



The scale of the water resource challenge

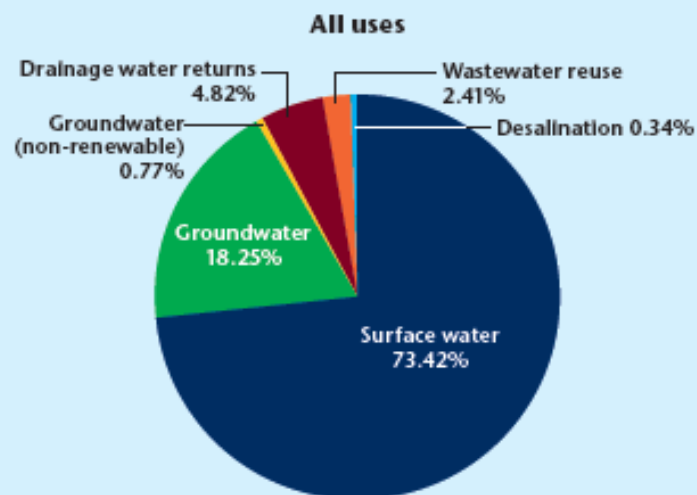
Professor Kevin Hiscock

**School of Environmental Sciences
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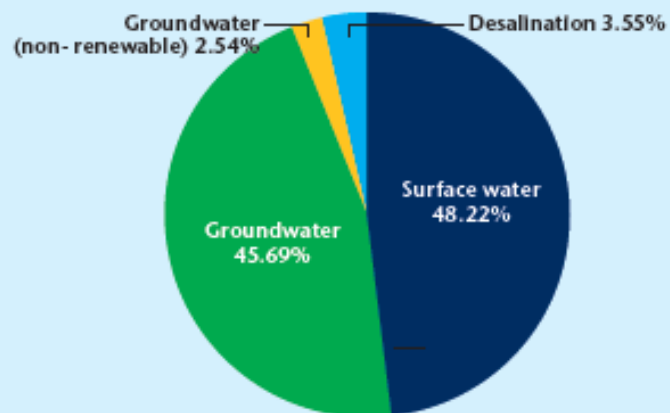
www.agritechwatercluster.org
agritechwatercluster@uea.ac.uk

Sources of water use globally and for major sectors, 2000

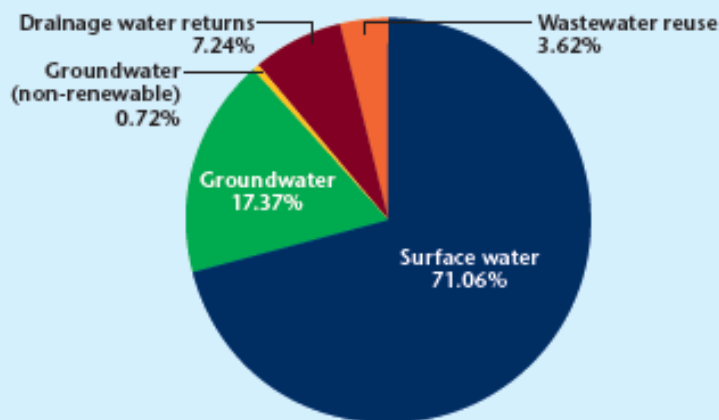
Withdrawals by supply source



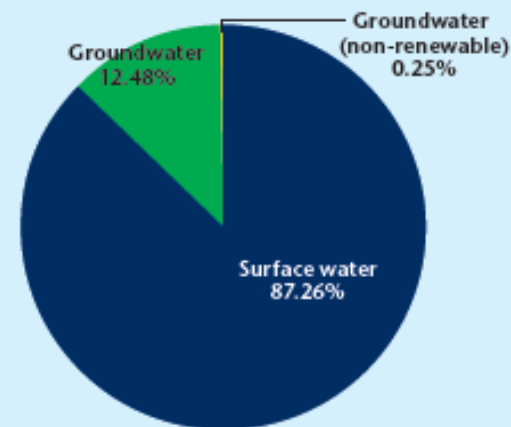
Drinking water use



Agriculture (Irrigation)



Energy and Industry



Source: FAO-AQUASTAT.

