OECD.EO

Using EO data for policy-relevant indicators

OECD reflections and challenges

StatEO26 conference – Earth observation for official statistics and policy indicators

5-7 May 2026

Presented by Mikaël Maes (OECD Environment Directorate)

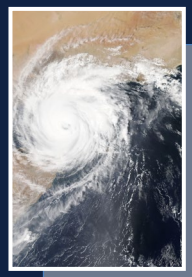
Joint work with Ivan Haščič and Louise Sieg.

OECD use of Earth observation data

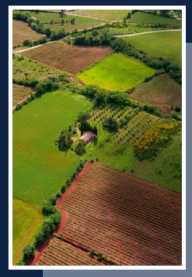
- Collecting harmonised data from countries is still relevant today (e.g., waste management, environmental taxation)

- Global geospatial data increasingly helps enrich OECD databases.

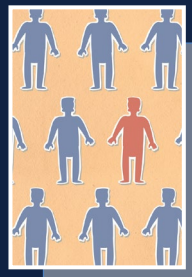
- The OECD and its member countries develop indicator methodologies to summarise complex datasets for policy analysis



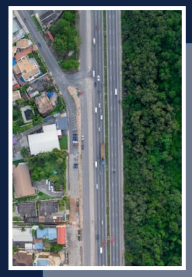
Climate



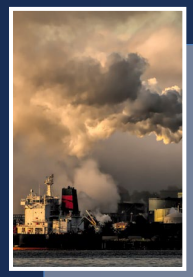
Land cover and use



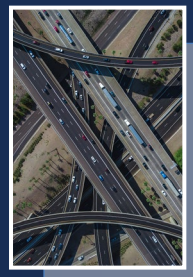
Demography



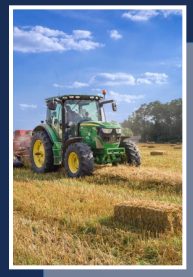
Territorial development



Air pollution



Infrastructure



Agriculture

Transport

Sometimes global EO data is the best way forward for harmonisation across countries

Diverse indices are used to capture hazards through different lenses

Hazard types

Land surface temperature
Hot days (T_{max} > 30°C, 35°C, 40 °C)
Tropical nights (T_{min} > 20°C, 26°C, 32°C)
Unusually warm days (T_{max} > 95P of the climate normal)
Unusually cold days (T_{min} < 5P of the climate normal)
Heat stress days (Universal Thermal Climate Index)
Heating degree days (T_{mean} > 18.3°C)
Cooling degree days (T_{mean} < 18.3°C)
Icing days (T_{max} < 0°C)

Cumulative precipitation
Very heavy precipitation days (total daily prec > 20 mm)
Frequency extreme precipitation events (total daily prec > 99P)
Average largest 1-day precipitation
Average largest 5-day cumulative precipitation

Soil moisture anomaly (short-term agricultural drought)
Standardised Precipitation Evapotranspiration Index (12-month period)
Maximum number of consecutive dry days

Burned area
Burning risk

Violent storms (wind speeds > 28.6 m/s)
Cyclone wind threats (50-, 100-, 250- and 500-year return period)

River flooding (10-, 20-, 50-, 100-year return period)

Coastal flooding (10-, 25-, 50-, 100-year return period)

Exposure types

Average population-weighted exposure
Share of population exposed across duration thresholds

