

EEA information on climate change impacts, vulnerability and adaptation

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Climate change impacts, vulnerability and adaptation

Group of experts on climate change impacts and adaptation for transport networks and nodes, 7th session, Geneva, 3-5 June 2015

EEA networking with member countries (Eionet)



EEA coverage

Member countries

Cooperating countries

*Kosovo under UNSCR 1244/99

- **33 member** and six collaborating **countries** (ministries and **environment agencies**)
- Main target audience: **policymakers** at European and national levels
- Supporting and informing policy development and implementation by **data, indicators and assessments** (e.g. on climate change impacts, vulnerability and adaptation)
- **Networking:** annual Eionet workshop, expert meetings
- Supported by **European Topic Centres**, e.g. on adaptation see: <http://cca.eionet.europa.eu/>

THE EUROPEAN ENVIRONMENT

STATE AND OUTLOOK 2015



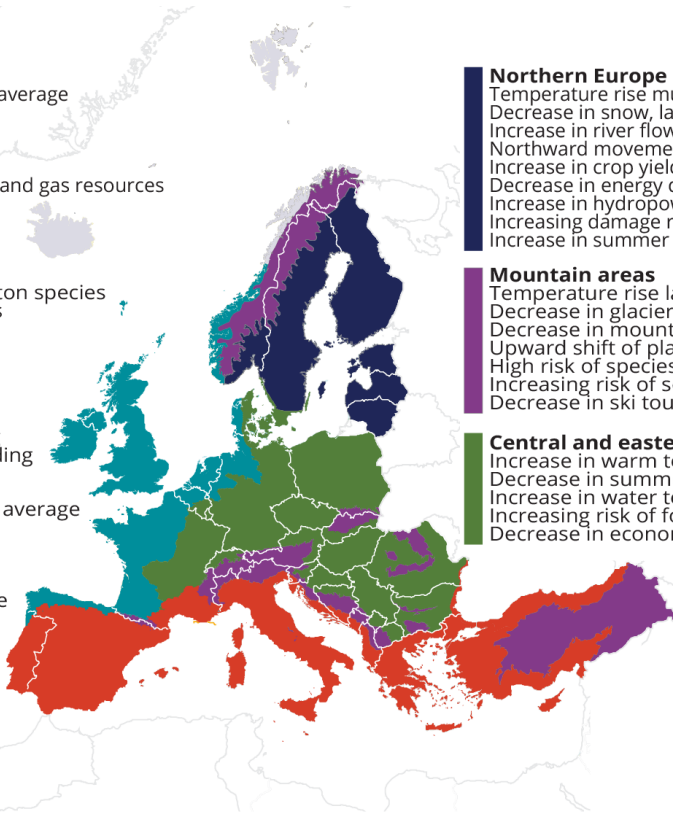
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Key observed and projected impacts from climate change for the main regions in Europe

SYNTHESIS REPORT	GLOBAL MEGATRENDS	EUROPEAN BRIEFINGS	COUNTRY COMPARISONS	COUNTRIES & REGIONS
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- Arctic**
 - Temperature rise much larger than global average
 - Decrease in Arctic sea ice coverage
 - Decrease in Greenland ice sheet
 - Decrease in permafrost areas
 - Increasing risk of biodiversity loss
 - Intensified shipping and exploitation of oil and gas resources
- Coastal zones and regional seas**
 - Sea-level rise
 - Increase in sea surface temperatures
 - Increase in ocean acidity
 - Northward expansion of fish and plankton species
 - Changes in phytoplankton communities
 - Increasing risk for fish stocks
- North-western Europe**
 - Increase in winter precipitation
 - Increase in river flow
 - Northward movement of species
 - Decrease in energy demand for heating
 - Increasing risk of river and coastal flooding
- Mediterranean region**
 - Temperature rise larger than European average
 - Decrease in annual precipitation
 - Decrease in annual river flow
 - Increasing risk of biodiversity loss
 - Increasing risk of desertification
 - Increasing water demand for agriculture
 - Decrease in crop yields
 - Increasing risk of forest fire
 - Increase in mortality from heat waves
 - Expansion of habitats for southern disease vectors
 - Decrease in hydropower potential
 - Decrease in summer tourism and potential increase in other seasons



- Northern Europe**
 - Temperature rise much larger than global average
 - Decrease in snow, lake and river ice cover
 - Increase in river flows
 - Northward movement of species
 - Increase in crop yields
 - Decrease in energy demand for heating
 - Increase in hydropower potential
 - Increasing damage risk from winter storms
 - Increase in summer tourism
- Mountain areas**
 - Temperature rise larger than European average
 - Decrease in glacier extent and volume
 - Decrease in mountain permafrost areas
 - Upward shift of plant and animal species
 - High risk of species extinction in Alpine regions
 - Increasing risk of soil erosion
 - Decrease in ski tourism
- Central and eastern Europe**
 - Increase in warm temperature extremes
 - Decrease in summer precipitation
 - Increase in water temperature
 - Increasing risk of forest fire
 - Decrease in economic value of forests

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Climate change impacts on ecosystems	Water use and water stress	Urban systems and grey infrastructure	Climate change & related envl. health risks
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Source: EEA (2012), Climate change, impacts and vulnerability in Europe 2012. An indicator-based report, EEA Report No 12/2012, European Environment Agency, Copenhagen, Denmark.

