



# GEOSPATIAL ANALYSIS TO SUPPORT POLICYMAKERS

Geospatial World Forum  
4 May 2023, Rotterdam, the Netherlands

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# Introduction to the OECD

BETTER POLICIES FOR BETTER LIVES



- Historically, OECD data & statistics are collected from countries, and this is still important today.



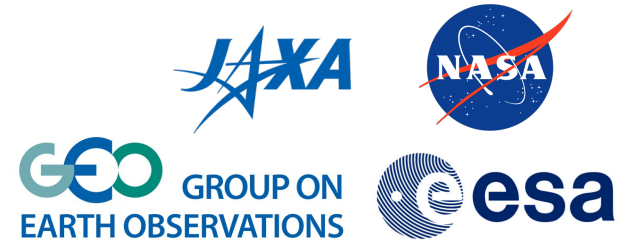
- Increasingly, this information is further complemented by drawing on global geospatial datasets, enriching OECD databases.



- The OECD and its member countries develop indicator methodologies to summarise complex datasets and thus support policymakers at all levels of government.

- The OECD participates and uses data from a variety of bodies:

- OECD Space Forum
- Space agencies of member countries
- Group on Earth Observations
- Other data providers



- The OECD also provides user feedback to data providers and communicates on evolving policy demands to steer future developments.

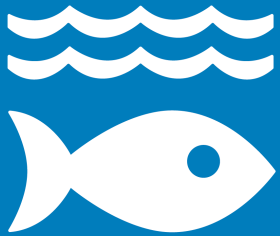
An aerial photograph of a lush wetland landscape. A winding river flows through the center, surrounded by dense green vegetation and numerous small, interconnected water bodies. The scene is captured from a high angle, showing the intricate patterns of the water and land. A dark blue diagonal overlay covers the bottom-left portion of the image, containing the text 'Protected areas' in white.

Protected areas



# International agreements

## 14 LIFE BELOW WATER



By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on best available scientific information.

Sustainable Development Goal Target 14.5, 2015



Ensure and enable that by 2030 at least **30 per cent of terrestrial, inland water, and of coastal and marine areas**, especially areas of particular importance for biodiversity and ecosystem functions and services, **are effectively conserved and managed [...]**

Kunming-Montreal Global Biodiversity Framework, 2022

## 15 LIFE ON LAND



Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.

Sustainable Development Goal Target 15.5, 2015



**THE LAW  
OF THE SEA**

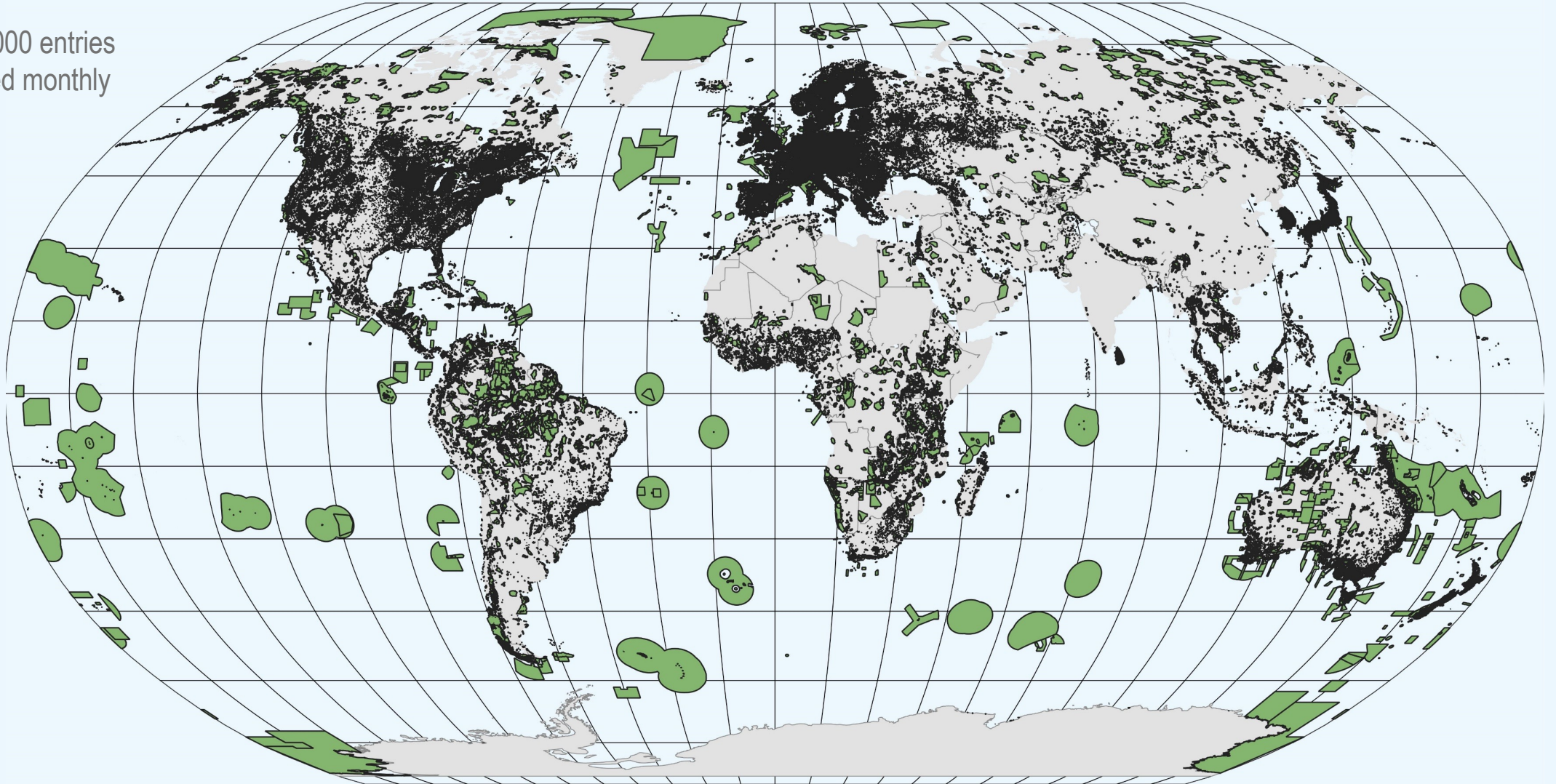
The High Seas Treaty sets up a legal mechanism to designate marine protected areas on the high seas.

