

Measures and actions against drought in southern Europe and the Mediterranean

Water2Adapt: Resilience enhancement and water demand management for climate change adaptation

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Outlook

- Mounting evidence about climate change impacts in Europe and Mediterranean
- EU Drought Policy – rising above the gathering storm
- Water efficiency and economic policy instruments: water tariffs and trading

Mounting evidence about climate change impacts

Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX Report)

- There is medium confidence that some regions of the world have experienced more intense and longer droughts, in particular in southern Europe
- Economic losses from weather- and climate-related disasters have increased, but with large spatial and interannual variability (high confidence, based on high agreement, medium evidence).
- Increasing exposure of people and economic assets has been the major cause of long-term increases in economic losses from weather- and climate-related disasters (high confidence).

Mounting evidence about climate change impacts (2)

- There is medium confidence that droughts will intensify in the 21st century in some seasons and areas, including southern Europe and the Mediterranean region due to reduced precipitation and/or increased evapotranspiration.
- Definitional issues, lack of observational data, and the inability of models to include all the factors that influence droughts preclude stronger confidence than medium in drought projections



W₂A

Water²Adapt

*Resilience enhancement
and water demand management*

Partners:

Fondazione Eni Enrico Mattei (FEEM); Seeconsult GmbH; Basque Centre for Climate Change (BC3); Chamber of Agriculture of Lower Saxony (CALS); Fundação da Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa

Research topics

- Analysed selected drought events in four selected river basins in Italy, Germany, Spain, and Portugal;
- Identified practices, which lead to unsustainable consumption and inefficient allocation of water;
- Assessed the social and economic impacts of droughts;
- Analysed the performance and wider impacts of WDM.

Project received funding from ERA-net funding initiative, 2nd Joint Call for Research on IWRM

Key messages

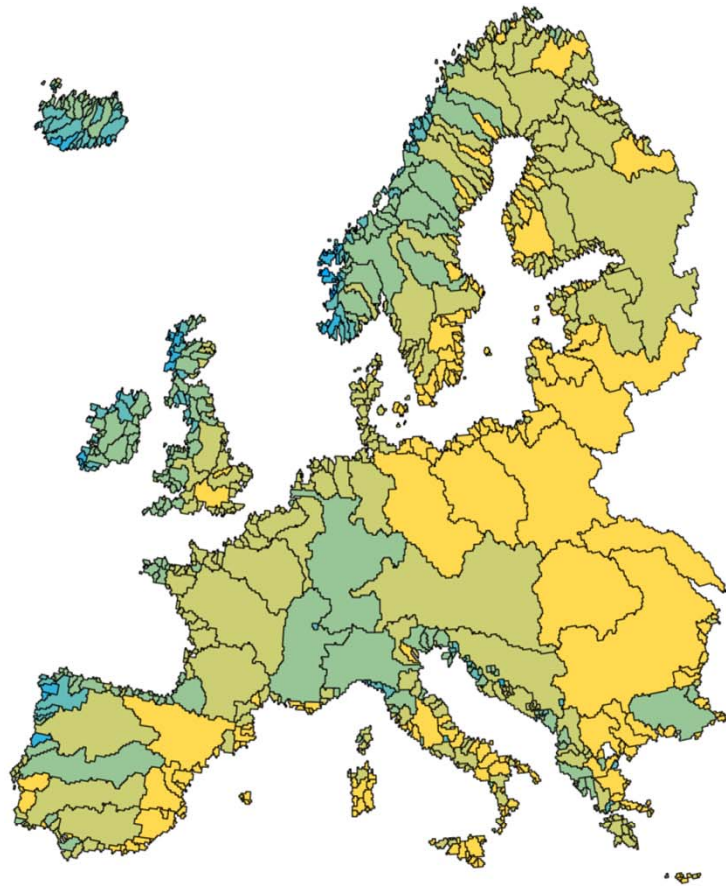
The cost of not-having sufficient water for satisfying water needs is deeply underestimated. The welfare losses are quantifiable.

Intensification of water crisis is the result of unsustainable water management, fragmented institutions, slow implementation of reforms, insufficient financial endowment, and a variety of social norms, viewpoints and beliefs regarding the ways water should be managed.

Resilience to WS&D is driven by the ability to i) ***moderate impacts of climate variability***, ii) put in place ***allocation mechanisms*** helping to shift water from low to high value/priority uses as the water resources become scarcer, temporarily or permanently (through negotiation or coercive or voluntary actions); and iii) ***ability to cushion the losses***.