Related content



The EU CC adaptation strategy (2013)

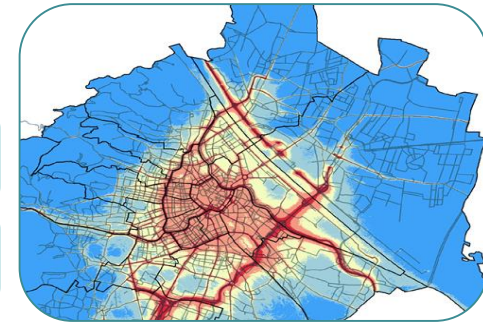
Priority 1: Promoting action by Member States

- Action 1.** Encourage MS to adopt Adaptation Strategies and action plans
- Action 2.** LIFE funding, including adaptation priority areas
- Action 3.** Promoting adaptation action by cities along the Covenant of Mayors initiative



Priority 2: Better informed decision-making

- Action 4.** Knowledge-gap strategy
- Action 5.** Climate-ADAPT



Priority 3: Key vulnerable sectors

- Action 6.** Climate proofing the Common Agricultural Policy, Cohesion Policy, and the Common Fisheries Policy
- Action 7.** Making infrastructure more resilient
- Action 8.** Promote products & services by insurance and finance markets



Some EU level action relevant for transport

- **20 % of the EU budget** is foreseen for climate change action (various EU funds are available)
- 2013 EU adaptation **strategy (action 7 ‘Making infrastructure more resilient’)**
- Adaptation to climate change is mentioned in the **2013 TEN-T guidelines**
- **European standardisation organisations** requested to map industry-relevant standards for transport infrastructure (outcome expected in 2016)
- European Commission **Guidance** (2013) for including adaptation in **Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA)**

EEA activities on climate change impacts, vulnerability and adaptation



Climate-ADAPT
European Climate Adaptation Platform

Home | Adaptation information | EU Adaptation Policy | Countries, regions, cities | Tools | Links | Search the database | Newsletter

About Climate Change Adaptation in Europe

The European Climate Adaptation Platform (Climate-ADAPT) aims to support Europe in adapting to climate change. It is an initiative of the European Commission and helps users to access and share information on:

- Expected climate change in Europe
- Current and future vulnerability of regions and sectors
- National and transnational adaptation strategies
- Adaptation case studies and potential adaptation options
- Tools that support adaptation planning

SEARCH THE CLIMATE ADAPTATION DATABASE

Search Term(s):
Keyword Search

Sectors: Agriculture and Forest; Biodiversity; Coastal areas

Country: Albania; Austria; Belgium

SEARCH

Advanced Search

Share your information

News

- 11 Feb 2015 Irish Climate Action Bill includes adaptation measures
- 11 Feb 2015 Adaptation indicators for Catalonia now published
- 10 Feb 2015 Guidelines on better water reuse in Europe

Events

- 3 Mar 2015, Be prepared: reducing the impact of extreme weather on people's lives, Brussels, Belgium
- 5 Mar 2015, Invasive plants & algae in our changing environment, Brussels, Belgium
- 16 Mar 2015, Launch of URBACT II programme, Brussels, Belgium

EU sector policies

- Agriculture & Forestry
- Water

EU information systems

- NATURES 4ADAPT
- WISE
- Biodiversity

Planned reports (2016):

- Monitoring and evaluation of national policies
- Impacts and vulnerability
- Urban adaptation

Supported by a European Topic Centre, see:
<http://cca.eionet.europa.eu/>

EEA networking and dissemination (2015)

- Annual **EIONET workshop** with all member and collaborating countries (Copenhagen, 15-16 June 2015)
- **Webinars** on Climate-ADAPT (e.g. April 2015 and autumn 2015)
- Dissemination of European Climate Adaptation **Newsletter since Jan. 2015**
- **Expert meetings** (e.g. on extreme weather and climate related events and on monitoring and evaluation of policies)
- Participation in the conferences e.g. the **second European Climate Change Adaptation Conference** 12-14 May 2015, Copenhagen, DK (<http://www.ecca2015.eu/>)

European Climate Adaptation Platform Climate-ADAPT

- **Supports** governmental policy and decision makers developing and implementing climate change adaptation strategies, policies and actions.
- **Complementary** to national and sectoral platforms.
- European Climate Adaptation - **newsletter** since January 2015.

The screenshot shows the homepage of the European Climate Adaptation Platform (Climate-ADAPT). The header includes the logo and navigation links: Home, Adaptation information, EU Adaptation Policy, Countries, regions, cities, Tools, Links, Search the database, and Newsletter. The main content area is divided into several sections:

- About Climate Change Adaptation in Europe:** A section with a large image of a modern building and a list of topics: Expected climate change in Europe, Current and future vulnerability of regions and sectors, National and transnational adaptation strategies, Adaptation case studies and potential adaptation options, and Tools that support adaptation planning.
- Adaptation support tool:** A section with a circular diagram and the text "New to adaptation? Use the Adaptation Support Tool".
- What are European countries doing?:** A section with a map of Europe and a "Choose a country" dropdown menu.
- Find case studies on adaptation in Europe:** A section with a map of Europe and a "GO" button.
- Share your information:** A section with a circular diagram and a "Share your information" button.
- News:** A section with a list of news items, including "21 mei 2014 Protecting farms from extreme weather with Agrirwizard guide" and "21 mei 2014 Presentations from Carpathian Convention WG on adaptation".
- Events:** A section with a list of events, including "27 Jun 2014, Sixth International Conference on Climate Change: Impacts and Responses, Reykjavik, Iceland" and "4 Jul 2014, Prepare your city for extreme weather events. Webinar".
- EU sector policies:** A section with a list of policies, including "Agriculture & Forestry" and "Water management".
- EU information systems:** A section with a list of information systems, including "MAYORS ADAPT" and "WISE".

