



# **Towards Sustainable Water Management – Potential Infrastructure Policies and Actions in Europe**

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**Thematic workshop on Infrastructures/Land use**

# This presentation

- Water
- The water Framework Directive
- Sustainable water management
- Virtual water
- Drivers and trends in the water use
- The future
- Potential infrastructure policies and actions



# WATER

The production of one kilogram of beef requires 16 000 litres of water.

To produce 1 litre of milk requires 1000 litres of water

To produce 1 kg of wheat requires 1350 litres of water

To produce one cup of coffee we need 140 litres of water.



# WATER

- **Water is essential**
  - There is no life without water
- **Water is non-substitutable**
  - There is no alternative for water.
- **Water is finite**
  - The amount of water available is limited by the amount of water that circulates through the atmosphere on an annual basis.
- **Water is fugitive**
  - Water flows under gravity. Annual recharge rates determine safe and sustainable yields, not the stocks.
- **Water is a system**
  - The annual water cycle from rainfall to runoff is a complex system where several processes (infiltration, surface runoff, recharge, seepage, re-infiltration, moisture recycling) are interconnected and interdependent with only one direction of flow: downstream.
- **Water is bulky**
  - Although water is essential for almost any economic activity, there are not many examples of water being transported over any considerable distance, particularly not against the force of gravity.



# Water Framework Directive

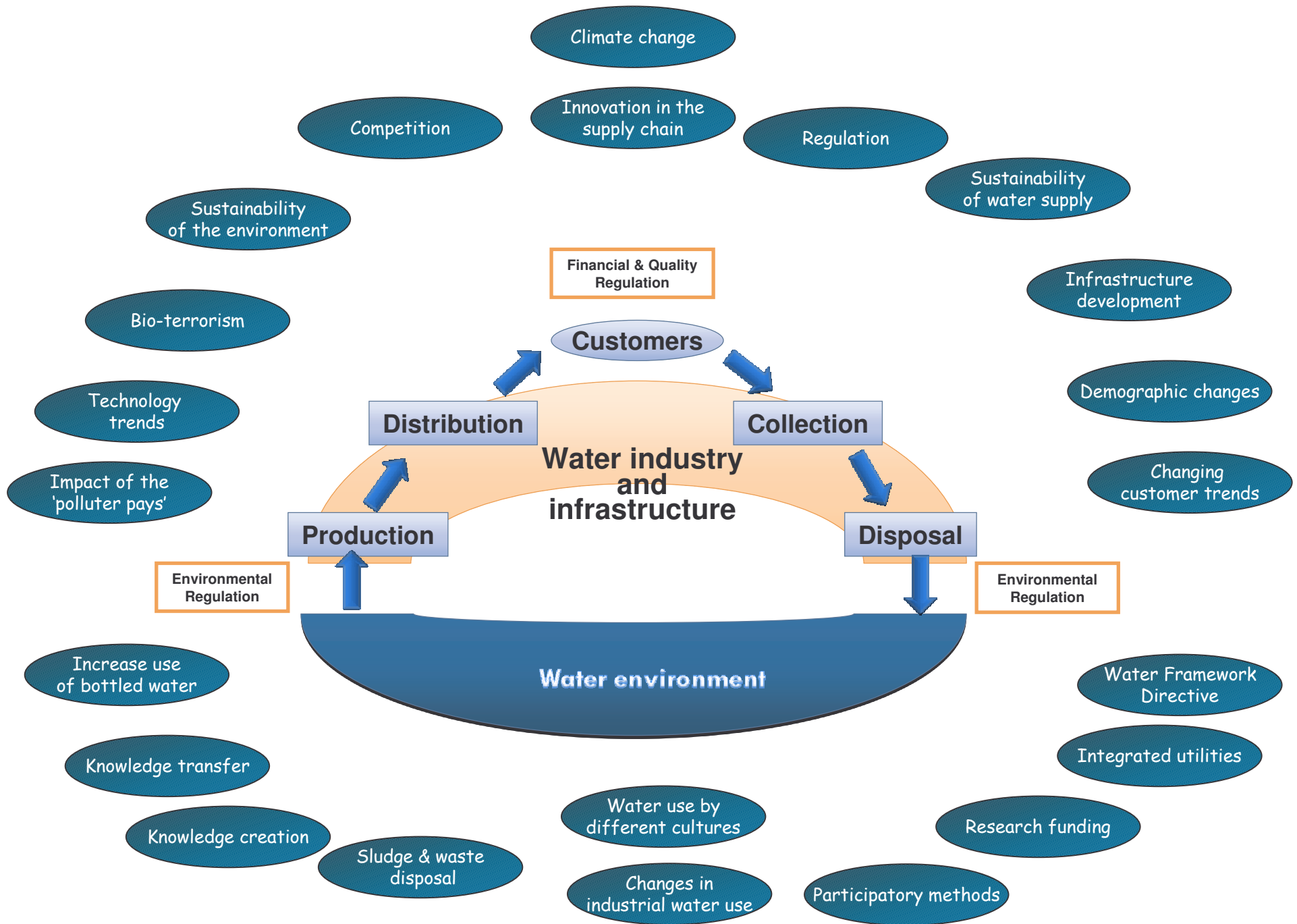
- Expanding the scope of water protection to all waters, surface waters and groundwater
- Achieving "good status" for all waters by a set deadline
- Water management based on river basins
- Combined approach of emission limit values and quality standards
- Water pricing
- Stakeholder involvement
- Streamlining legislation

