



OBSERVATORIO DEL AGUA
WATER OBSERVATORY

Director: Professor Ramon Llamas (UCM/Spanish Royal Academy of Sciences)

Prof Alberto Garrido (UPM); Dr Elena Lopez-Gunn (FMB-Water Observatory/UCM); Dr Maite M Aldaya (FMB-WO/UPM)
Dr Lucia De Stefano (FMB-WO/UCM); Aurelien Dumont (PhD Candidate FMB-WO/UCM); Gloria Salmoral (PhD Candidate FMB-WO/UPM); Marta Rica PhD Candidate (FMB-WO/UCM); Daniel Chico (PhD Candidate FMB-WO /UPM) Insa Niemeyer (FMB-WO/UPM)

What is the FMB-WO?

A think-tank created by the Botin Foundation to analyze global and regional water problems and offer policy-relevant research.

It is formed by a multi-disciplinary team of 10 scientists (2 professors, 4 PostDocs and 4 graduate students) associated with the Complutense University and Technical University of Madrid, Spain.

Mission and Vision

The FMB-WO was created to generate innovative thinking in global and regional water issues, and make scientific contributions for sustainable water resources management.

FMB-WO trusts human ingenuity and institutional inventiveness can offer promising solutions in the area of water resources management, and critically evaluates the standing of glooming world water predictions.

The Marcelino Botin Foundation Water Workshop Series A GLOBAL Fora to gather "water intelligence"

These workshops are held in Santander approximately every two years, at the **Marcelino Botin Foundation** headquarters. The seminars have provided a platform to discuss key global water issues. The end product has been an edited book of the proceedings.

➤ **1FMBWater Workshop (December 2001) "Intensive Groundwater use"**

Llamas, M.R. y Custodio, E. (2003). *Intensive use of groundwater: challenges and opportunities*. Balkema, Dordrecht.

➤ **2FMBWater Workshop (June 2004) "Water Crisis; myth or reality (coorganised the University of Harvard)"**

Rogers, P. Llamas, M.R. and Martinez-Cortina, L. (2006) *Water crisis: Myth or reality?*, Taylor and Francis, London.

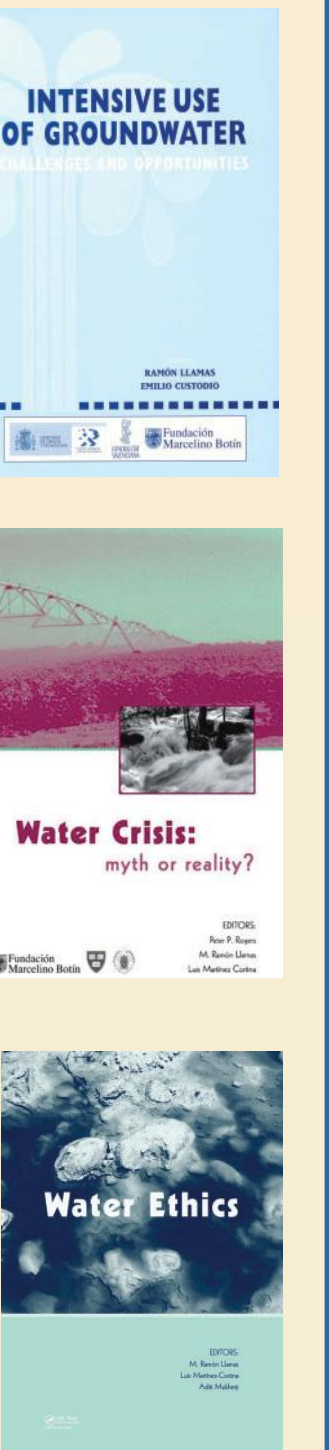
➤ **3FMBWater Workshop (June 2007) "Water Ethics"**

Llamas, R., Martinez-Cortina, L. and Mukherji, A (2009) *Water Ethics*, Taylor and Francis, London