<http://climate-adapt.eea.europa.eu>

Countries adaptation strategies and policies (to be updated after country reporting March 2015)

Climature-ADAPT | Sign In | Glossary | Contact | Sitemap | Legal notice | About | Help

European Climate Adaptation Platform

Search the website

Home | Adaptation information | EU Adaptation Policy | Countries, regions, cities | Tools | Links | Search the database | Newsletter

→ General → Countries → Transnational regions → Cities and towns



Choose a country

Germany

[Legal framework](#) | [Assessments](#) | [Priority sectors](#) | [Local actions](#) | [Summary](#) | [Contact](#)

German Adaptation Strategy (DAS)

In 2008 the Federal Government of Germany adopted the "German Strategy for Adaptation to Climate Change" (DAS; [pdf_en](#); [pdf_de](#)). It lays the foundation for a medium-term process to progressively identify the effects of global climate change, assess the risks, and develop and implement adaptation measures.

Adaptation Action Plan (APA) of the German Adaptation Strategy

To underpin this strategy with specific action, the DAS was followed by the "Adaptation Action Plan of the German Adaptation Strategy" (APA) in relation to climate change (APA; [pdf_en](#); [pdf_de](#)), adopted on 31.08.2011. The action plan commits to concrete steps in the further development and implementation of the DAS. It follows an integrated approach which takes account of the interactions between sectoral and regional activities and strives to anchor consideration of the possible impacts of climate change in all relevant policies.

Further information can be found on the webpages of Germany's Federal Ministry for the Environment, Nature Conservation Building and Nuclear Safety (BMUB; [Webpage_en](#)) leading the DAS process and the Federal Environment Agency (UBA; [Webpage_de](#); [Webpage_en](#)) including the UBA's "KomPass - Climate Impacts and Adaptation in Germany") information portal www.anpassung.net.

In the framework of the APA, KomPass transforms its webpage <http://www.anpassung.net> ([Webpage_en](#); [Webpage_de](#)) into a national Information, Communication and Cooperation Platform on Adaptation.

The UBA-KomPass portal is intended to serve the networking of information provision on adaptation activities and policy, and is being further expanded for this purpose in cooperation with other governmental agencies.

Furthermore, the Web portal forms the interface to the European Union's adaptation information portal (European Climate Adaptation Platform; [Climate-ADAPT](#)).

Sub-national (Länder) Adaptation Strategies

Information for cities

Key activity: DG CLIMA funded initiative launched in 2014 ‘Mayors adapt’; conference 16 Oct 2014 with more than 100 cities <http://mayors-adapt.eu/>

Climate-ADAPT <http://climate-adapt.eea.europa.eu/cities> (will include city profiles from MayorsAdapt from 2015)



European cities adapt to climate change, Open European Day (Bonn, May 2014)
<http://resilient-cities.iclei.org/bonn2014/open-european-day/>



EEA report 2012 (vulnerabilities; planning urban adaptation; multi-level governance)

New report due in 2016



Case studies (examples)

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Case study



Room for the River Waal – protecting the city of Nijmegen (2016)

The river Waal bends sharply and narrows near Nijmegen, the Netherlands. That the river may flood at high water as a result became clearly evident in 1993 and 1995. Adequate measures are necessary in order to protect the inhabitants of the city against this type of flooding and its impacts. In the case of Nijmegen, these measures involve moving the Waal dike at Lent and constructing an ancillary channel in the flood plains. This latter measure will create an island in the Waal and a unique urban river park in the heart of Nijmegen with room for living, recreational activities, culture, water and

nature.

→ Case Study Description

- [Challenges](#)
- [Objectives](#)
- [Adaptation Options Implemented In This Case](#)
- [Solutions](#)
- [Importance and Relevance of Adaptation](#)

→ Additional Details

- [Stakeholder Participation](#)
- [Success and Limiting Factors](#)
- [Costs and Benefits](#)
- [Legal Aspects](#)
- [Implementation Time](#)
- [Life Time](#)

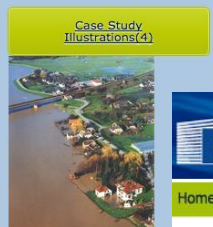
→ Reference Information

- [Contact](#)
- [Websites](#)

Case Study Description

→ [Challenges](#)

The River Waal is the largest river in The Netherlands. It is a lowland river starting at the Panmerdene Canal, where the River Rhine splits into the Lower Rhine and the Waal. Its width is 350-400m on average. The first part, until the city of Nijmegen, is characterised by broad meanders and a broad winter bed up to 2 km wide. The second part is narrower and only slightly meandering and the associated floodplains are also narrower.