# EU Water Legislation today

- Water Framework Directive
- Bathing Water
- Drinking Water
- Surface Water
- Fish Water
- Shellfish Water
- Ground water
- Urban Waste Water
- Nitrates
- IPPC
- Exchange of Information Decision Surface Waters
- Dangerous Substances

# THE WATER SECTOR TODAY

- The responsibility for the provision of water services in most countries lays with municipalities:
  - Legal ownership of assets (except in Britain)
  - Municipalities may delegate or outsource services (most countries)
- Diversity of operators and their strategies
  - More than 30 000 operators
  - Public, private, mixed
- Private investments in some countries
  - Capital investment projects, equity investments...



# Sustainable water management

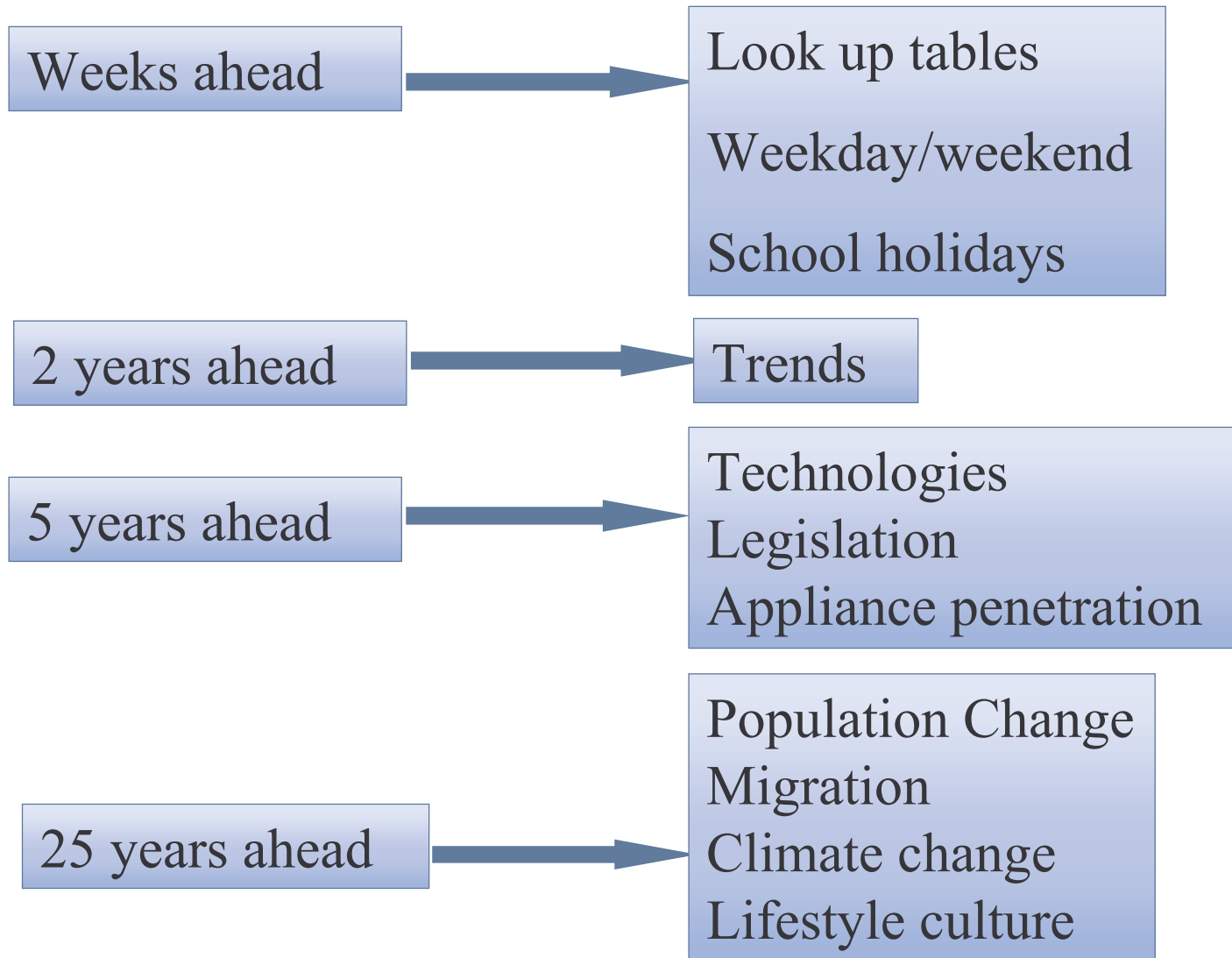
- **Integrated management at catchment scale**
  - development of tools, methods and management schemes
  - socio-economic aspects
- **Treatment and purification technologies**
  - management of water in the city
  - waste water treatment and re-use
- **Monitoring and early warning systems**
  - pollution surveillance and control
  - improved flood and drought forecasting
- **Ecological quality**
  - ecosystem functioning
  - ecological quality targets
- **Pollution prevention**
  - contaminated land, landfills and sediments
  - diffuse pollution
- **Water-deficient regions**
  - water management tools and technological developments
  - saline water intrusion