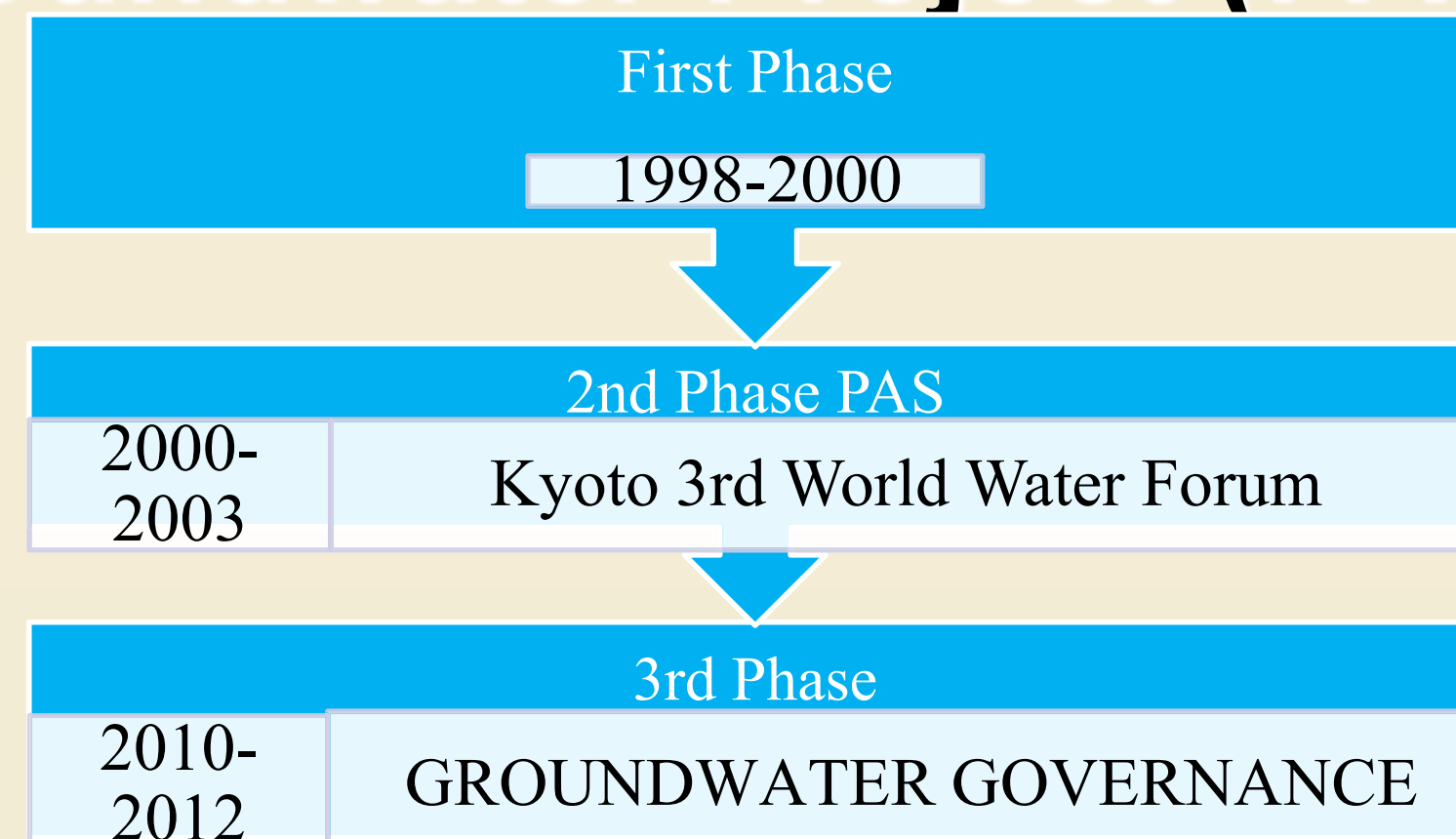
➤ **4FMBWater Workshop (September 2009) "Rethinking water and food security"**