Average livestock-weighted exposure

Share of cropland exposed across duration thresholds

Mean cropland exposure

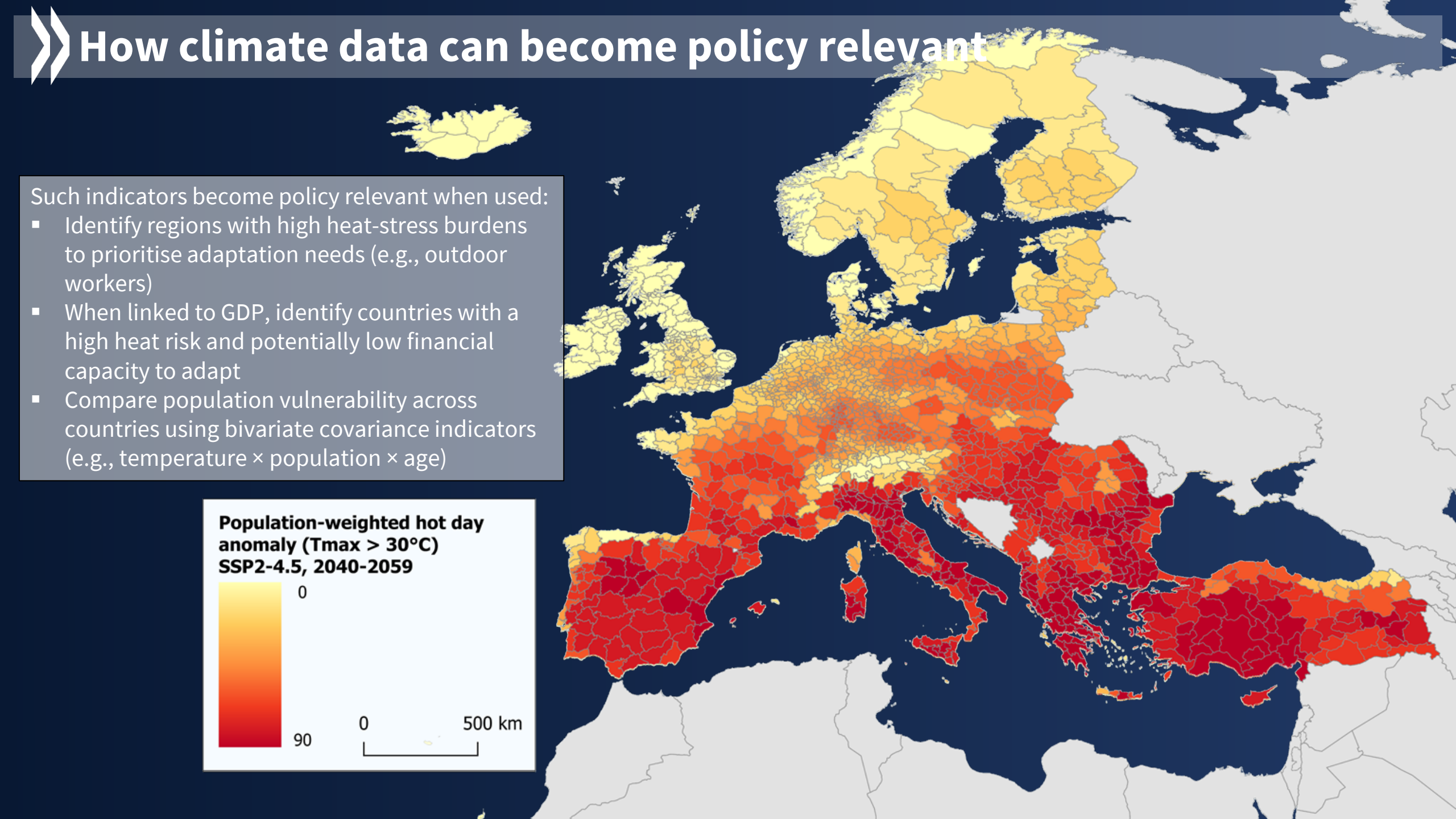
Share of forested areas exposed

Share of built-up area exposed

How climate data can become policy relevant

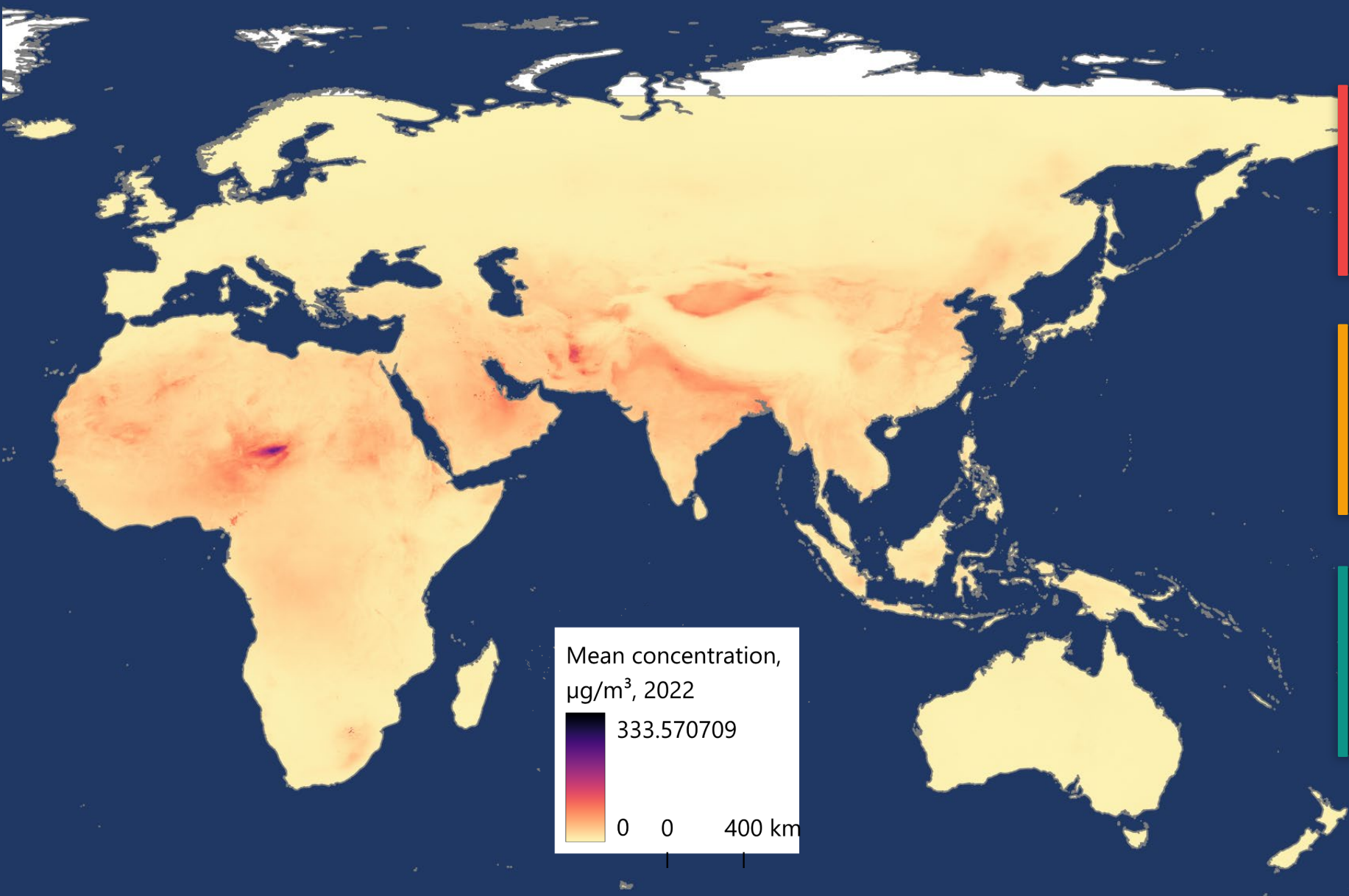
Such indicators become policy relevant when used:

- Identify regions with high heat-stress burdens to prioritise adaptation needs (e.g., outdoor workers)
- When linked to GDP, identify countries with a high heat risk and potentially low financial capacity to adapt
- Compare population vulnerability across countries using bivariate covariance indicators (e.g., temperature × population × age)



Many policy-relevant indicators are strongest when EO data is combined with ground monitoring