Constraints on World Agricultural Production



40% too dry

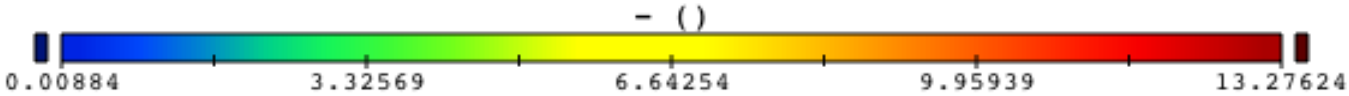
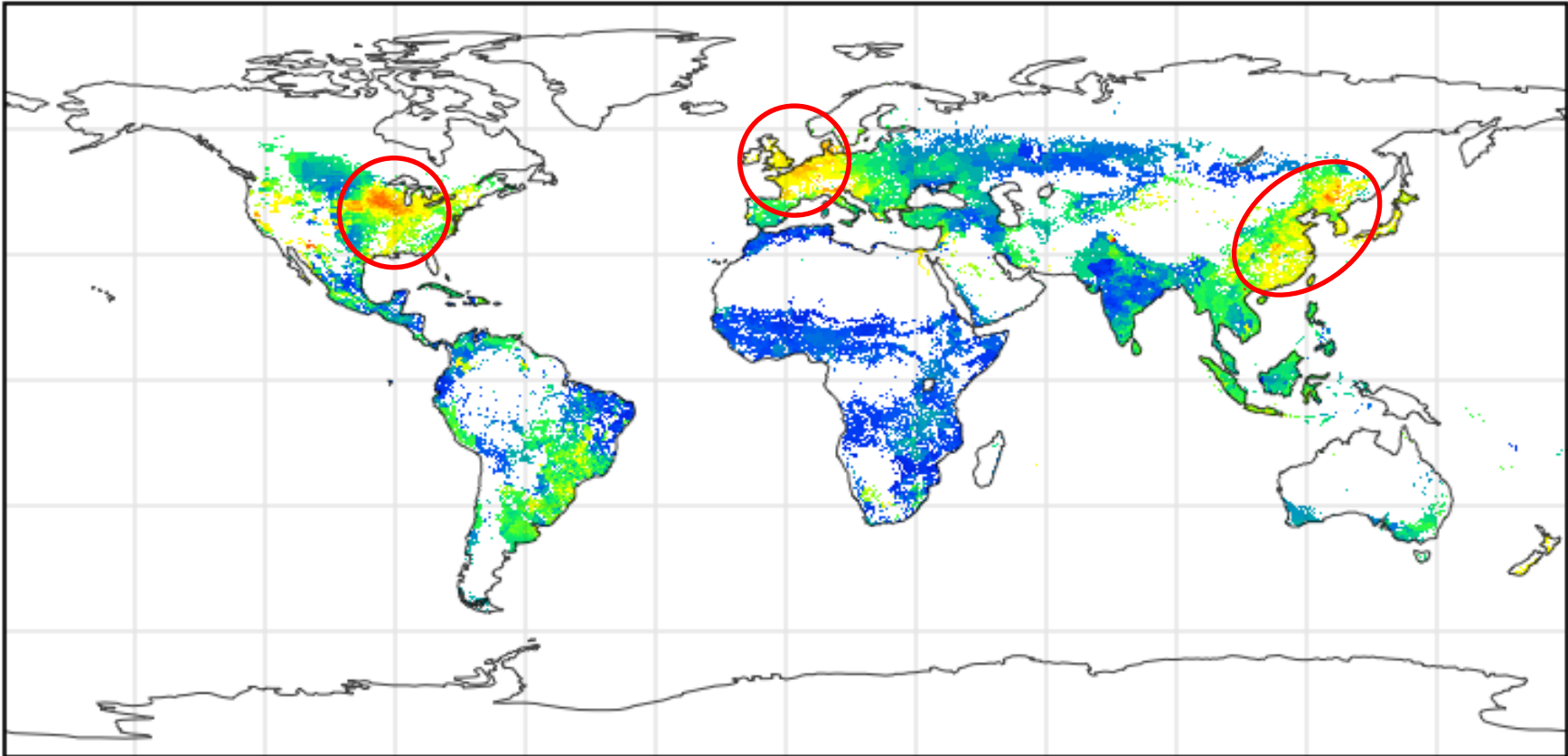
21% too cold