Martinez-Cortina, L. Garrido, A and Lopez-Gunn, E (2010) *Re-thinking water and food security*

➤ **5FMBWater Workshop (October 2010) "Water and food conflicts versus cooperation in a globalized world"**

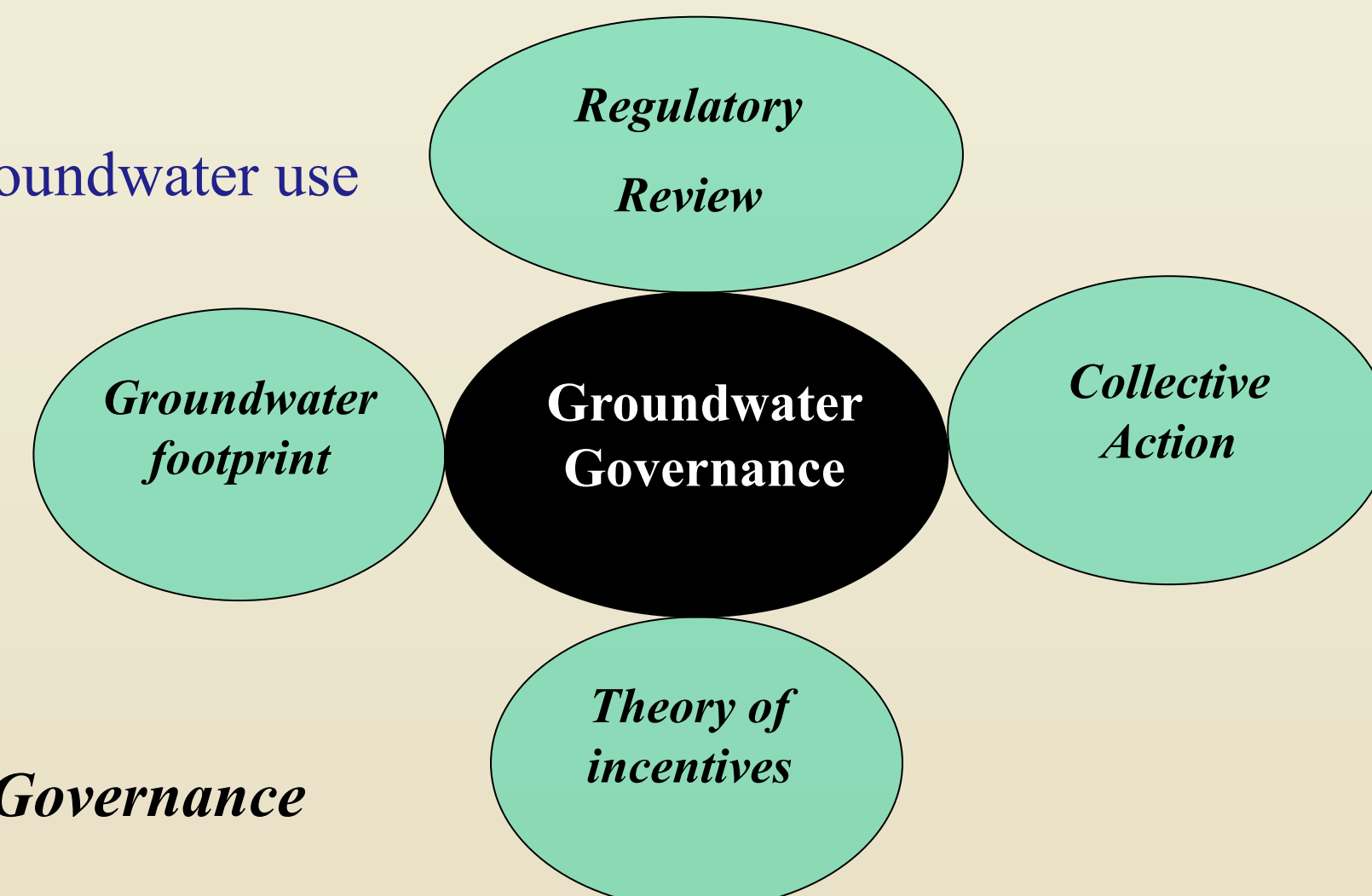


SPAIN: The Groundwater Project (PAS Series)