Global $PM_{2.5}$ exposure: what only a hybrid dataset can reveal



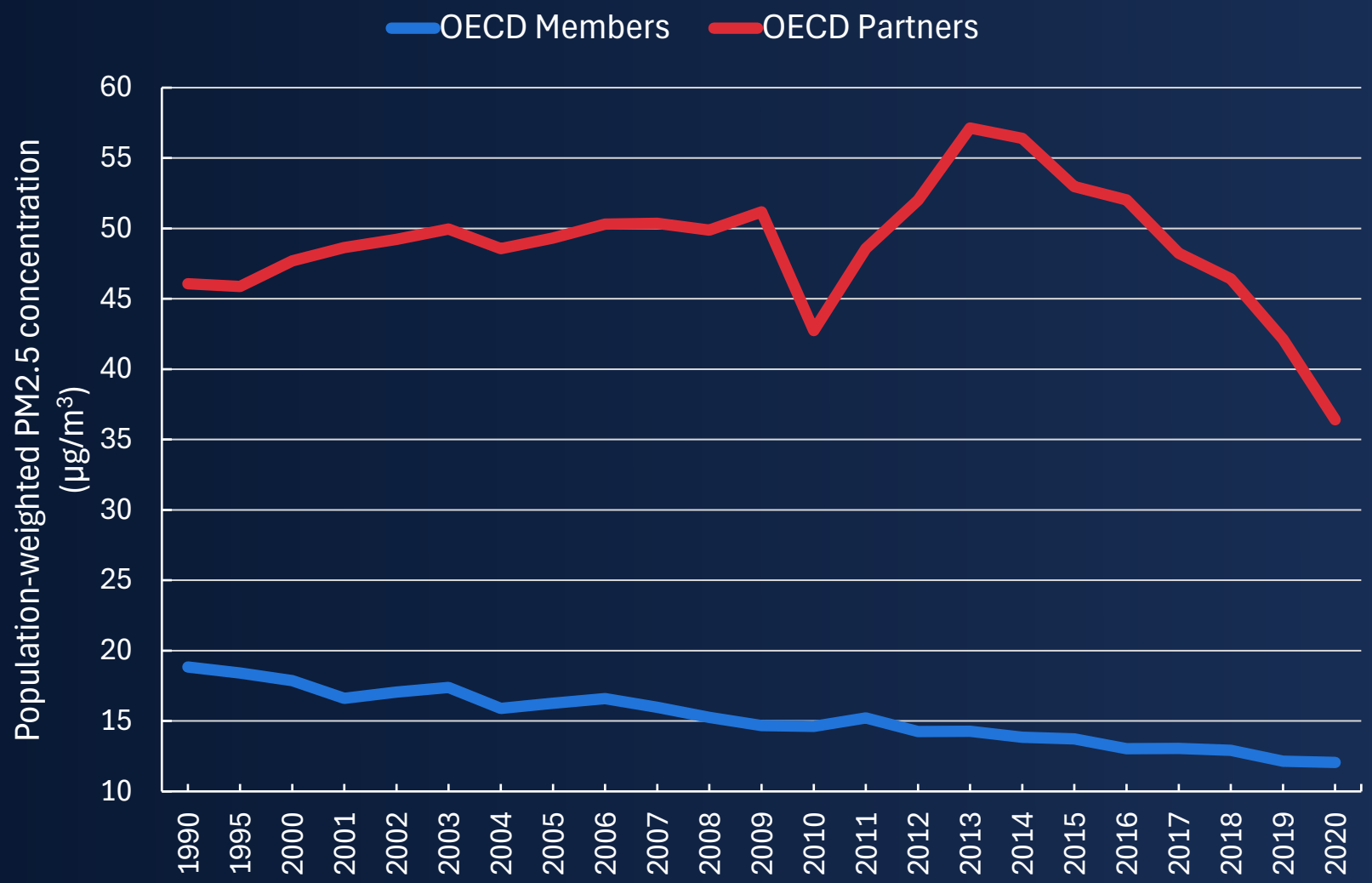
~7M
Premature deaths/year linked to $PM_{2.5}$

99%
of world population exposed above WHO guideline

Uneven
Global ground-network coverage

Source: OECD analysis based on the Atmospheric Composition and Analysis Group's PM2.5 dataset (released 2025).

Consistent long-run trends are only possible thanks to hybrid data



The WHO 2021 threshold matters

Hybrid data have the potential to improve countries' compliance with the revised 5 µg/m³ guideline across countries, including those without dense ground networks.

A common yardstick for policy

Fusing EO with ground stations removes inconsistencies between national measurement systems — enabling OECD-wide cross-country benchmarking.

Ground data calibrates; EO distributes.

Figure. …

Source: OECD analysis based on Global Burden of Disease PM2.5 dataset (released 2022).

EO data can take policy-relevant information one step further, opening new avenues…

The Global Biodiversity Framework

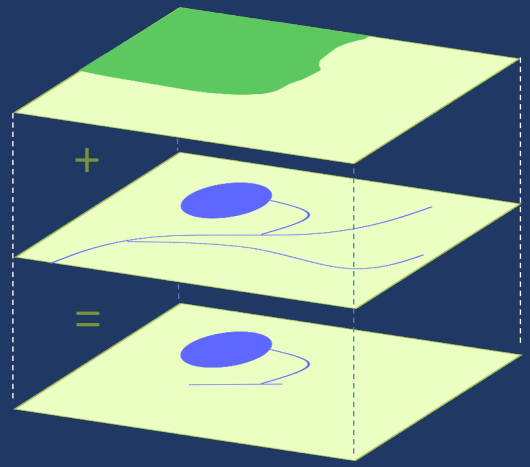
A critical knowledge gap exists in current biodiversity and conservation tracking frameworks such as:

