DestinE and European policy priority needs – example on drought and agriculture

Eva Ivits | 3rd DestinE User eXchange | 15-16 October 2024

European Environment Agency

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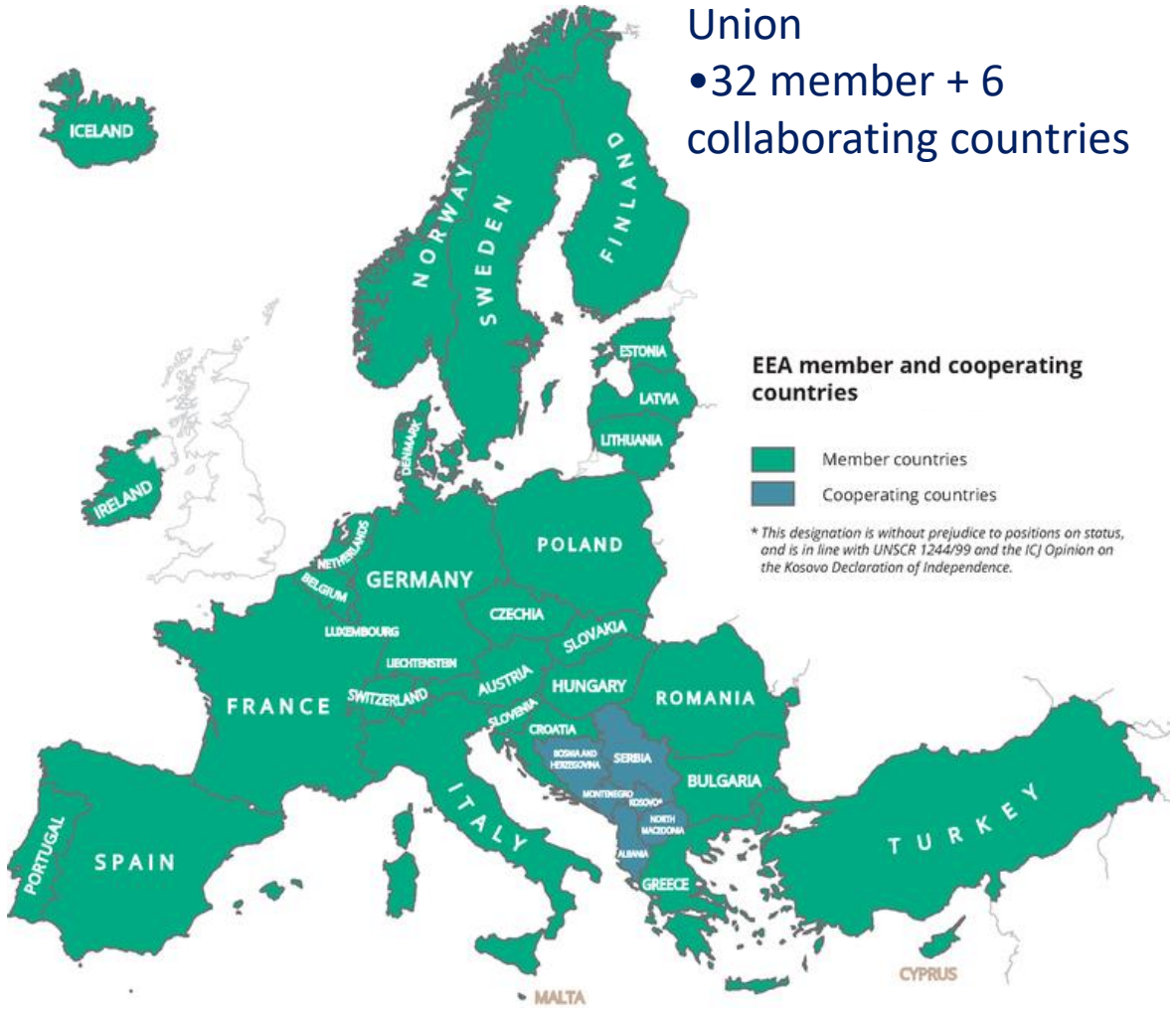
EEA **gathers** various data and information across Europe, **combines** and **translates** them into transparent messages to **inform** EU policy and decision-making.

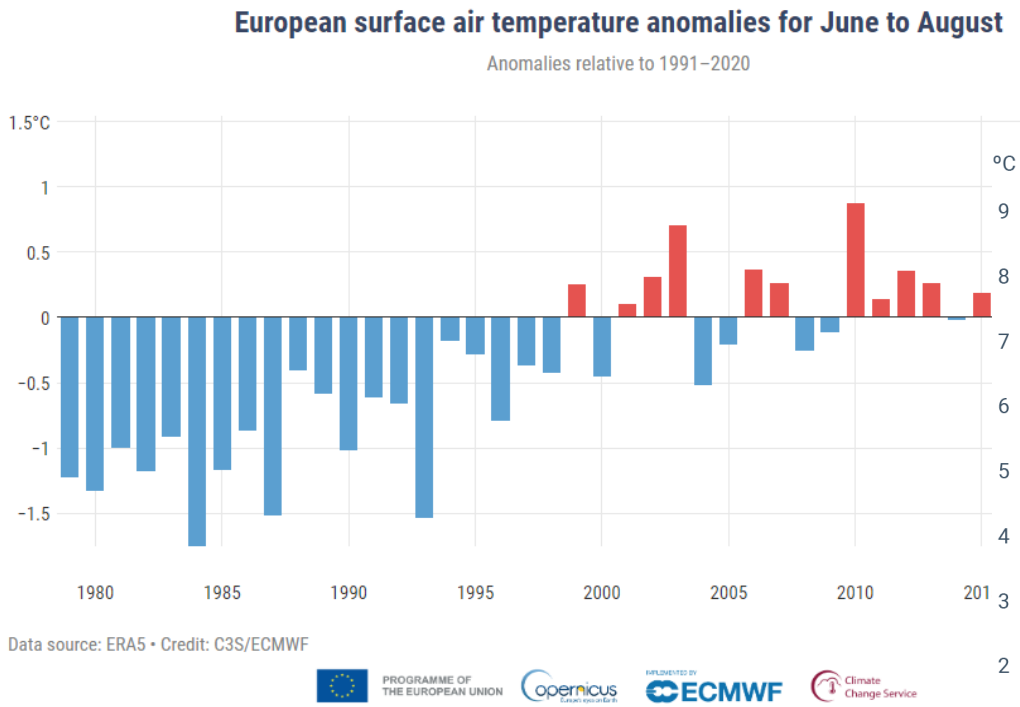
EEA Climate Change Impacts & Adaptation:

- Provides policy support on climate change hazards, resilience, impacts and risks;
- Supports development and implementation of (sub-) national adaptation strategies

- Agency of the European Union
- 32 member + 6 collaborating countries



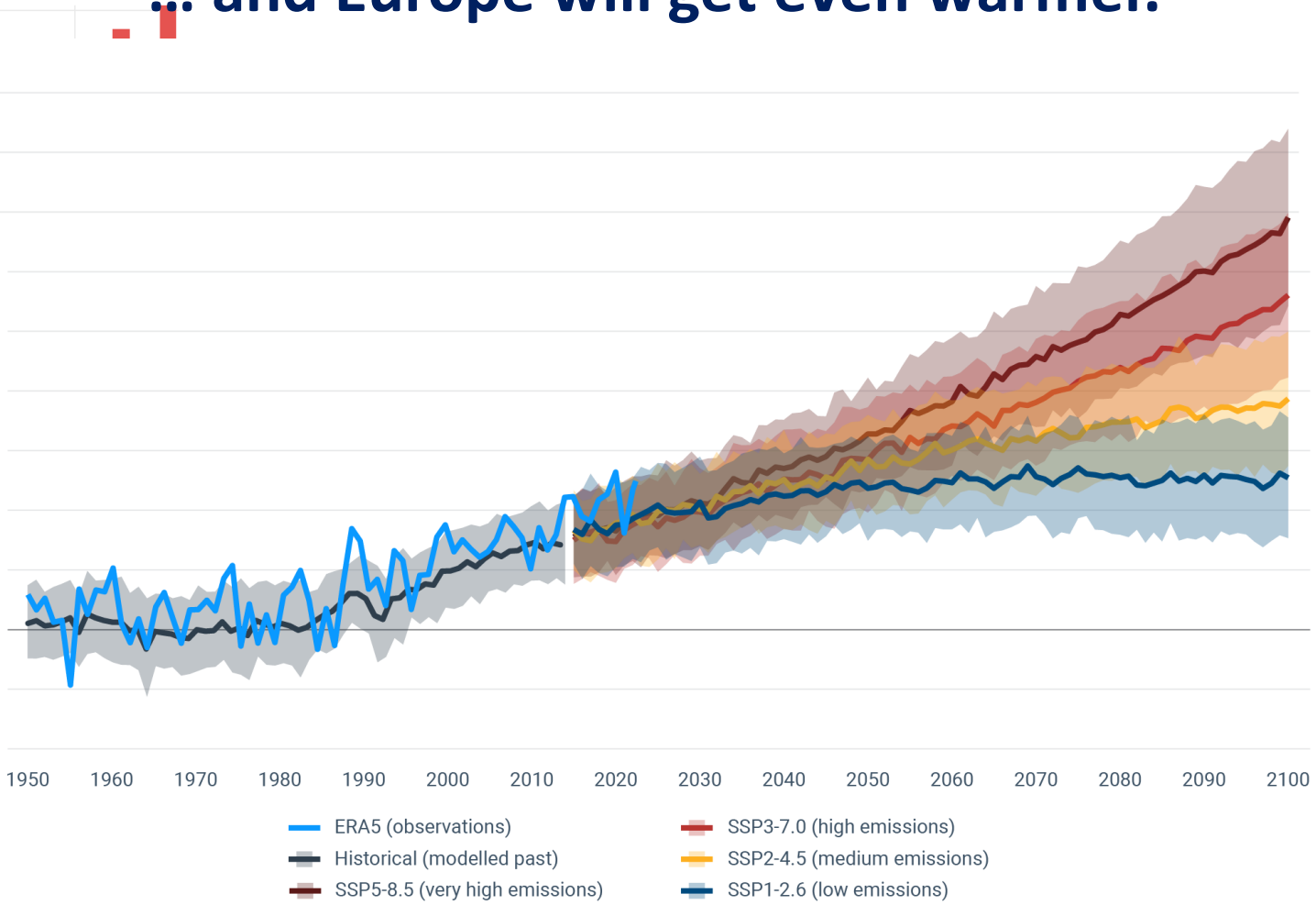
DestinE input to EU policy making: Global warming continues …