Keywords

Nijmegen, room for the river, dike relocation, integrated approach, urban development

Sectors

Disaster Risk Reduction
 Urban
 Water management

Climate impacts

Flooding

Geographic characterisation

Europe:
 Macro-Transnational region: North Europe

Biographical regions:
 Atlantic

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Case study



Zaragoza: combining awareness raising and financial measures to enhance water efficiency (2014)

The Zaragoza Water Saving City programme was initiated in 1996 in response to water scarcity. It included awareness raising campaigns, the implementation of examples of good practice and voluntary public commitments by citizens and businesses. The water tariffs were revised to provide disincentives and incentives that ensure a full cost recovery whilst maintaining affordability for low income households. The programme also involved improvements to the water distribution infrastructure to reduce the waste of water. After 15 years the city achieved a reduction of water consumption by almost 30%, mainly due to changes in water use behaviour and is now known throughout the world as a leader in the field of water conservation. The city participated in the SWITCH project (Sustainable Water Management Improves Tomorrow's Cities' Health; 2006-2011) to further reinforce the commitment of the city to manage its water resources

sustainably.

→ Case Study Description

- [Challenges](#)
- [Objectives](#)
- [Adaptation Options Implemented In This Case](#)
- [Solutions](#)
- [Importance and Relevance of Adaptation](#)

→ Additional Details

- [Stakeholder Participation](#)
- [Success and Limiting Factors](#)
- [Costs and Benefits](#)
- [Legal Aspects](#)



Keywords

Water consumption, water saving, behaviour change, tariffs, incentives, leakages, mixed solutions

Sectors

Urban
 Water management

Climate impacts

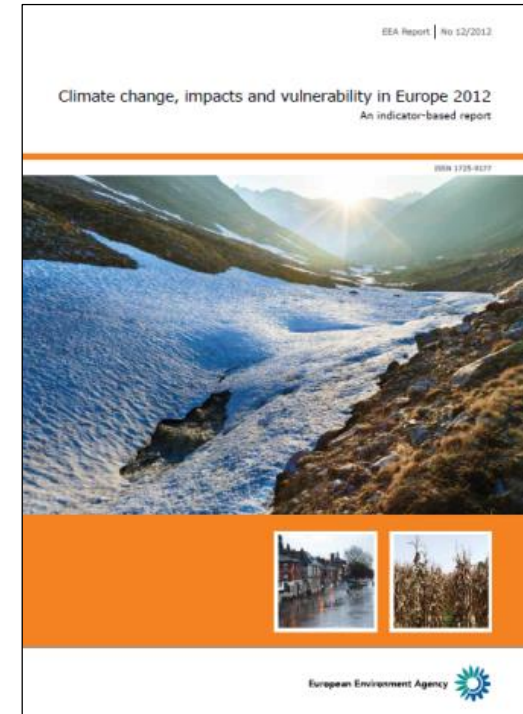
Water Scarcity
 Droughts

Geographic characterisation

Europe:
 Macro-Transnational region: South West Europe

2012 EEA indicator report on climate change, impacts and vulnerability

- **Coordination** by EEA
- **Authors and contributors (total 90):**
 - EEA and 3 European Topic Centres (CCA, ICM, BD)
 - Joint Research Centre (European Commission)
 - World Health Organisation (Regional Office for Europe)
 - European Centre for Disease Prevention and Control
 - Other organisations
- **External Advisory Group:**
EC, EEA SC, WHO, ECMWF, IPCC, AMAP/SWIPA, etc.
- **Content:**
Focus on indicators, but including additional information that is not suitable as EEA indicator
- **Data sources:**
International databases, European and other research projects, academic publications
- **Extent:**
300 pages, 42 indicators, >120 maps and figures



To be updated and new report published in 2016

National adaptation policy processes in Europe (EEA report published 14 Oct 2014)

- **Self-assessment** of 44 questions; 30 EEA member countries responded
- Mid 2013-mid 2014; two consultation processes of countries
- Key findings clustered around 8 Key Topics :
 - Public and policy awareness of the need for adaptation
 - Knowledge generation and use
 - Planning adaptation
 - Coordination of adaptation
 - Stakeholders involvement
 - Implementation of adaptation
 - Transnational cooperation
 - Monitoring, reporting and evaluation