Backbones of the resilience are enabling environment; preservation of healthy river ecosystem and ecosystem services; and efficient use and application of water

Water availability outlooks



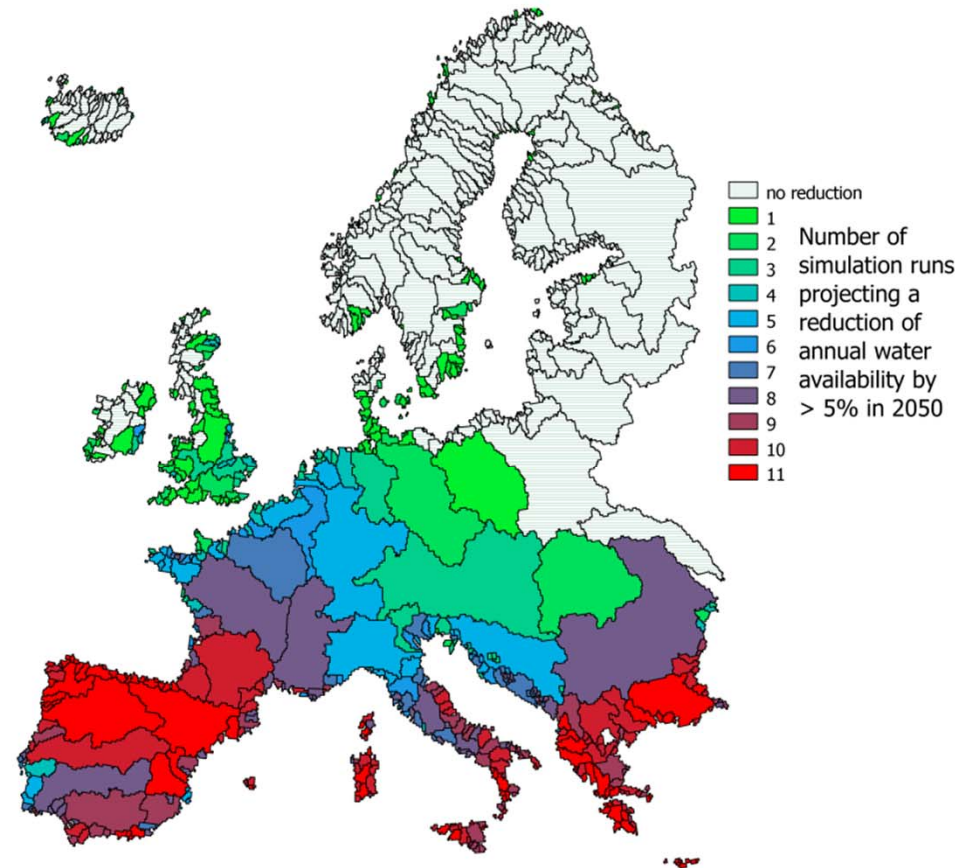
Baseline (1961-90)

Annual water availability
on river basin scale

Baseline (mm)

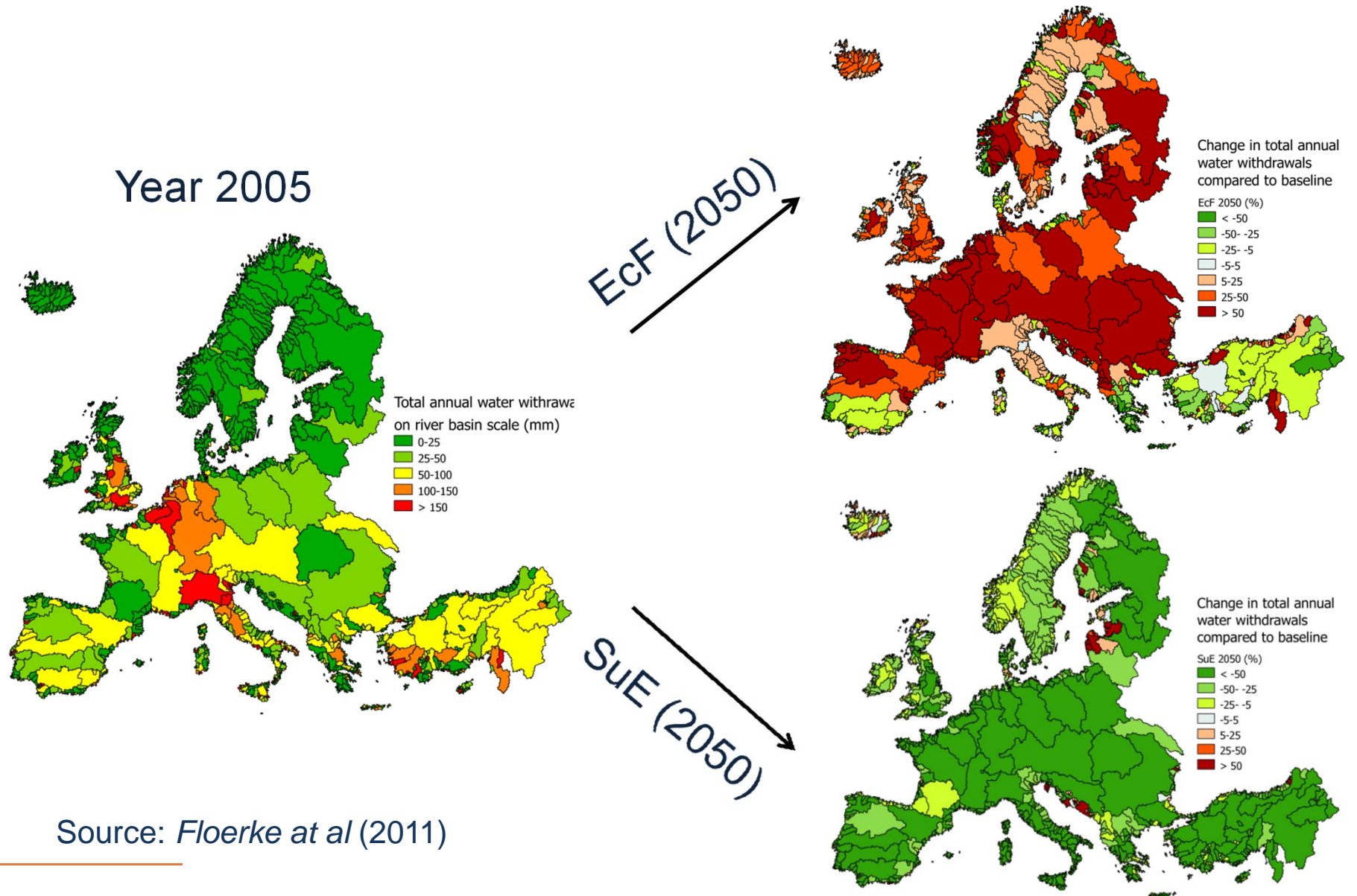
- 0 - 200
- 200 - 400
- 400 - 800
- 800 - 1200
- 1200 - 1800
- 1800 - 3000