High Seas Treaty, 2023



# World Database on Protected Areas

- > 280,000 entries
- Updated monthly



# Terrestrial Protected Areas (2022)

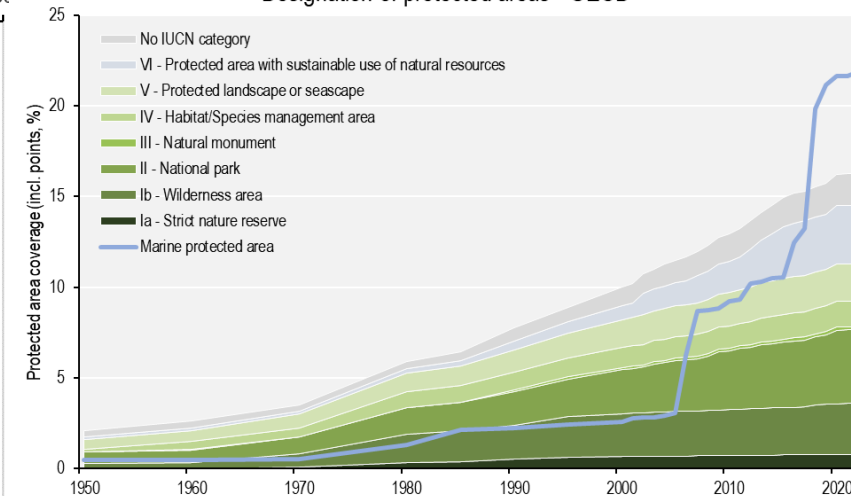
# Marine Protected Areas (2022)

# Historical patterns (1950 - 2022)

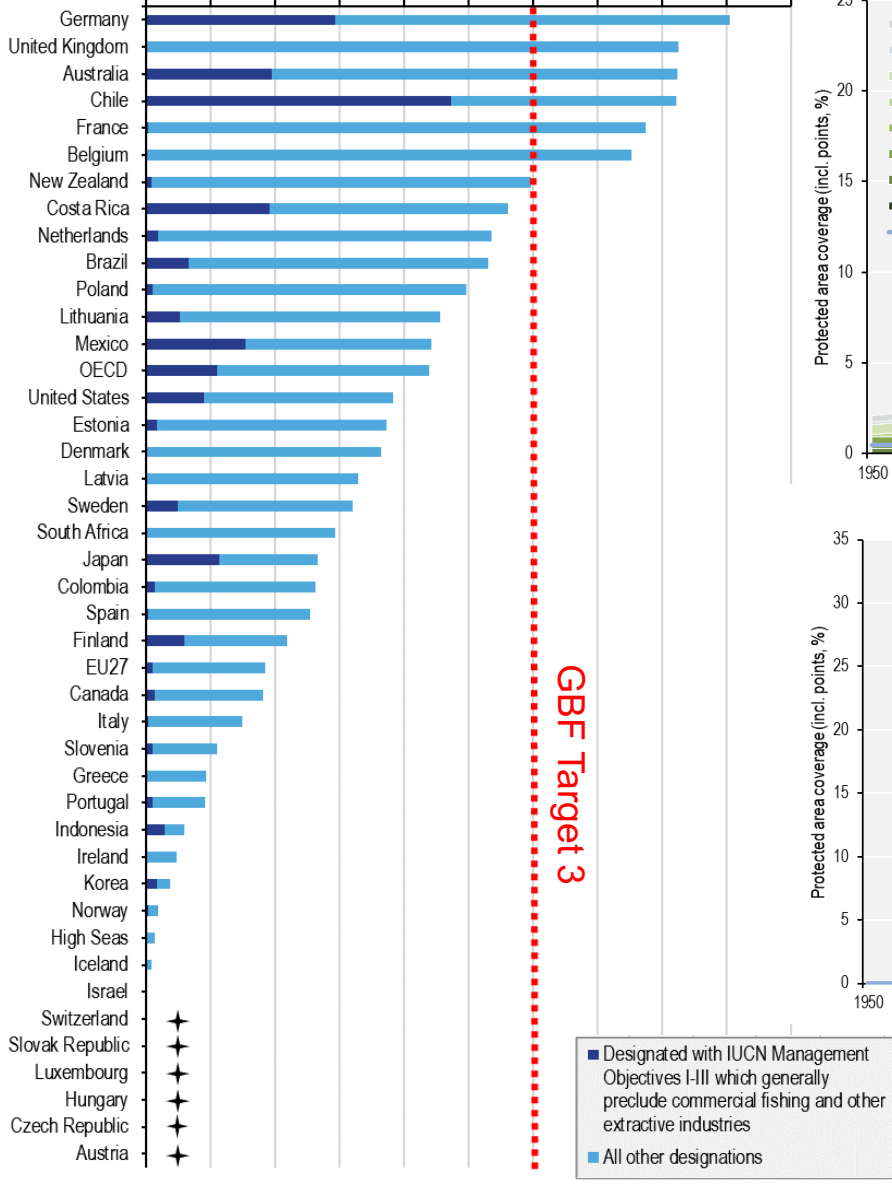
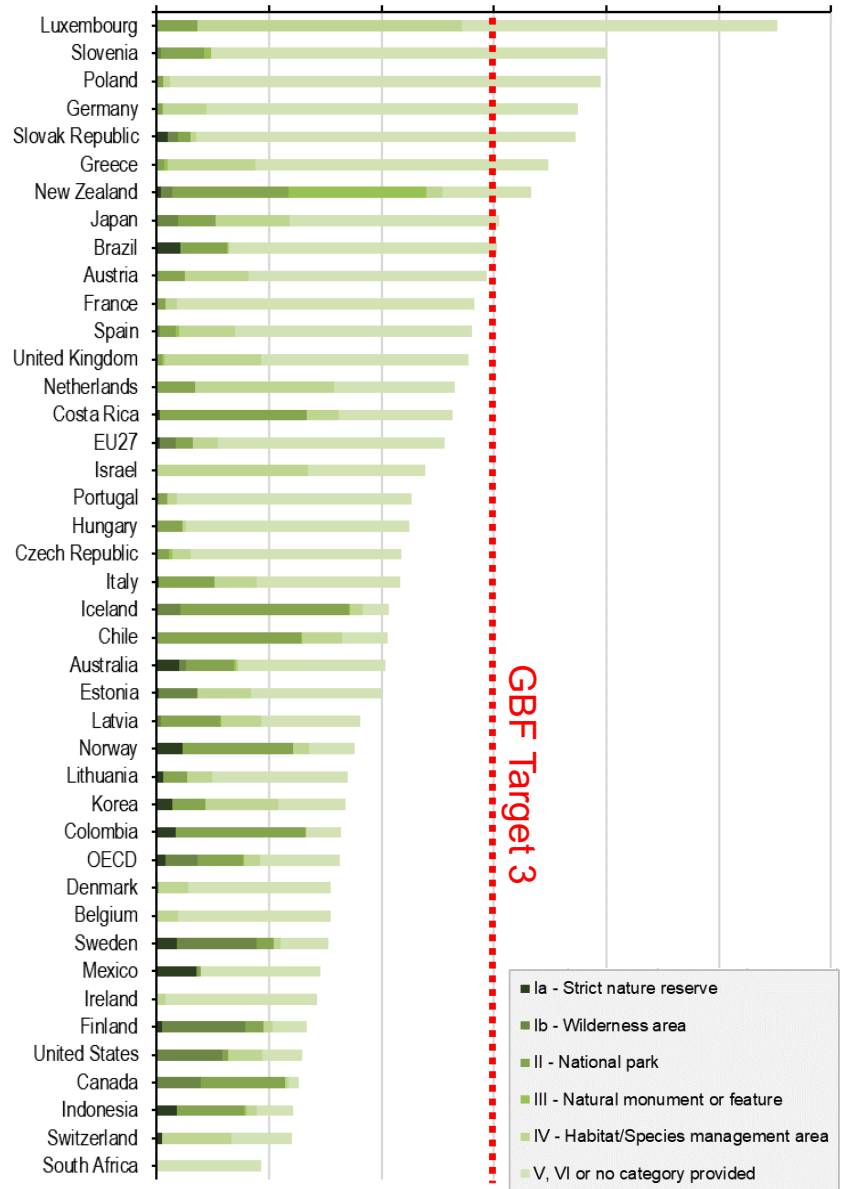
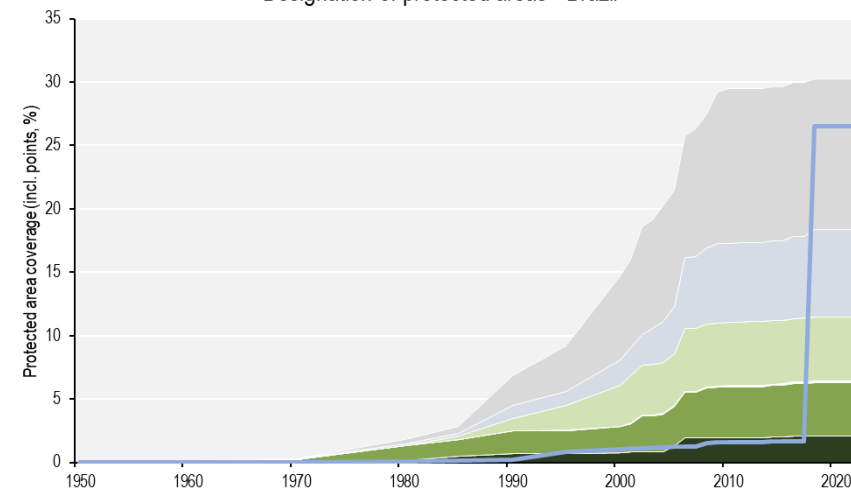
%land area

