The Water JPI

Joint Programming Initiative
Water Challenges for a Changing World

Jornada de Presentación

a la Comunidad Científica

MINECO

18 de diciembre de 2012

The vision document

- The grand challenge: "Achieving Sustainable Water Systems for a Sustainable Economy in Europe and Abroad"

JPI Objectives

- Involving water end-users for effective RDI results uptake.
- Attaining critical mass of research programmes.
  - Involve at least two-thirds of the public National water RDI investment in Europe.
- Reaching effective, sustainable coordination of European water RDI.
- Harmonising National water RDI agendas in Partner Countries.
- Harmonising National water RDI activities in Partner Countries.
  - Develop a catalogue of jointly programmed activities whose global budget amounts to at least 20 % of the total water RDI budget of partner Programmes.
- Supporting European leadership in science and technology.

JPI Research Questions

- Maintaining Ecosystem Sustainability
- Developing safe water systems for the citizens
- Promoting competitiveness in the water industry
- Implementing a water-wise bio-based economy
- Closing the water cycle gap

JPI Governance
Governing Board

- Assembly of RDI Programme owners
- Meets every year, has met twice
- Members nominate members of the Executive Board
- President: Marina Villegas, MINECO
- Vice-President, Renske Peters, NL Innovation
- Makes strategic decisions
- Is the highest decision making level

JPI Governance
Executive Board

- Assembly of RDI Programme managers
- Meets twice a year, has met four times
- President: Enrique Playán, MINECO
  - Also the Water JPI Coordinator
  - The Coordination Team daily manages the initiative
- Vice-President, Hans Kuypers, NL Innovation
- Makes tactical decisions
- Addresses daily management activitives

JPI Governance Advisory Boards

- Provide advice to
  - Governing Board
  - Executive Board
- Two boards:
  - Scientific and Technological Board
  - Stakeholders Advisory Group
- Meet once a year, have met once

Scientific and Technological Board

- President: Damià BARCELÓ, IDAEA-CSIC, ICRA, Spain
- Vice-President: Cees BUISMAN, Wetsus, The Netherlands
- Other members:
  - Dr. Luc ABBADIE
  - Prof. Eilon ADAR
  - Dr. Marc F.P. BIERKENS
  - Dr. Despo FATTA-KASSINOS
  - Prof. Robert FERRIER
  - Prof. Maria KENNEDY
  - Prof. Claudia PAHL-WOSTL
  - Dr. Jens Christian REFSGAARD
  - Dr. Susan D. RICHARDSON
  - Prof. Karl-Ulrich RUDOLPH
  - Dr. Sveinung SÆGROV
  - Dr. João SANTOS PEREIRA
  - Dr. Eric SERVAT
  - Dr. Merete Johannessen ULSTEIN
  - Dr. Michele VURRO

Stakeholders Advisory Board

- President: Water Supply and Sanitation Technology Platform
- Vice-President: Finnish Environmental Institute
- Other members:
  - Acqueau, the EUREKA Cluster for water
  - ARC, Aqua Research Collaboration
  - CIS-SPI, Science-Policy Interface
  - EMWIS, Euro-Mediterranean Information System on know-how in the water sector
  - EurAqua, European Network of Freshwater Research Organisations
  - EUREAU,
  - European Federation of National Associations of Water and Wastewater Services
  - EWA, European Water Association
  - FAO Land and Water
  - Júcar River Basin Organization
  - WssTP

JPI Governance Secretariat

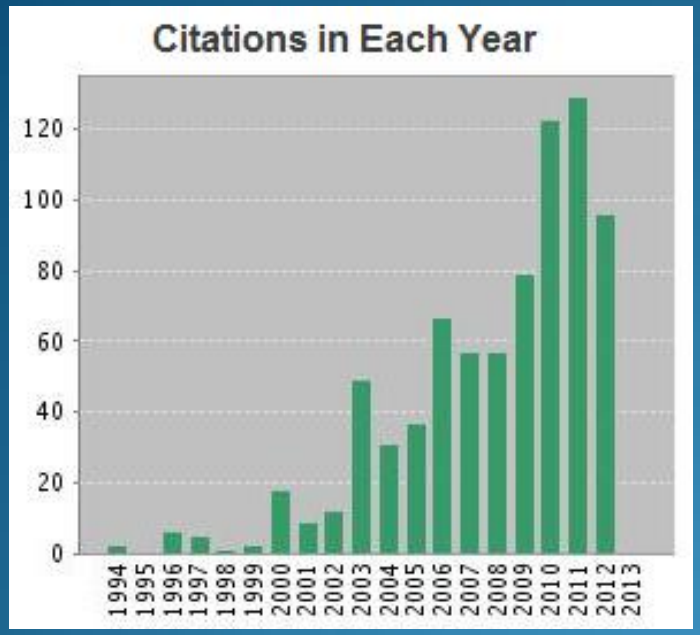
- Addresses the day-to-day management of the Water JPI
- Supports the Coordination Team and the Advisory Boards
- Supports the Task Forces
- Currently implemented by FECYT

Mapping Water RDI funding

- Country summary reports were produced for all countries (30 = JPI + rest of MS + some AC)
- Surveyed / Estimated mobilization of resources through the JPI:

Study Target	Countries	National Public RDI Funding (M€)	Funding respect to MS+AC (%)
Europe	MS	351	94
	AC	22	6
	MS + AC	372	100
Water JPI	Partners	328	88
	Observers	30	8
	Part. + Obs.	358	96

- The EC invests 130 M€/yr through the FP (average of FP6 and FP7 so far)
- Total investment in public RDI: about 500 M€/yr in MS+AC+EC



