European information on climate change impacts, vulnerability and adaptation (Climate-ADAPT and other EEA products and services)
EEA networking with member countries (Eionet)

- **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**

- **Networking**: annual Eionet workshop, expert meetings

- Supported by **European Topic Centres**, e.g. on adaptation see: [http://cca.eionet.europa.eu/](http://cca.eionet.europa.eu/)
EEA products and services on climate change impacts, vulnerability and adaptation 2014-2016

2014

- National adaptation policy processes in European countries — 2014

2014

- Adaptation of transport to climate change in Europe
  - Challenges and options across transport modes and stakeholders

2015

- Overview of climate change adaptation platforms in Europe

2015

- National monitoring, reporting and evaluation of climate change adaptation in Europe

2016 assessment reports

- Urban adaptation
- Climate change, impacts and vulnerability

All supported by a European Topic Centre, see: [http://cca.eionet.europa.eu/](http://cca.eionet.europa.eu/)
2016 EEA report on climate change, impacts and vulnerability

• **Previous reports:** 2004, 2008 and 2012

• **Content:**
  • Assessing impacts of past and future climate change
  • Climate impacts on socio-economic sectors, ecosystems, and health
  • Vulnerability to climate change

• **Authors and contributors:**
  • EEA and European Topic Centres
  • Joint Research Centre (European Commission)
  • World Health Organisation
  • European Centre for Disease Prevention and Control

• **Data sources:**
  • International databases and reports
  • (European) research projects and data centres

• **Reviews:**
  • Advisory Group and experts (autumn 2015)
  • Eionet review (February/March 2016)

**To be published end 2016**

*Update and extension of the 2012 EEA report*
Key observed and projected impacts from climate change for the main regions in Europe

**Arctic**
- Temperature rise much larger than global average
- Decrease in Arctic sea ice coverage
- Decrease in Greenland ice sheet
- Decrease in permafrost areas
- 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

## Indicators in the 2016 EEA CCIV report

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<tr>
<th>Topic</th>
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<tbody>
<tr>
<td>Atmosphere</td>
<td>- Global and European temperature&lt;br&gt;- Heat extremes&lt;br&gt;- Mean precipitation&lt;br&gt;- Heavy precipitation&lt;br&gt;- Wind storms&lt;br&gt;- Hail</td>
<td>Economic impacts of extreme events</td>
<td>- Damage from extreme weather and climate events</td>
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<td>Cryosphere</td>
<td>- Arctic and Baltic sea ice&lt;br&gt;- Greenland and Antarctic ice sheet&lt;br&gt;- Glaciers&lt;br&gt;- Snow cover</td>
<td>Human health</td>
<td>- Floods and health&lt;br&gt;- Extreme temperatures and health&lt;br&gt;- Vector-borne diseases&lt;br&gt;- Water- and food-borne diseases</td>
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<td>Oceans and marine environment, coastal areas</td>
<td>- Ocean acidification&lt;br&gt;- Ocean heat content&lt;br&gt;- Sea surface temperature&lt;br&gt;- Distribution shifts of marine species&lt;br&gt;- Ocean oxygen content&lt;br&gt;- Global and European sea level rise</td>
<td>Agriculture</td>
<td>- Growing season&lt;br&gt;- Agrophenology&lt;br&gt;- Water-limited crop productivity&lt;br&gt;- Crop-water demand</td>
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<td>Freshwater</td>
<td>- River flow&lt;br&gt;- River floods&lt;br&gt;- Meteorological and hydrological droughts&lt;br&gt;- Water temperature</td>
<td>Energy</td>
<td>- Heating and cooling degree days</td>
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<td>Terrestrial ecosystems</td>
<td>- Soil moisture&lt;br&gt;- Animal and plant phenology&lt;br&gt;- Distribution shifts of animals and plants&lt;br&gt;- Forest composition and distribution&lt;br&gt;- Forest fires</td>
<td>Transport</td>
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*Red: New or substantially expanded indicator*  
*Green: EEA core set indicator*  