%EEZ area

Designation of protected areas - OECD



Designation of protected areas - Brazil



GBF Target 3

GBF Target 3

- Ia - Strict nature reserve
- Ib - Wilderness area
- II - National park
- III - Natural monument or feature
- IV - Habitat/Species management area
- V, VI or no category provided

- Designated with IUCN Management Objectives I-III which generally preclude commercial fishing and other extractive industries
- All other designations

Source: OECD calculations using the UNEP-WCMC World Database on Protected Areas (WPA) and methodology from Mackie, A., et al. (2017), ["Indicators on Terrestrial and Marine Protected Areas: Methodology and Results for OECD and G20 countries"](#), OECD Environment Working Papers, No. 126, OECD Publishing, Paris.

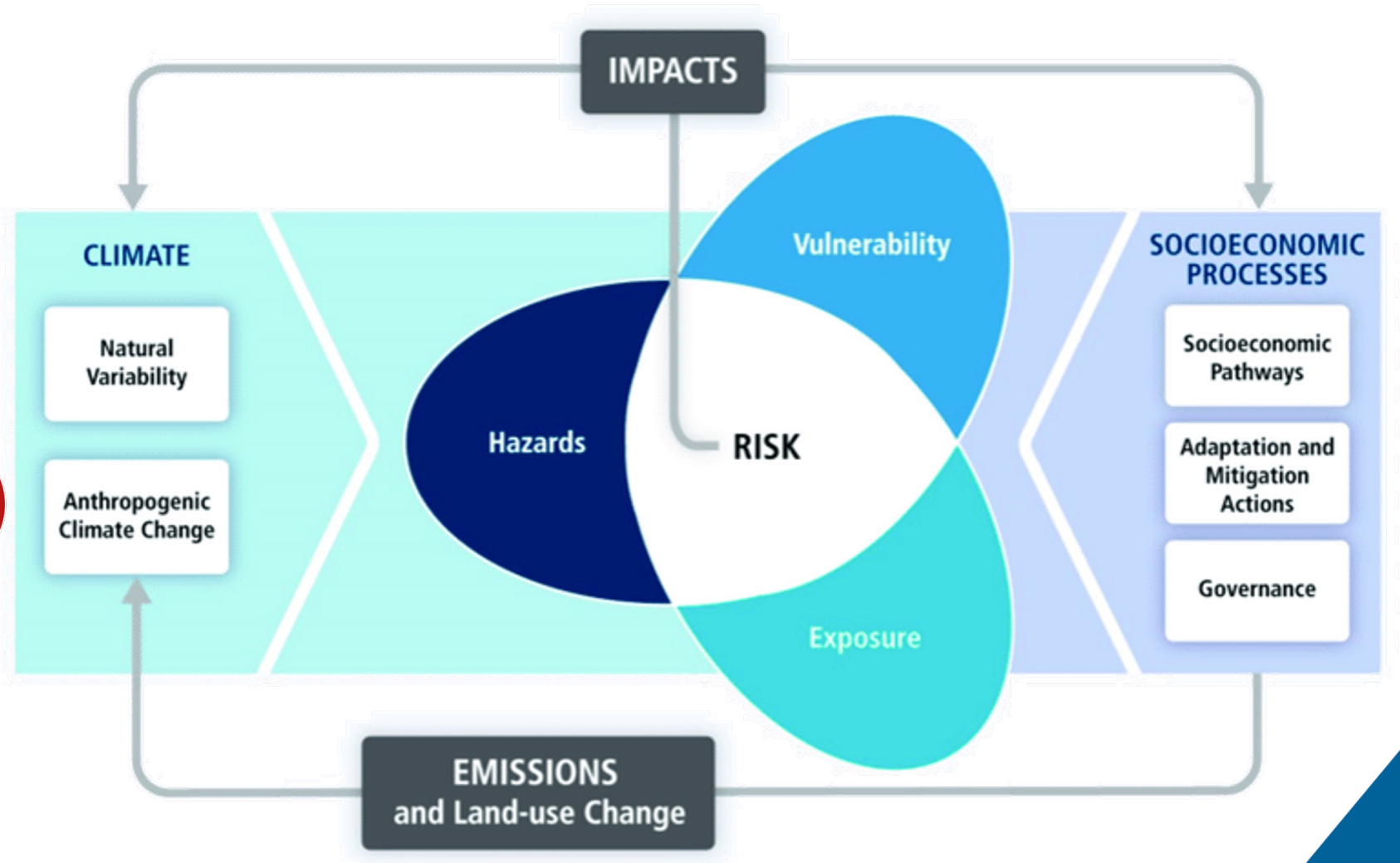
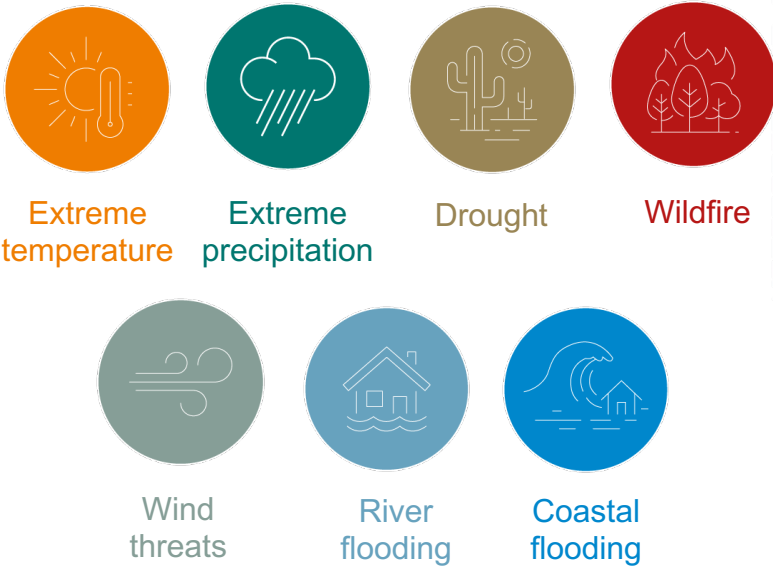
A photograph of a forest at sunset or sunrise. The trees are silhouetted against a bright orange and yellow sky. A large, semi-transparent blue diagonal shape covers the bottom-left portion of the image, creating a modern, graphic design element.