Mapping Water Research in Europe and Spain

Water JPI

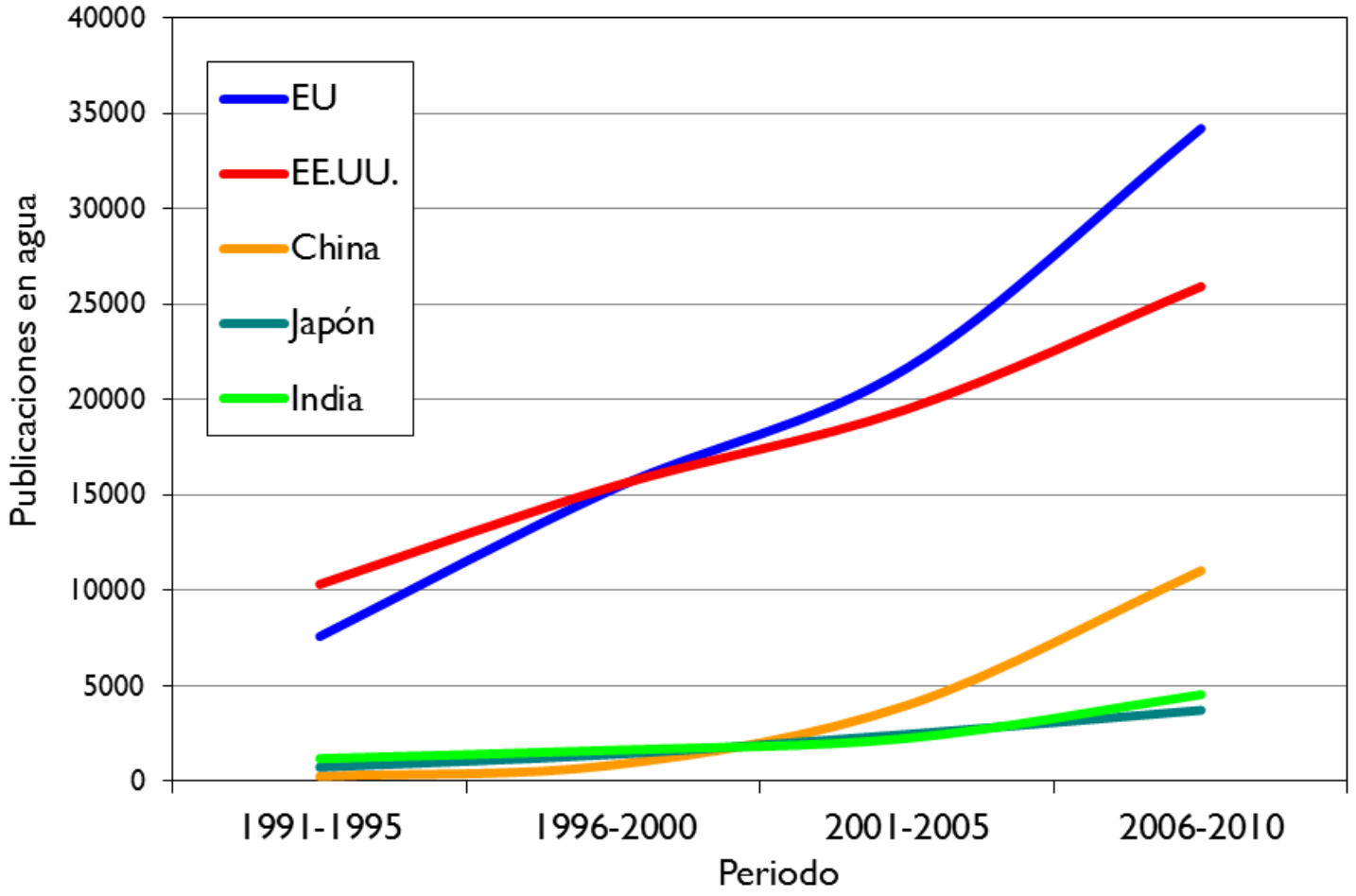
Miguel Ángel Gilarranz

20 min

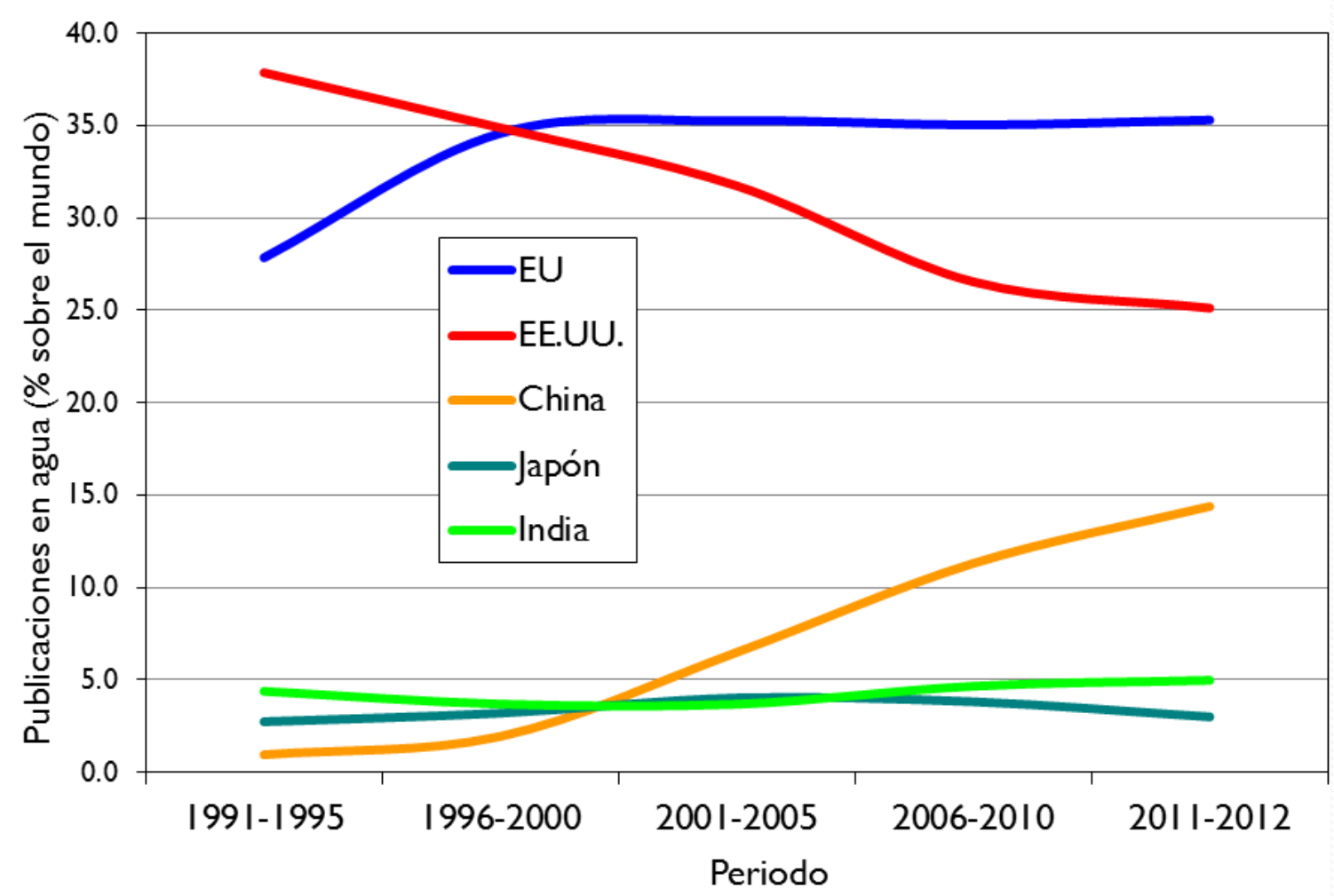
A bibliometric study

- Performed in July 2012
- ISI Web of Science
- Covering period: 1991-2012
- Using specific descriptors for water research and its sections