# Virtual water

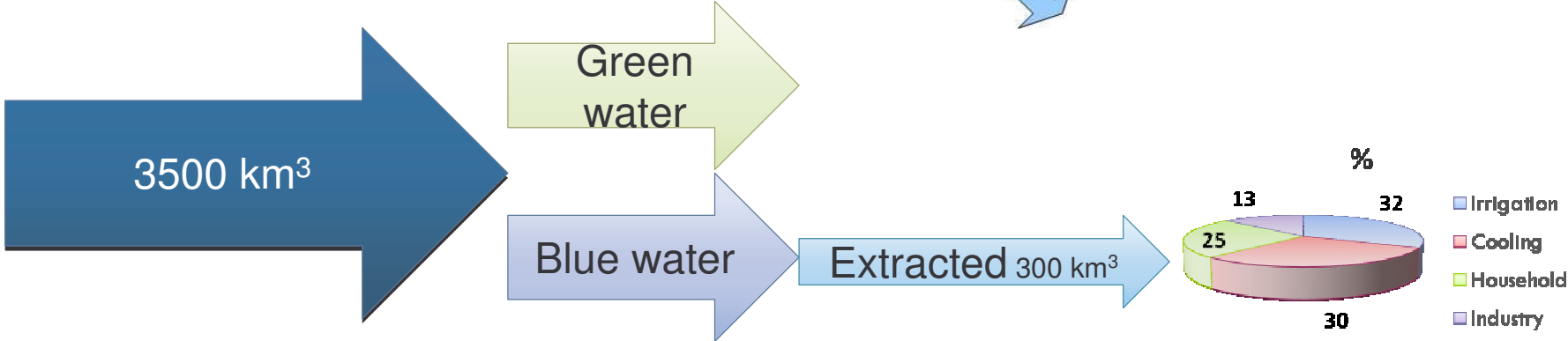
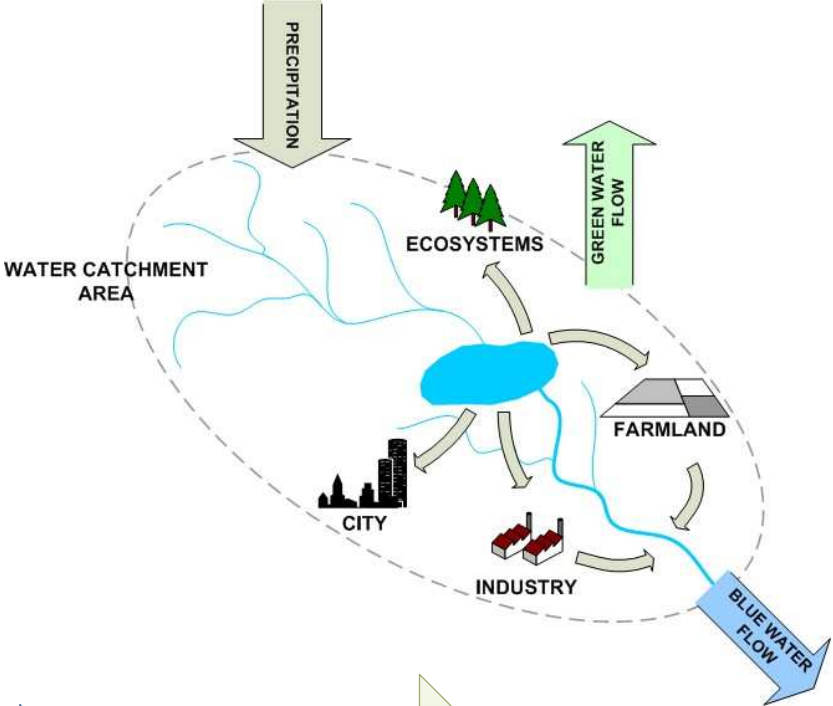
- Water is traded in the form of its products: grains, timber, meat, fodder, fruits, flowers, etc. This is called the trade of "virtual water"
- Recent research shows that the impact of global trade on regional water systems is at least as important as the impact of climate change on regional water systems.
- Europe is importing more water than exporting