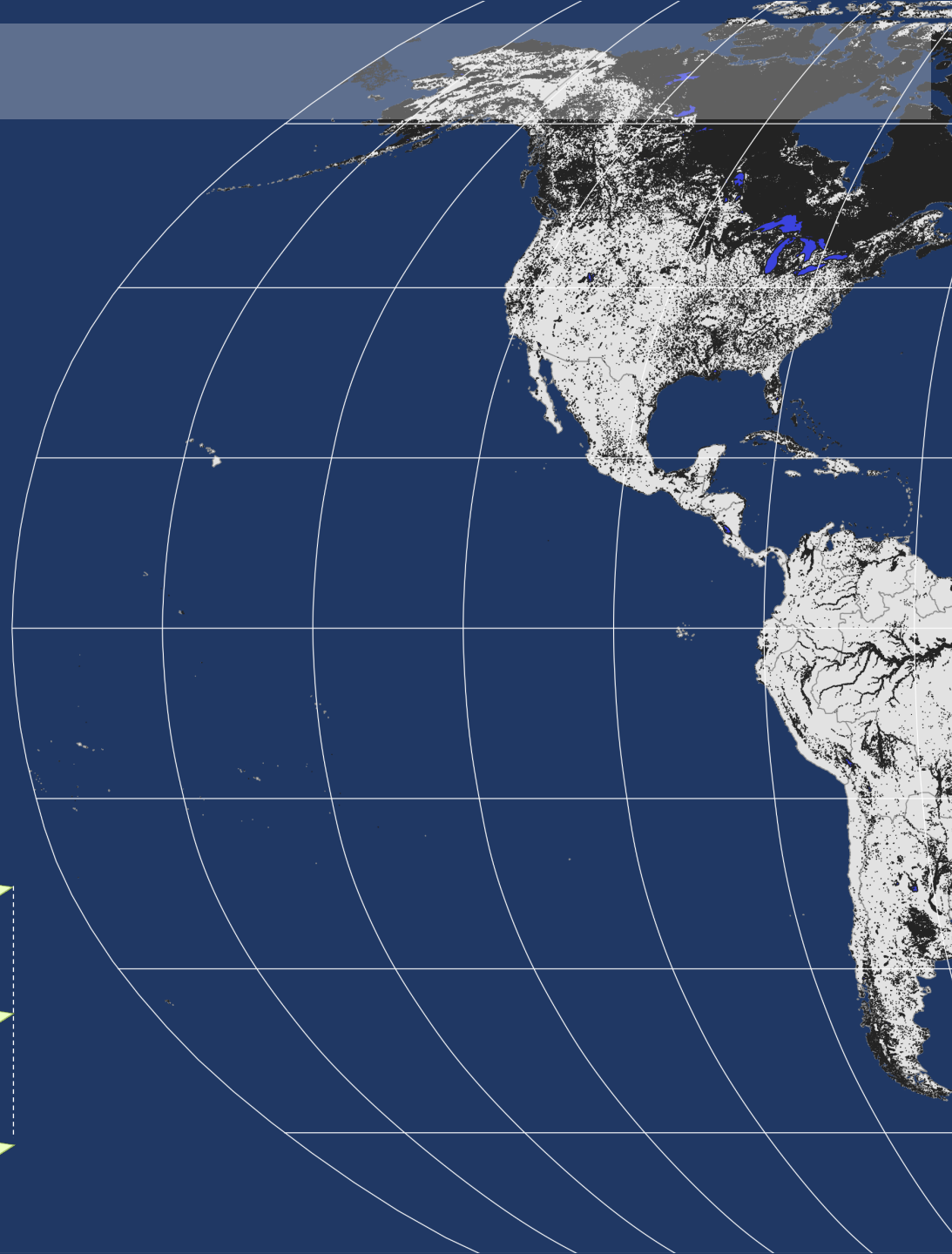
Kunming-Montreal **Global Biodiversity Framework Target 3 posits *"to protect at least 30% of inland waters by 2030..."***

The **World Database on Protected Areas**, maintained by UNEP-WCMC, records protected areas globally, storing these either as polygons or as points.