AN INSTITUTIONAL AUDIT OF SPANISH GROUNDWATER GOVERNANCE PROJECT OBJECTIVES

- 1. THE EXTENDED GROUNDWATER FOOTPRINT
 - Bird's eye view of Spanish River Basin Hydrological Plans
 - Case studies: Western Mancha Aquifer, Guadalquivir basin, Campo de Dalias, Jucar basin, Pas basin
- 2. COLLECTIVE ACTION IN GROUNDWATER USE
 - Mapping the institutional diversity of collective institutions
 - Evaluating collective action and good groundwater governance
- 3. GROUNDWATER RIGHTS AND REGULATION
 - Non-authorized groundwater use
 - Flexibility and security of groundwater rights of climate change and variability
- 4. THEORY OF INCENTIVES
 - Perverse and beneficial subsidies
 - The nexus water and energy: electricity in groundwater use
 - PES and the Green economy



Core issues on the study of Groundwater Governance

SPAIN: The Extended Water Footprint (PAV Series)

Water footprint in Spain considering economic and hydrological data

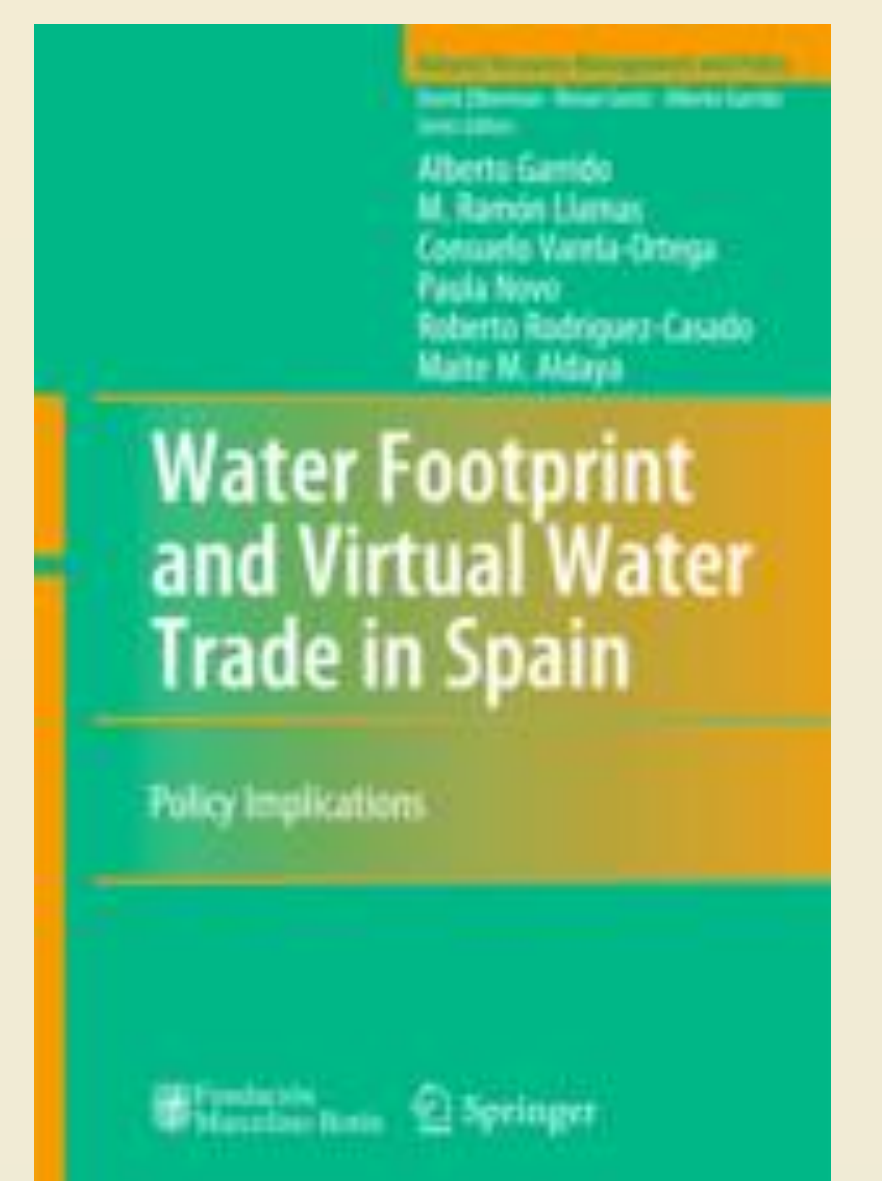
2008-2010 Publications: 4 Monographs and 1 book