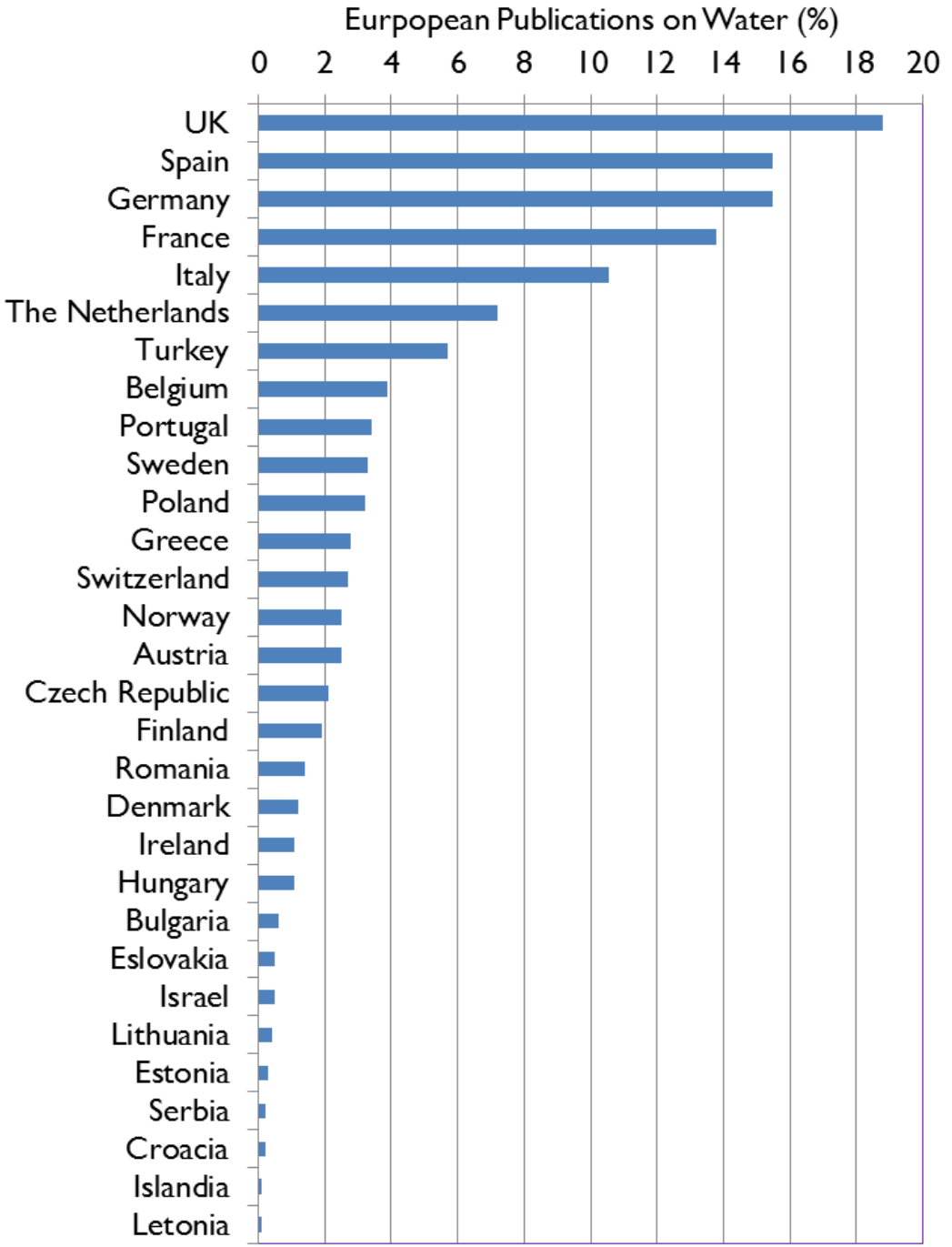
Europe leads in publications



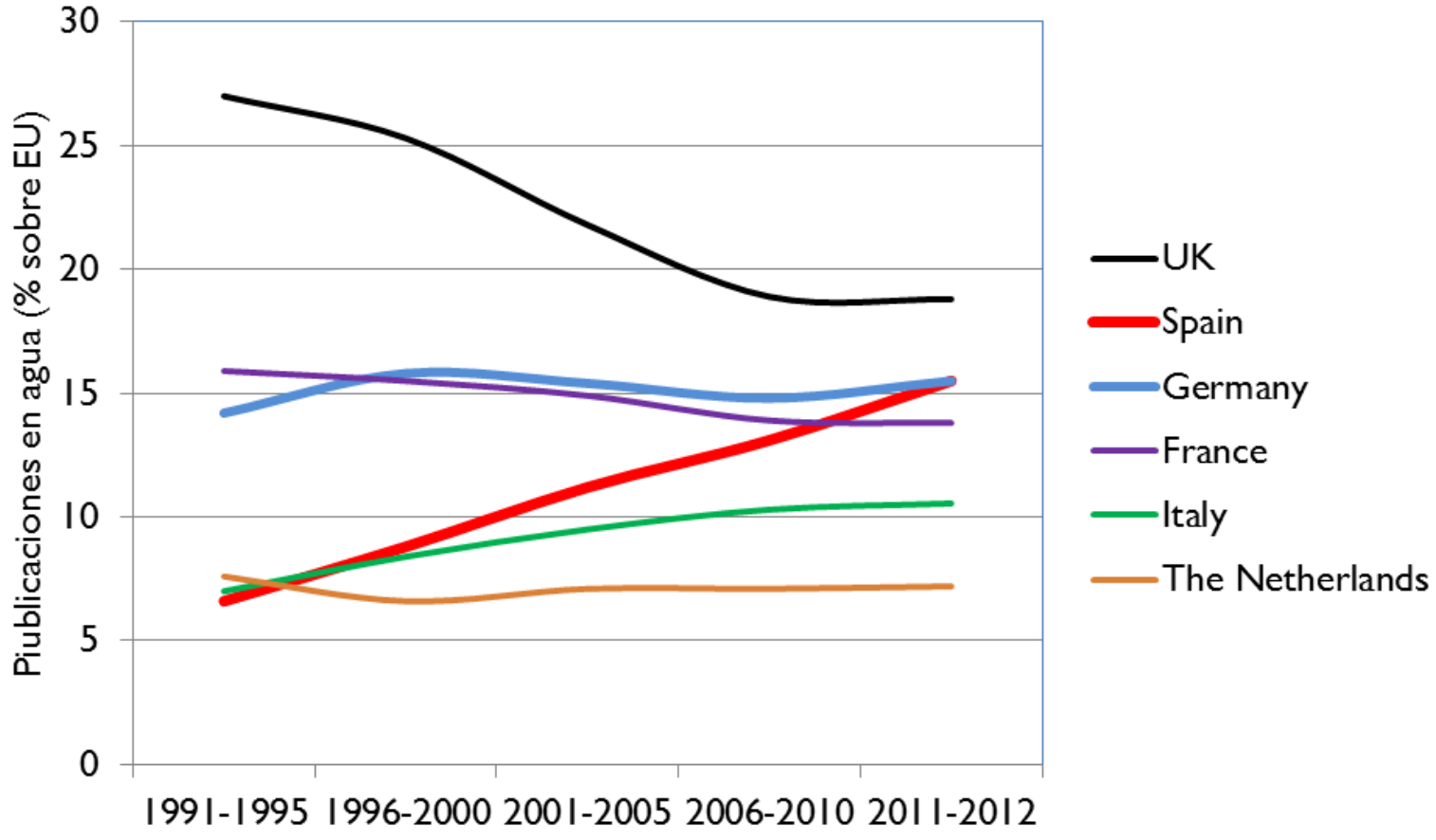
Europe leads in publications