2050s (2041-2070)



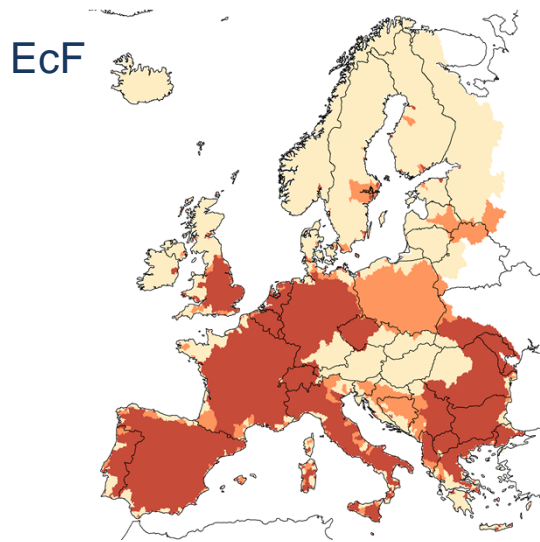
Source: *Floerke et al* (2011)

Expected water withdrawals In Europe

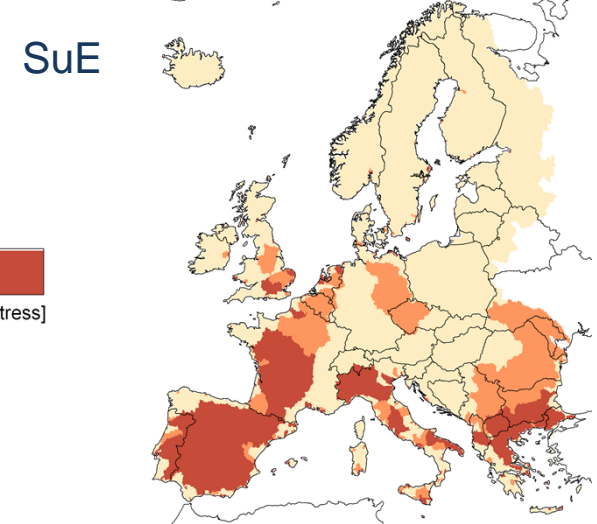


Source: Floerke at al (2011)

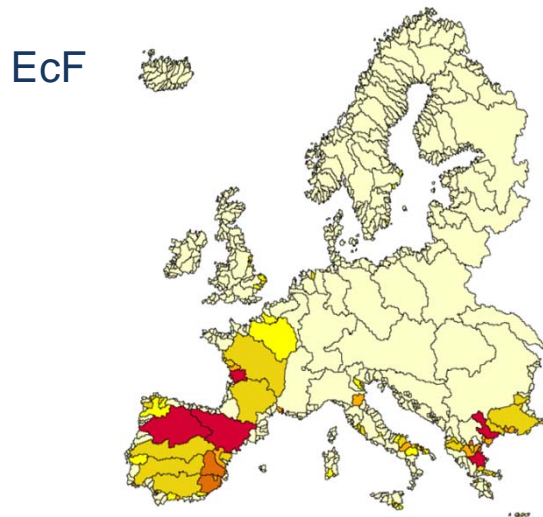
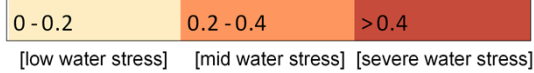
Water scarcity in 2050 (regions)