21% too wet

6% rough terrain

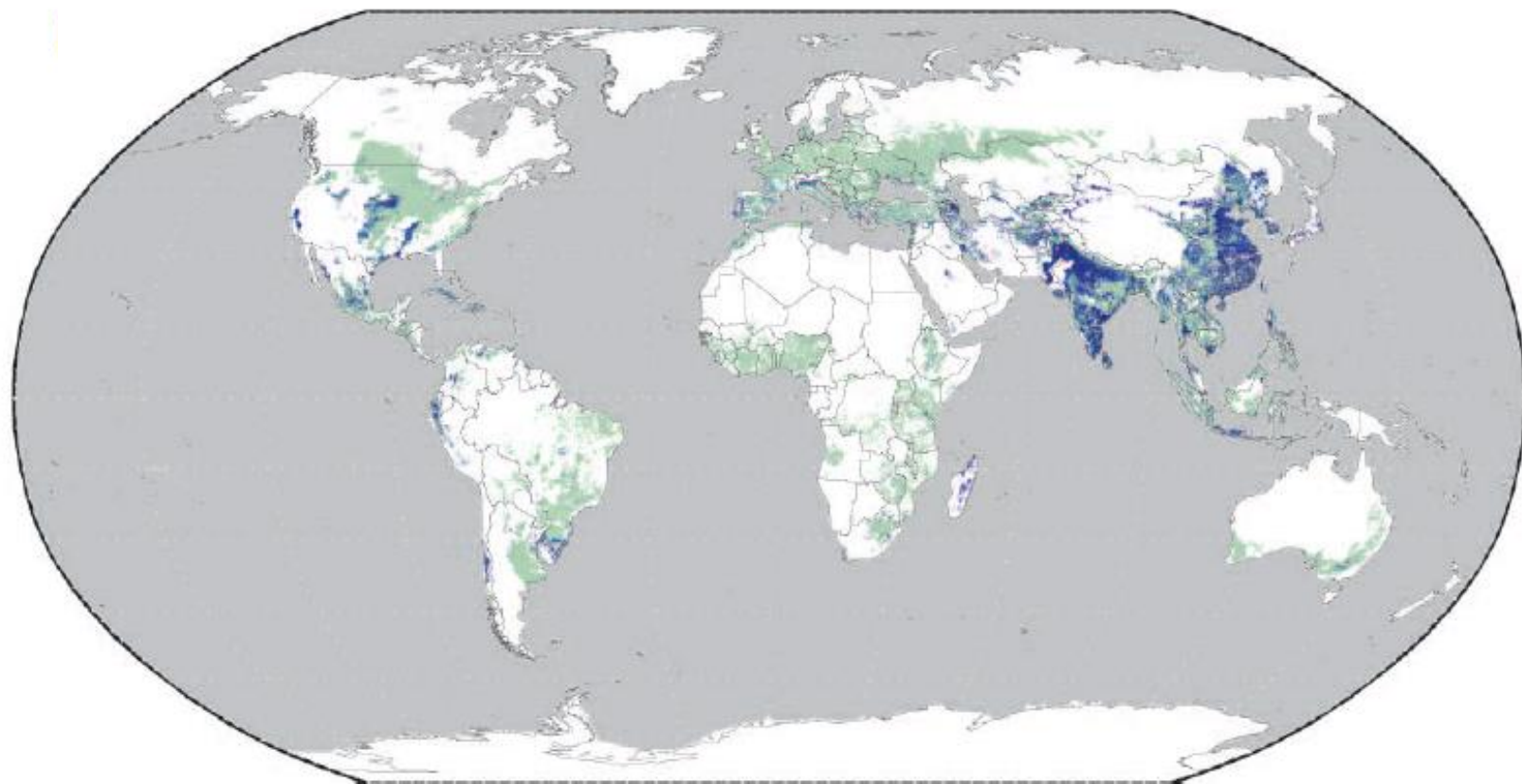
2% unsuitable soils