The HydroSHEDS project, initiated by the World Wildlife Fund US, maps out hydrographic features, including:

- **Lake polygons**
- **River lines**
- Sub-basin boundaries
- Hydro-environmental variables
- Waterfall locations





OECD countries protect lakes far more than rivers

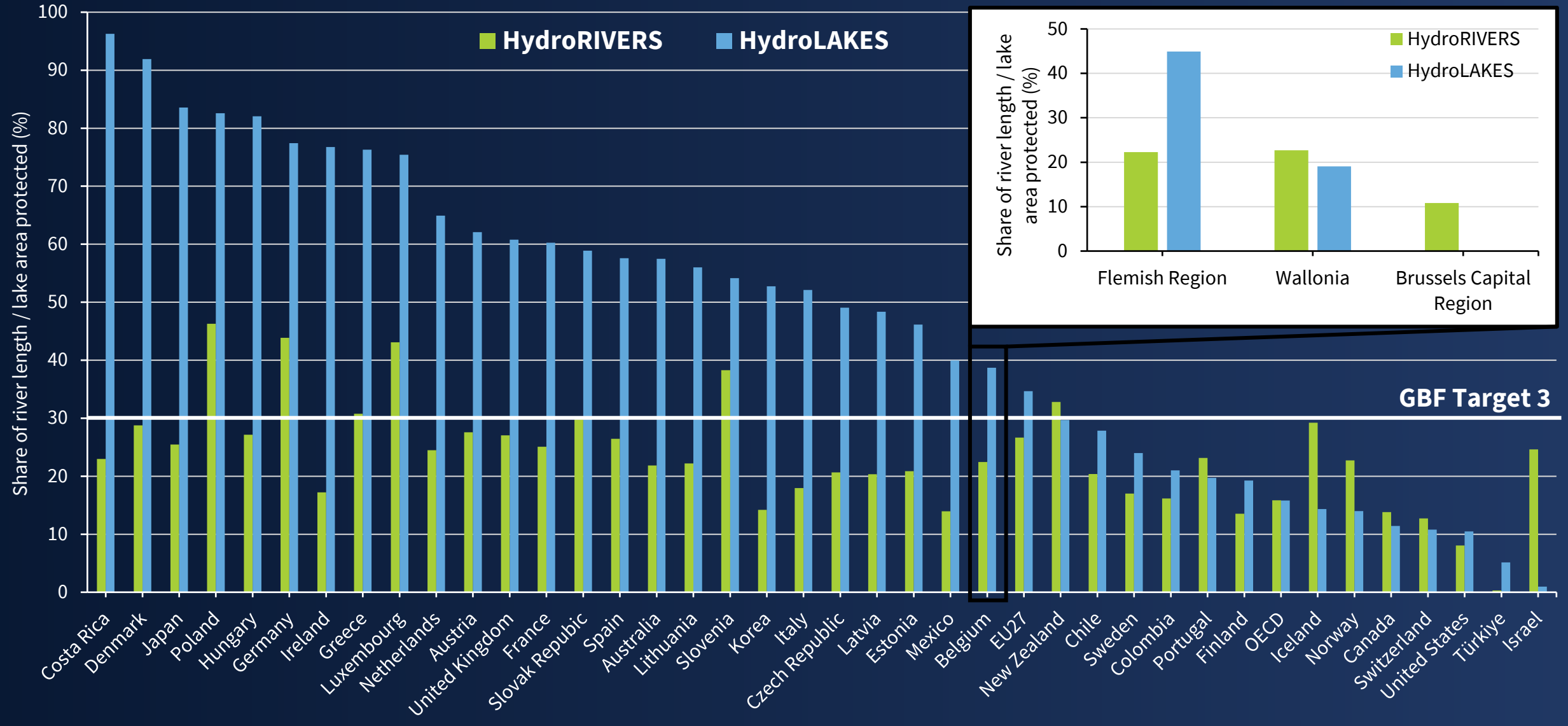


Figure. Share of inland water (%) under protected area designation across all IUCN categories, OECD Members, 2024

Source: OECD analysis based on OECD (2017) and the January 2025 release of the WDPA, the 2016 release of the HydroLAKES database and the 2019 release of the HydroRIVERS database.

Some key challenges from the OECD's perspective

- More EO data and their better quality is welcome. However, policy relevance requires that EO data is commensurable and linkable with other (non-EO) data such as social, demographic and economic statistics.
  - Continued dialogue between EO data producers and the policy community is needed with respect to future EO capabilities.

- Trust and uncertainty issues require greater attention by the EO community
  - How do we integrate uncertainty estimates into policy-relevant indicators when there is no spatially-explicit and publicly-available uncertainty data available?

    →This is an important point to build trust between EO data producers, indicator producers and policymakers.

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Thank you for listening!

Contact:
Mikaël J. A. Maes, mikael.maes@oecd.org
Louise Sieg, louise.sieg@oecd.org
Ivan Haščič, ivan.hascic@oecd.org