WEI summer



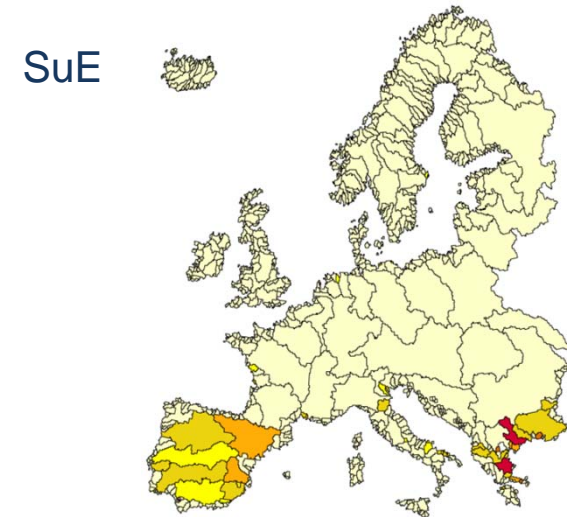
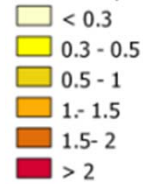
withdrawals-to-availability ratio



Agriculture

Ratio of irrigation water consumption to water availability

EcF 2050, summer



Water scarce basins in 2012



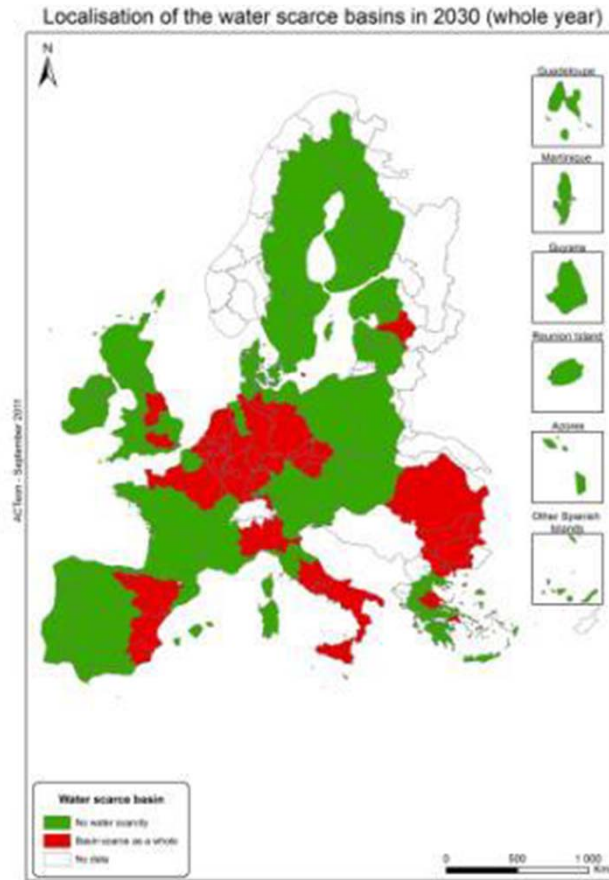
2012, water stress all year round



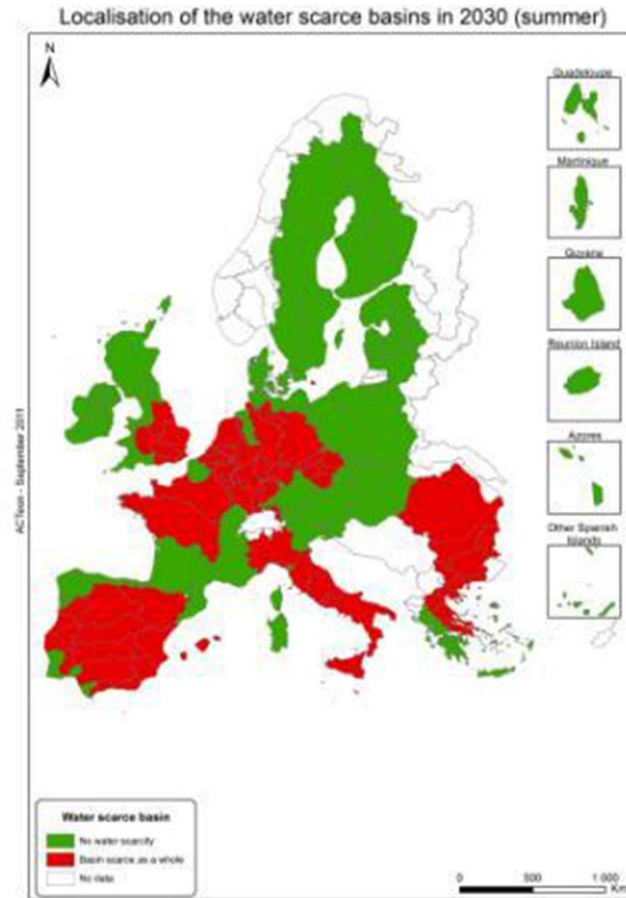
2012, water stress in summer

Source: Strosser et al (2011)

Water scarce basins by 2030



2030, water stress all year round



2030, water stress in summer

Source: Strosser et al (2011)

"By 2050 the EU's economy .. is competitive, inclusive and provides a high standard of living with much lower environmental impacts. All resources are sustainably managed .. Climate change milestones have been reached, while biodiversity and the ecosystem services ... have been protected, valued and substantially restored" (2011 Roadmap to a resource efficient Europe)

A step change improvement in water use (efficiency) is required, through competitiveness and reward for innovation
(*Transforming Water* by Prof. M. Young & FEEM)

European Policy on Drought and Water Scarcity

European Drought Policy – A Cinderella among the European environmental legislation

It is widely held belief that the EU Water Framework Directive (2000/60/EC) is not fully equipped to adequately confront the issue of water scarcity and droughts

Growing frustration with the slow and uneven rate of implementation across Member States; the Review of the River Basin Management Plans indicates that a significant number of EU water bodies ‘will not reach ‘good status’ by 2015 due to both long-standing and emerging challenges’ (EP Resolution A7-0192/2012)

EP called several times upon the Commission to submit legislation, ‘similar to the directive on floods, which encourages the adoption of an EU policy on water shortages, droughts and adapting to climate change’.