# Climate-related hazards



# A new loss and damage fund...

The new loss and damage fund will assist developing countries in responding to climate change damages.



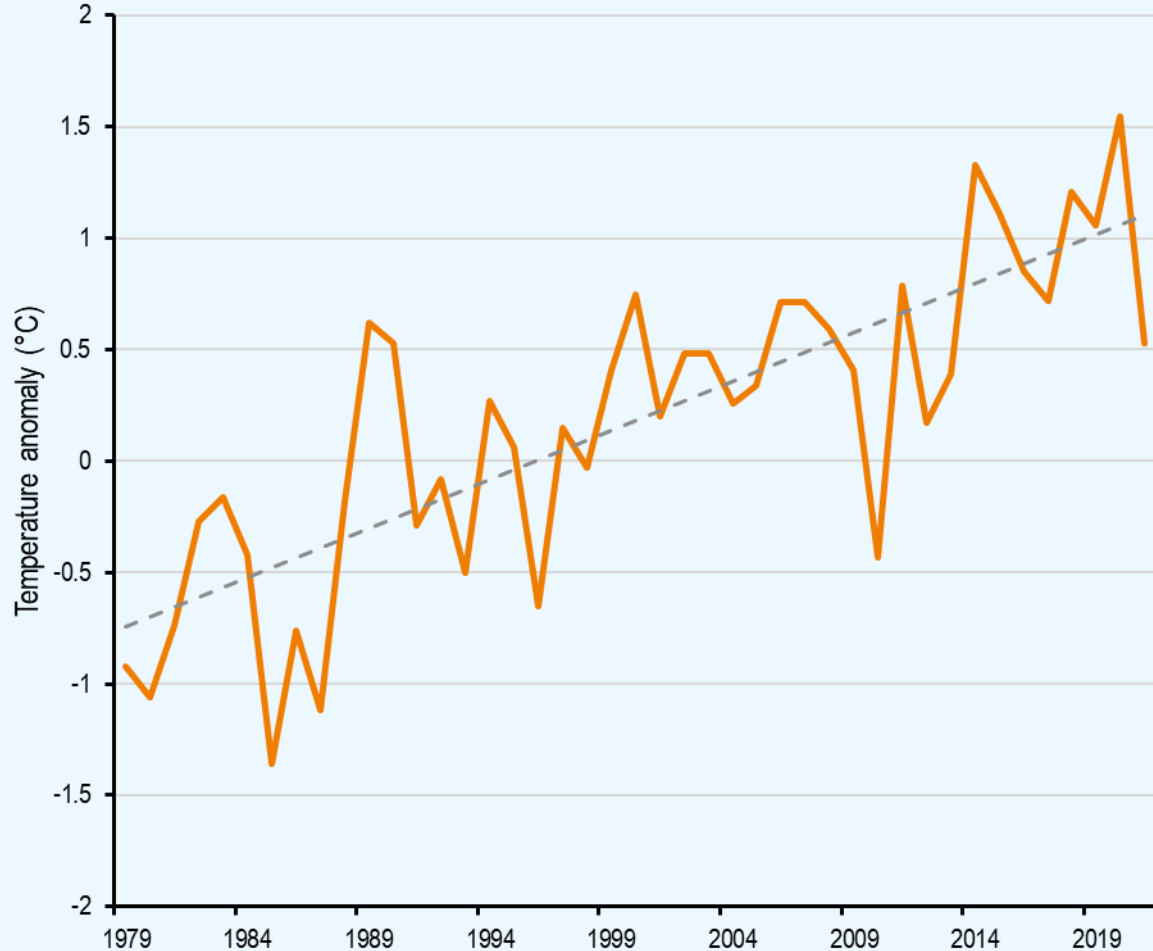
Source: IPCC 2014 & IPCC 2022





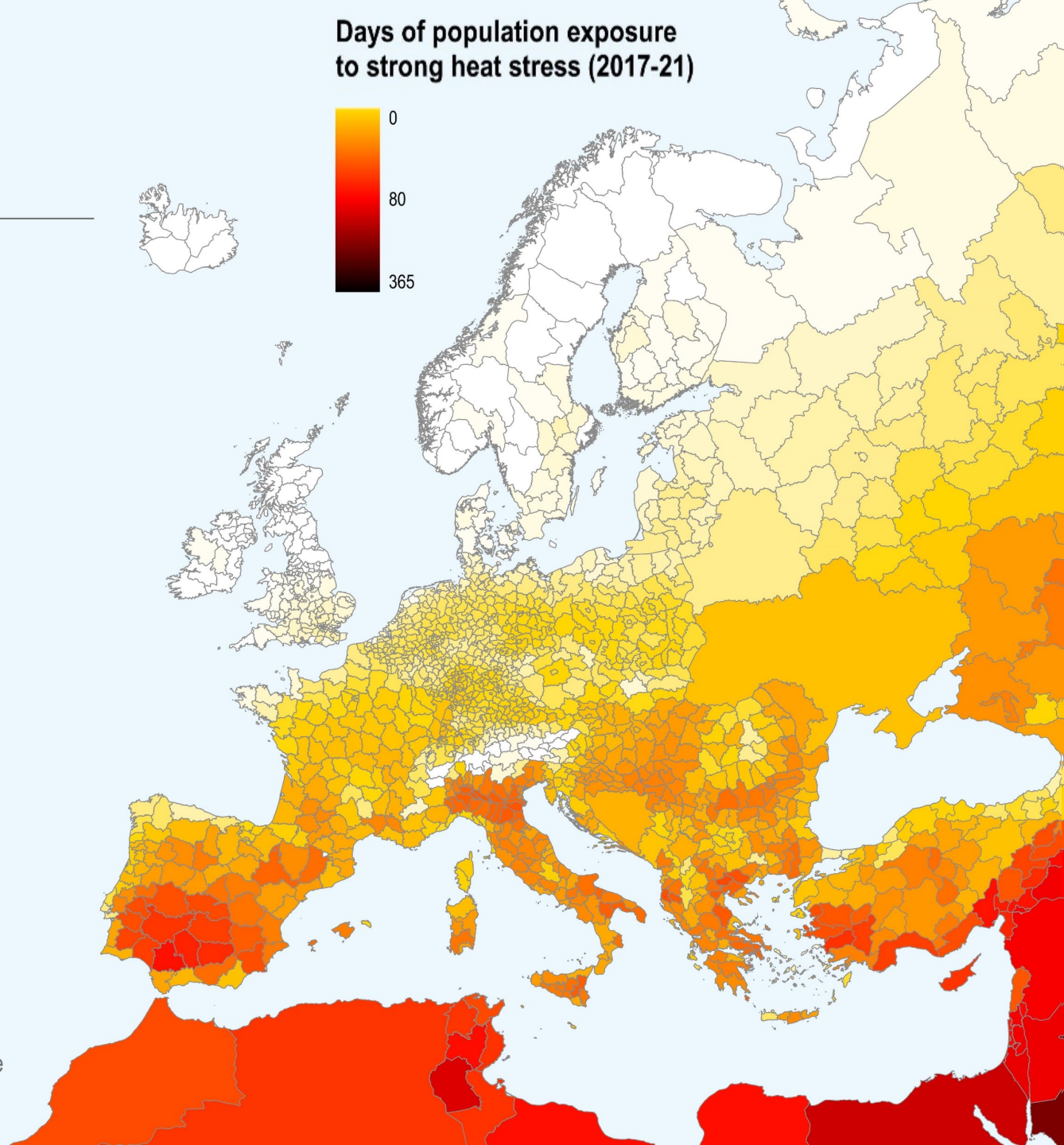
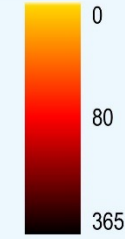
# Extreme temperature

Population exposure to heat (Days of OECD Europe average 1979-21)