# Water Scenarios



# Green and Blue water



# Trends

Irrigation



Irrigation in northern Europe 10% of area, in southern Europe 60% of area and with an expected increase.

Cooling



Introduction in the power sector of cooling towers that use far less water than existing cooling systems

Household



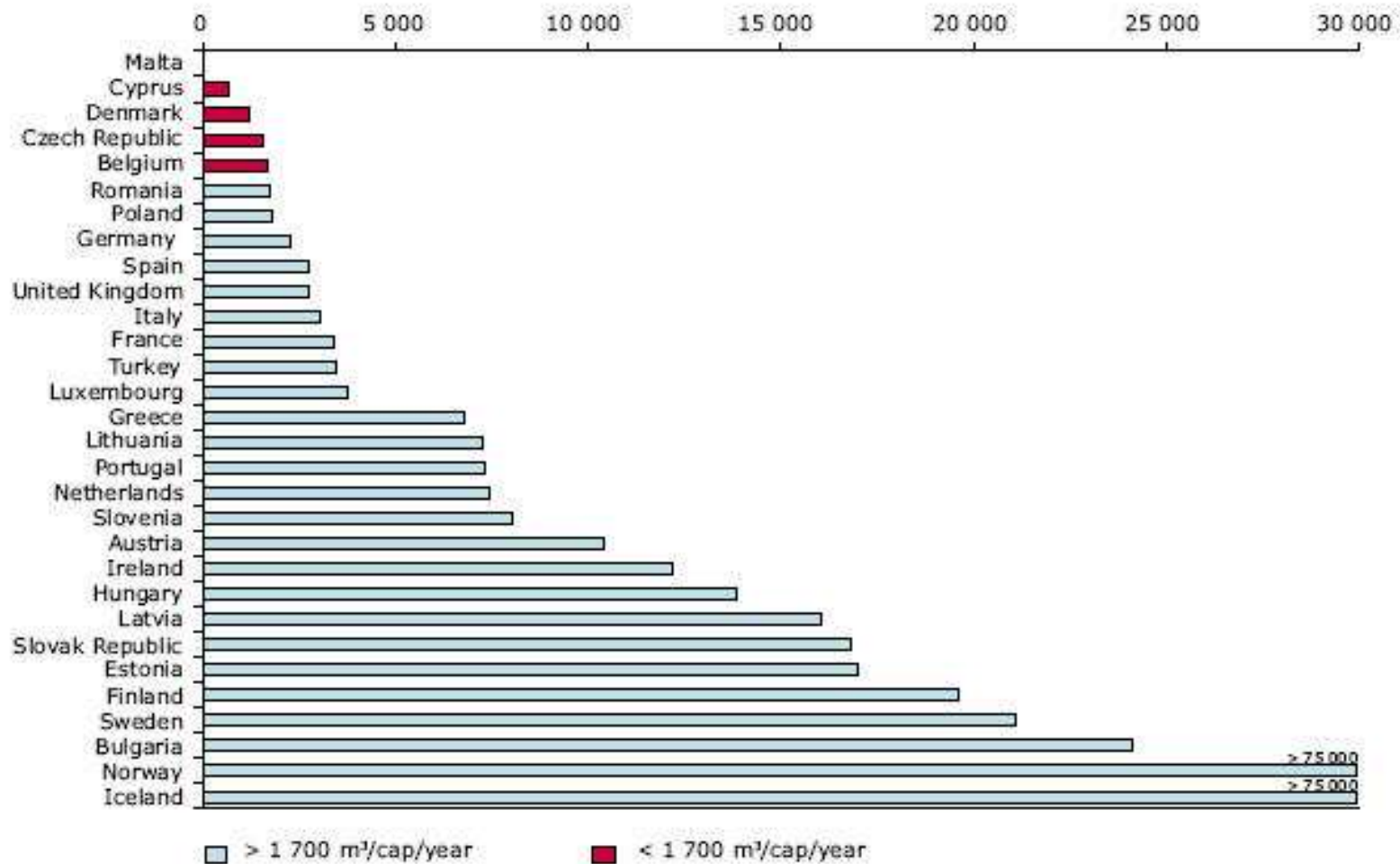
Rise with wealth, with diminishing household size, more second homes and mass tourism.