European Policy on Drought and Water Scarcity (cont.)

Communication - Addressing the challenge of water scarcity and droughts in the European Union (COM/2007/0414 final)

- Putting the right price tag on water
- Allocating water and water-related funding more efficiently
- Improving drought risk management
- Considering additional water supply infrastructures
- Fostering water efficient technologies and practices
- Fostering the emergence of a water-saving culture in Europe
- Improve knowledge and data collection

Water pricing is slowly being implemented in MS. It seems that neither the objectives of full implementation of the WFD in terms of water cost recovery or the implementation of the 'users pay' principle have been reached so far (Strosser et al., 2012)

Blueprint to Safeguard Europe's Water Resources

- Mid-term implementation report to the WFD (2000/60/EC)
 - Review of the policy on water scarcity and droughts (follow-up on WS&D Communication)
 - "Fitness Check" of freshwater policy as part of European Commission's smart regulation policy.
 - Review of the groundwater pollutants and the related environmental quality standards under the Groundwater Directive (2006/118/EC)
 - Review of the adaptation measures in the area of inter alia water and nature policies envisaged by the 2009 White Paper on Adaptation to Climate Change (COM(2009) 147 final)
- Expected in November 2012
 - Seven policy areas: Land Use, **Economic Incentives, Quantitative water resources use targets**, Governance, Knowledge Base, Innovation, Global Dimension

Blueprint to Safeguard Europe's Water Resources

- Builds upon the White Paper "Adapting to climate change: Towards a European framework for action" (COM(2009) 147 final)
- The strategy relates to the implementation of the Europe 2020 Strategy and in particular to the resource efficiency flagship as well as to the implementation of the post 2013 Multiannual Financial Framework.
- Adaptation to climate change is a crosscutting issue and will affect key EU policies including: Cohesion policy, Common agricultural policy, policies related to disaster risk management, maritime policy and environmental policies.

Options considered: 1) filling the knowledge gaps and facilitating exchange of best practices between Member States; and actors concerned, (2) further developing adaptation mainstreaming into relevant EU policies and strategies, (3) capturing the potential of the market for enhancing the EU's resilience to climate change

Set of the potential EU policy options for WS&D

Policy objective	Policy area	Voluntary - Strengthening knowledge and raising awareness	Mandatory and regulatory - Strengthening the quantitative dimension of the WFD	Cross-compliance - for EU sector policies (e.g. agriculture)	Cross-compliance - for EU financing instruments ³⁸	Mandatory and regulatory - A new EU directive
Restoring the water balance in all European river basins	E-flows	✓	✓	✓	✓	✓
	Efficiency targets	✓		✓	✓	✓
	Economic incentives for efficient water use	✓	✓		✓	
	Guiding land use to respond to water scarcity	✓	✓	✓	✓	
	Trading water use rights for the environment	✓	✓			✓
Enhancing drought management in Europe	Strengthening the European Drought Emergency Response Capacity	✓			✓ (adaptation of the EU Solidarity Fund)	
	Assess and manage	✓	✓			✓

Source: Strosser et al (2011)

Resource efficient Europe

- Flagship initiative under the Europe 2020 strategy – a shift towards a resource-efficient, low-carbon economy,
- Milestone (EC Roadmap to a Resource Efficient Europe, COM(2011) 571 final)

By 2020, all WFD River Basin Management Plans (RBMPs) have long been implemented. Good status – quality, quantity and use - of waters was attained in all EU river basins in 2015. The impacts of droughts and floods are minimised, with adapted crops, increased water retention in soils and efficient irrigation. Alternative water supply options are only relied upon when all cheaper savings opportunities are taken. Water abstraction should stay below 20% of available renewable water resources

Resource efficient Europe (cont.)

Proposed policies

- Water **efficiency targets** and improved water efficiency measures (e.g. smart metering, mandatory requirements on water using devices; guidelines for water re-use, reduction of leakage in water infrastructure, water saving in irrigation),
- Better demand management through **economic instruments (pricing, water allocation)** and use of labelling and certification schemes measuring life-cycle impact and virtual water content of products,
- **European Innovation Partnership on water**

Economic policy instruments

In a world of ever increasing water demand and decline in water availability and/or reliability, where water-related hazards are on rise, where climate change threatens to undo decades of development efforts, the only way to sustainability is a right mix of mutually strengthening policy instruments.