Grain Yields Around the World



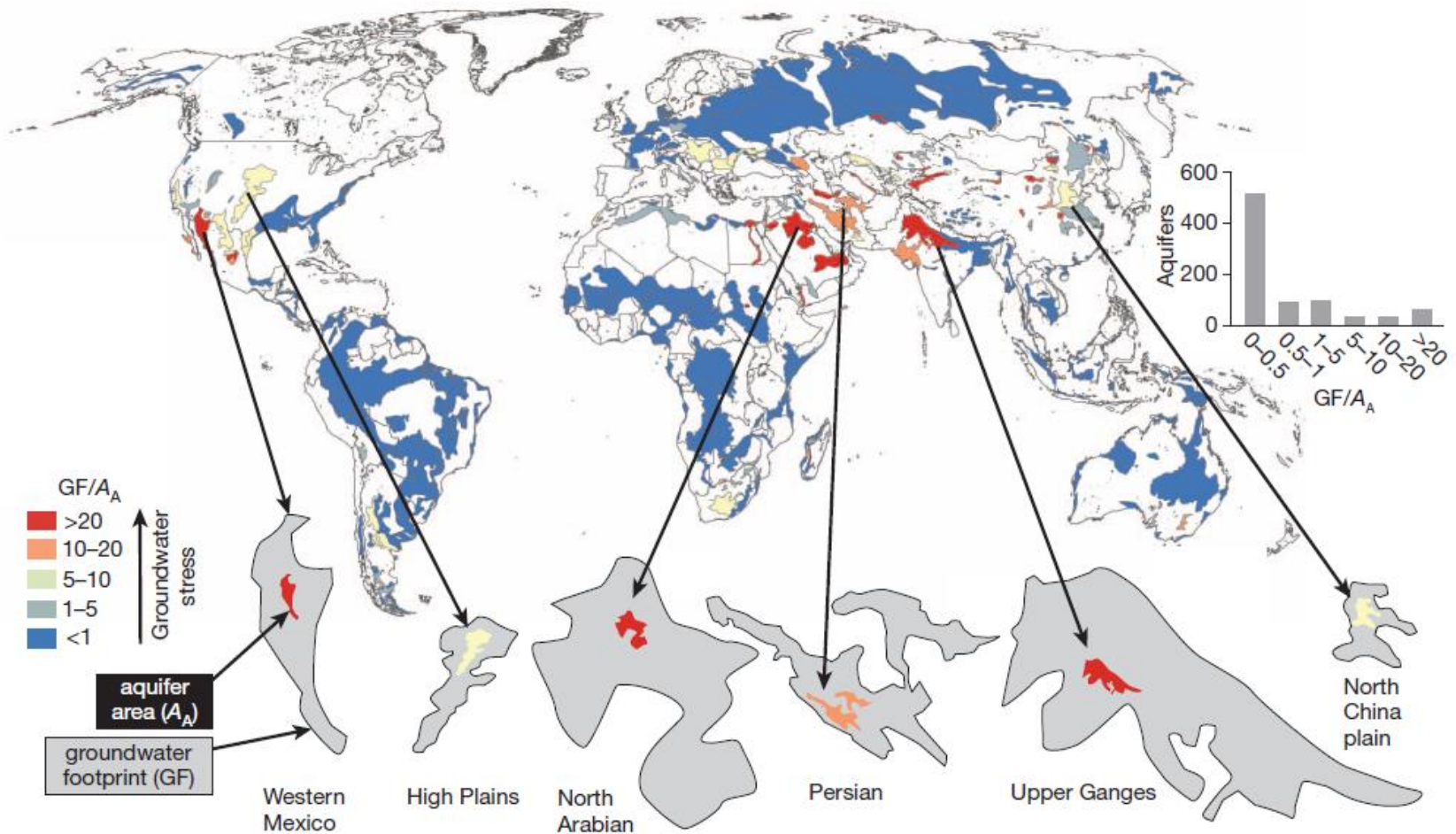
Equirectangular projection centered on 0.0°E