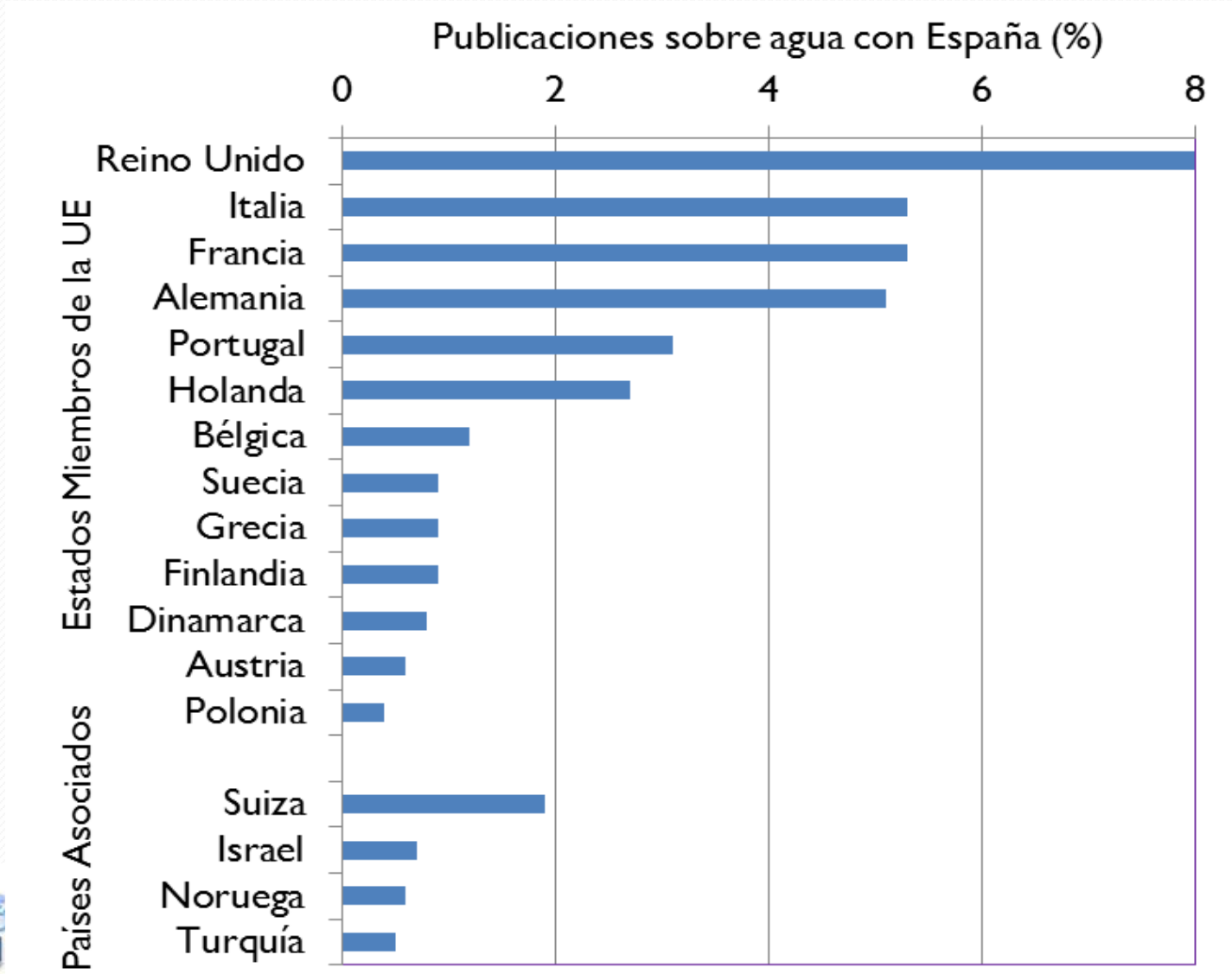
Who publishes in Europe on water? (2011-2012)



Who publishes in Europe on water?