European mean surface air temperature anomalies relative to 1991–2020 for each boreal summer (
1979 to 2024. Data source: ERA5. Credit: Copernicus Climate Change Service/ECMWF

Source: Copernicus Climate Change Service

… and Europe will get even warmer.



Source: Copernicus climate change service based on CMIP6

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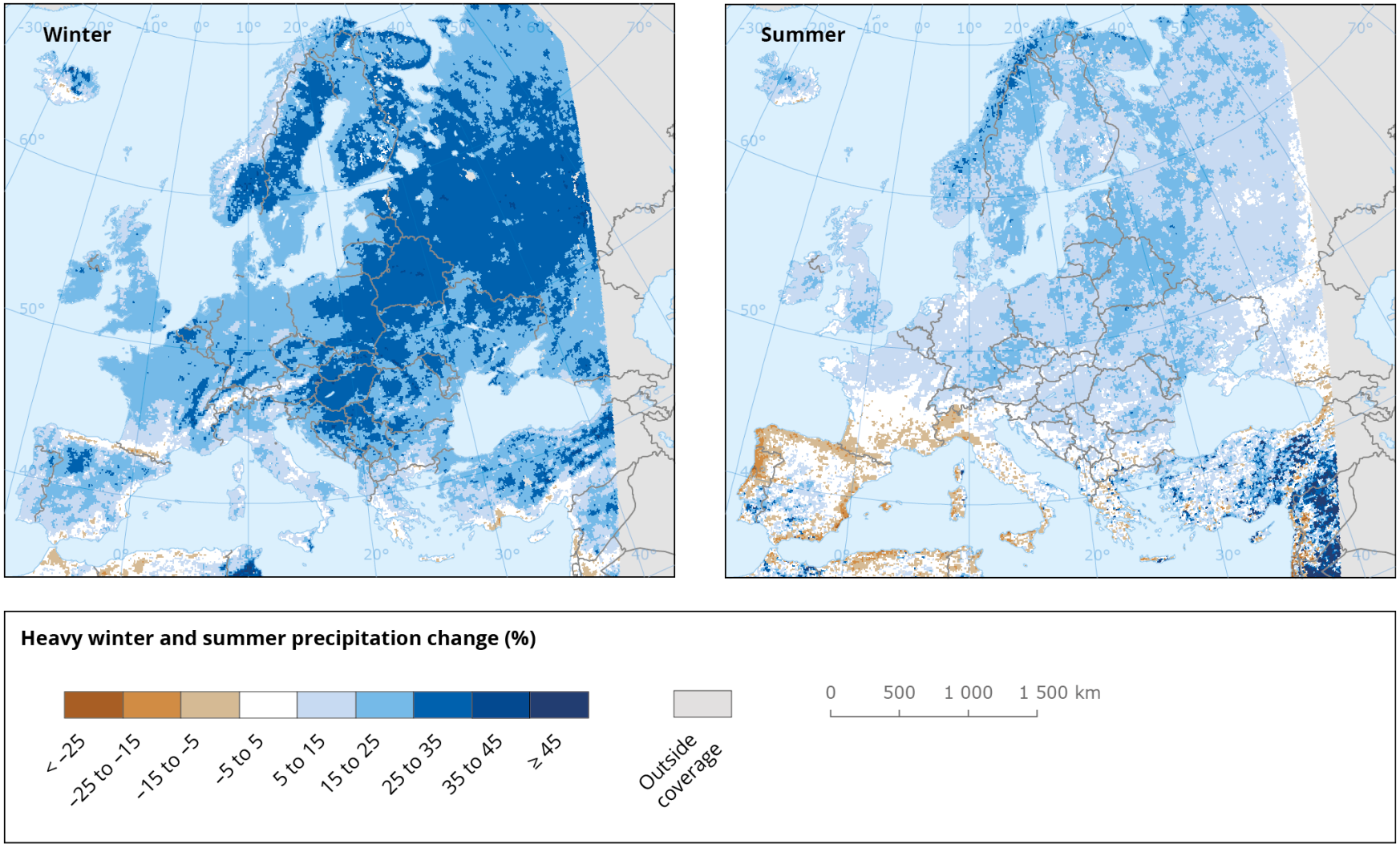
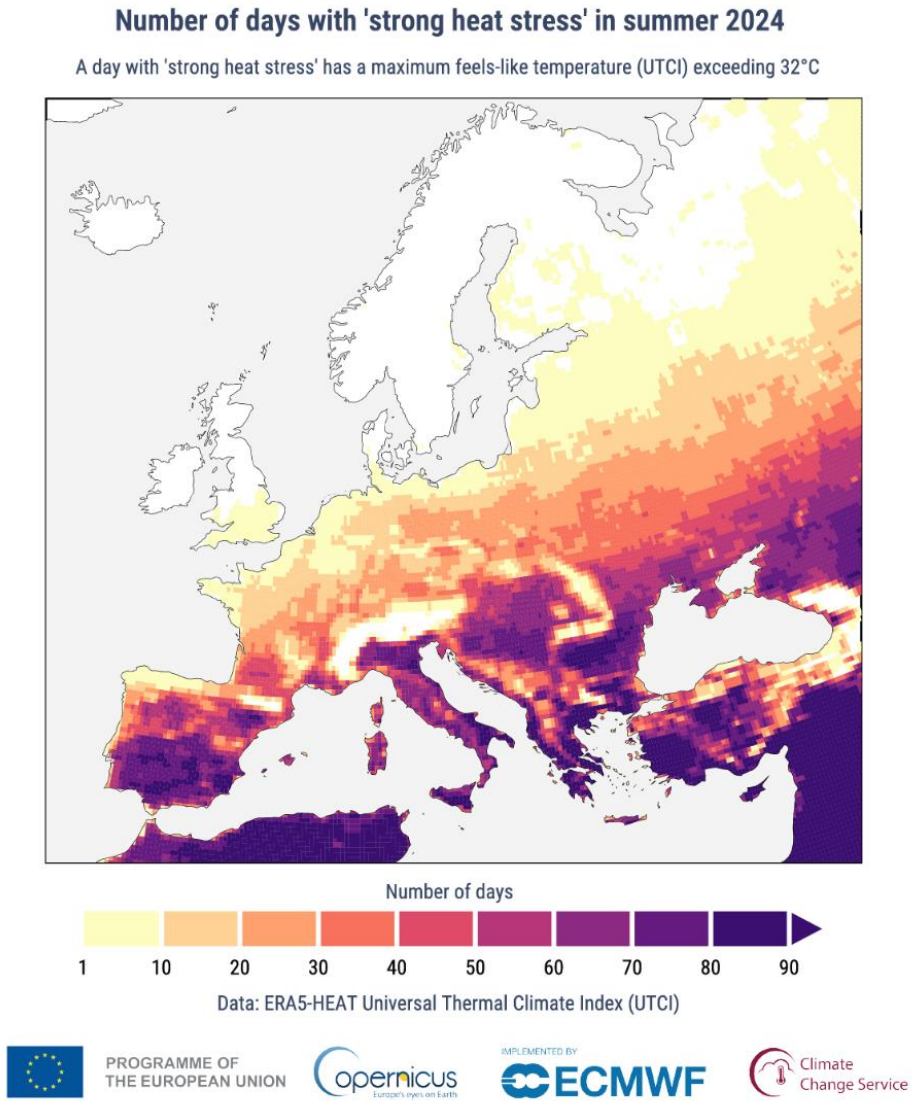
More winter flooding and summer droughts, ...