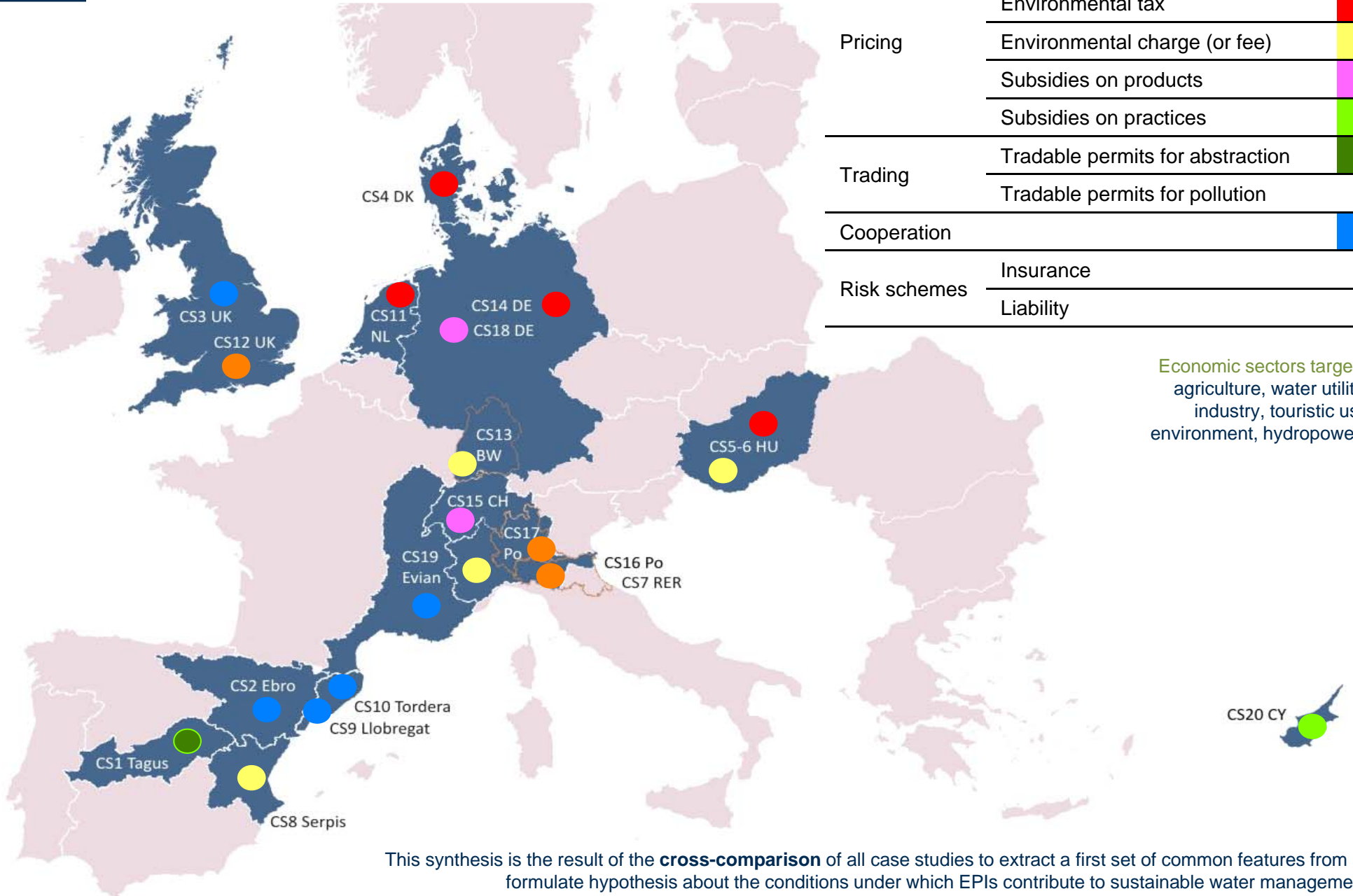
In this policy mix, **Economic Policy Instruments (EPs)** are best suited to foster an efficient allocation and use of water, reduce harmful exposure and impacts on the communities and environment, and protect natural capital.

Economic policy Instrument (EPIs)

- cover a range of different instruments 'harnessing market forces' (pricing, trading, market friction reduction, risk sharing)
- play an important role for achieving environmental goals in an cost-efficient way; encourage behaviour change and technology innovation/diffusion, rectify market failure
- require a through analysis, design and implementation
- are reconcilable with different worldviews and deeply held values



Type of instrument	
Pricing	Water tariff
	Environmental tax
	Environmental charge (or fee)
	Subsidies on products
	Subsidies on practices
Trading	Tradable permits for abstraction
	Tradable permits for pollution
Cooperation	
Risk schemes	Insurance
	Liability