EEA Report | No 4/2014

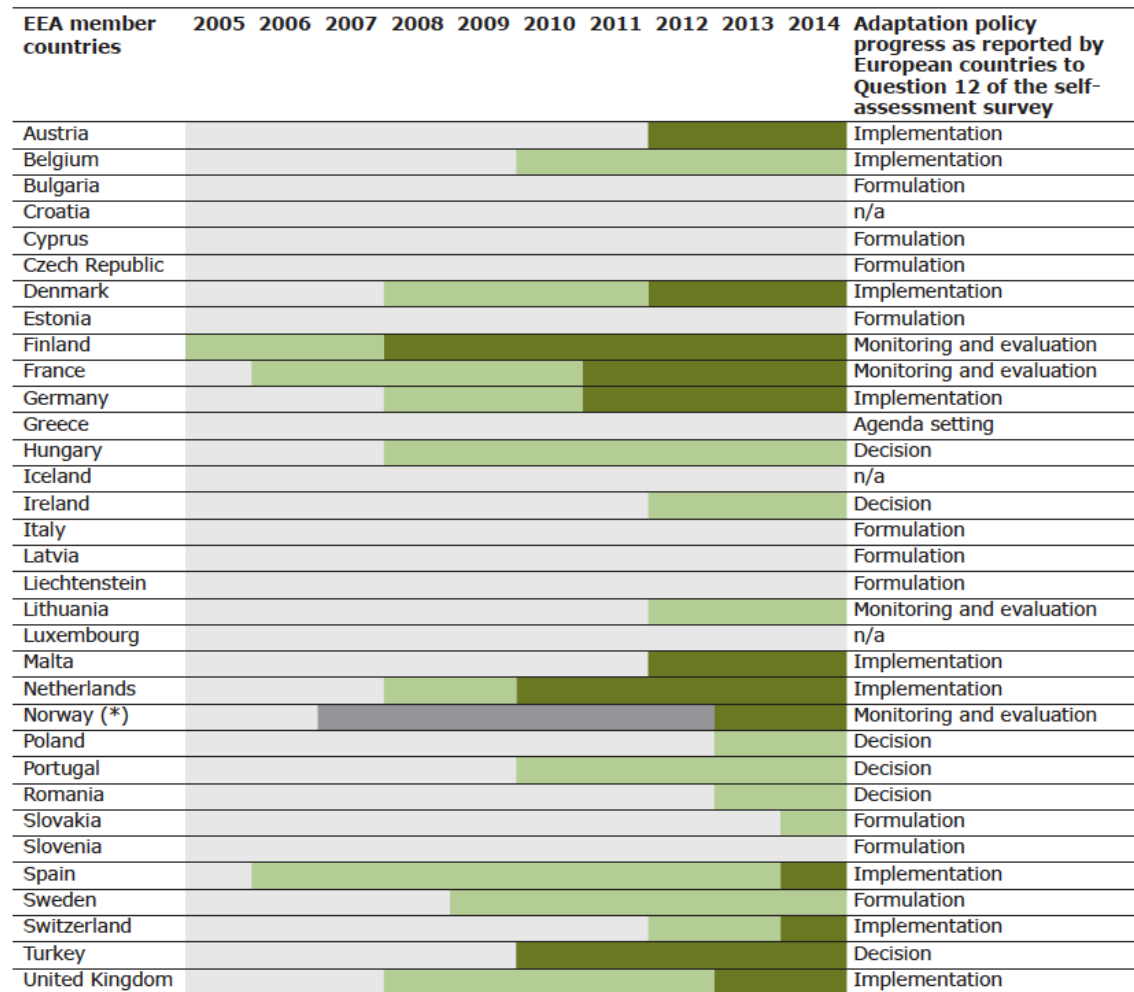
National adaptation policy processes
in European countries – 2014



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Overview of national and sectoral adaptation strategies and plans in Europe

- **21 countries have a national adaptation strategy** and 12 also have action plans (national and/or multi-sectoral)
- **13 countries report they are in the implementation or monitoring and evaluation stage**
- **Providing information and mainstreaming in sectors are the most reported policies**