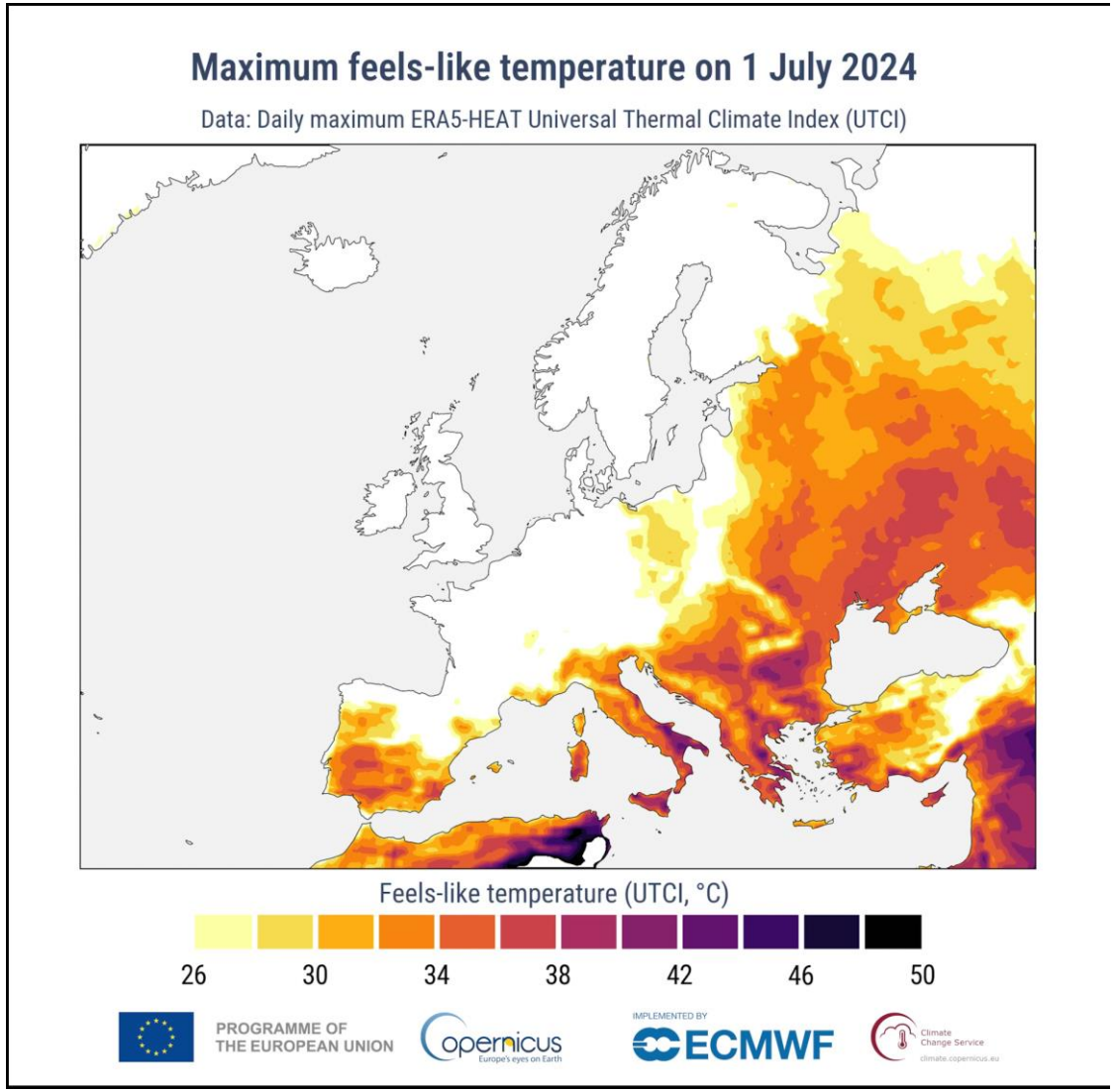
Winter and summer heavy rain (projected change for 2080s, high emissions scenario)



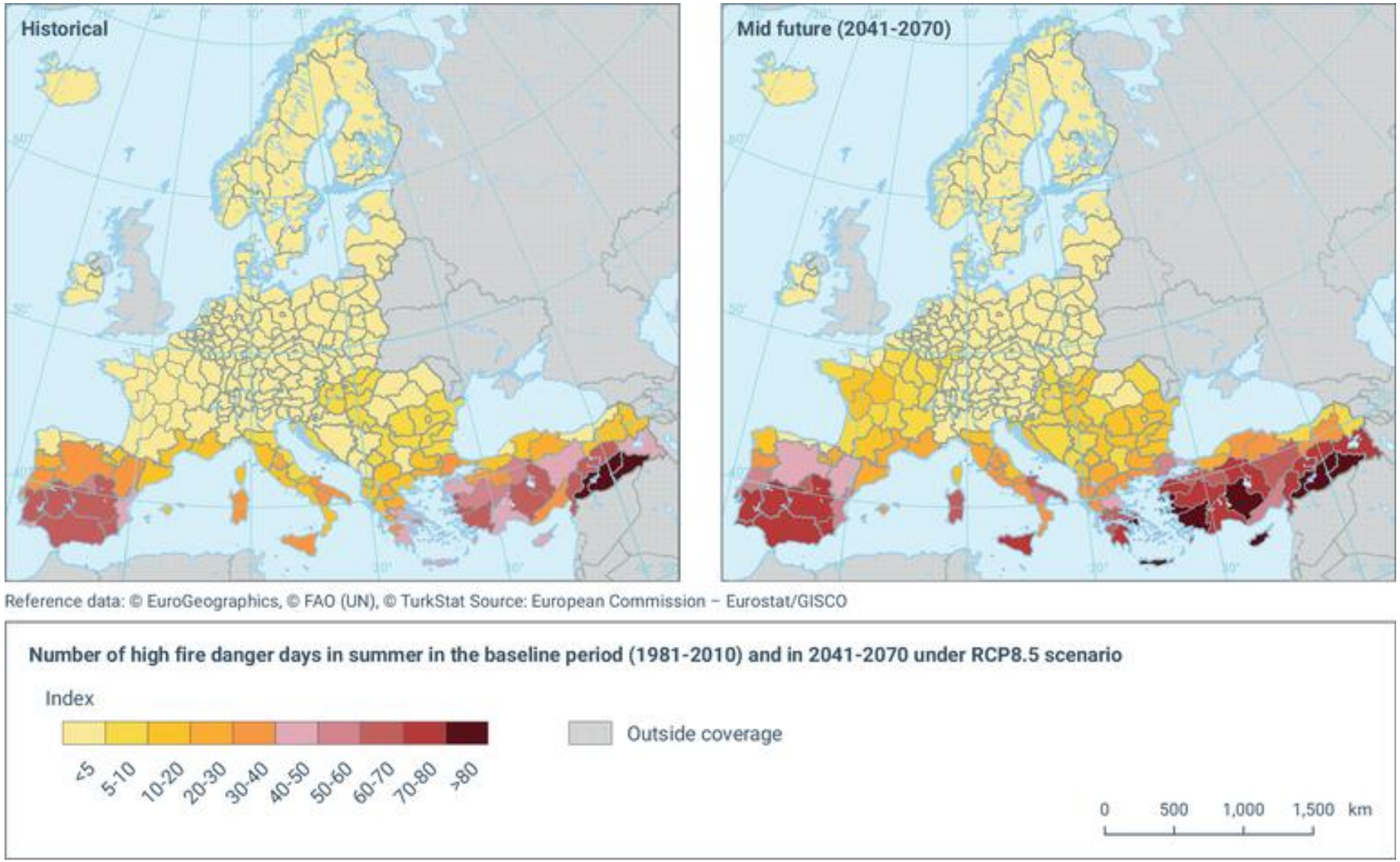
Source: EURO-CORDEX
(Jacob et al., 2014)

… and more heatwaves, …





…and more wildfires.