Source: OECD and IEA calculations using temperature data from ERA5 reanalysis (Copernicus Climate Data Store) and methodology from Maes, M., et al. (2022), "[Monitoring exposure to climate-related hazards: Indicator methodology and key results](#)", OECD Environment Working Papers, No. 201.

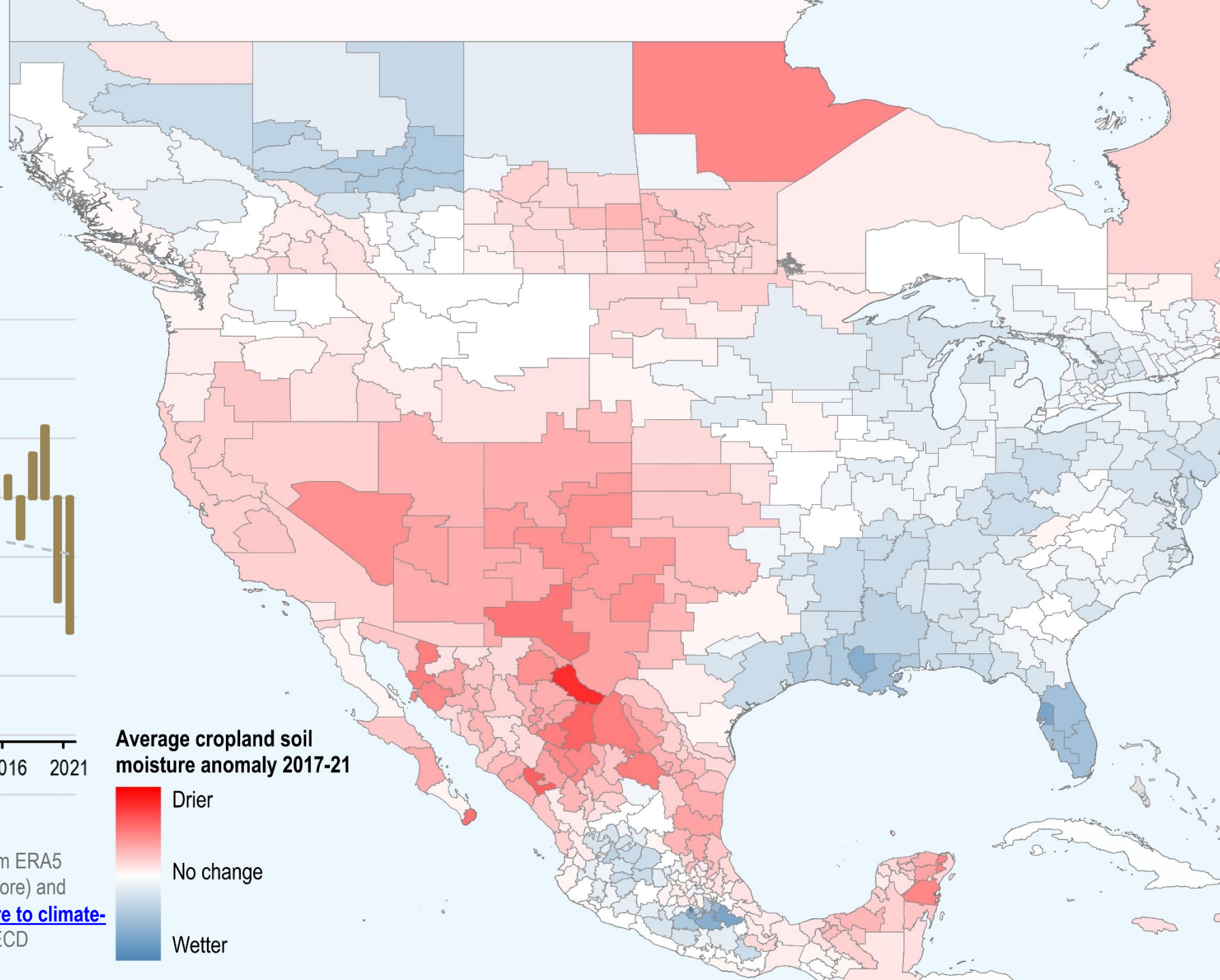
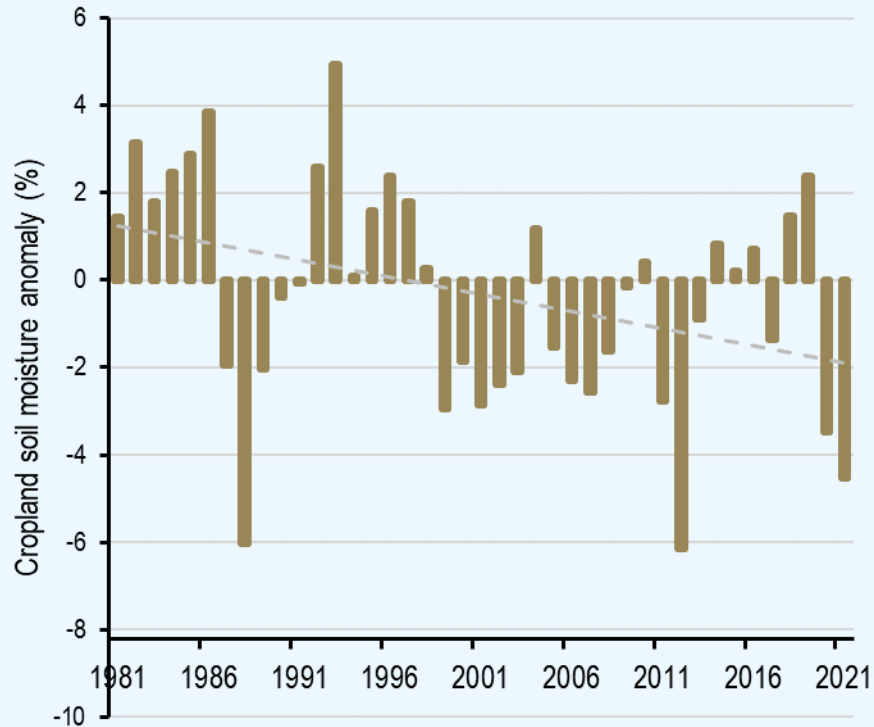
Days of population exposure to strong heat stress (2017-21)