Industry



Future of the heavy industries unsure (iron and steel, chemicals, metals and minerals, paper and pulp, food processing, engineering and textiles). Service and tourist industry will increase

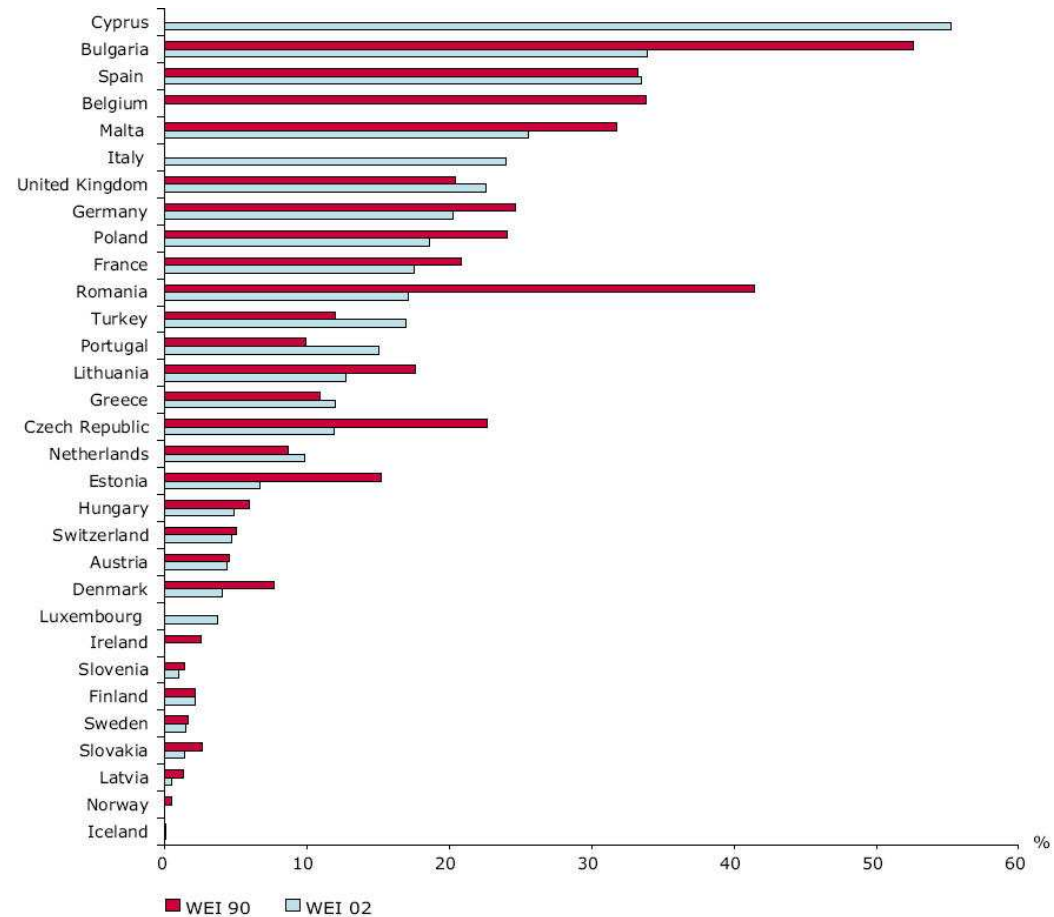
# Current water availability



Source: EEA, 2003.