Who publishes with Spain? (2011-2012)



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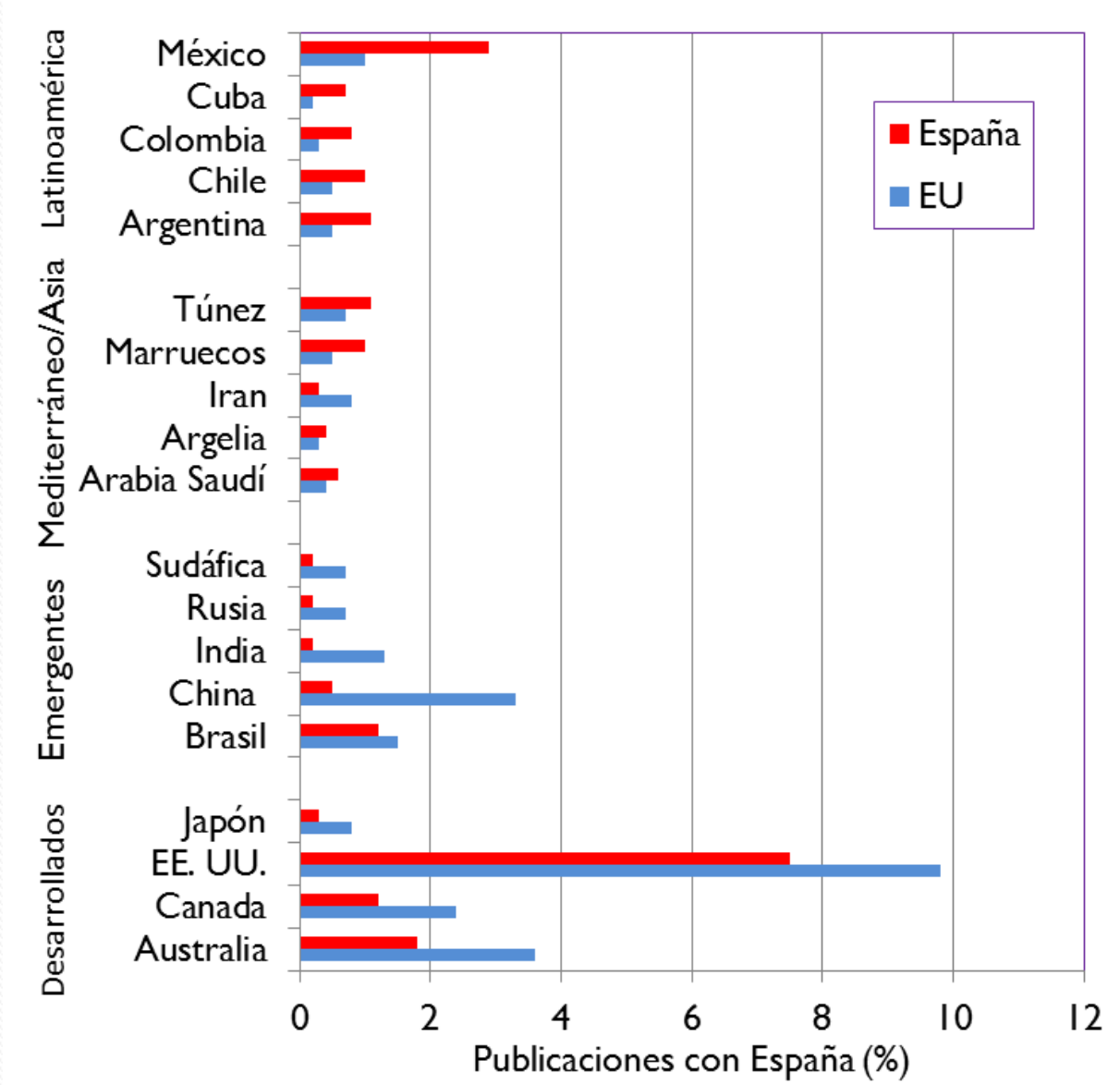