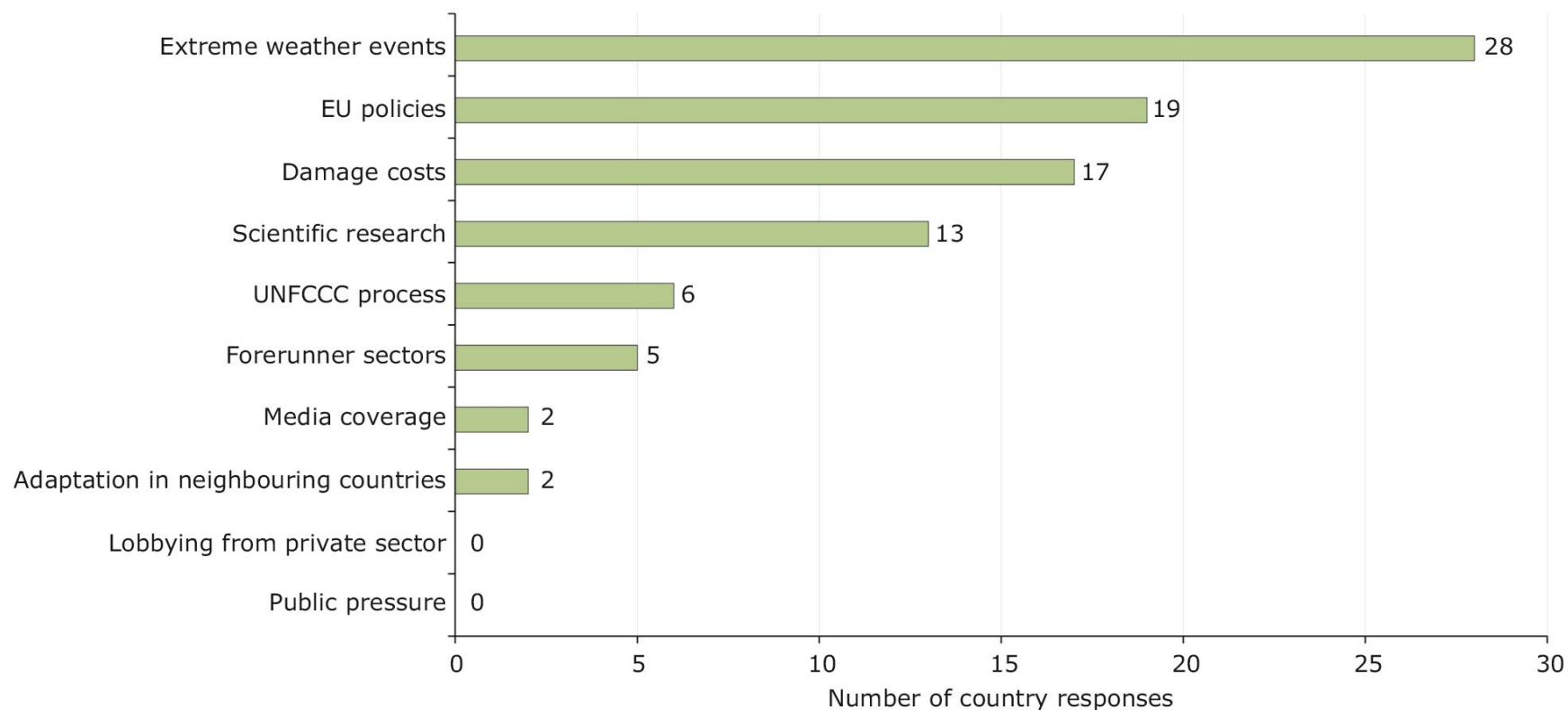


Note: No policy
 National adaptation strategy (NAS) in place
 National adaptation strategy (NAS) and national and/or sectoral adaptation plans (NAP/SAP) in place



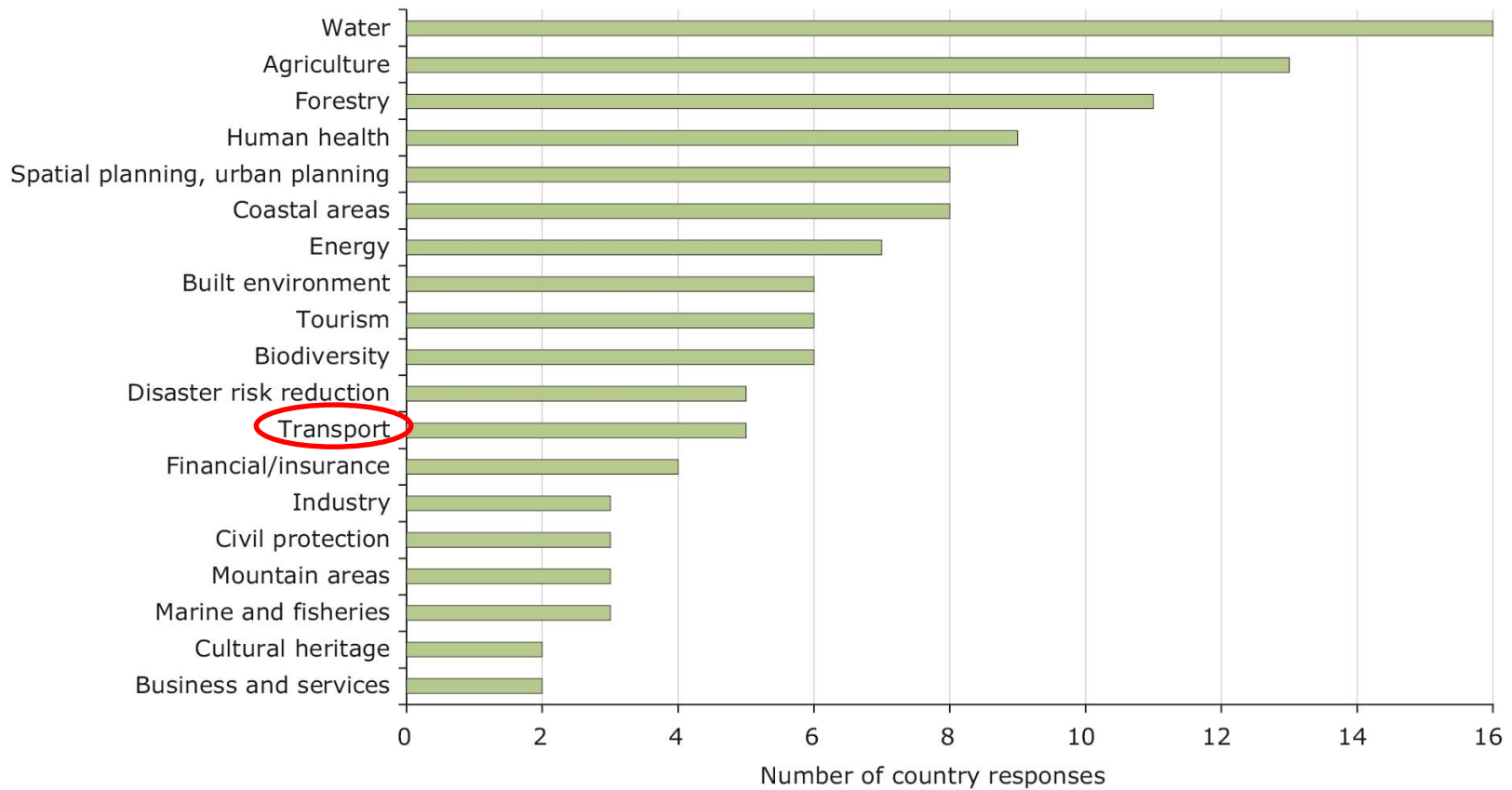
Main reasons for developing adaptation policies

