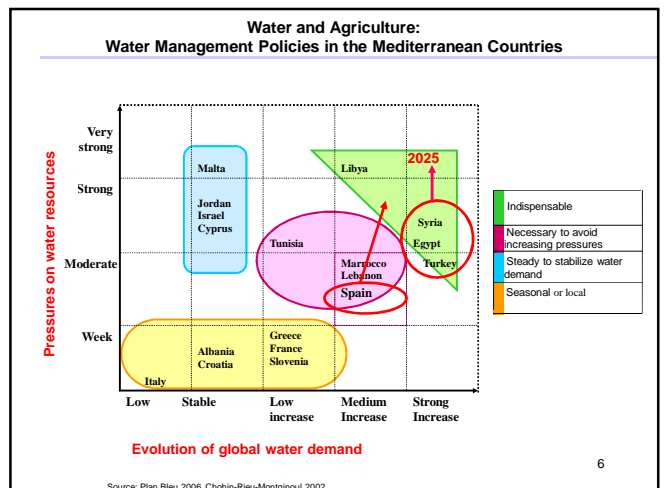
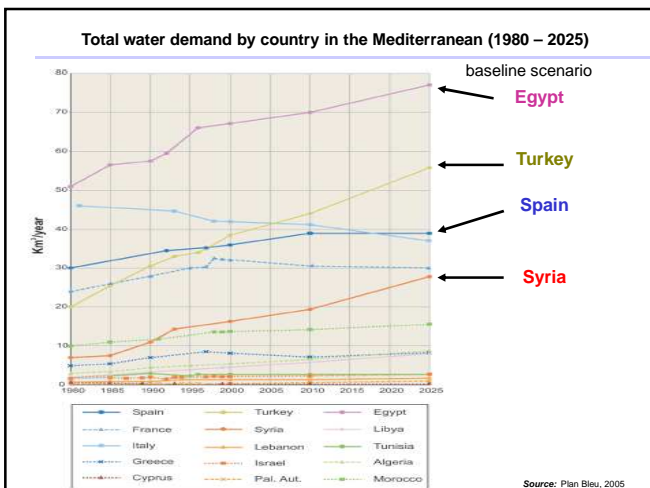
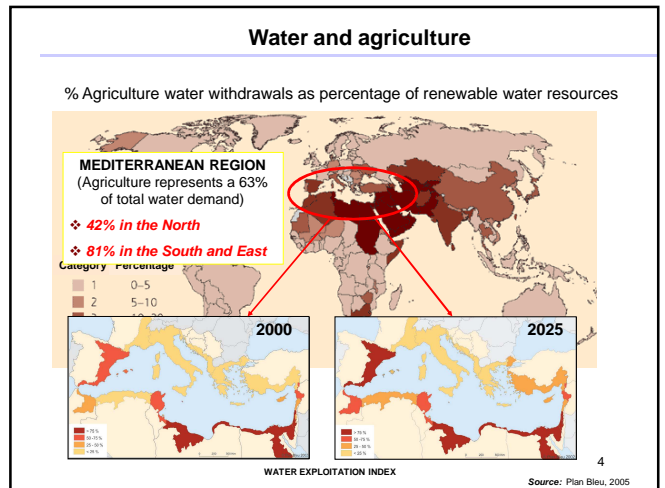
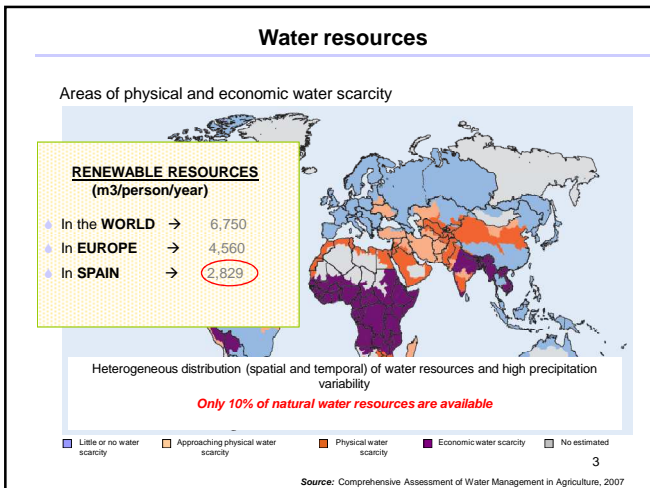
Consuelo Varela Ortega (1) and Juan Antonio Sagardoy (2)

