



*Forum Loire & affluents
Au cœur de l'Europe des fleuves
Adaptation aux impacts du changement climatique*

EU Research & Innovation for flood risk reduction Achievements, challenges and future orientations

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Floods: A major Natural Hazard in Europe

- 1998-2009: 213 major events, over 1100 deaths
- 52 billion € in insured economic losses

Riverine Floods



Flash Floods

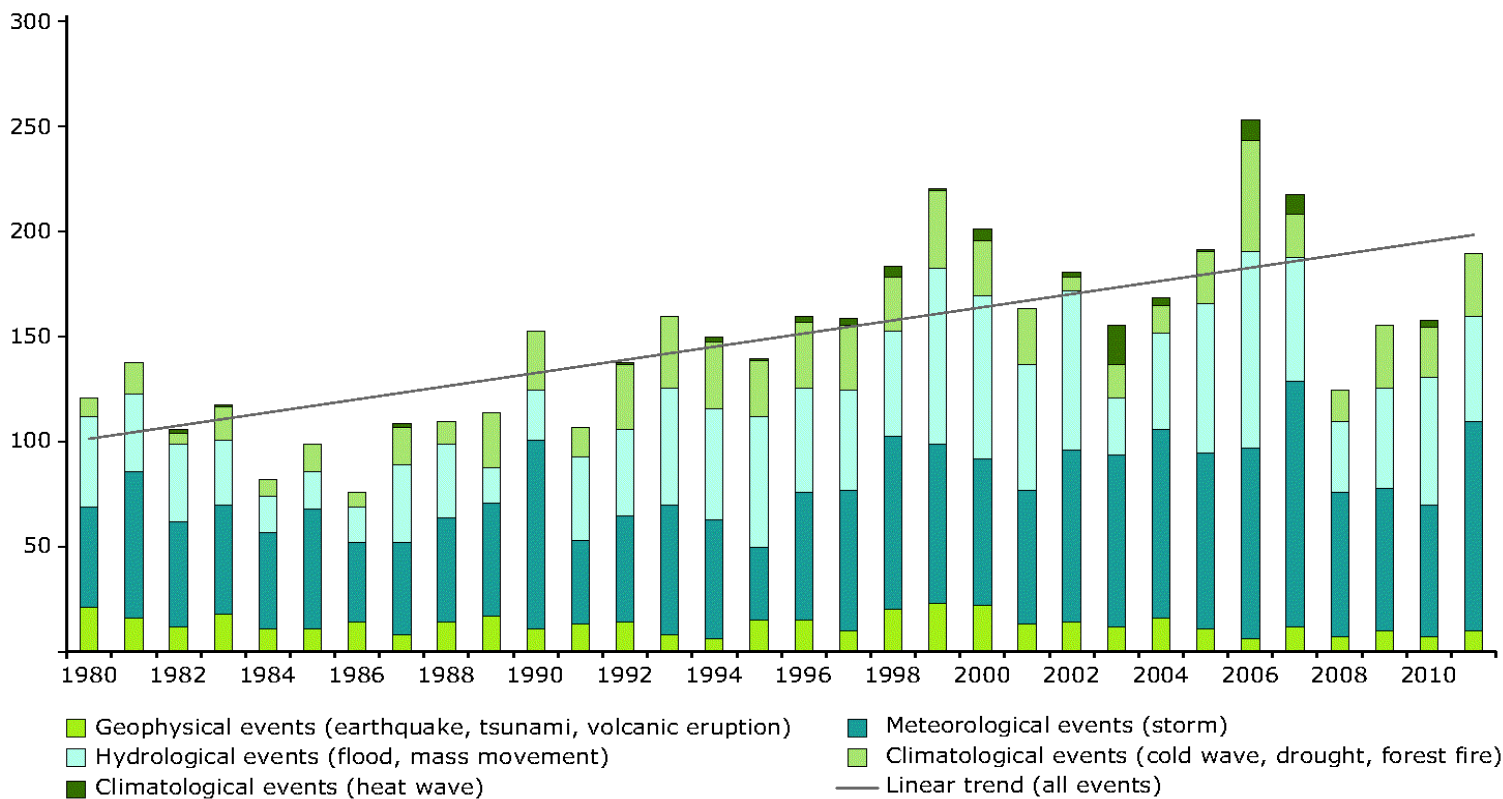


Coastal Floods/Storms



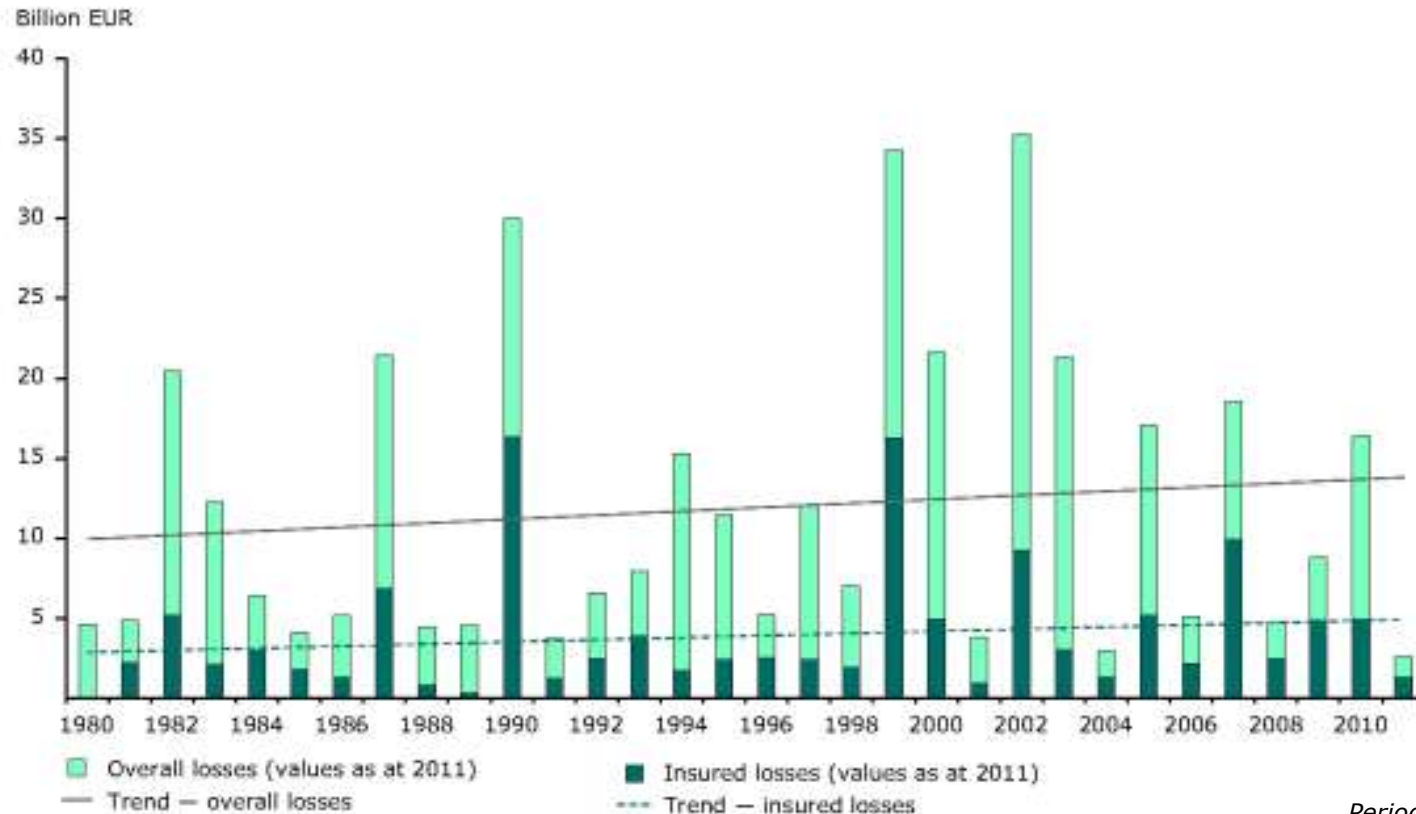
Occurrence of natural disasters in Europe 1980-2011