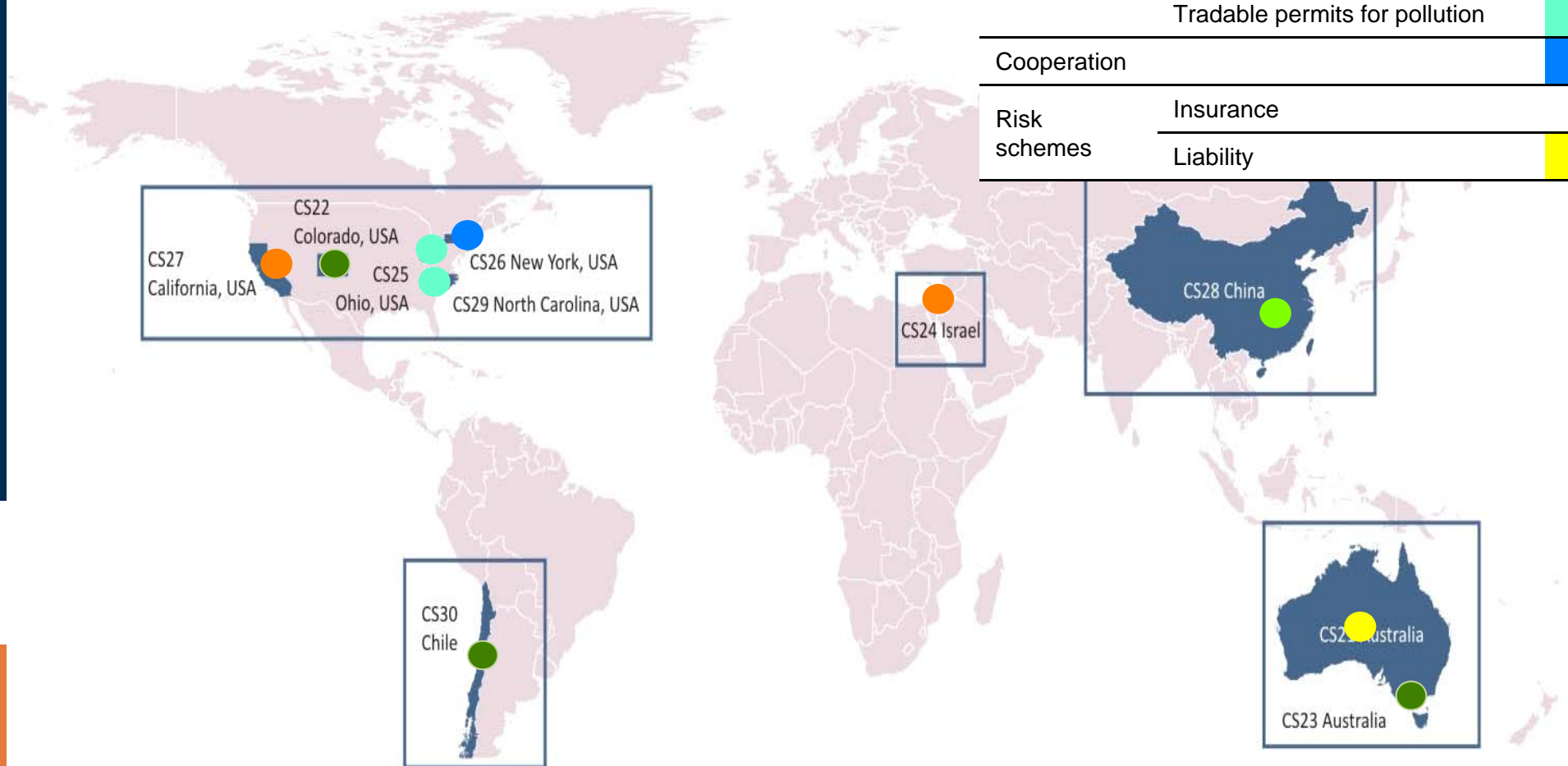


Economic sectors targeted:
 agriculture, water utilities,
 industry, touristic uses,
 environment, hydropower...

This synthesis is the result of the **cross-comparison** of all case studies to extract a first set of common features from and formulate hypothesis about the conditions under which EPIs contribute to sustainable water management.

Type of instrument

Pricing	Water tariff	Orange
	Environmental tax	
	Environmental charge (or fee)	
	Subsidies on products	
	Subsidies on practices	Light Green
Trading	Tradable permits for abstraction	Dark Green
	Tradable permits for pollution	Cyan
Cooperation		Blue
Risk schemes	Insurance	
	Liability	Yellow



Performance of the reviewed EPIs

EPIs have made a real contribution to:

- Raise revenue for valuable public aims.
- Make the provision of water services financially sustainable.
- Supporting the development policies in strategic areas such as agriculture, energy, land settlements, manufacturing.

EPIs have a real potential to:

- Convert payments on the use of water into working incentives for water conservation.
- Promote individual actions to save water, increase water efficiency, improve water quality and reduce water associated risks.