Data Min = 0.00884, Max = 13.27624



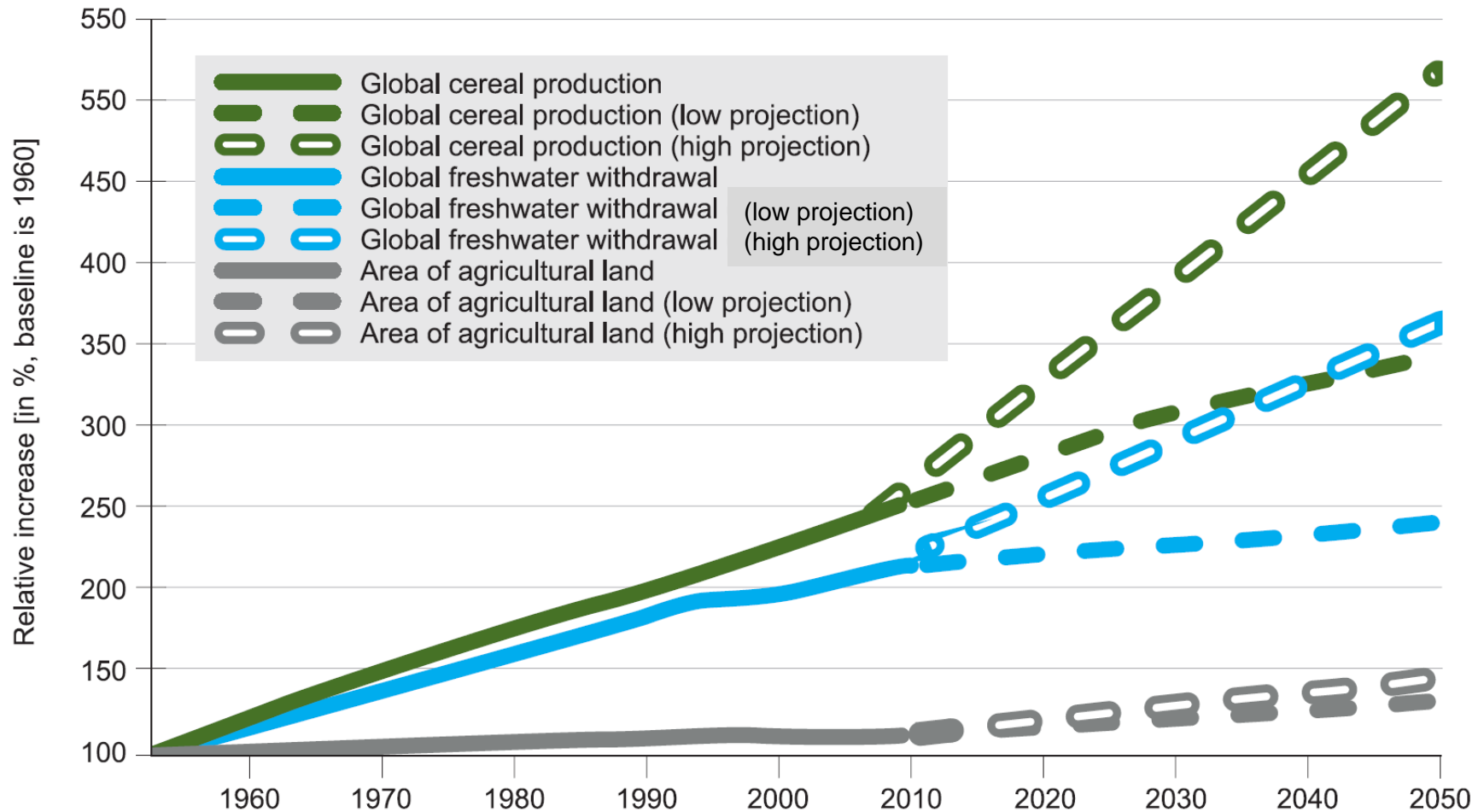
Major cereals: area irrigated (%)