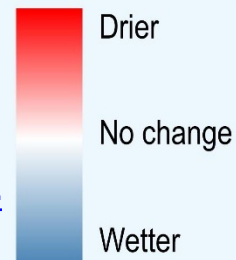


# Drought

**Agricultural drought is increasing**  
(OECD America average, 1981 - 2021)



**Average cropland soil moisture anomaly 2017-21**




**Source:** OECD calculations using soil moisture satellite data from ERA5 reanalysis, land cover gridded data (Copernicus Climate Data Store) and methodology from Maes, M., et al. (2022), [“Monitoring exposure to climate-related hazards: Indicator methodology and key results”](#), OECD Environment Working Papers, No. 201, OECD Publishing, Paris.

A photograph of an industrial facility, likely a power plant or refinery, emitting thick, dark smoke into the sky. The smoke rises from several tall chimneys and spreads across the upper portion of the frame. The sky is a mix of blue and orange, suggesting a sunrise or sunset. In the foreground, there is a thick layer of white, low-lying clouds or fog that partially obscures the base of the industrial facility. A large, solid blue diagonal shape covers the left side of the image, extending from the top-left corner towards the bottom-right.

# Air pollution

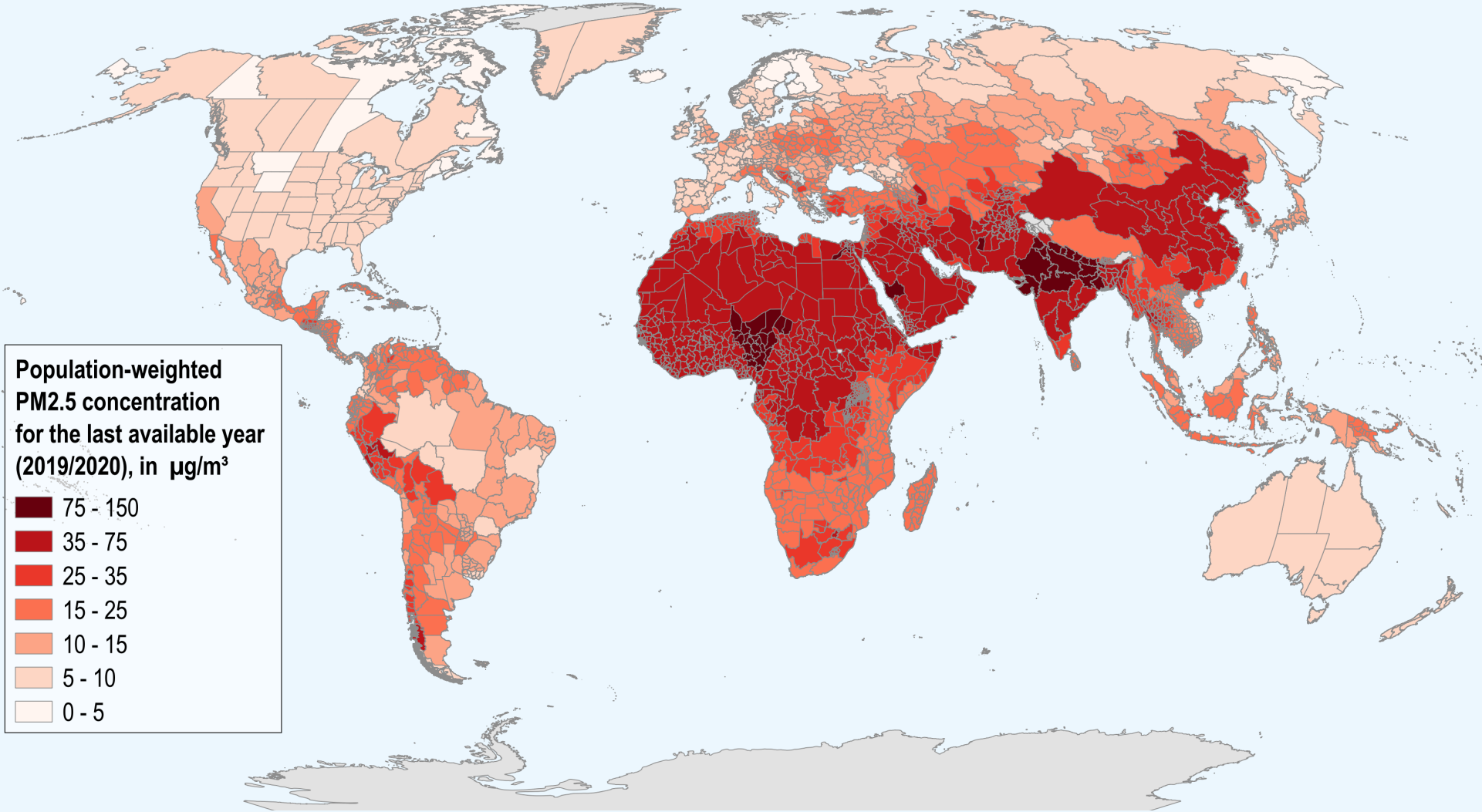


# The Global Burden of Disease: PM<sub>2.5</sub> pollution



**World Health Organization**

WHO air quality guidelines recommend not exceeding annual mean concentrations of PM<sub>2.5</sub> 5 µg/m<sup>3</sup>. WHO AQG, 2021