(1) Universidad Politécnica de Madrid, Spain
 (2) Mediterranean Agronomic Institute (CIHEAM), Bari, Italy

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1. The Mediterranean region, agriculture and water resources : Overview
2. Looking for the rationale: Is trade ameliorating or exacerbating water stress? The case of Syria
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4. Concluding reflections

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Contents

- The case of Syria:
- Looking for the rationale: Is trade ameliorating or exacerbating water stress?

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Syria: Main features of the irrigation sector

→ Importance of ground water resources:

- From 1,213,000 ha irrigated
 - 40% by public networks (484,000 ha)
 - 60% by private wells (716,000 ha) → 37% of all water resources

→ Difficult control of ground water resources

- Irrigated area by wells is not evenly distributed, 44% located in the Al Hassake region (NE) one of the most critical over-exploited areas
- Total number of wells is 200,000 of which 1/4 were not licensed in 2000. This motivated the enacting of a special decree

→ Low technological development

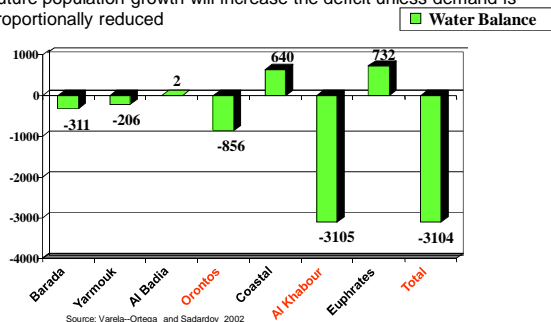
- Gravity irrigation covers 90% of the irrigated area
- Sprinkler irrigation covers 8.8 % (112,000 ha)
- Drip irrigation covers 1.2 % (15,000 ha)

→ High water consumption rates

- Average consumption is 12,400 m³ / ha
- can reach 16,700 m³/ha in the Euphrates basin

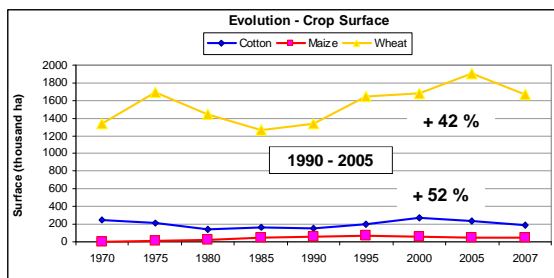
Water balance in Syria (2002)

- Total water resources → 16,058 million m³/year
- Total uses → 19,162 million m³/year
- National water balance deficit → 3,104 M m³/year
- Future population growth will increase the deficit unless demand is proportionally reduced



Source: Varela-Ortega and Sadardoy 2002

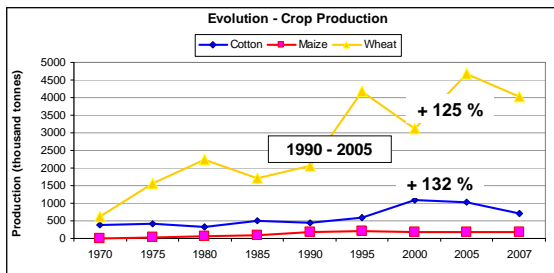
Syria: Evolution of cultivated area for main crops