Figure 2.1 Triggers of adaptation (Question 3; 30 responding countries; five countries identifying four triggers instead of three as requested)



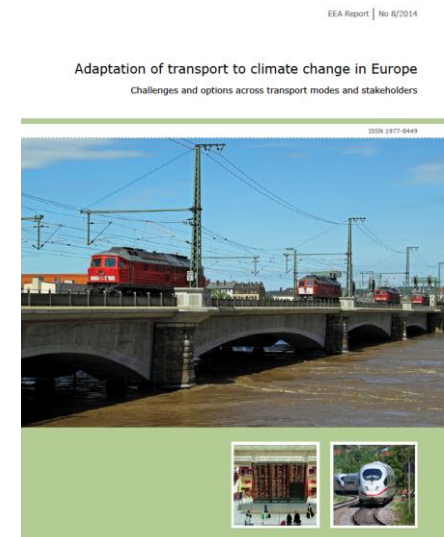
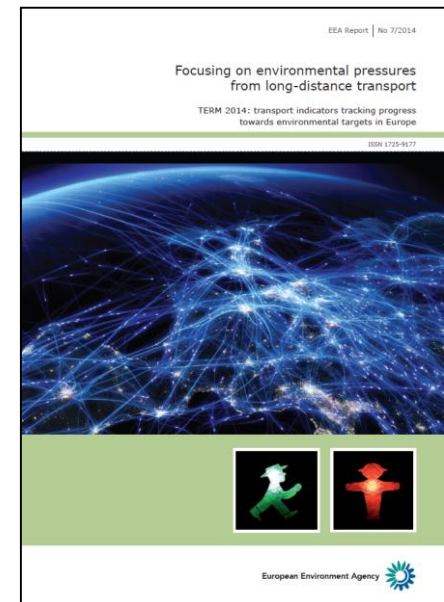
Priority sectors

Figure 2.16 Priority sectors for adaptation implementation (Question 31; 17 responding countries)



2014 EEA reports on 'Adaptation of transport to climate change in Europe' and on 'transport and environment' (annual)

- **Annual EEA assessment report** 'Transport and Environmental Reporting Mechanism' : **indicators and tracking progress to targets** (e.g. air quality, noise, greenhouse gas emissions) and a special focus in 2014 on impact of long-distance transport.
- **2014 report on adaptation of transport:**
 - Main challenges
 - State of action in countries
 - Examples of initiatives
 - Potential way forward
- **Information basis:** questionnaire to EEA member countries, Climate-ADAPT, literature review, case studies from stakeholders
- Initial report to **stimulate exchange of experiences**; not a comprehensive overview



Main messages EEA 2014 report on 'Adaptation of transport to climate change in Europe'

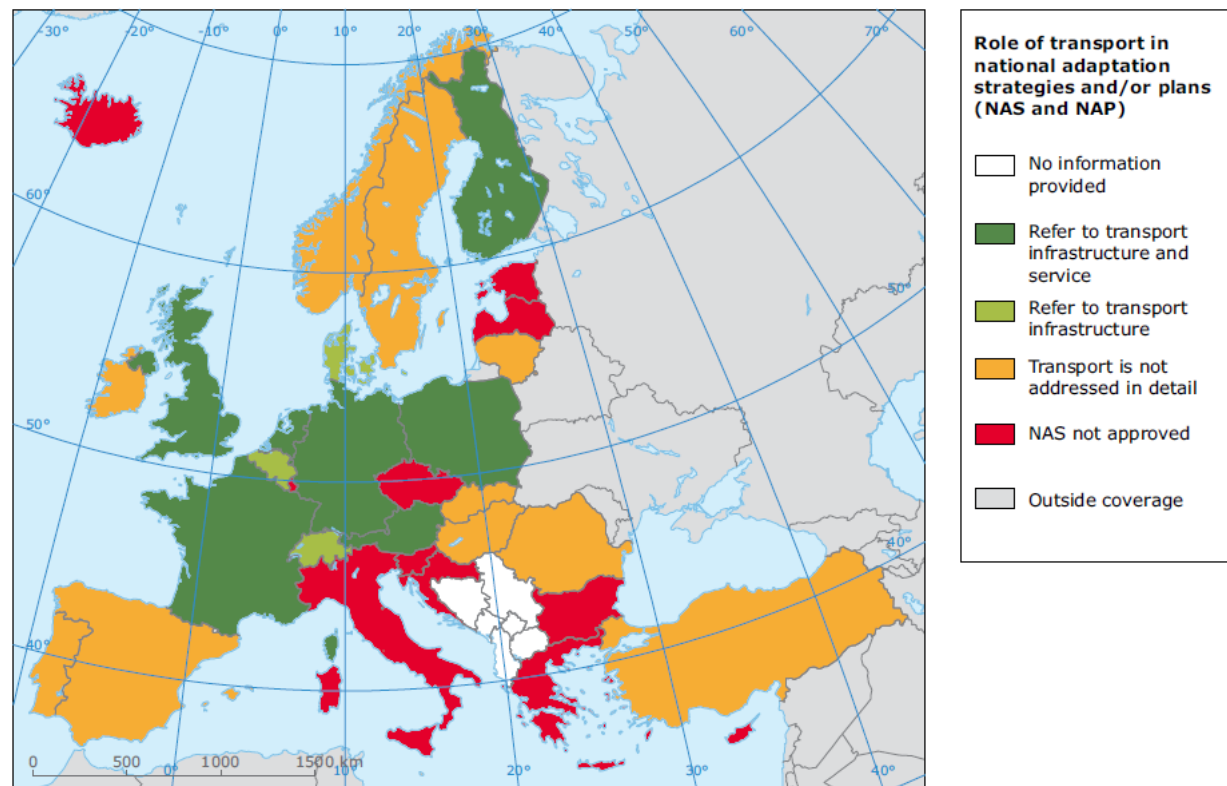
- Climate change **threatens to compromise transport services** that are indispensable for Europe's economy and society
- The **effects** of malfunction, disturbance and broken links **may stretch far beyond the originally affected area**
- Despite the key role of transport and the huge challenges posed by climate change, **attention to adaptation is as yet relatively low**
- Adapting the transport system **could require substantial infrastructure investments**; mainstreaming of adaptation in infrastructure planning is needed now
- **Low-cost options also exist**, but as yet are less in focus
- **Cooperation** between the many diverse stakeholders within and outside the transport sector can help achieve more **efficient and effective adaptation**
- The **EU and national governments** can create the **enabling framework and invest in the knowledge base**
- The magnitude of climate change and related socio-economic change suggests potential benefits from exploring **innovative options**
- Adaptation to climate change is a new policy area; the **effectiveness** of current steps **should be evaluated** in the future