Number of events



Source:
European
Environment
Agency

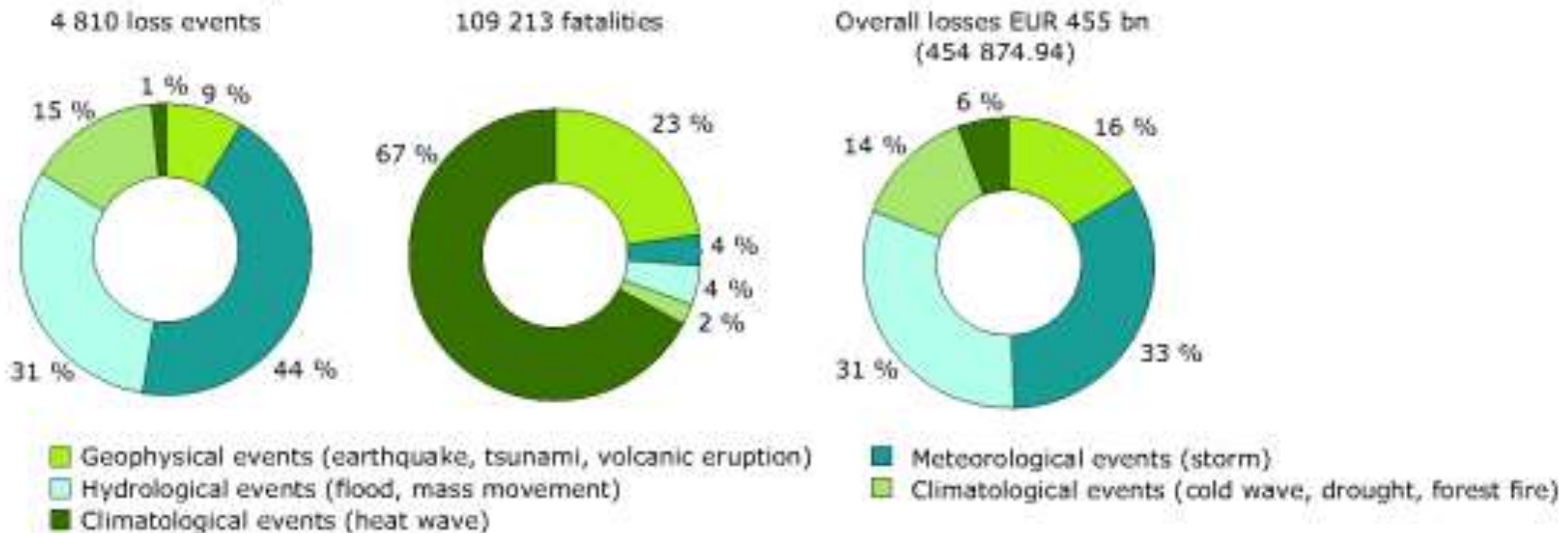
An upward trend in economic losses



Period: 1980-2011
Source: European
Environment Agency




Losses, fatalities & economic damage from natural disasters

- **Hydro-meteorological events** (storms, floods, and landslides) account for **64 %** of the reported damages due to natural disasters in Europe since 1980
- Climatological events (extreme temperatures, droughts and forest fires) account for another **20 %**.