Source: own elaboration based in FAOSTAT 2009

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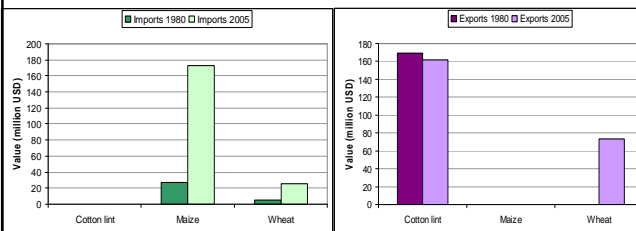
Syria: Evolution of crop production



Source: own elaboration based in FAOSTAT 2009

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Syria: Agricultural Trade



Source: own elaboration based in FAOSTAT 2009

Irrigated land distribution and crop water use in Syria

	AREA (ha)	Percentage of Irrigated area (%)	On farm Irrig. Water (m3 /ha)	Irrigation distribution efficiency	Total Irrigation water use (million m3)
WHEAT	689868	57	4000	0,7	3942
MAIZE	72627	6	5000	0,7	519
COTTON	274585	23	11000	0,8	3776
SUGAR BEET	28667	2	6000	0,7	246
POTATO	21668	2	5500	0,7	170
TOMATO	9743	1	9300	0,7	129
OTHERS	109715	10	6000	0,7	940
TOTAL	1206873	100			9722
Total per inhabitant					508

Source: Agricultural Census 1998, Varela and Sagardoy 2003; Kaisi et al, 2005

Net agricultural trade (imports-exports) in Syria

Main Crops	Net trade (Import -exports)			
	1990		2004	
	Quantity (tonnes)	Value (million US \$)	Quantity (tonnes)	Value (million US \$)
Barley	96089	17,5	426326	42,5
Cotton	-66193	-152,9	-113601	-164,0
Maize	249332	60,1	854841	118,8
Sugar beet	0	0,0	-1	0,0
Wheat	934844	148,2	-558471	-105,3
Total Merchandise Trade	No data	-1812,6	No data	880,4

Source: FAOSTAT, 2009

Estimation of blue virtual water trade in Syria imports -exports

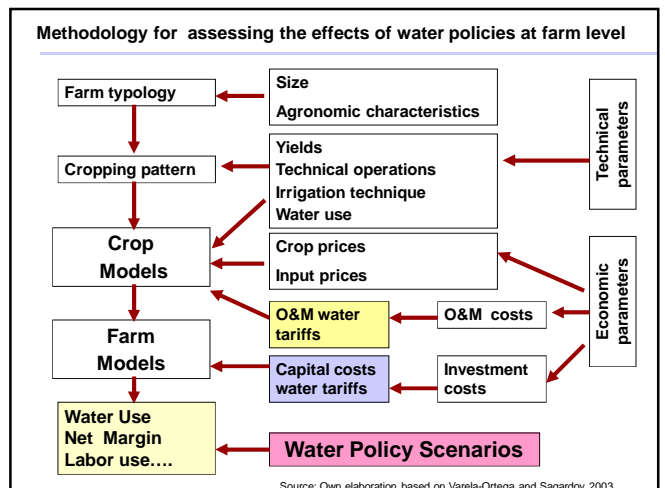
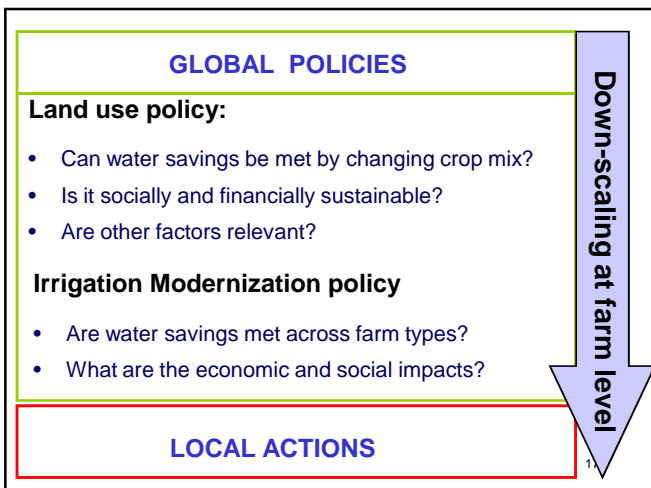
Crop	Blue virtual water traded	
	Irrigation water (m3/ton)	Year 2004 m3 (million)
Barley	n.a	na.
Cotton lint	9167	-1041,34
Maize	1587	1356,63
Sugar beet	143	0,00
Wheat	952	-531,88
Net total blue water traded		-216,59
Per inhabitant (m3)		-11,33