Annual water availability per capita by country,  
2001

# Trends in water abstraction

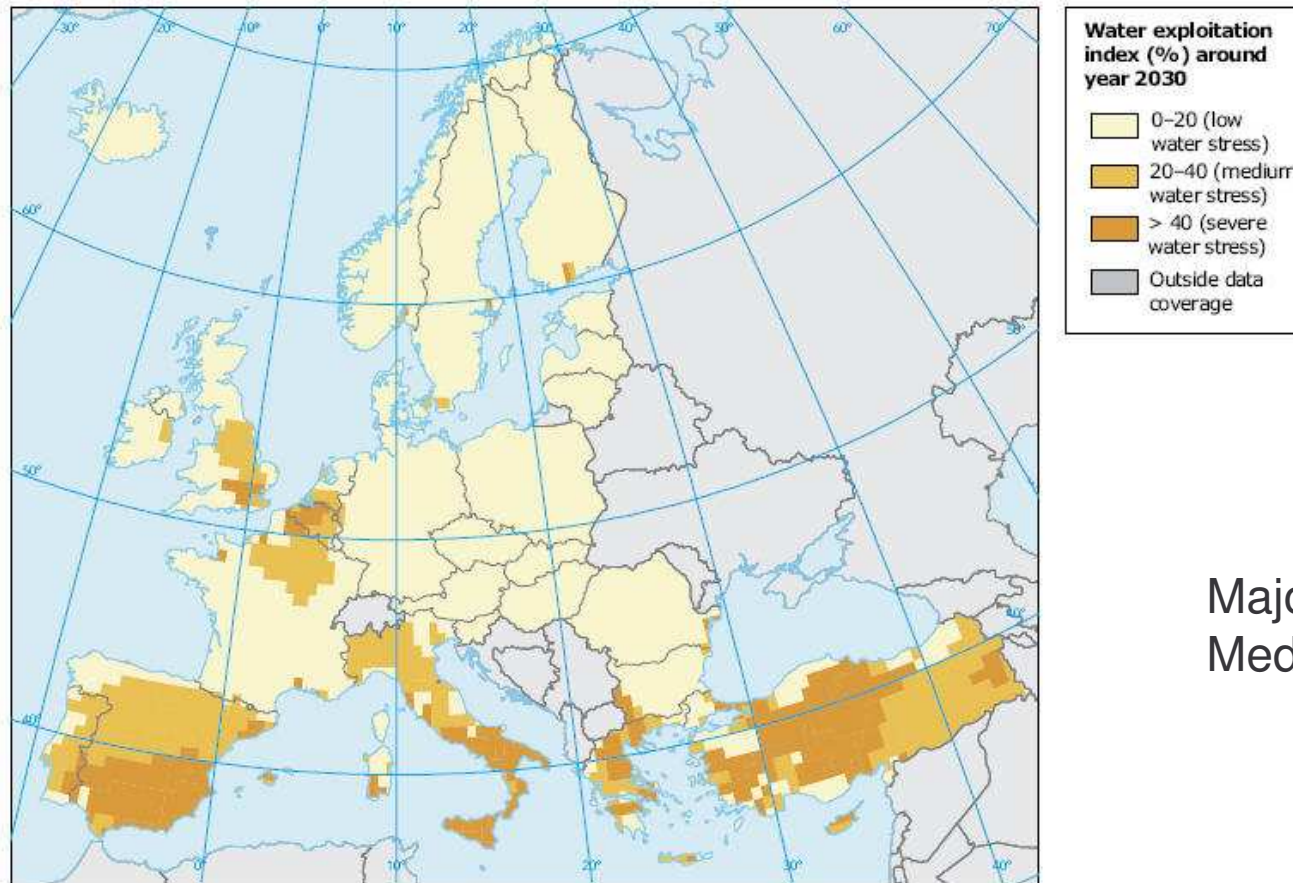


**Note:** 1990 = 1991 for Germany, France, Spain and Latvia;  
 1990 = 1992 for Hungary and Iceland;  
 2002 = 2001 for Germany, the Netherlands, Bulgaria and Turkey;  
 2002 = 2000 for Malta;  
 2002 = 1999 for Luxembourg, Finland and Austria;  
 2002 = 1998 for Italy and Portugal;  
 2002 = 1997 for Greece.