1. Are virtual water flows in Spanish grain trade consistent with relative water scarcity? (Novo et al., 2008);
2. La huella hidrológica de la agricultura española (Rodríguez et al., 2008)
3. Water footprint analysis for the Guadiana river basin (Aldaya and Llamas, 2008)
4. La huella hídrica de la ganadería española (Rodríguez et al., 2009)
5. Water footprint and virtual water trade in Spain (Garrido et al., 2010)

April 2010 Water footprint training course in Spain, endorsed by the WFN

2010-2012 – Ongoing Research projects

1. Water footprint of tomato production in Spain
2. Water footprint of olive oil production in Spain
3. The role of groundwater in the Spanish water policy
4. Water footprint of the Doñana National Park
5. Water footprint of the Guadalquivir river basin
6. Water footprint of the Jucar river basin
7. Water footprint of the Campo de Dalias region
8. Water footprint of the Nansa river basin
9. The nexus water and energy in Spain



Example: **Water and Energy Project**

The FMB-WO has evaluated the water-energy nexus in Spain, and will publish a long-document and a scientific paper reporting the main results:

- The water sector uses 7-8% of all electricity consumed in Spain (65% of each in the water cycle in the urban water sector, including water treatment)
- The irrigation sector's energy demand has increased significantly because of the adoption of drip irrigation technologies
- The increase of renewable energy is not limited by scarce water resources, as water demand would grow only to less than 1% of current abstraction.

NEW!: PROJECT ON WATER AND FOOD SECURITY IN LATINAMERICA

- **REALISTIC** Based on experience acquired from research in Spain over the last 10 years. Although the issues in Latin America will be highly context specific the similarity is the evolution and the nature of the issues (Spain is the most arid country in the EU and at the same time is has experienced a dramatic social, economic and political over the last 50 years)
- **INNOVATIVE** It places particular effort in integrating all the factors that condition the durability and effectiveness key to sound water policy. Namely extended water footprint, productivity of water, desalination, groundwater silent revolution, cultural, emotional and psychological elements in water management.
- **THINKING OUT OF THE WATER BOX** Many key decisions in relation to water take place out of the water box, that is, outside the normal water organizations and institutions sphere of influence
- **EXPERIENCE** Our studies in Spain have clearly highlighted the great economic importance that water has for food and fodder imports and exports (virtual water)
- **TRANSPARENCY, PARTICIPATION AND ACCOUNTABILITY** Emphasise their importance in decision making
- **FROM "MORE CROPS AND JOBS PER DROP" TO "MORE CASH AND CARE OF NATURE PER DROP"**: To undertake a deep transition in the way water is managed, it is crucial to focus on WIN-WIN solutions which takes account of

the powerful agricultural lobby

□ **NO BLUEPRINTS OR ONE SIZE FITS ALL** Put to good use all the experience and accumulated knowledge: Available, affordable science and technology put to society's benefit, based on the Spanish experience with its faults and virtues can be useful for other countries but as something to be prescribed but as something to be adapted. There are no magic blueprints or universal solutions, but those more suited to each individual country.