Source: own elaboration

Contents

3. Down-scaling to the national perspective: a proposed guideline for assessing water conservation policies

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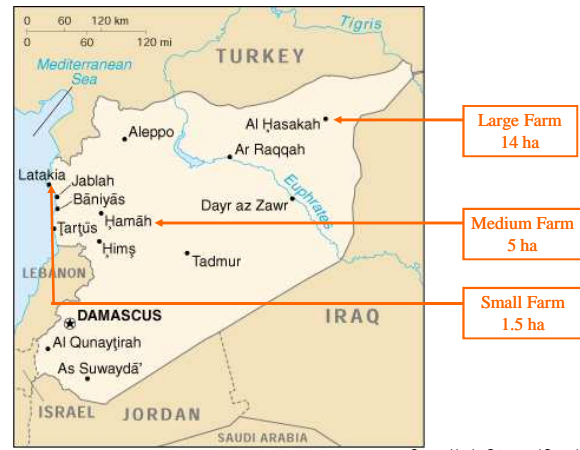


Syria. Farm Models

A farm model typology for irrigated agriculture in Syria was constructed based on the combination of :

- **3 Representative Farms selected according to size, location and crop distribution that account for 82% of irrigated land 77% of irrigated holdings**
 - Large (14 ha), extensive (wheat, cotton)
 - Medium (5 ha), semi-intensive (wheat, cotton, sugar beet, potato)
 - Small (1.5 ha), intensive (potato, tomato, oranges)
- **2 Water Sources** were considered
 - River water
 - Well water (50 m, 100 m, 200 m, well depth)
- **3 Types of Irrigation Techniques** were considered
 - Surface, Sprinkler, Drip

