Economic aspects of virtual water trade: lessons from the Spanish case

Alberto Garrido
CEIGRAM (Research for the Management of Agricultural and Environmental Risks)
Universidad Politécnica de Madrid, Spain

and colleagues
M. Ramón Llamas, Maite M. Aldaya, Paula Novo, Roberto Rodríguez Casado, Consuelo Varela-Ortega
LXXXVII x CCCXCI = ??
LXXXVII x CCCXCIX = ??

LXXXVIII

x

CCCXCIX

MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMCXII
LXXXVII \times \text{CCCXCIX} = ??

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Year 825, Al-Khowârizmi

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Year 825, Al-Khowârizmi

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88 \\
\times \\
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35112
\end{array}
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Italy 1434, edicts still prohibited the use of infidel numbers
3 Key facts for thinking about virtual water trade

- Gains from trade
- Land ‘grabs’
- Farm trade

The case of Spain

- Time, space and economic dimensions
- Does virtual water trade exacerbate water scarcity?
- Agricultural policy conclusions

Conclusions
1st Key fact: games from trade

Evaluation of the impact of full trade liberalisation

Increase of world welfare (%)

Source: Doët (IFPRI, 2009)
1st Key fact for thinking
The bulk of farm trade is performed by 14 countries+EU

Leading exporters and importers of agricultural products, 2006

Taken from WTO (2009)

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<td>31</td>
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3 Key facts for thought

• 1. ‘Land-grabs’ (Sources: The Economist / Ifpri)
  ▪ Sudan has ‘reserved’ 20% of its farmland to Arab countries
  ▪ China has purchased/leased 2.8 mill ha and set up 11 experimentation centres in Africa.
  ▪ 15-20 mill ha (evaluated at $ 20-30 bill) already leased.
  ▪ Representing 30-40 mill. T of cereals (where 220 mill are trade each year worldwide).
  ▪ Peter Brabeck-Letmathe, Nesté, CEO: “The purchases weren’t about land, but water” “The great water grab”
### 3 Key facts for thought

#### 1. ‘Land-grabs’ (Sources: The Economist / Ifpri)

<table>
<thead>
<tr>
<th>Country</th>
<th>Renewable resources (km³)</th>
<th>Withdrawal (km³)</th>
<th>Per cap withdrawal (m³/p/yr)</th>
<th>Arable Land (1000 ha)</th>
<th>Irrigated land (1000 ha)</th>
<th>Irrigation potential (1000 ha)</th>
<th>Pot / actual</th>
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<td>22</td>
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<td>3700</td>
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<td>5960</td>
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<td>804</td>
<td>2900</td>
<td>899</td>
<td>1500</td>
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<td>4634</td>
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Source: FAO and Gleick (2009)
3 Key facts for thought

• 1. ‘Land-grabs’ (Sources: The Economist / Ifpri)

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<th>Region</th>
<th>IRWR</th>
<th>Total volume of freshwater utilization</th>
<th>Freshwater utilization by purpose</th>
<th>Utilization* as % of resources</th>
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<td></td>
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<td>km³/yr</td>
<td>Domestic use</td>
<td>%</td>
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<td>World</td>
<td>43 764</td>
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Source: CAWMA (2007)
3 Key facts for thought

Water Resources and food security in developing countries

Taken from FAO (2009)
In short...

1. Africa has great potential, but needs capital, expertise and know-how. Africa can become a large food (energy) exporter.

2. Land-grabs are testimony of the huge gains from-trade that can be achieved (it raises acute equity issues)

3. Many world agricultural regions are producing much below their productive potential (low input, little capital, lack of access markets)
The case of Spain

1. Virtual imports and exports
2. Time-dimension
3. Space dimension
4. Economic dimension
5. Does virtual water trade exacerbate water scarcity?
The case of Spain
Agricultural Water footprint

Source: Garrido et al. (2009)
The case of Spain
Virtual water imports

<table>
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<th>Country</th>
<th>(10^9 m3/Year)</th>
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<td>Japan</td>
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<td>UK</td>
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<td>Morocco</td>
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</table>

... (Source: Hoekstra and Chapagain, 2008)

| Spain          | 25 (2006)      |

(Source: Garrido et al. 2009)
The case of Spain
Crop and livestock connections

Virtual Water 'Exports'
- Crops
- Crops Products
- Livestock Products

Virtual Water 'Imports'

>50% Pork sector

(Source: Garrido et al. 2009)
The case of Spain: Virtual water trade through crops’ trade

Virtual water exports

Virtual water imports

(Source: Garrido et al. 2009)
The case of Spain: Virtual water trade through crops’ trade

Virtual water exports

Virtual water imports

(Source: Garrido et al. 2009)
The case of Spain:
Virtual water imports

[Graph showing virtual water imports from 1997 to 2006 for different countries: France, Brazil, USA, Ukraine, Argentina, Portugal, Germany, UK, Tunisia, Uganda, Indonesia, and TOTAL.]

Source: Garrido et al. 2009
The case of Spain: Space dimension

Blue water exports

Water stress
(withdrawal-to-availability)

- < 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1.0
- > 1.0

(Source: Garrido et al. 2009)
Blue water exports
Not all exported m$^3$ are equally valuable

(Source: Garrido et al. 2009)
The case of Spain: Does virtual water trade exacerbate water scarcity?

Based on statistical analysis
(41 provinces, 10 years, cross-section, time-series analysis)

- No, it does not exacerbate water scarcity. Virtual water exports are the result of:
  - Natural endowments
  - Access to markets
  - Existence of capital infrastructure
  - Work productivity
  - Water policies
The case of Spain: Does Spanish water trade contribute efficiently to world water productivity?

- Yes, it converts green water into blue water, and has specialised in:
  - Meat production
  - Fruits and vegetables

- “Water” exchange terms have remained stable (1996-2006)
THANK YOU

Soon available:

Garrido, A., M.R. Llamas, C. Varela-Ortega, M.M. Aldaya, P. Novo and R. Rodríguez-Casado. “*Water Footprint and Virtual Water Trade in Spain*”. Springer, NY

www.ceigram.upm.es
alberto.garrido@upm.es