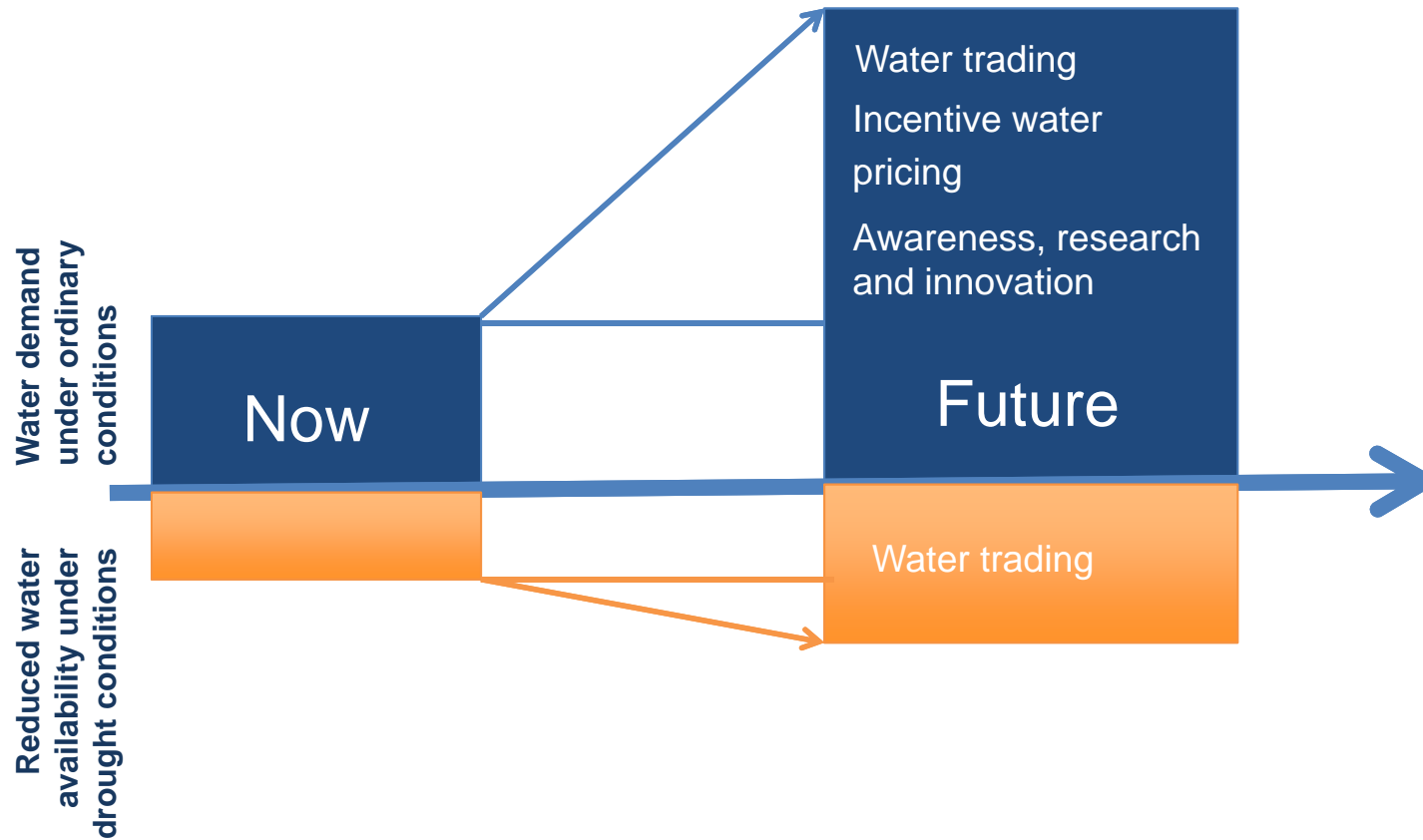
Performance of the reviewed EPIs (2)

- Improving water allocation through water trading
- Promoting water efficiency through water pricing, subsidies, fines, etc.
- Fostering planned responses to water risks through cooperative agreements, income stabilization insurance, water preservation funds.
- Cooperating to share the benefits of preserving water resources through PES schemes, self-enforceable agreements among users, etc.).
- Empowerment over natural assets through corporate social responsibility, preservation funds, etc.

Improving allocation efficiency through water trading

- Water trading schemes have been developed around the world as an instrument to deal with water scarcity problems and improve water allocation among users (USA, Australia, Chile, Spain, South Africa and China),
- Facilitate shift from low – to high value uses of water, thus benefiting the society
- Positive experiences despite some drawbacks: the variety of different forms and multiplicity of the institutional frameworks make it difficult to draw firm conclusions about the preconditions under which WTS performs well
- Facilitated by longhouse projects

Adaptation wedges



Brainstorming session

Water efficiency

European and Mediterranean economies are 'thirsty' as shown by *high water intensity* (amount of water used per unit of GDP).

Improved water efficiency is achievable in energy, agriculture, in manufacturing and households.

What are the expected performance, and unintended side effects of the proposed policies? How feasible are they?

Brainstorming session

Innovative economic policy instruments

In many European and Mediterranean economies the full scope of incentive pricing and market re-allocation of water has not been yet explored. Water trading schemes may unfold the competitiveness and economic performance of Mediterranean countries, helping so to master the financial and economic crisis

What are the expected performance, and unintended side effects of the proposed policies? How feasible are they?

Brainstorming session

Cross boarder and transnational collaboration

European Innovation Partnerships on Water along with other funding initiatives and programmes, including Horizon 2020, Joint Programming Initiative on Water (JPI Water) and LIFE programme, create opportunities for a closer cross-boarded and transnational collaboration.

To what extent the water efficiency and economic policy instruments are able to foster collaboration across European and Mediterranean countries?



Thank you for your attention

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