Syria. Location of representative farms



Source: Varela-Ortega and Sagardoy, 2003

Syria. Water Wheel in Hamah



Source: Photo by Varela-Ortega 2006

Syria. Irrigation canal in Al-Hasakah



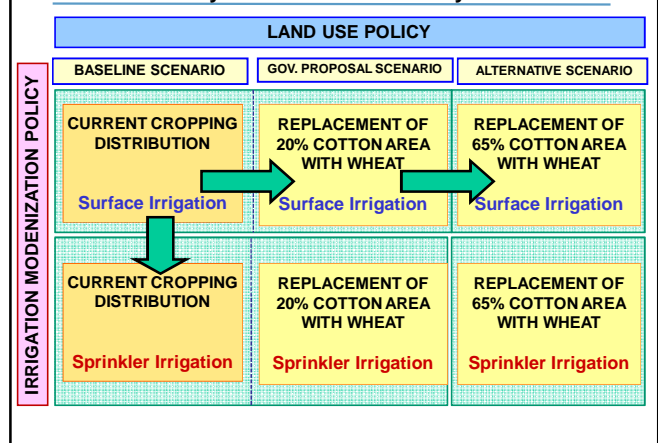
Source: Photo by Varela-Ortega 2002

Syria. Field visit in Raqqah



Source: Photo by Varela-Ortega 2002

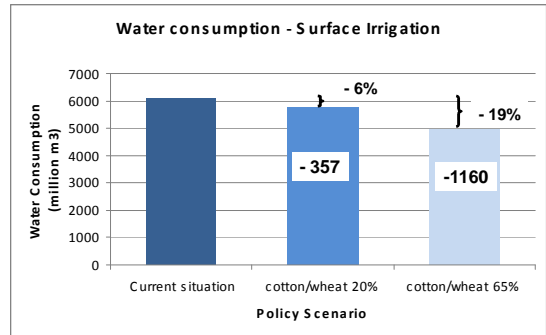
Syria. Simulation of Policy scenarios



Syria. Results of Land Use policy

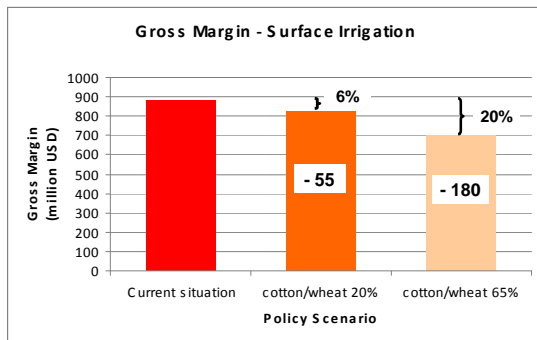
- Changing cropping patterns to encourage water savings

Syria. Results of Land Use policy at National level Impact on Irrigation Water Use



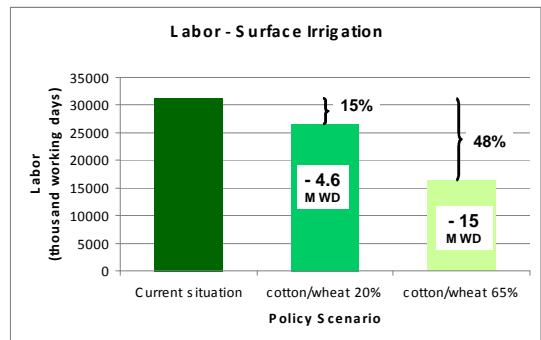
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Syria. Results of Land Use policy at National level Impact on Farm Income



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Syria. Results of Land Use policy at National level Impact on Labor

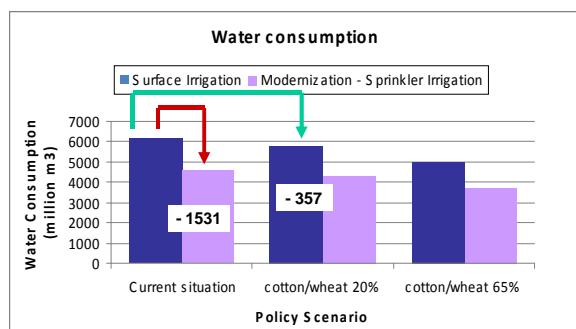


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Syria. Results on Irrigation Modernization Policy

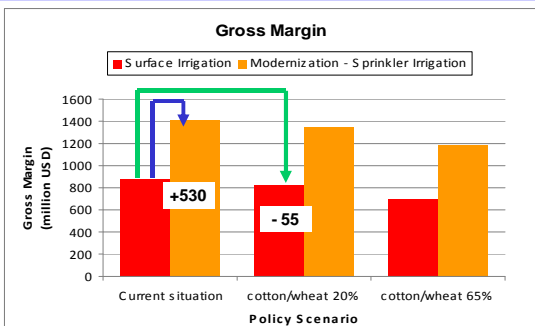
- Investing in sprinkler irrigation to encourage water savings

Syria. Comparative Results of Modernization and Land Use Policies at National level Impact on Irrigation Water Use



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Syria. Comparative Results of Modernization and Land Use Policies at National level
Impact on Farm Income