Spanish Leadership on Water Research

Tema	k publicaciones	% España en EU	Países que lideran: 1° al 6°
Agua	34.4	**13.1**	UK DE FR **ES** IT NL
Rural	24.7	**12.7**	UK DE FR **ES** IT NL
Urbano	4.2	**15.4**	UK **ES** DE FR IT TR
Industrial	7.3	**13.6**	UK **ES** FR DE IT TR

National average of publications from Spain in Europe: 13.1 %

Green: better than our national average

Red: worse than our national average

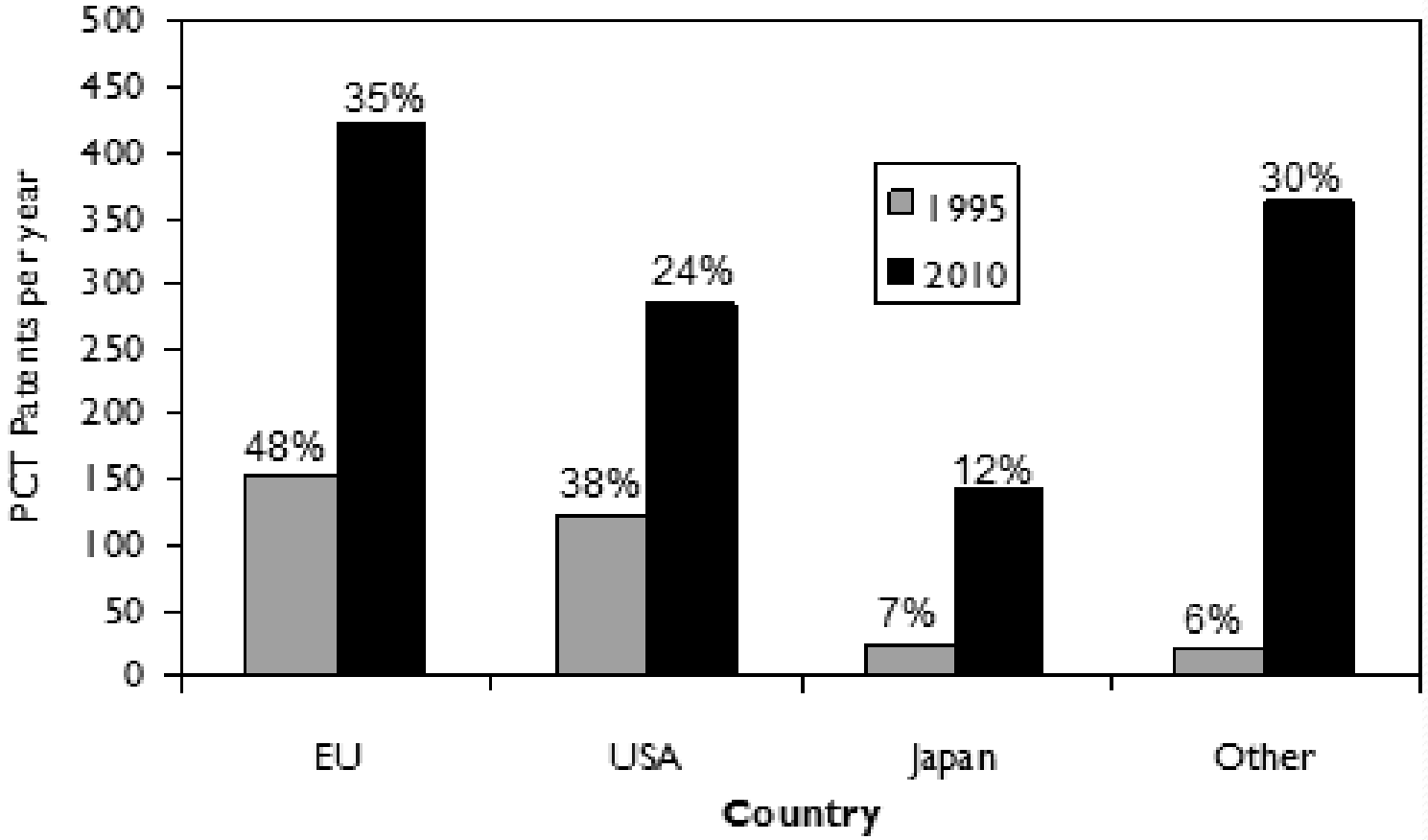
(ISI Web of Science, period 2006-2010, based on specific keywords)

Spanish Leadership on Water Research

Tema	% España en EU	Países que lideran: 1° al 6°					
Desalación	20.7	**ES**	DE	UK	FR	IT	EL
Regadíos	19.6	**ES**	UK	DE	TR	IT	FR
Contaminación Agraria	11.6	UK	TR	**ES**	DE	FR	IT
Disruptores endocrinos	21.3	**ES**	DE	IT	FR	UK	CZ
Sequía	18.6	**ES**	DE	UK	FR	IT	NL
Tratamiento de aguas	16.5	**ES**	UK	DE	PO	IT	TR
Tecnología de membranas	10.4	DE	FR	UK	IT	**ES**	NL
Inundaciones	7.5	UK	DE	FR	IT	NL	**ES**
Cambio climático	10.8	UK	DE	FR	**ES**	NL	IT
Servicios ecosistémicos	8.1	UK	DE	IT	NL	SE	FR
Soporte a políticas	10.7	UK	NL	DE	IT	**ES**	FR

(ISI Web of Science, period 2006-2010, based on specific keywords)

Europe leads in patents too!