[EEA web site: http://www.eea.europa.eu/data-and-maps/indicators/#c5=climate&c7=all&c0=10&b_start=0]
Key findings from the draft indicator-based summary

- All key findings from the 2012 EEA CCIV report were confirmed
- Some **new indicators** were included in the 2016 report (e.g. hail, ocean dead zones, cooling demand)
- Some **unprecedented climatic conditions** (e.g. all-time records in global and European temperature broken in 2014 and again in 2015)
- **Acceleration** of some climatic **trends** (e.g. ice sheet decline, sea-level rise)
- **Progress in attribution** of some observed climatic changes (e.g. statistical attribution of extreme climate events)
- **New quantitative projections** for some climate variables (e.g. cryosphere)
- More evidence of **future increases in climatic hazards** in some regions (e.g. heat waves, droughts, top wind speeds, storm surges)
- Progress in climatic **attribution** of some **observed impacts** (e.g. changes in forest species, establishment of invasive species, disease outbreaks)
Methods for climate change impacts, vulnerabilities and risks


Source: UNEP/Global Programme of Research on Climate Change Vulnerability, Impacts and Adaptation(PROVIA), Guidance on Assessing Vulnerability, Impacts and Adaptation to Climate Change (2013)
Progressive and very strong increase in overall climate hazard especially in south-western regions.

Key hotspots emerge particularly along coastlines and in floodplains.

Damages could triple by the 2020s, multiply six-fold by mid-century, and amount to more than 10 times present damages by the end of the century.

Economic losses are highest for the industry, transport and energy sectors. The strongest increase in damage is projected for the energy and transport sectors, and for EU investments in environment and tourism.

Floods currently account for approximately half of climate hazard damages, but in the future droughts and heatwaves may become the most damaging hazards.

Substantial resources may be required to increase the resilience of critical infrastructures and EU regional investments against future climate.

Impact and adaptation costs do not fall equally across Europe. Southern and south-eastern European countries will be most impacted.
Projected increase in exposure to multiple climatic hazards

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<th>2020s</th>
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Hazards considered:
- Heat and cold waves
- Coastal flooding
- River flooding
- River droughts
- Wildfires
- Windstorms

Source:
ENHANCE project / CCMFF project (Forzieri et al., 2016)
National adaptation policy processes in Europe (EEA report, 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
Overview of national and sectoral adaptation strategies and plans in Europe (EEA report, 2014) + updated information

- **23 countries** have a national adaptation strategy and 12 also have action plans (national and/or multi-sectoral)

- **Some countries** report they are in the implementation or monitoring and evaluation stage

- **Providing information and mainstreaming** in sectors are the most reported policies

- **Main drivers**: extreme weather events and damage costs, EU policies, research

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

* Norway had a NAP before a NAS
Figure 2.16 Priority sectors for adaptation implementation (Question 31; 17 responding countries)

- Water
- Agriculture
- Forestry
- Human health
- Spatial planning, urban planning
- Coastal areas
- Energy
- Built environment
- Tourism
- Biodiversity
- Disaster risk reduction
- Transport
- Financial/insurance
- Industry
- Civil protection
- Mountain areas
- Marine and fisheries
- Cultural heritage
- Business and services

Number of country responses
Main messages EEA 2014 report on ‘Adaptation of transport to climate change in Europe’

- Climate change **threatens** to compromise **transport services**
- The **effects** of malfunction, disturbance and broken links may stretch far beyond the originally affected area
- **Attention** to adaptation is as yet **relatively low**
- Adapting could require **substantial infrastructure investments**; mainstreaming in infrastructure planning is needed now
- **Low-cost options also exist**, but as yet are less in focus
- **Cooperation** between the many diverse stakeholders can help achieve more **efficient and effective adaptation**
- The **EU and national governments** can create the **enabling framework** and invest in the **knowledge base**
- Potential benefits of exploring **innovative options**
- **Effectiveness** of current steps should be **evaluated** in the future
Examples of actions in the report