Belgium and Ireland 1994 data and Norway 1985 data.

Data source: EEA based on data from Eurostat data tables (Ref: [www.eea.eu.int/coreset](http://www.eea.eu.int/coreset)): renewable water resources (million m<sup>3</sup>/year), LTAA and annual water abstraction by source and by sector (million m<sup>3</sup>/year), total freshwater abstraction (surface and groundwater).

# Forthcoming water stress areas



Major cities and  
Mediterranean area

Source: EEA, 2005.

# Trends in surface water and river basin management

A slight decrease in overall **river water exploitation**



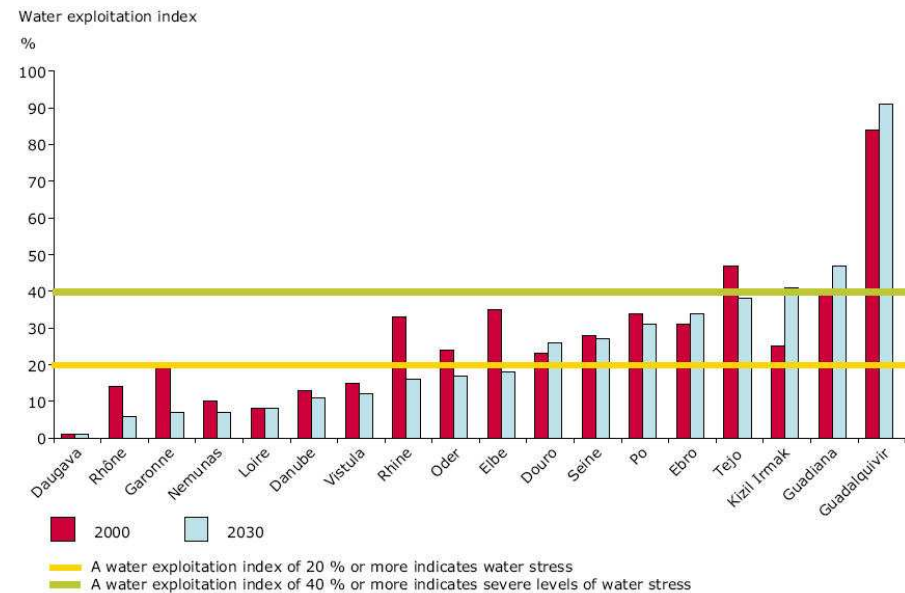
**Extreme events** - Northern Europe is likely to become more flood prone and southern Europe more drought prone



**River water quality** across Europe is generally improving



**Regulation**, canalisation, dam building, river bank management likely to increase



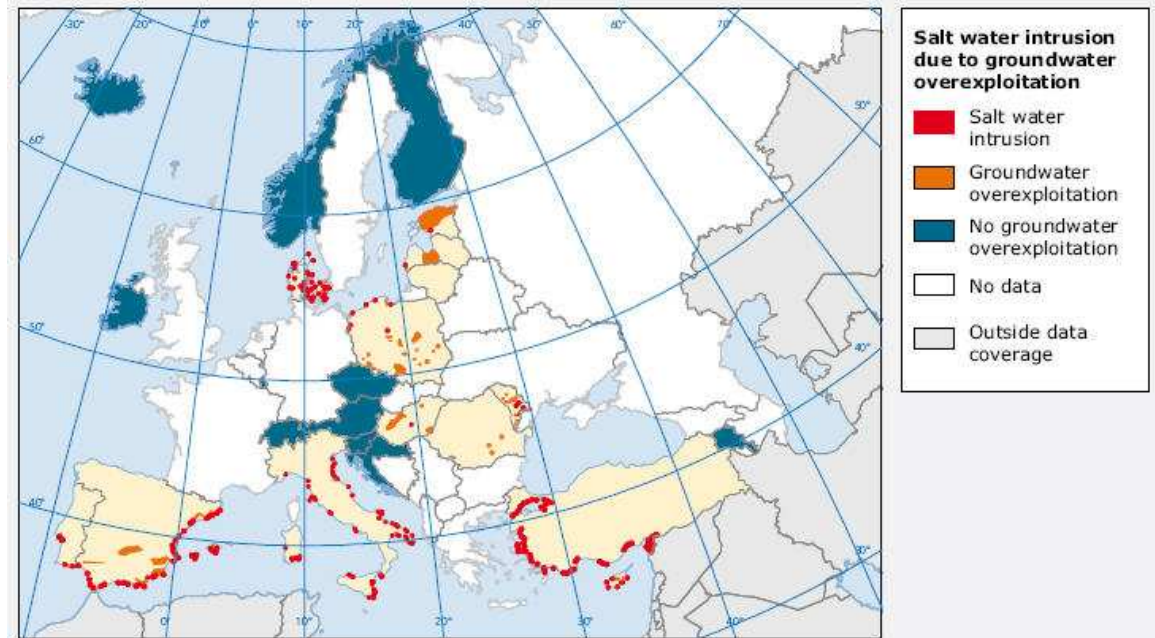
Source: EEA, 2005.