The Strategic Research and Innovation Agenda

Water JPI

Damià Barceló

15 min

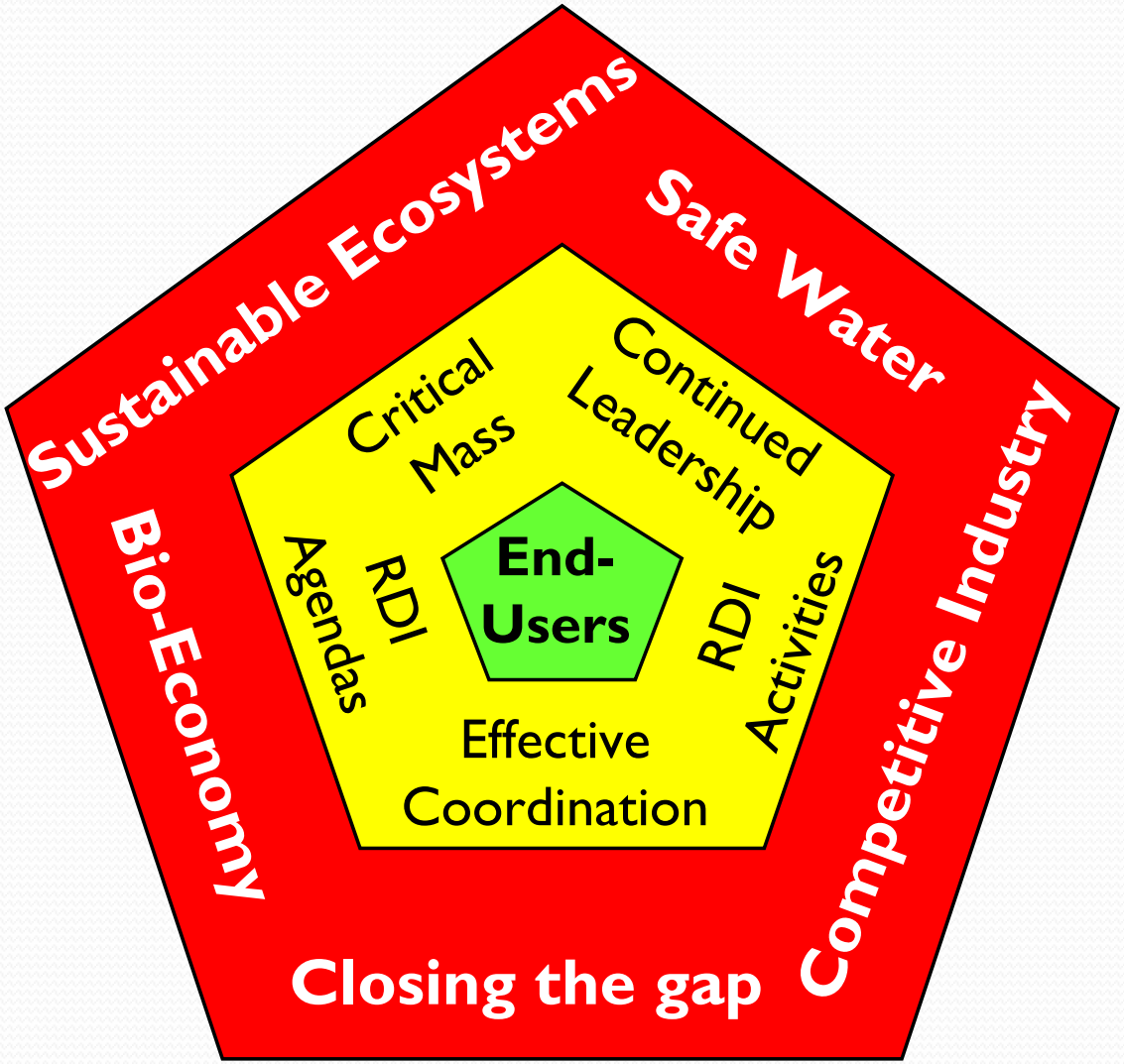
The process to build the SRIA

- Preliminary work:
  - Definition of Research Questions (2011)
  - A framework for SRIA: Input from STB and SAG (2011)
  - Design of the full process (2012)
  - Agenda in progress (2013-14)
    - Identification of Gaps and Needs
    - Societal consultation
    - Document drafting
  - Agenda review (2014-15)
    - Full cycle

SRIA 1.0, June 2014 (working documents released since June 2013)

SRIA 2.0, December 2015

Recalling the structure: Objectives and research questions



Building the Agenda

- Research Questions
  - Are the five pillars of the SRIA
  - Are equally important to reach Water JPI objectives
- The Agenda derives from the Vision (document released in 2010)
- The Agenda must be scientific and technological
  - Interaction with the STB and other agents
- The Agenda must be Strategic
  - Consultation with stakeholders and society at large
- The Agenda is produced by Programme Owners and Managers

Gathering input from the STB

- First meeting of the STB, October 2011
- STB members filled in fiches with their ideas for SRIA elements addressing the five research questions
- Non-structured, bottom-up consultation
- Elements have been received partially responding to the five research questions
- Research questions are next described, and a summary of STB findings follows

Q1: Ecosystem Sustainability

- Integrated, trans-disciplinary research approach required
- Analyse influence of external factors on the water cycle:
- Exhaustion, overexploitation and depletion of water resources;
  - Pollution;
  - Climate change, inducing short to long-term variations in water availability;
  - Extreme events (droughts and floods);
  - Sea water intrusion; and
  - Morphological changes / infrastructures and works on rivers and lakes.