□ **QUESTION PARADIGMS** Spain the most arid country in the EU is not "water scarce". The main issue e.g. relate to how nowadays it is used by low economic and social value activities, e.g. 10% of blue water used for irrigation generates 90% of the economic value of Spanish irrigated agriculture (CHECK). The intensive use (and lack of control) of groundwater has generated enormous economic and social benefits. But has also generated ecological problems and social conflict in certain regions, still pending a solution. Therefore we are giving a lot of attention to groundwater governance aspects, although it is a common problem to all arid and semi-arid regions. The intractable problem of diffuse water pollution is a pending and unsolved problem due to intensive agriculture

A selection of Publications (refereed papers/Chapters)

- Aldaya, M.M. and Llamas, M.R. (2009) Water footprint analysis (hydrologic and economic) of the Guadiana river basin. Third Edition of the United Nations World Water Development Report (WWDR-3).
- Aldaya, M.M. and Llamas, M.R. (2008) Water Footprint analysis for the Guadiana river basin. *Value of Water Report Series* No 35, UNESCO-IHE, Delft, The Netherlands.
- Aldaya, M.M., Martínez-Santos, P. and Llamas, M.R. (2009) Incorporating the water footprint and virtual water into policy: reflections from the Mancha Occidental region, Spain. *Water Resources Management* DOI 10.1007/s11269-009-9480-8
- Aldaya, M.M., Garrido, A., Llamas, M.R., Varela-Ortega, C., Novo, P. and Rodríguez, R. (2009) *Water footprint and virtual water trade in Spain*. In Garrido and Llamas (Eds.) *Water Policy in Spain*. Taylor & Francis, London. 49-59 pp.
- Aldaya, M.M., A. Garrido, M.R. Llamas, C. Varela-Ortega, P. Novo and R. Rodríguez (2008) "The Water Footprint of Spain". *Sustainable Water Management* 3, 15-20, 2008.
- Lopez-Gunn, E., Llamas, R., Garrido, A. and Sanz, D. (in press) Chapter 10 Groundwater management in Treatise in Water Science (ed. Peter Rogers) (Elsevier)
- Lopez-Gunn, E. (2009) "Agua para todos": The new regionalist hydraulic paradigm in Spain. *Water Alternatives* 2(3): 416-439. Rodríguez Casado, R., A. Garrido, C. Varela-Ortega. "La huella hidrológica de la agricultura española". *Ingeniería del Agua*, 2009.
- Novo, P. R. Rodríguez Casado, P. A. Garrido and C. Varela-Ortega. La escasez de agua cuestionada: huella hídrica y comercio de agua virtual agrario. En Gómez-Limón, J.A. et al., (eds). *La economía del agua de riego en España*. Fundación Cajamar. 2009.
- Novo, P., Garrido, A. and Varela-Ortega, C. (2009) "Are virtual water "flows" in Spanish grain trade consistent with relative water scarcity?". *Ecological Economics* 68(5): 1454-1646.

Contact Information: www.fundacionmbotin/agua

Prof R Llamas (mrllamas@geo.ucm.es)
Dr Elena Lopez-Gunn (e.lopez_gunn@geo.ucm.es)
Dr Lucia De Stefano (luciads@hotmail.com)
Aurelien Dumont (adumont@geo.ucm.es)
Marta Rica (martarica@gmail.com)
Universidad Complutense Madrid (UCM)
Dpt Geodynamics
Geology Faculty,
Madrid 28040 Spain

Prof Alberto Garrido (alberto.garrido@uom.es)
Dr Maite M. Aldaya (maite.aldaya@uom.es)
Gloria Salmoral (gloria.salmoral@uom.es)
Daniel Chico (daniel.chico@uom.es)
Insa Niemeyer (nsa.niemeyer@googlemail.com)
Technical University of Madrid (UPM)
CEIGRAM- Research Centre for the Management of Agricultural and Environmental Risks
Dpt of Agricultural Economics, Madrid 28040