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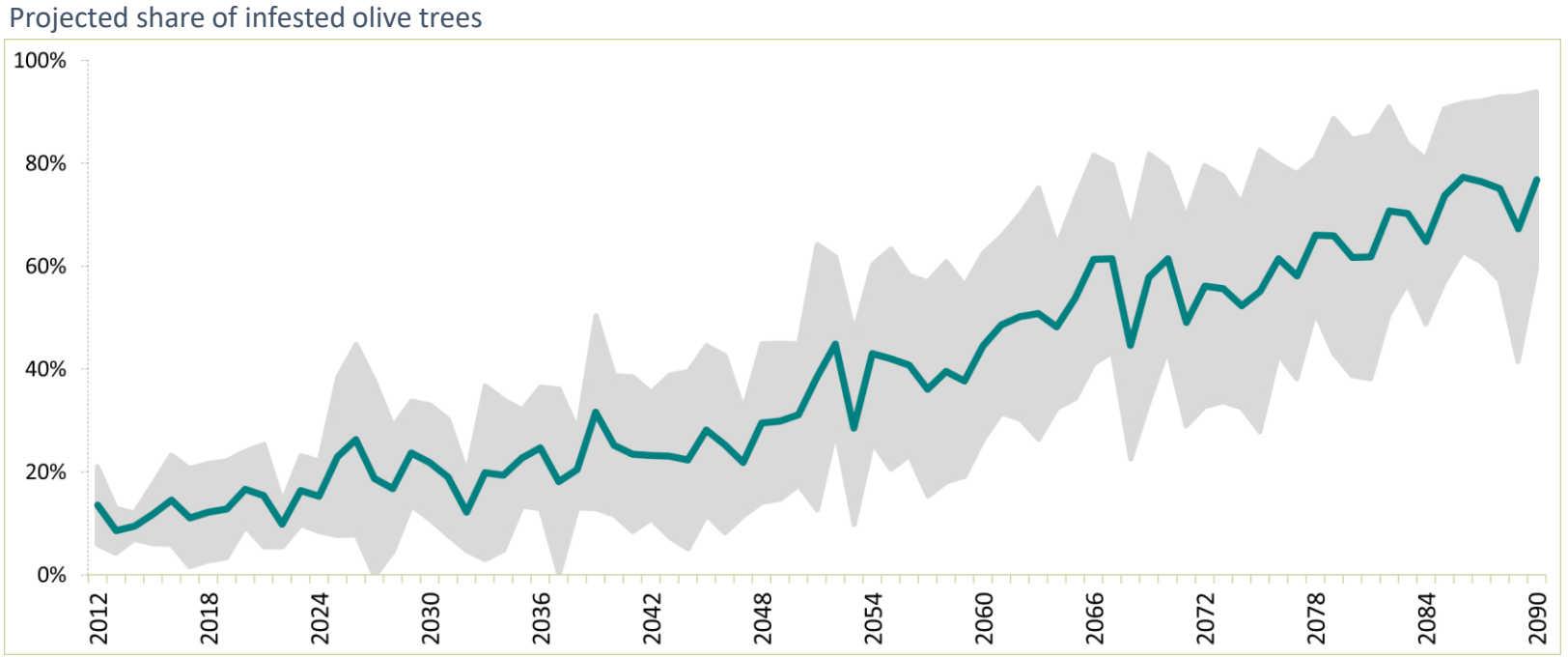
Warmer temperatures in winter lead to more pests …

Development of pest infestation for olive trees in Italy based on high-end scenario



Based on Copernicus Climate Change Service data (AgriCLASS project)

75 % of global olive oil production is in Europe – an important agriculture commodity for exports

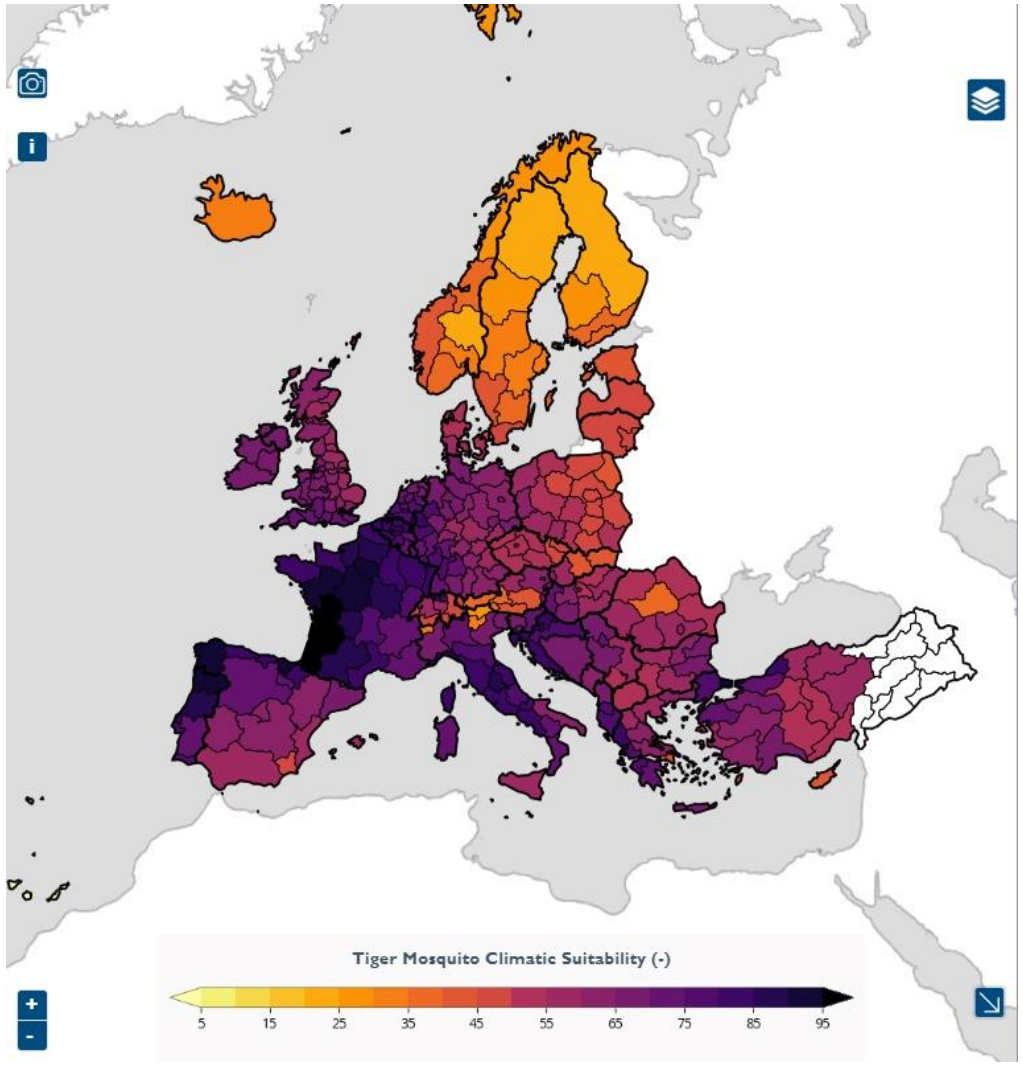
By end of century 60-80 % of olive trees might be affected by pests due to the warmer conditions

mostly because of warmer winters (currently around 10 %)

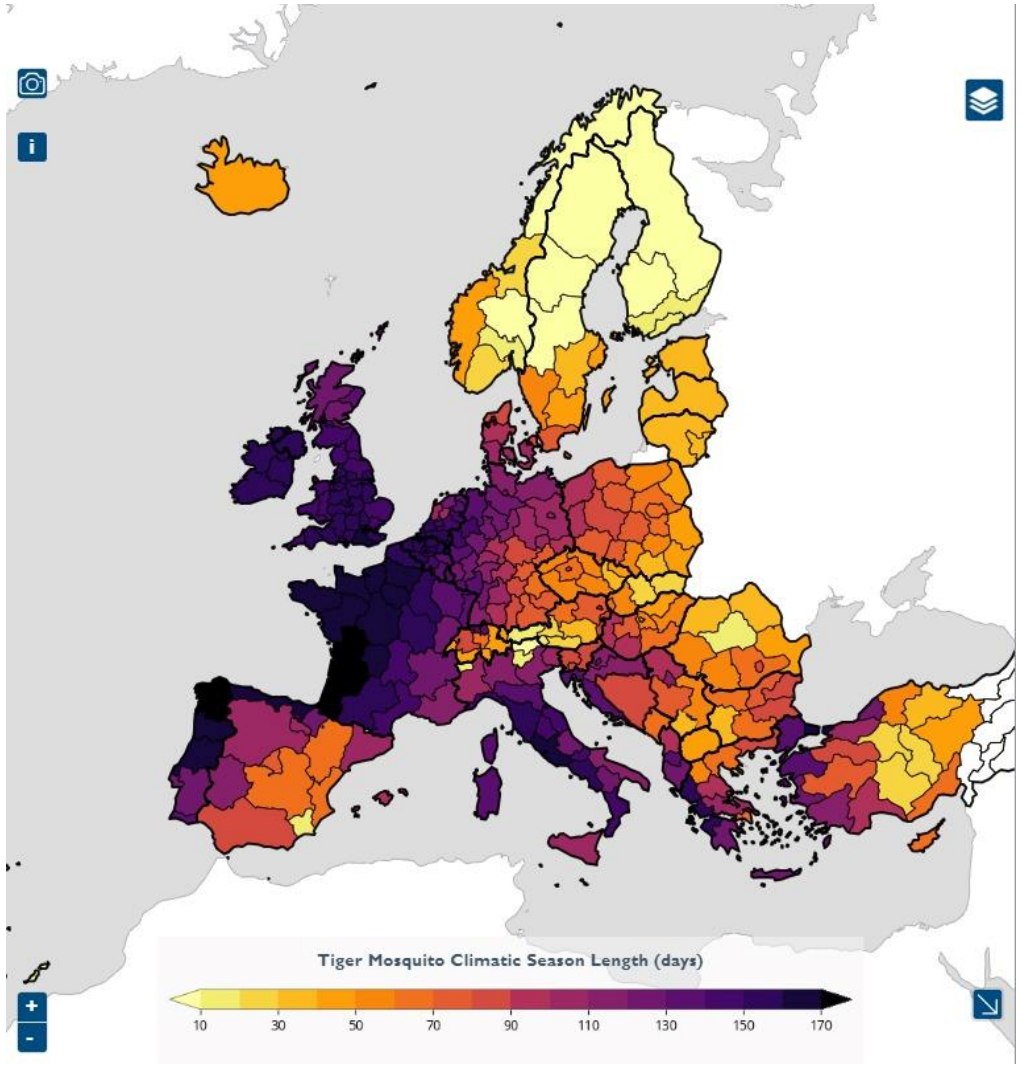
- Adaptation options include early warning, spraying and planting resilient trees