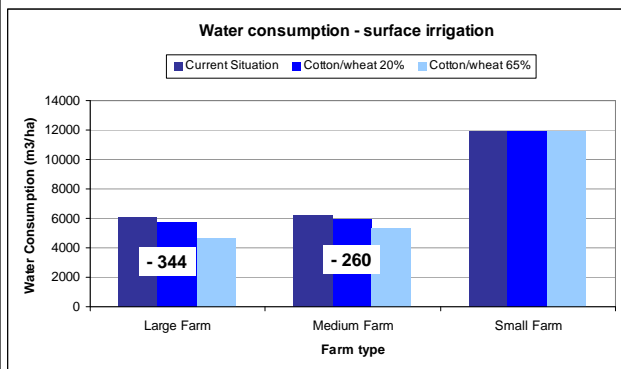


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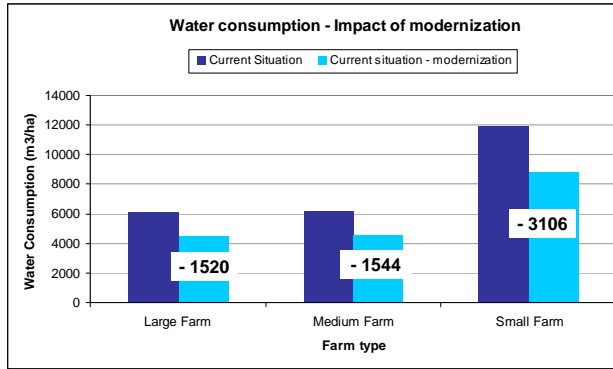
Syria Policy impacts at farm level

- Effects at farm level

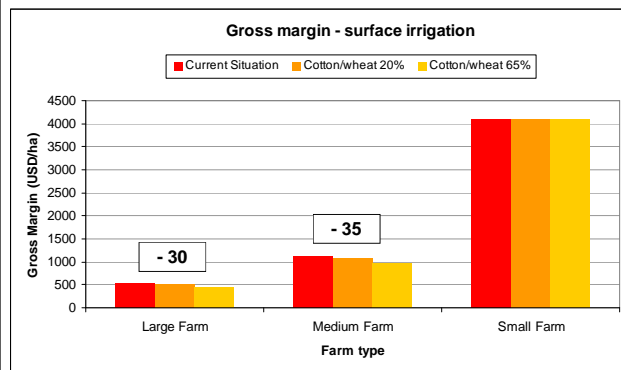
Syria. Results at Farm level:
Water consumption reduction in land use policy



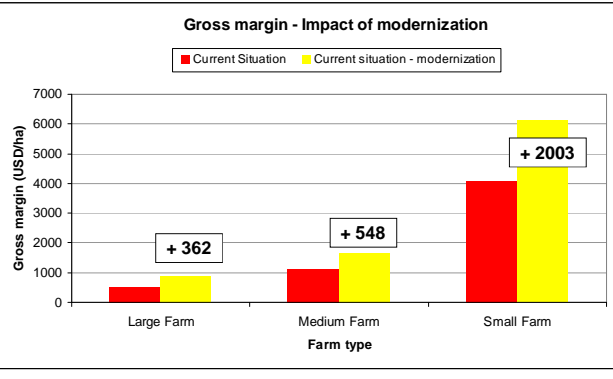
Syria. Results at Farm level:
Water consumption reduction in modernization policy



Syria. Results at Farm level:
Farm income variation in land use policy



Syria. Results at Farm level:
Farm income variation in modernization policy



Some reflections...

- Method → Macro analysis complemented at micro level
- Difficulties of data, information...field work requirements → consider technical, social and institutional factors
- Balanced trade-off between conserving water resources and maintain social and economic viability → efficiency and equity considerations
- Spatial and temporal dimensions → water is site-specific and context specific
- Need to downscale → impacts of policy decisions vary across regions and local communities
- Difficult for public authorities → policy choice, revealed objectives? priorities? Social cost of policy? Conserving water resources via trade policy or via technological solutions?
- The role of water management and water institutions?

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GRACIAS !

consuelo.varela@upm.es

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