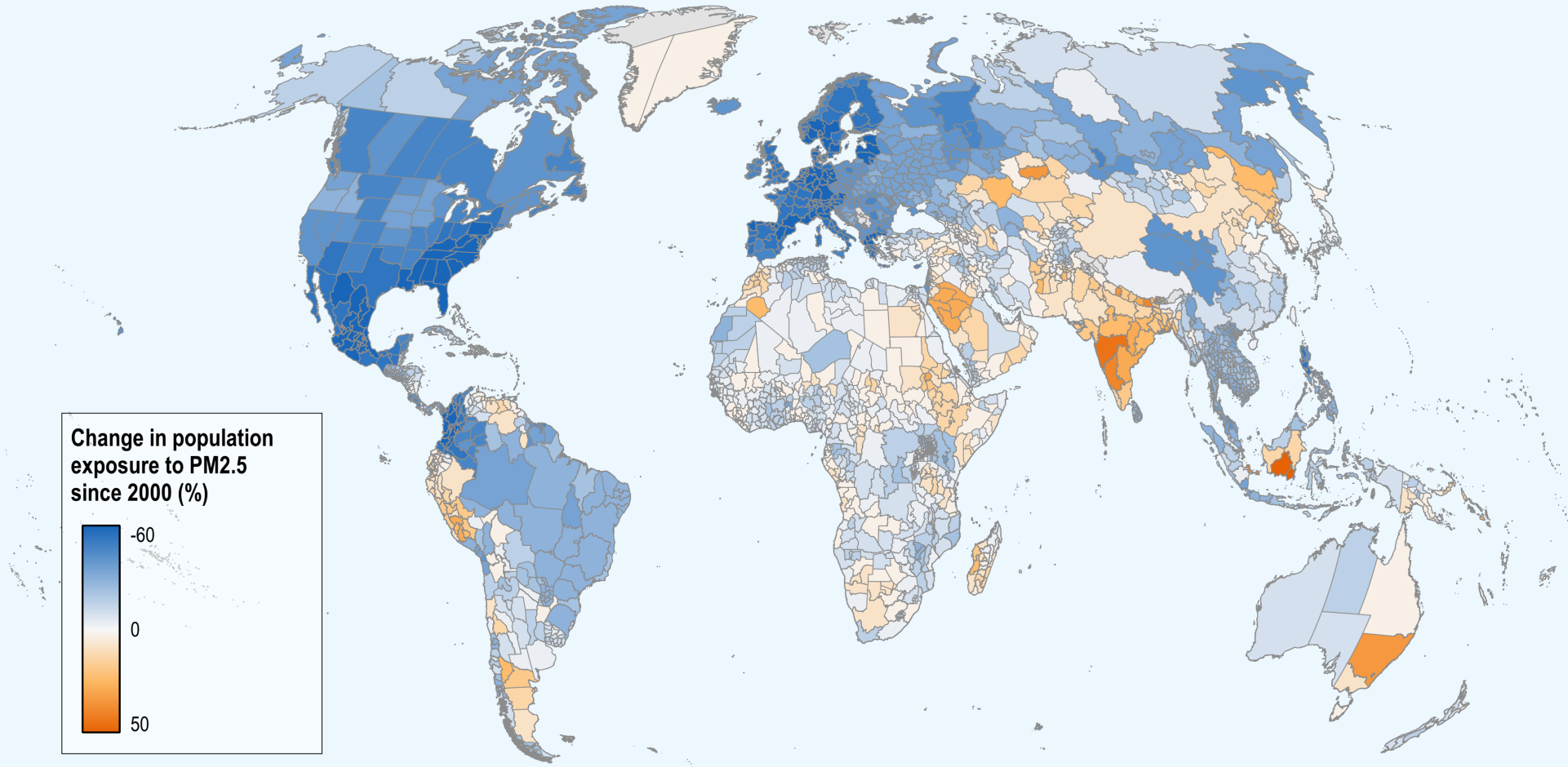


- Estimates of ambient air pollution:
- Satellite observations of aerosols
  - ground measurements
  - chemical transport model simulations
  - population estimates
  - land-use data.

Source: OECD calculations using Global Burden of Disease data and methodology from Mackie, A., et al. (2016), "[Population exposure to fine particles: Methodology and results for OECD and G20 countries](#)", OECD Green Growth Papers, No. 2016/02, OECD Publishing, Paris.



# Air pollution change (2000 - 2020)



An aerial photograph of a vast agricultural landscape, showing a patchwork of green and brown fields stretching towards a hazy horizon under a blue sky with scattered white clouds. A large, semi-transparent blue diagonal overlay covers the left and bottom-left portions of the image.