State of action in EEA member countries

- The **transport** sector is addressed in many national adaptation strategies only to a **limited extent**
- Many refer to transport **infrastructure issues while few also include services** (e.g. alternative routes and means of transport, traffic management)
- Only **few countries** have started to **implement** adaptation measures in the transport sector and system
- **Rail, road, urban** are **addressed most**, but some also include aviation, waterborne and maritime transport
- **Some countries** started to revise **guidelines and standards**

Map 2.2 Role of transport in national adaptation strategies and/or plans (NAS and NAP)



Sources: ETC/CCA, 2013; EC and EEA, 2014; EEA, 2014b.

Examples of actions in the report

- **Making information accessible, assessing risks and vulnerabilities:**
 - National information platforms (various countries; see also the recent EEA report, published 12 May 2015)
 - Adaptation strategies for rail by SNCF (France), Deutsche Bahn (Germany)
 - Systematic data collections of disruption events under extreme weather for railways (Austria)
 - Cooperation between Network Rail and Met Office on impacts of climate change (United Kingdom)
 - Cooperation between transport stakeholders, hydrological and meteorological experts (Norway)
 - Research project and cooperation on inland and coastal water ways (Germany)
 - Stepwise approach of 'Road Network Climate Change Study' (Scotland)
 - Identification of flood-sensitive sections in road network (Sweden)
 - Local knowledge in the vulnerability study of Nice Airport (France)
- **Operational tools; infrastructure design, construction and management; operations and services:**
 - Tool for coping with natural hazards and extreme weather in aviation (EUROCONTROL)
 - Dealing with disruption of rail services and other emergencies (Austria)
 - Contingency plan for Copenhagen Airport (Denmark)
 - Revision and application of railway drainage standards (United Kingdom)
 - Urban transport: new design standards for Copenhagen Metro (Denmark)
 - Climate-proof expansion of the Port of Rotterdam (Netherlands)
 - Technological innovation: new locks in the Albert Canal in Flanders (Belgium)
 - Reconstruction of the Dawlish railway line (United Kingdom)
 - Adjusting rail operations by RENFE (Spain)

Key messages from examples of actions

- Most practical examples of adaptation action in the transport sector and system that can be found across Europe focus on **early steps** like collecting the knowledge, and tailoring **climate change impact information and assessments**.
- **Tools and measures** developed to **manage risks from natural hazards**, including early warning systems and contingency plans, can be useful for climate change adaptation too; however, there are only **few examples of implementation** in the transport sector/system.
- **Most adaptation action** focuses on climate-proofing transport **infrastructures**; relatively little attention is given so far to transport operations.
- Only a **few examples** are found that search for **innovative solutions** across different transport modes, transport as part of broader adaptation plans, or outside traditional paths — e.g. by considering relocation, building redundancies, or changing services to accommodate current and future accessibility demands.
- Effective **cooperation** between stakeholders inside and outside the transport sector **can help** to make use of the knowledge gained in other sectors and to find tailored, innovative and effective solutions to adapt transport.
- **Integrating** adaptation requirements into the **design of new and upgraded infrastructure comes at lower cost** than adding them at a later stage.

Ways forward to a resilient transport system

- Need for an adaptation approach with a **long-term and systemic perspective**, thus also preventing possible lock-ins into unsustainable development paths
- Use of **new technology** and also implementation of alternative approaches for **managing transport demand and supply** is important
- A **flexible transport structure** can help, e.g. by providing functionally redundant options
- **Incremental and fundamental changes** to be employed **complementary**
- The EU Framework Programme for **Research and Innovation** (Horizon 2020), and similar national activities can help enhance knowledge base and **information systems** can promote use and sharing
- **Engagement of all main stakeholders** in the transport sector/system is important
- More attention is needed to **adapting transport services in addition to adapting transport infrastructure**
- Adaptation measures (overall and in the transport sector) should be further **monitored and evaluated**

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<http://climate-adapt.eea.europa.eu/>

<http://www.eea.europa.eu/soer>