Period: 1980-2011
 Source: European Environment Agency

Climate change as an aggravating factor for flood risks in Europe

Europe				
Key risk	Adaptation issues & prospects	Climatic drivers	Timeframe	Risk & potential for adaptation
<p>Increased economic losses and people affected by flooding in river basins and coasts, driven by increasing urbanization, increasing sea levels, coastal erosion, and peak river discharges (<i>high confidence</i>)</p> <p>[23.2-3]</p> <p>Increased economic losses and people affected by flooding</p>	<p>Adaptation can prevent most of the projected damages (<i>high confidence</i>).</p> <ul style="list-style-type: none"> • Significant experience in hard flood-protection technologies and increasing experience with soft protection measures • High costs for increasing protection • Potential barriers to adaptation in urban and environmental areas <p>Adaptation can prevent most of projected damages</p>		<p>Present</p> <p>Near term (2030–2040)</p> <p>Long term (2080–2100) 2°C 4°C</p>	<p>Very low Medium Very high</p> <p>Present: Risk level is Medium</p> <p>Near term: Risk level is Medium</p> <p>Long term: Risk level is Medium for 2°C, Very high for 4°C</p>
<p>Increased water restrictions. Significant reduction in water availability from river abstraction and from groundwater resources, combined with increased water demand (e.g., for irrigation, energy and industry, domestic use) and with reduced water drainage and runoff as a result of increased evaporative demand, particularly in southern Europe (<i>high confidence</i>)</p> <p>[23.4, 23.7]</p>	<ul style="list-style-type: none"> • Proven adaptation potential from adoption of more water-efficient technologies and of water-saving strategies (e.g., for irrigation, crop species, land cover, industries, domestic use) • Implementation of best practices and governance instruments in river basin management plans and integrated water management 		<p>Present</p> <p>Near term (2030–2040)</p> <p>Long term (2080–2100) 2°C 4°C</p>	<p>Very low Medium Very high</p> <p>Present: Risk level is Medium</p> <p>Near term: Risk level is Medium</p> <p>Long term: Risk level is Medium for 2°C, Very high for 4°C</p>
<p>Increased economic losses and people affected by extreme heat events: impacts on health and well-being, labor productivity, crop production, air quality, and increasing risk of wildfires in southern Europe and in Russian boreal region (<i>medium confidence</i>)</p> <p>[23.3-7, Table 23-1]</p>	<ul style="list-style-type: none"> • Implementation of warning systems • Adaptation of dwellings and workplaces and of transport and energy infrastructure • Reductions in emissions to improve air quality • Improved wildfire management • Development of insurance products against weather-related yield variations 		<p>Present</p> <p>Near term (2030–2040)</p> <p>Long term (2080–2100) 2°C 4°C</p>	<p>Very low Medium Very high</p> <p>Present: Risk level is Medium</p> <p>Near term: Risk level is Medium</p> <p>Long term: Risk level is Medium for 2°C, Very high for 4°C</p>

Main policy response: the EU Floods Directive

- Addressing diversity of flood events across Europe, such as river floods, flash floods, coastal floods
- Flexibility for planning and action at local / regional / sub-basin level while ensuring cooperation/coordination across the basin



Other relevant EU policy instruments

- **Blueprint to safeguard Europe's Water Resources**
 - Evaluation of existing policies and actions for coherence
 - Actions for **tackling the obstacles** which hamper safeguarding Europe's water resources
- **European Climate Change Adaptation Strategy – 2013**
 - Overall aim: More climate-resilient Europe
 - **Enhancing capacity to respond to impacts of climate change** at all levels (from local to EU)
 - Developing **a coherent approach**
 - Improving **coordination**



EU Research & Innovation

- **Sustained support to research on floods since the 1980s** (> 30 years of R&I projects)
- **Some key achievements:**
 - Improved **forecasting & early warning**, management of **structural defenses** and procedures to increase **public preparedness**
 - Assessment of **flood resilient technologies** and **flood risk reduction** practices in the **built environment**
 - Better assessment of **direct economic damage costs/first steps towards assessing indirect economic damage**
 - **New paradigms in flood risk reduction:** from response to long-term risk prevention

Examples of FP7 Research in support of flood-related policies, climate change adaptation & societal needs

IMPRINTS

Preparedness and risk management for **flash floods** and debris flow events



CORFU

Collaborative research on **flood resilience in urban areas**



STARFLOOD

Towards resilient **flood risk governance**



FLOODPROBE

Technologies for the effective **flood protection of the built environment**

RAMSES

Reconciling **Adaptation, Mitigation** and **Sustainable Development for citiES**

RISC-KIT

Resilience-Increasing Strategies for **Coasts** – toolKIT

Preparing for **extreme** and rare events in **coastal regions**

PEARL

Climate Change Adaptation & Disaster Risk Reduction in Horizon 2020 (1/2)