…to more vector born diseases, …

Tiger mosquito climatic suitability



Tiger mosquito season length (days)



Source: Copernicus Climate Change Service

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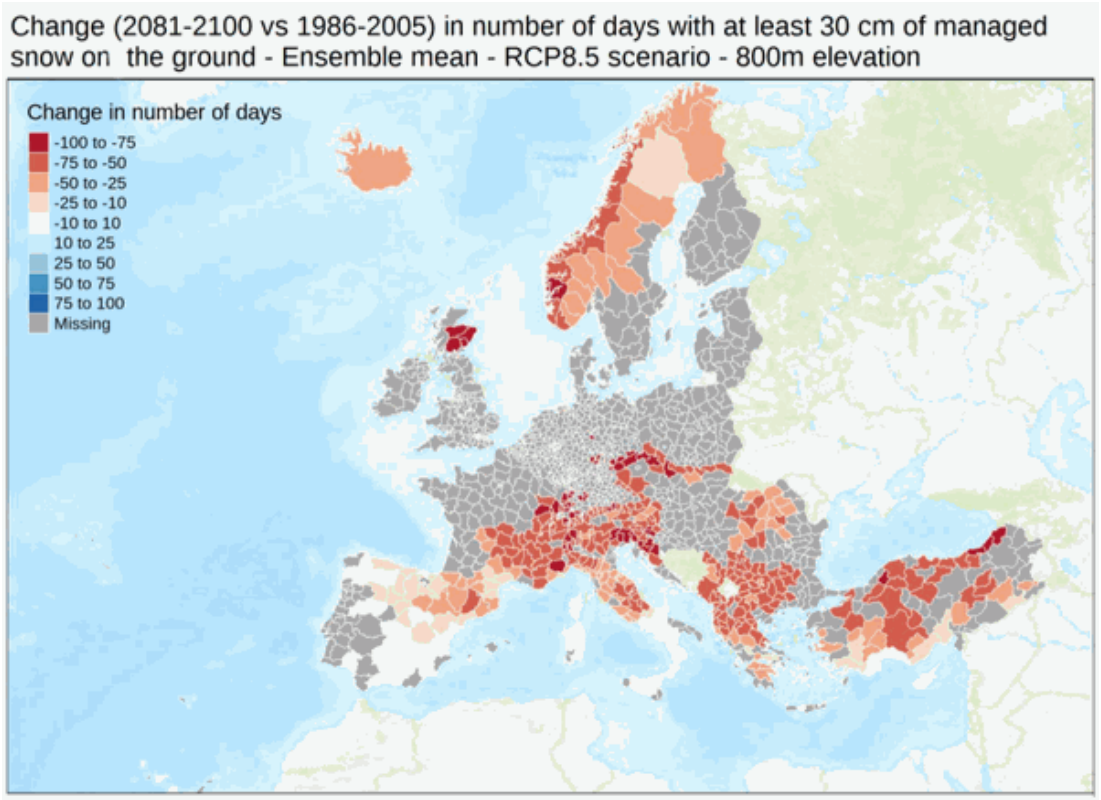
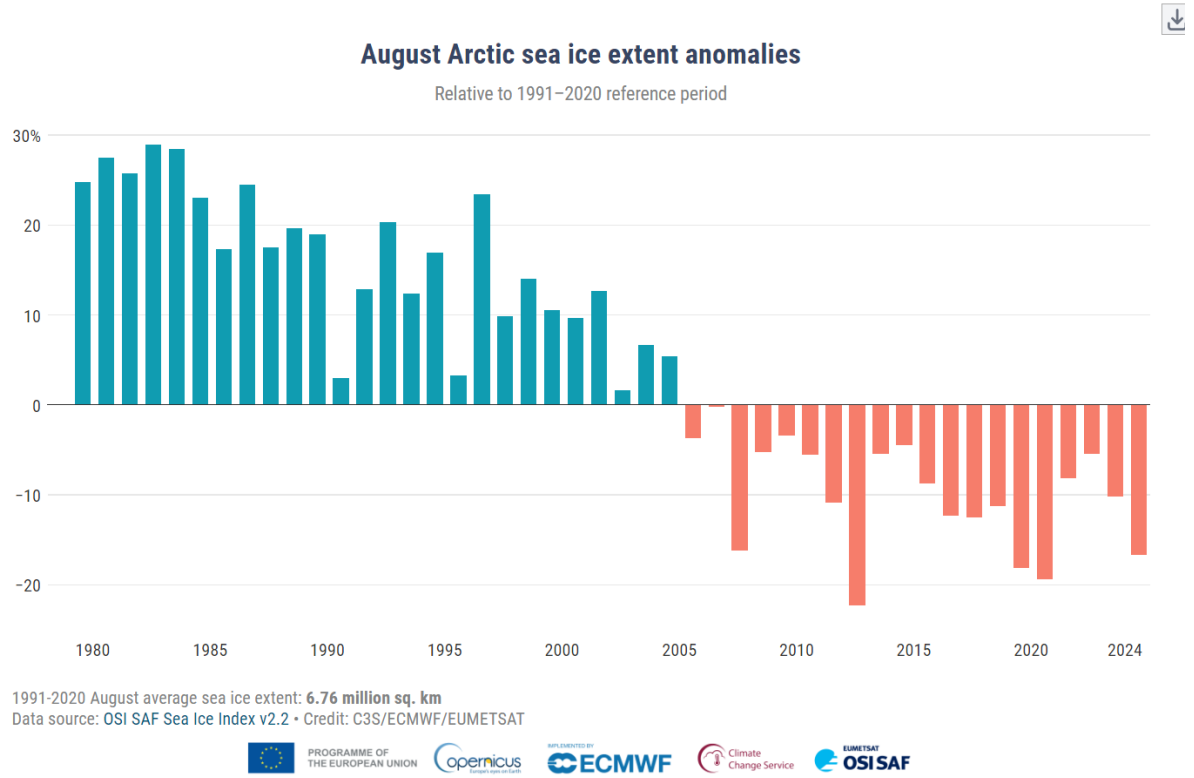
… to less snow in Mountains and disappearing sea ice.



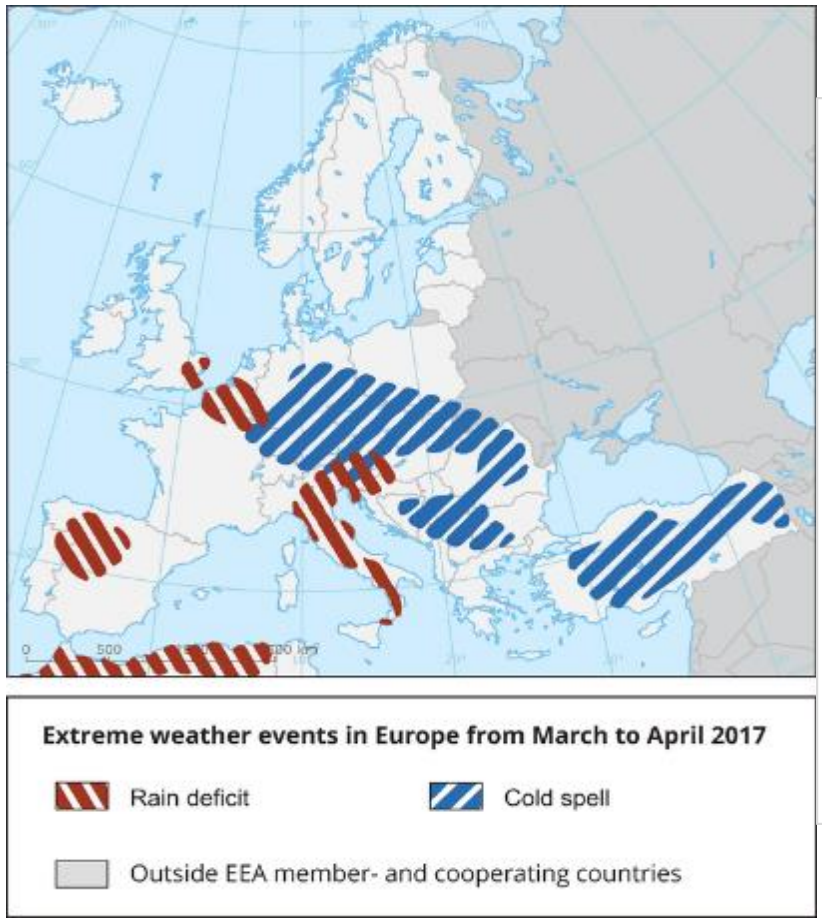
[Mountain tourism meteorological and snow indicators for Europe from 1950 to 2100 derived from reanalysis and climate projections (copernicus.eu)]