# Trends in groundwater management

Increasing demand from agriculture and industry and for public supply



Increasing risks for groundwater contamination and increasing rehabilitation needs

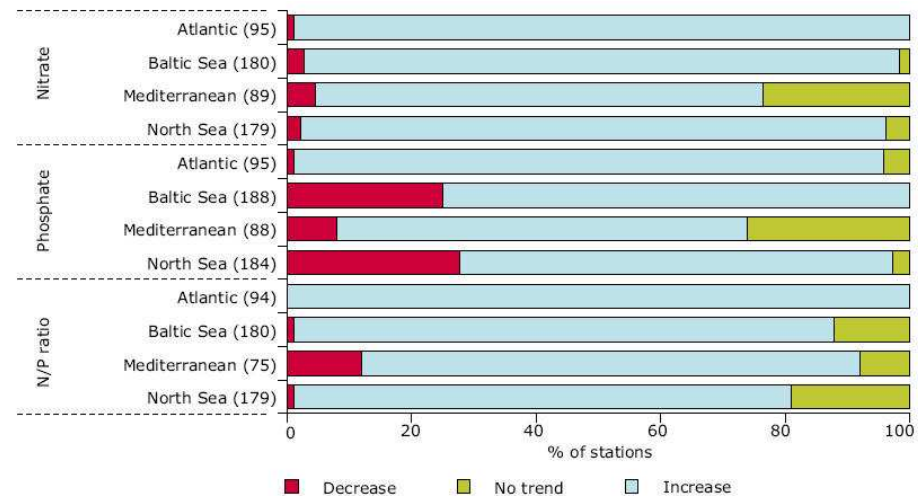


Source: EEA ETC/W, 2005.

# Trends in marine water management

Marine pollution by eutrophication (Nitrates and Phosphates)

Oil spills



**Note:** Trend analyses are based on time-series 1985–2003 from each monitoring station having at least 3 years data in the period 1995–2003 and at least 5 years data in all. Number of stations in brackets.

Atlantic (incl. the Celtic Seas) data from: the United Kingdom, Ireland and ICES. Baltic Sea (incl. the Belt Sea and the Kattegat) data from: Denmark, Finland, Germany, Lithuania, Poland, Sweden and ICES. Mediterranean data from: Italy. North Sea (incl. the Channel and the Skagerrak) data from: Belgium, Denmark, Germany, the Netherlands, Norway, Sweden, the United Kingdom and ICES.

Data source: EEA Data service, data from OSPAR, Helcom, ICES and EEA member countries ([www.eea.eu.int](http://www.eea.eu.int)).

# Future influencing factors

- Global issues will dominate
  - large global market
  - climate change
  - water stress in 2nd/3rd world countries
  - Co-ordinated EU regulation (Water Framework Directive) implemented
- Consumers will have more influence
  - more choice
  - better informed and raised awareness
- More emphasis on environment & sustainability
- More imbalance / opportunity
  - those with plentiful water / those without
  - global water companies / local water companies



# Potential Infrastructure policies and actions

- Water pricing
- Non-point source management in agriculture
- Improved sewage water treatment in E and S Europe
- Improved greywater recirculation in industry
- Cooling water reductions in power stations
- Improvements in household technologies
- Improved groundwater protection
- Improvement of coastal zone management
- Major changes in agricultural practices and crops

Thank you



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