Q1: Ecosystem Sustainability

- Data mining and observatory
  - Integrated hydrological, hydrochemical and hydrobiological data
    - Analysis of status and long-term trends
    - Harmonised data on water flow, quality and biology… public repositories
    - Analyse combined effects of climate change, land management and other drivers
  - Geosciences observatory
    - Support research on up-scaling of water flow, reactive transport and floodplain ecosystems to the catchment scale
    - Based on experimental catchments + connected databases
- Global/Climate change
  - Impact of GC on extreme events: water quality and quantity
    - Risk assessment: global change + land management + pollution
    - Model development:, emphasis on hydrological change predictions and water quality
      - Policy relevant analysis of alternative storylines
      - Improved description of the physical processes: raw data
      - Fully coupled climate – hydrological models

Q1: Ecosystem Sustainability

- Global/Climate change
  - How to address end users' needs?
    - Decision-making tools based on the selection of robust, possibly impact specific, down-scaling methods
  - Impact of climate change on sediments processes
    - More intense floods and storm flows may remobilise sediments
    - Changes in climate will change course of pollutants
    - Predict and quantify effects on sediment quality and quantity and impacts
  - Adaptive water management and integration policies
    - Developed and tested on relevant cases using:
      - Scenario development,
      - Uncertainty assessments,
      - Active stakeholder involvement, and
      - pilot experiments.
    - Required dynamic science-policy interface

Q2: Safe water for citizens

- What are the (new) contaminants, such as polar compounds, pharmaceuticals or emerging pathogens including viruses?
- How can we predict their environmental behaviour and treatment, and what impact do they have on human health?
- To what extent are these contaminants removed by natural processes in water and soil, or by physical techniques in drinking water treatment?
- How can the quality of the produced water be maintained in time and throughout the distribution system?
- Which health risks could result from new water concepts such as supply of hot water, cooling towers, water reuse and water in the city?
- Objectives:
  - Supply citizens with top water quality
  - Protecting citizens' life and property from natural hazards

Q2: Safe water for citizens

- New and emerging contaminants
  - Some identified in the new draft list of priority contaminants to be included in WFD
  - Research on contaminants and transformation products to assess environmental and health risks; cyanobacterial blooms
  - New sampling protocols for emerging contaminants
- Biotechnology for potable water treatment
  - Biological filtration processes for removal of dissolved and particulate natural organic matter, ammonia and trace organic contaminants
  - Research on robustness of biological water treatment (i.e., design and operational procedures, guidelines for aerobic systems)
  - Research in drinking water treatment processes (i.e., new disinfection by-products)

Q2: Safe water for citizens

- Secure monitoring and control of ageing urban water systems for a reliable and safe service
  - Robust technical solutions and methods for the water and wastewater sector
  - Efficient and secure use of monitoring and control systems,
  - Long term rehabilitation decisions
  - Leaking urban pipelines contaminating urban ground waters with concentrated emerging contaminants
- Monitoring and early warning systems for people
  - Flash urban floods
  - Flooding by groundwater level rise

Q3: Competitiveness in Water industry

- Innovative technologies are required to create products and services for the citizens and their governments.
- Engage in the production of problem-solving knowledge leading to the development of market oriented solutions.
- Cooperation with stakeholders to ensure production of business opportunities
- Technology for
  - Water storage,
  - Distribution,
  - Measurement,
  - Purification,
  - Treatment,
  - Desalination
  - Irrigation.
- Focus on new materials, processes, management tools, ICT, energy input and environmental profile.

Q4. Water-wise bio-economy

- Bio-based economy Intensifies agriculture
  - Demand for new non-food products, biopharming…
  - More pressure on natural resources: water and agrochemicals
- Need for more efficient agricultural systems.
- Understanding of agricultural water abstraction effects on European ecosystems and water delivery systems
- New techniques and plant materials resulting in increased irrigation efficiency and reduced consumptive use and water pollution will be developed.

Q4. Water-wise bio-economy

- Climate change… Effect on crop evapotranspiration?
  - Affect water resources and agricultural production
  - Modify equilibrium between water demand and supply
  - Networking observations, predicting trends

Q5: Closing the Water Cycle Gap

- Growing freshwater scarcity: reconciling water supply and demand
- Financial water issues need to be analysed for different uses and regions.
- Semi-arid areas: investigate closed water systems
- New integrated concepts related to:
  - water re-use,
  - energy,
  - recovery of valuable substances,
  - monitoring and control,
  - decentralized systems, interaction with natural resources
  - Management of Aquifer Recharge
  - Soil-Aquifer Treatment
- Combined socio-economic approach
- Deepening Water foot-printing
- Crossing hydrologic scales

Q5: Closing the Water Cycle Gap

- Constrains to reuse of treated wastewater (mainly for agriculture) in water scarce areas:
  - Financial: high treatment, network and energy costs, low prices of freshwater compared to reclaimed water, low user willingness to pay for reclaimed wastewater.
  - Health impacts and environmental safety: soil structure deterioration, increased salinity and excess of nitrogen.
  - Standards and regulations: often too strict, often inadequate.
  - Monitoring and evaluation: lack of qualified personnel, monitoring equipment or cost
  - Technical: insufficient/inappropriate infrastructure
  - Public acceptance and awareness: low involvement/awareness of both farmers and crop consumers of crops grown with reclaimed wastewater and/or sludge.
- Treated wastewater reuse for agricultural and landscape irrigation
  - Hazards associated with effluent reuse.
  - Risks to health and potential environmental damages.
  - Pathogenic organisms in effluents
  - Build-up of toxic materials within the soil, eventually reach the human food chain.
  - Substances negatively affecting plant growth and development.

Q5: Closing the Water Cycle Gap

- Treated wastewater reuse: groundwater recharge for
  - Control of saltwater intrusion barriers in coastal aquifers.
  - Further treatment for future reuse.
  - Incrementing potable or non-potable aquifers.
  - Storage for treated water, control of ground subsidence.
  - Loss of identity between treated water and ground water: psychology
- Treated wastewater for direct and indirect potable reuse
  - Investigate current limitations on direct reuse of wastewater for potable purposes
  - Indirect reuse for potable purposes takes place constantly and on a worldwide basis.
    - Develop educational campaigns about the use of reused water for drinking.
    - By virtue of residence time in water bodies, water often gains additional treatment… added opportunity for quality monitoring


Questions and Answers