Making information accessible, assessing risks and vulnerabilities:

- National information platforms (various countries; see also the EEA report, published 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)
European Climate Adaptation Platform Climate-ADAPT

Scope:
- Launched 2012, supports developing and implementing adaptation strategies, policies and actions
- Complementary to national, other platforms

Intended Users:
- Experts and decision makers on EU, transnational, national, sub-national levels, research institutes

Maintenance:
- Funded and carried out by EEA with DG CLIMA, supported by ETC/CCA

Dissemination and sharing:
- Bimonthly newsletter
- Webinars
- Conferences, workshops

http://climateadapt.eea.europa.eu
Selecting knowledge in line with the governance level

**Climate-ADAPT**
Main EU funded research projects

**Transnational platforms:**
projects relevant from transregional perspective

**National platforms:**
National adaptation research databases
Interaction with users and information providers

Transparency towards all stakeholders:
• via 5-year work plan

Personal interaction with users:
• Annual meeting with countries
• Webinars with users; e.g. on case studies

Personal interaction with information providers:
• Webinars, e.g. with research community
• New webinar autumn 2016

Regular promotion of new content and functionalities:
• Bimonthly newsletter
Disseminate platform news via the adaptation newsletter

European Climate-Adaptation Platform (Climate-ADAPT)
European Climate Adaptation Newsletter

Dissemination of Climate-ADAPT news
Key features of Climate-ADAPT

- Database search
- EU policy and funding
- Adaptation support tool
- Country profiles
- Cities
- Tools
- Search for case studies

European Climate Adaptation Platform

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

About Climate Change Adaptation in Europe

Read more
EU sector policies and adaptation

- Agriculture
- Forestry
- Health
- Biodiversity
- Water management
- Urban
- ...

Description of EU policies with links to key resources and indicators at European scale

European countries adaptation policies

- Presenting official information based on **country reporting** (Art. 15 EU MMR)
- Unique **summary** of national policies, assessments, sectors and actions, stakeholder involvement
- Web-based template with **links** to key **national documents** and official web-pages
Interactive urban vulnerability maps and city information

- Interactive **map book** based on European data presenting urban climate change threats (heat waves, urban flooding, water scarcity, forest fires)

- **City profiles** (see also Covenant of Mayors, http://www.covenantofmayors.eu/)

Options to use the maps ...

As a starting point, the indicated vulnerabilities will encourage stakeholders at European, national and city level to explore each situation in further detail, with more and local information. Furthermore, the map book enables cities to locate other cities with similar circumstances, as a starting point for sharing knowledge and experience. It allows clusters and hotspots for which national and European level actors can develop more tailored support. Finally, the map book provides a simple framework for urban vulnerability indicators, and indicates where further information is needed at local level, in order to make more detailed specific assessments.

... while recognising their limitations

The map book cannot provide a full and comprehensive picture, and the following limitations must be taken into account.
Case studies

- Successful and verified implemented adaptation approaches
- Metadata sheet with easy access to all aspects of planning and implementation
- Including images and documents
- Searchable via filter criteria and/or an interactive map based search tool
Changing approaches and actions across levels

• **Policymakers (EU, national, cities):** *from* strategies *towards* implementation and monitoring/evaluation.

• **Research and boundary organisations:** *from* climate change and impacts observations and projections *towards* vulnerability/risk assessments, climate and adaptation services and co-creation of knowledge.

• **Practitioners and businesses:** *from* awareness raising *towards* innovative solutions and investments (green and blue measures, enhancing quality of life and protecting ecosystems).

• **Collaboration and partnerships:** *from* meetings *towards* a community and linking different networks and sharing e.g. by knowledge platforms.
For info or further questions on this seminar and the activities of the JASPERS Networking Platform, please contact:

JASPERS Networking and Competence Centre

jaspersnetwork@eib.org

www.jaspersnetwork.org