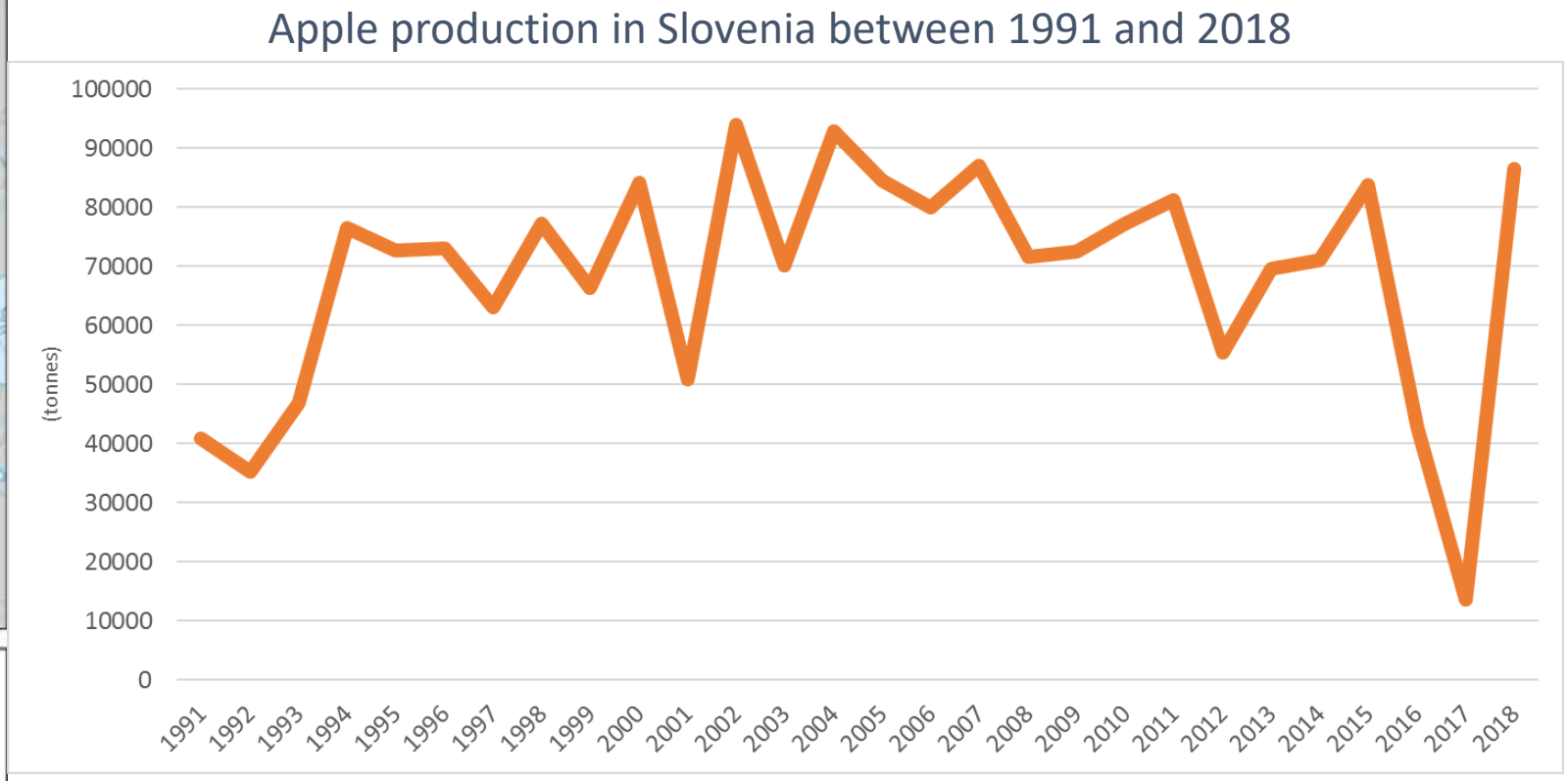
Time series of monthly mean Arctic sea ice extent anomalies for all August months from 1979 to 2024. The anomalies are expressed as a percentage of the August average for the period 1991-2020. Data source: EUMETSAT OSI SAF Sea Ice Index v2.2. Credits: C3S/ECMWF/EUMETSAT

Extreme weather affects yields, …

Weather and climate extreme events can influence total yield significantly



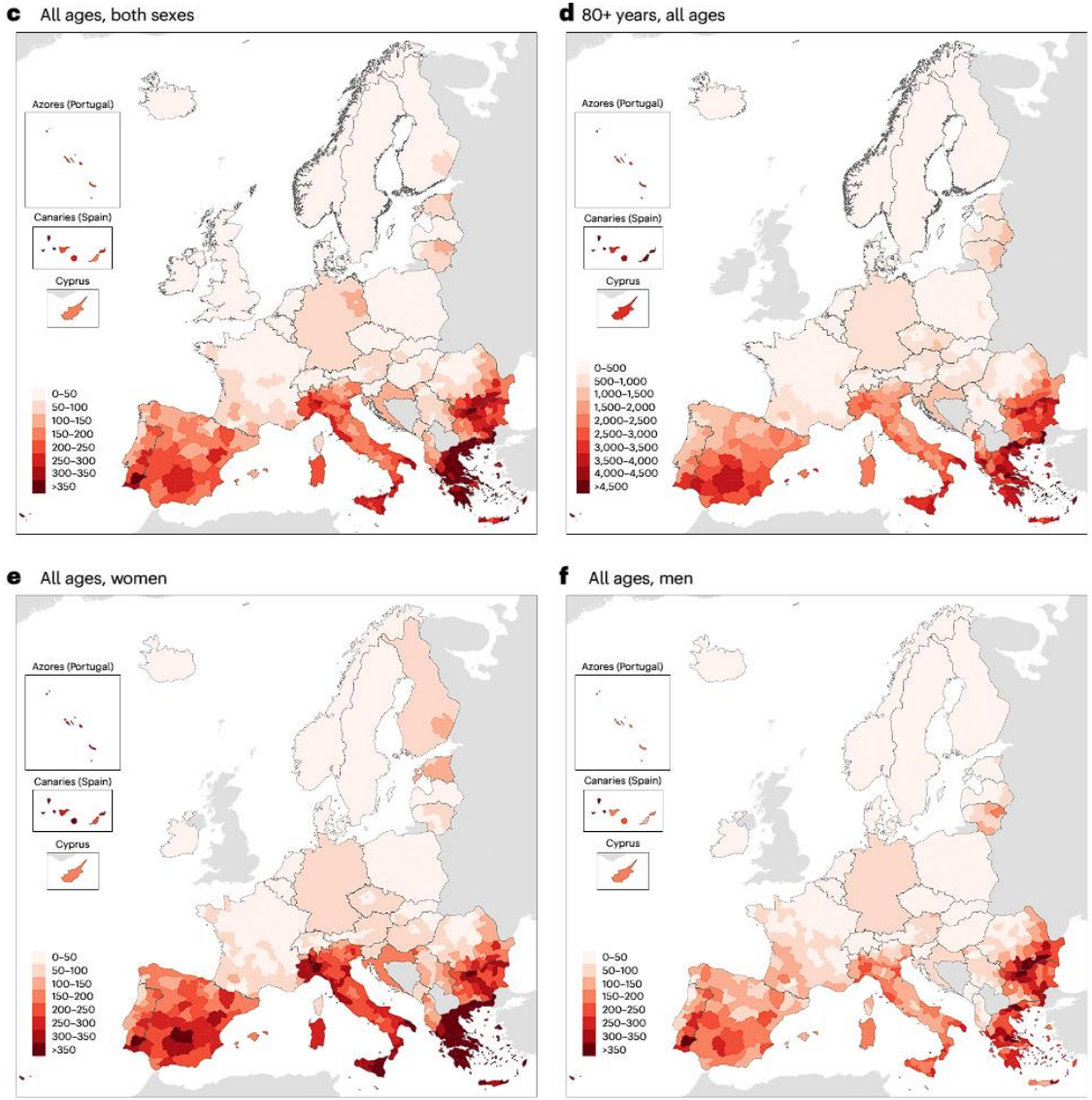
Source: DG JRC (Mars Bulletin, 2017)