- **Horizon 2020 – Short background**
 - A single programme bringing together three separate programmes/initiatives (FP, CIP and EIT)
 - Coupling research to innovation – from research to retail, all forms of innovation
 - Focus on societal challenges facing EU society, e.g. health, climate, clean energy and transport
 - Simplified access, for all companies, universities, institutes in all EU countries and beyond
- **Societal challenge "Climate action, resource efficiency and raw materials", addressing floods as related to cc adaptation, water management, natural hazards and earth observation**

Climate Change Adaptation & Disaster Risk Reduction the Horizon 2020 (2/2)

Coordination & Support - closed

- Platform for bridging the gap between CCA and DRR, dialogue and synthesis (MS&EU), clustering and co-operation with international initiatives (e.g. UNEP/PROVIA), support to H2020 strategic programming

Research & Innovation - closed

- Standardisation of methods for vulnerability, risks and climate impact assessment
- Decision support tools for cost-effective adaptation

Innovation - 2015

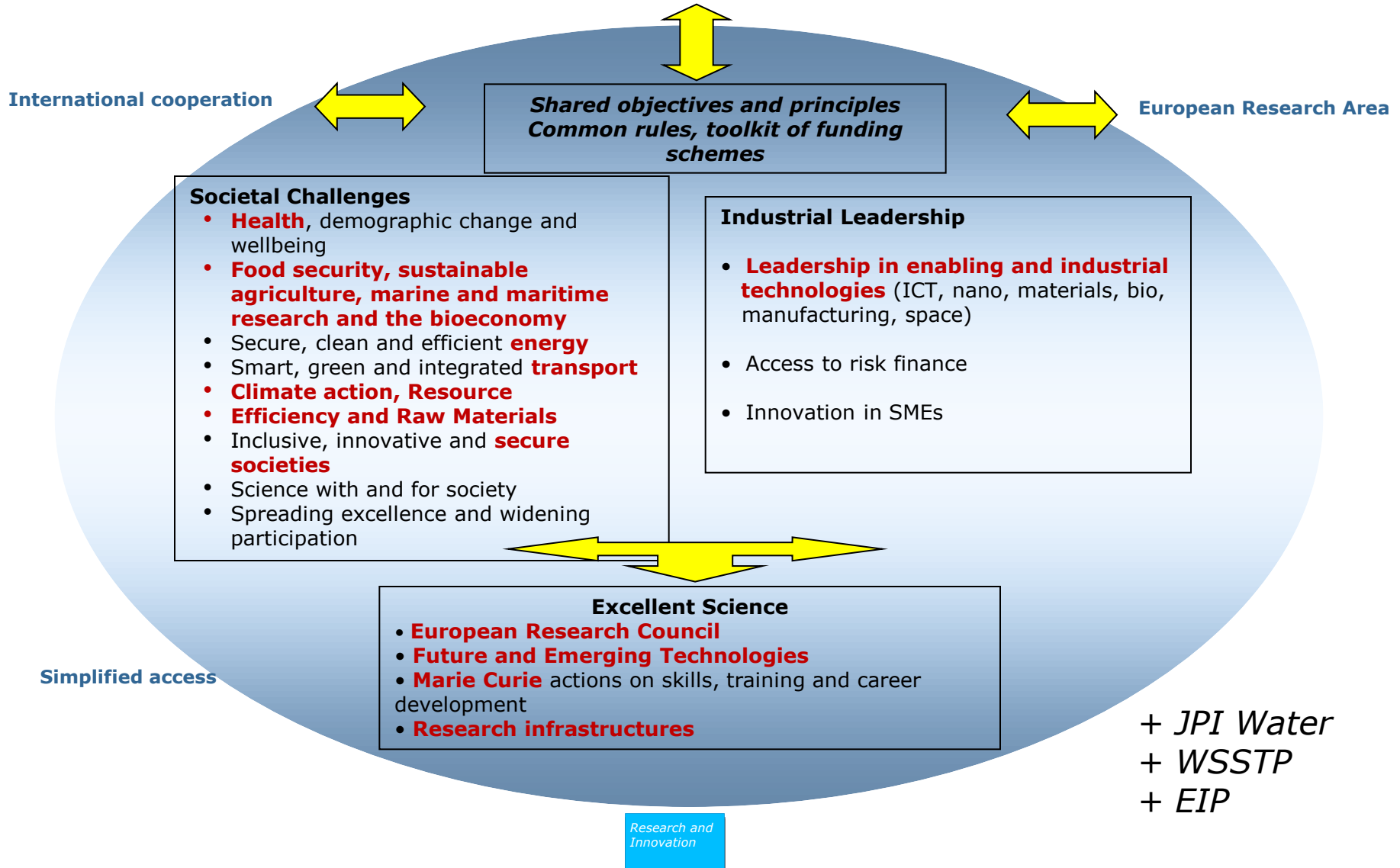
- Large scale demonstration activities on adaptation options (technological and non-technological) incl. ecosystem-based approaches (link with ESIF)