# Land cover



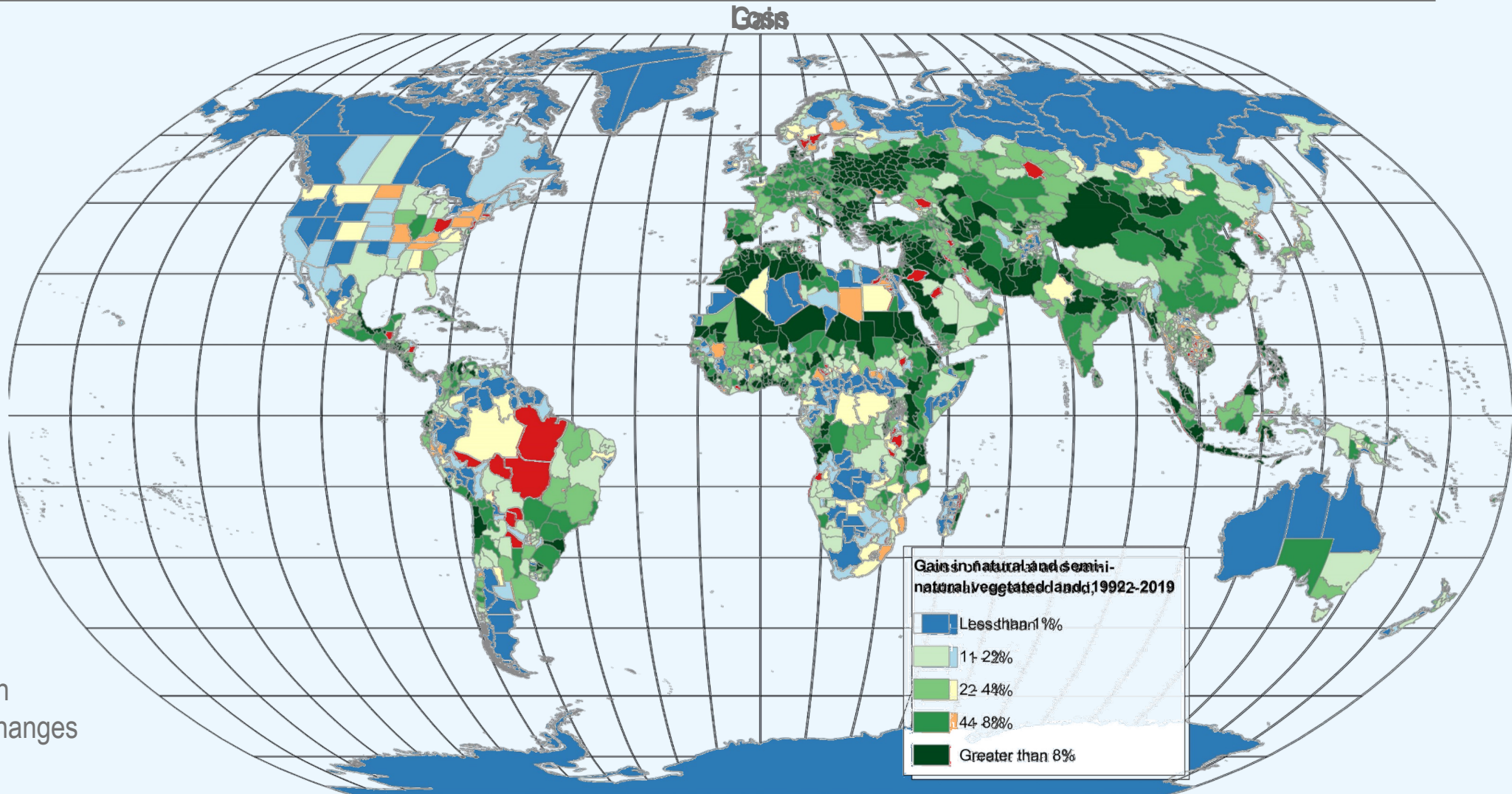
# Loss and gain of natural and semi-natural vegetated land

**15** LIFE ON LAND



By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world. SDG Target 15.3, 2015

- CCI Land Cover
- 300 m spatial resolution
- Long term cover and changes
- Yearly updates



Source: OECD calculations are based on Climate Change Initiative Land Cover (CCI-LC) and methodology from Hašič & Mackie (2018), "[Land Cover Change and Conversions: Methodology and Results for OECD and G20 countries](#)", OECD Green Growth Papers, No. 2018/04, OECD Publishing, Paris.



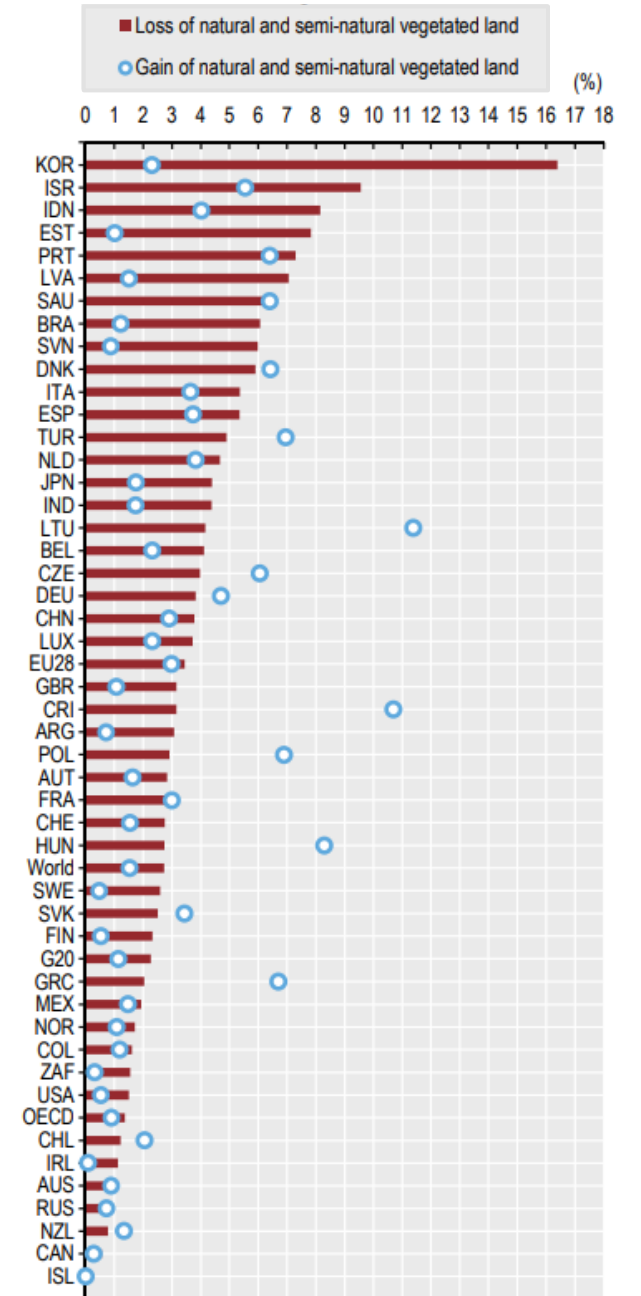
# Land cover change

Globally, an area the size of the United Kingdom (244 000 km<sup>2</sup>) has been converted to built-up areas between 1990 and 2014.

Built-up area in thousand km<sup>2</sup> in 2014 and new constructions since 1990.



## Conversions from and to natural and semi-natural vegetated land, 1992 – 2015



Source: OECD calculations are based on Climate Change Initiative Land Cover (CCI-LC) and Global Human Settlement Layer built-up area data. Methodology from Haščič & Mackie (2018), "[Land Cover Change and Conversions: Methodology and Results for OECD and G20 countries](#)", OECD Green Growth Papers, No. 2018/04.





## Conclusion

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- Earth observations and other geospatial data sources increasingly inform OECD indicators and policy analysis.
- Earth observations play a key role in the environmental policy domain, allowing to construct harmonised indicators across the world.
- Major data gaps and potential areas of improvement:
  - No compiled and harmonised **ocean** product exists comparable to what is available for global land cover products;
  - Little to no global geospatial data sources on **freshwater resources** comparable to what already exists for air quality;
  - Little global geospatial data sources on **biodiversity and ecosystem health** containing harmonised and comparable data points.
    - Most datasets are spatially biased towards the global north (i.e. PREDICTS database)
    - Datasets are not taxonomically representative



**Thank you  
for your attention!**

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## OECD Environment

International Programme  
for Action on Climate



Environment at a  
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## OECD Databases

Data Explorer



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