Source: Statistical office of Republic of Slovenia

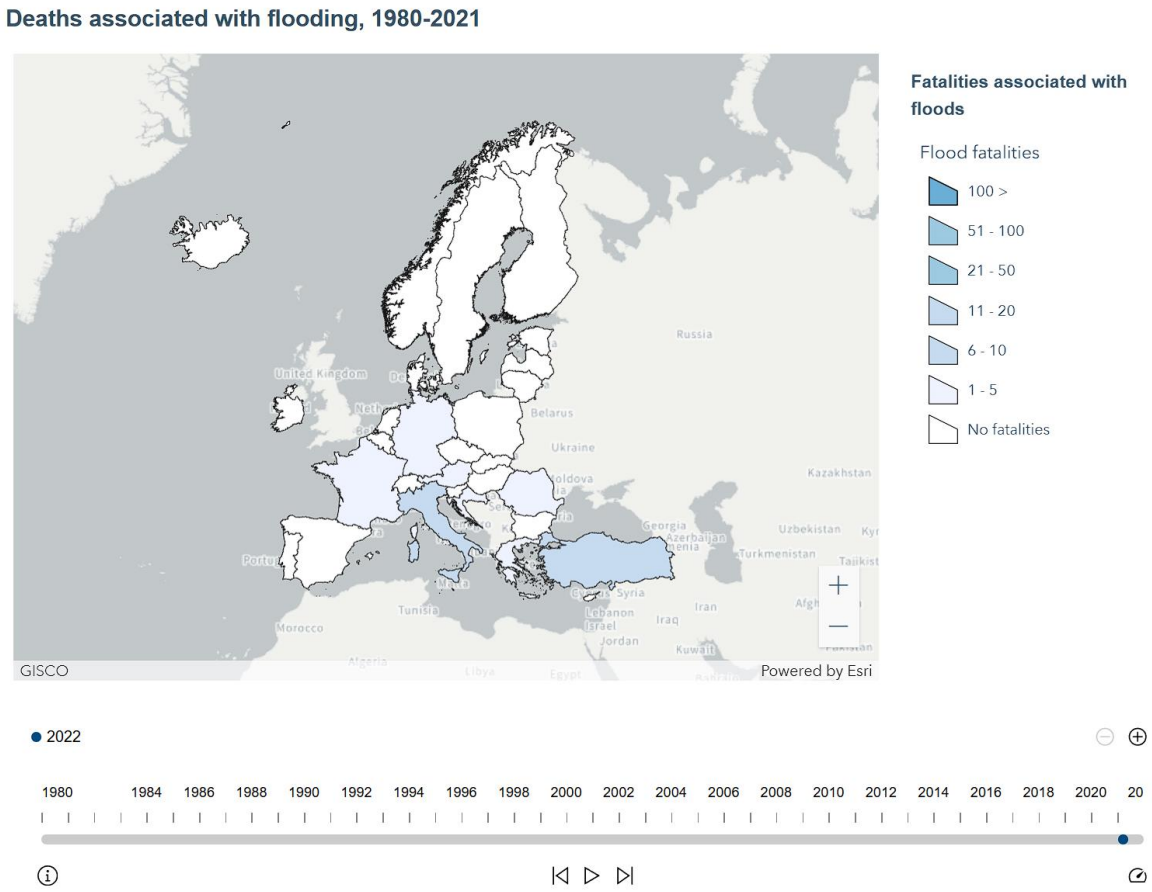
… extreme weather costs human life …

Heatwaves related mortality, 2023



https://doi.org/10.1038/s41591-024-03186-1

Death associated with flooding, 2022



Source: European Climate and Health Observatory

Sources

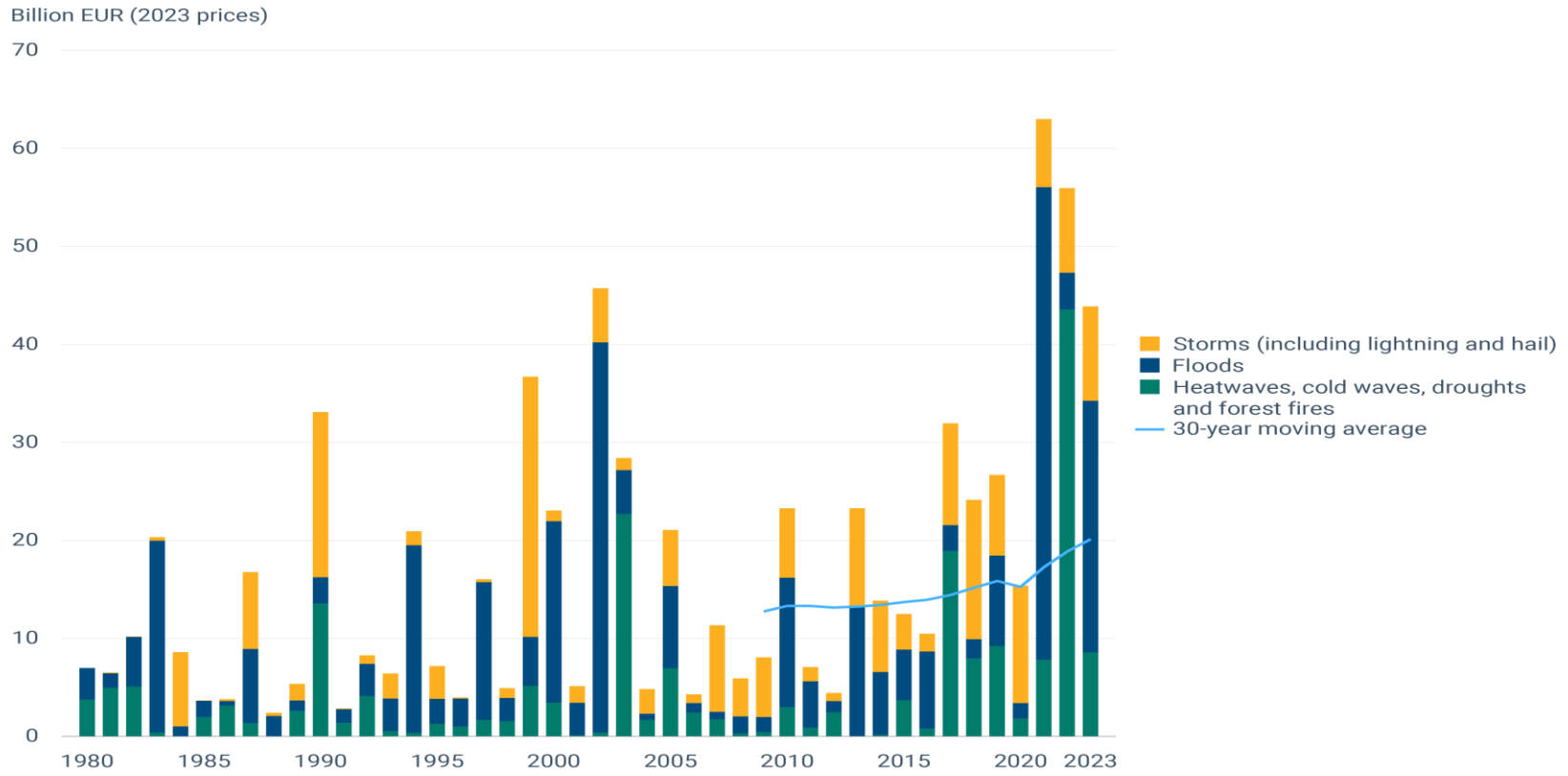
[1] EEA, 2023, Economic losses and fatalities from weather- and climate-related events in Europe

[2] European Climate and Health Observatory, 2021, Flooding

… and result in economic losses and social burden.

EU27, 1980-2023

- **EUR 738 billion in economic losses**
  - 2021: EUR 63 billion (EUR 40 billion flooding in BE/DE)
  - 2022: EUR 56 billion (forest fires, droughts, heat waves)
  - 2023: EUR 44 billion (floods, forest fires, droughts)
- **Estimated 240,000 fatalities due to heatwaves (vast majority), floods, storms, forest fires and landslides**



Source: EEA indicator Economic losses from weather and climate-related extremes in Europe – 8th EAP

By 2050 the EU needs to be climate-resilient society

EU Adaptation strategy

- Smarter adaptation – improving knowledge and managing uncertainty;
- More systemic adaptation – support policy development at all levels and sectors;
- Faster adaptation – speeding up adaptation across the board;
- Stepping up international action for climate resilience.