WATER in HORIZON 2020



European
Commission

Europe 2020 priorities





Horizon 2020 R&I on Water, Floods and Disasters Risk: The main drivers

- **International commitments** (e.g. post-Hyogo Framework for Action), **protocols, initiatives concluded by the EC and its Member States**
- **Existing and emerging EU environmental legislation and policies**, including the **WFD, Blueprint** to safeguard Europe's waters and **Floods Directive**
- Implementation of the **7th Environmental Action programme**, associated thematic strategies (e. g. soil) and action plans
- **Climate change impacts & adaptation**
- **Joint Programming Initiative** "Water challenges in a Changing World"
- **European Innovation Partnership** on Water
- Water related **ETPs** (WssTP, SusChem) and **PPPs** (SPIRE)
- Boost the **competitiveness** and **growth** of the **European water sector**



Mainstreaming of climate and sustainable development objectives

- **Climate action, resource efficiency and sustainable development** supported across the whole of Horizon 2020
- **At least 60%** of the overall Horizon 2020 budget should be related to **sustainable development**
- **Climate-related** expenditure should exceed **35%** of the overall Horizon 2020 budget



Strategic Programming 2016-2017 (1/2)

- Align with new **Commission's political orientations**;
- Transform **challenges** into **innovation** and **economic opportunities** contributing to **growth**, more and better **jobs**, industrial **competitiveness** for a **climate-smart** and **resource efficient economy**;
- Help **create markets** of the future with **supply** of and **demand** for **new systemic solutions**;
- Promote '**trans-disciplinary**' **approaches** involving **universities, private sector, policy makers, civil society** and **stakeholders** in **co-designing, co-developing and co-delivering R&I agendas and solutions**



Strategic Programming 2016-2017 (2/2)

- Promote **social innovation** and new **business models, financing, governance** and **policy-making**
- Fund **large-scale demonstration** projects as "**living labs**" to test, demonstrate, experiment, replicate and up-scale innovative solutions
- Use entire range of **H2020 funding instruments** (innovative public procurement, inducement prizes, R&I grants, market replication, new financial instruments ...).
- Promote **synergies** with **other sources of EU funding** (e.g. structural funds, LIFE programme, Future and Emerging Technologies, EIB financing...)

Strategic programme 2016-2017: draft SC5 scoping paper - priorities

- Orientations for 2016-2017

Main areas for investment:

- Systemic eco-innovation for a circular economy
- **Climate services**
- **Nature-based solutions**
- Raw materials

Other priority themes:

- ✓ **Earth observation**
- ✓ **Water**
- ✓ Cultural heritage for sustainable growth
- ✓ The Arctic

Future orientations (2015 and beyond)

- **Systemic eco-innovation**
- **Climate services**
 - Issue = Wide availability of climate projections but often not readily available to city planners
 - Response = Development of customised tools, products and climate information suitable for strategic planning to maximize its societal and economic value
 - A challenge-driven and solution-oriented approach, promoting the growth of a European market for climate services
- **Nature-based solutions** as means for climate-smart, sustainable and innovative adaptation



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<http://ec.europa.eu/programmes/horizon2020/>
- To be informed about the **European Research Area**
http://ec.europa.eu/research/era/index_en.htm

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