European Commission

[EU Adaptation Strategy - European Commission (europa.eu)]

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Increased need to understand complexity of adaptation

- **Economic losses and costs of adaptation are increasing**: **cost-effective solutions are urgently required**; share of investments into societal preparedness to climate risks at EU level unclear. **Mobilising the proper** (user driven) **investments.**
- **Lack of agreed metrics and targets** on societal preparedness to climate change risks. Adaptation measures must be informed by analysis of climate change risks and impacts, mobilizing climate finance. **Regular assessments and tracking of progress towards 2050**.
- **Adaptation in systems and sectors** (acknowledge the complexity and avoid maladaptation). Focus on human health, nature and justice in adapting to climate change.
- Defining who needs to do what and when: adopting the concept of **risks ownership, risks evaluation, policy reediness, policy horizon.** Digital tools, user interactivity.
- Most risks are co-owned between EU and the MS while the current EU policy readiness to climate risks is medium to low and policy horizon "short". **Member States** to **subnational regions** will need **more comprehensive legislation and improved implementation.**

Policy support challenges – example drought

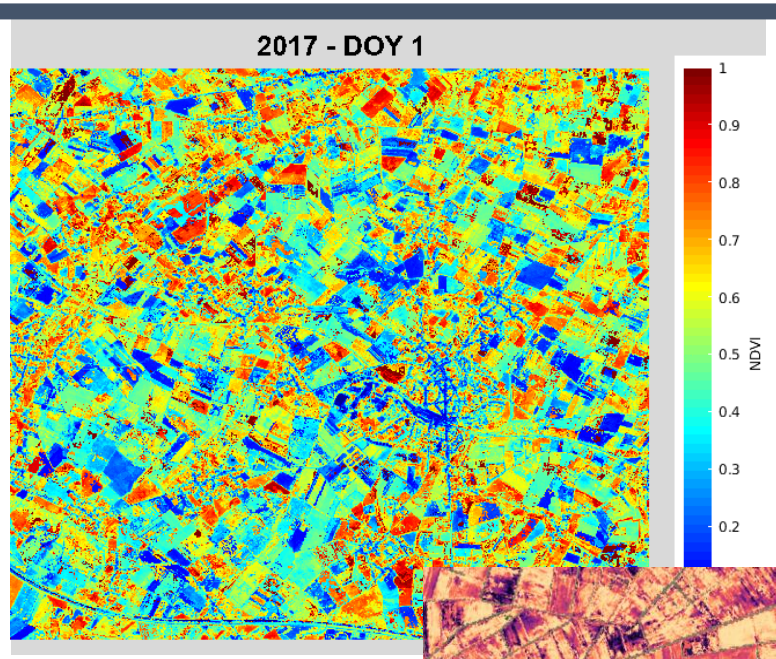
Impacts occur on a continental scale – but manifest locally.

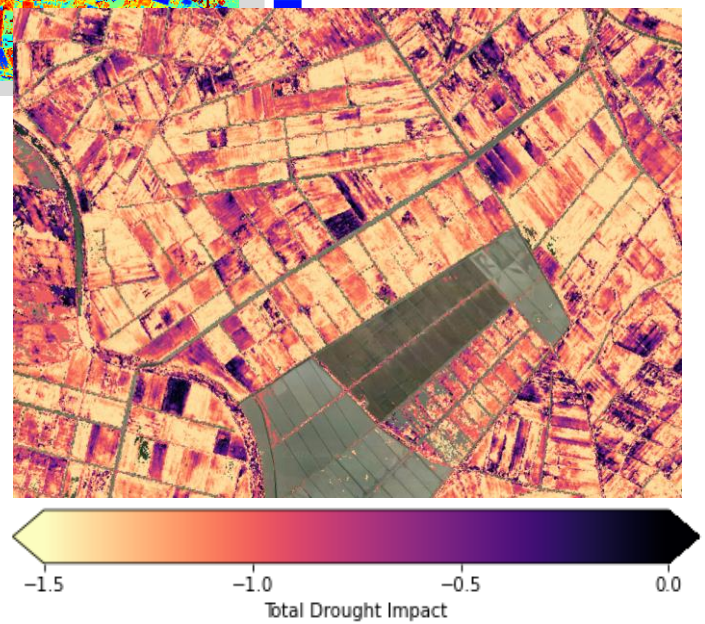
Impacts need to be monitored with high spatial and temporal resolution:

- Copernicus Land Monitoring Service: **High Resolution Vegetation Phenology and Productivity** (10m resolution, every 10 days, from 2017 on).
- Handling > 1 Million Sentinel-2 input files (totals ~350 TB)
- Generating > 6 Million output files (totals 750 TB) on WEkEO DIAS
- Bring the data to the user - > bring the user to the data

Use ancillary variables on demand:

- Soil Moisture time series,
- Water vapor density time series,
- Crop types,
- Yield statistics,
- population density,
- protected areas,
- environmental zones,
- administrative regions,
- Corine Land Cover,
- Socio-economic data.





Continental scale analytics of **impacts on** high resolution is not “business as usual” exercise.

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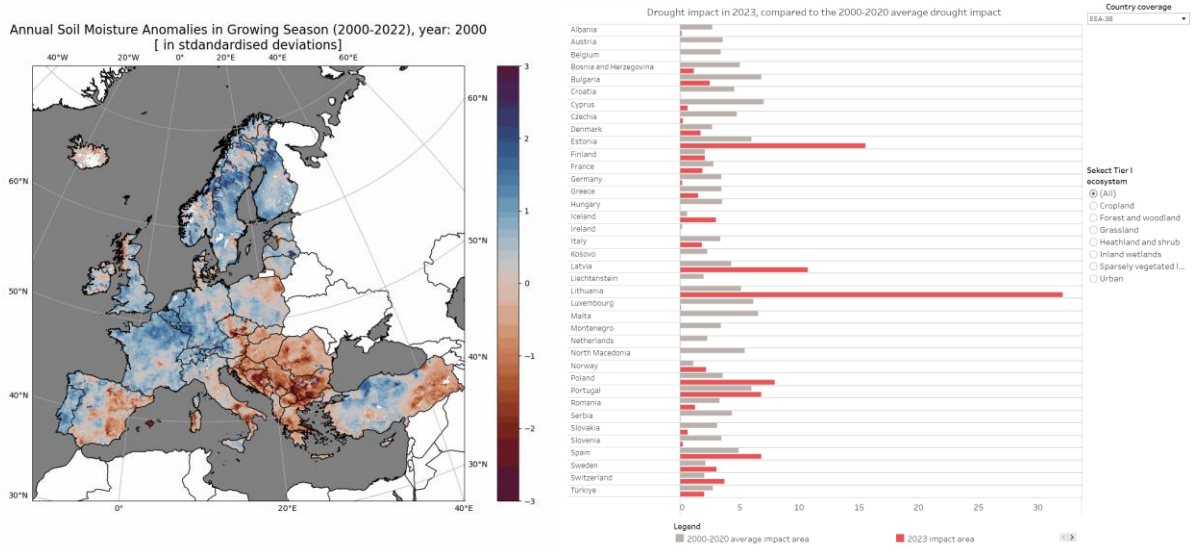
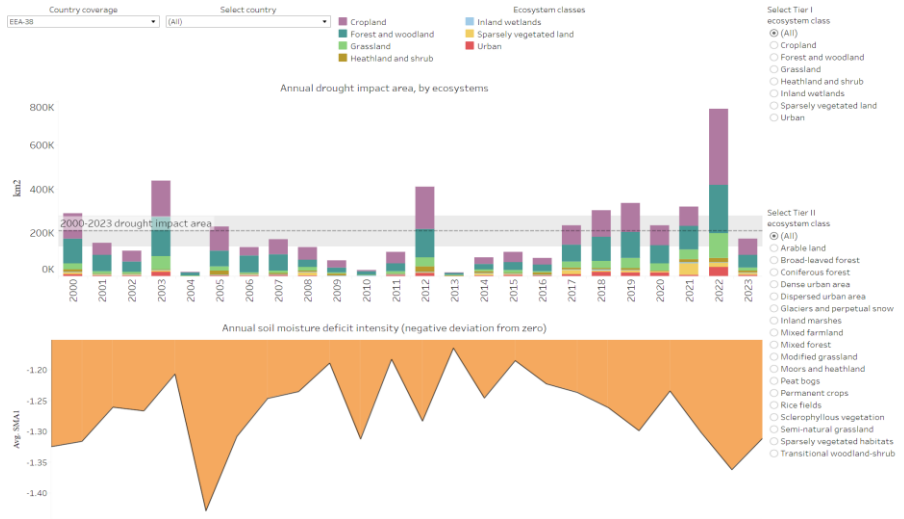
Policy support challenges – example drought

Monitoring, assessments, common working platform,…

- Empowering EEA (and other) users to flexibly perform policy relevant assessments on agriculture resilience;
- Flexibly ingest new datasets (climatic series, land cover, socio-economic, yield statistics, demographic, etc.);
- Monitor impacts near-real-time and near-real-detail;
- Monitor impacts locally and on the continental level;
- Integration of results in dashboards (embedded to websites);
- Offer a platform for policy, academia, and industry to work together;
- Enable exploring and the assessment of scenarios;
- Monitor the success of adaptation strategies;
- Facilitate nature-based solutions investments.





-> Digital Twins of several interconnected twins to address environmental and socio-economic impacts in combinations.

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Main areas for DestinE to contribute

- Next European Climate Risk Assessment (EUCRA);

- Contribute to EEA platforms and assessments for:
  - Address both climatic and non-climatic drivers;
  - Explore impact development pathways that will help us understand trade-offs and synergies;
  - Focus on solutions mitigating risks.

- Contibute to ad-hoc requests and assessments:
  - Focus on solutions mitigating risks;
  - address both climatic and non-climatic drivers;
  - Produce what-if analytics and enable the user to explore various scenarios.

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Thank you for your attention!

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