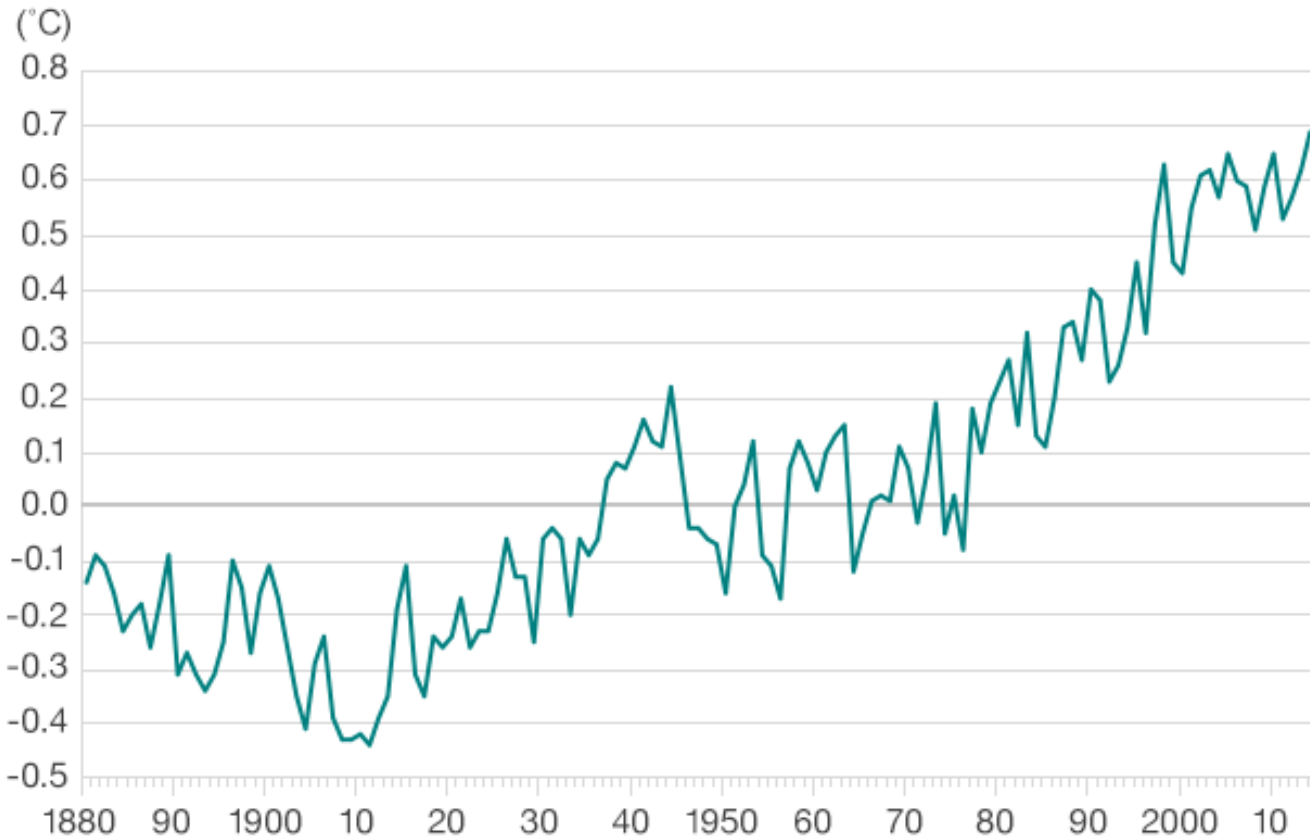
- Groundwater footprints of aquifers that are important in agriculture are larger than their geographic areas.
- Size of the global groundwater footprint: $(131.8 \pm 24.9) \times 10^6 \text{ km}^2$ or 3.5 ± 0.7 times the actual area of hydrologically active aquifers.

Global trends in water and land use and agricultural output



Under current production practices, an additional **5000 km³** of freshwater is needed to meet global food demand (= 70% increase on current agricultural water consumption) and likely to cross a 'planetary boundary' for sustainable water resources use.

Global average temperature anomaly (1880-2014)



Source: NOAA

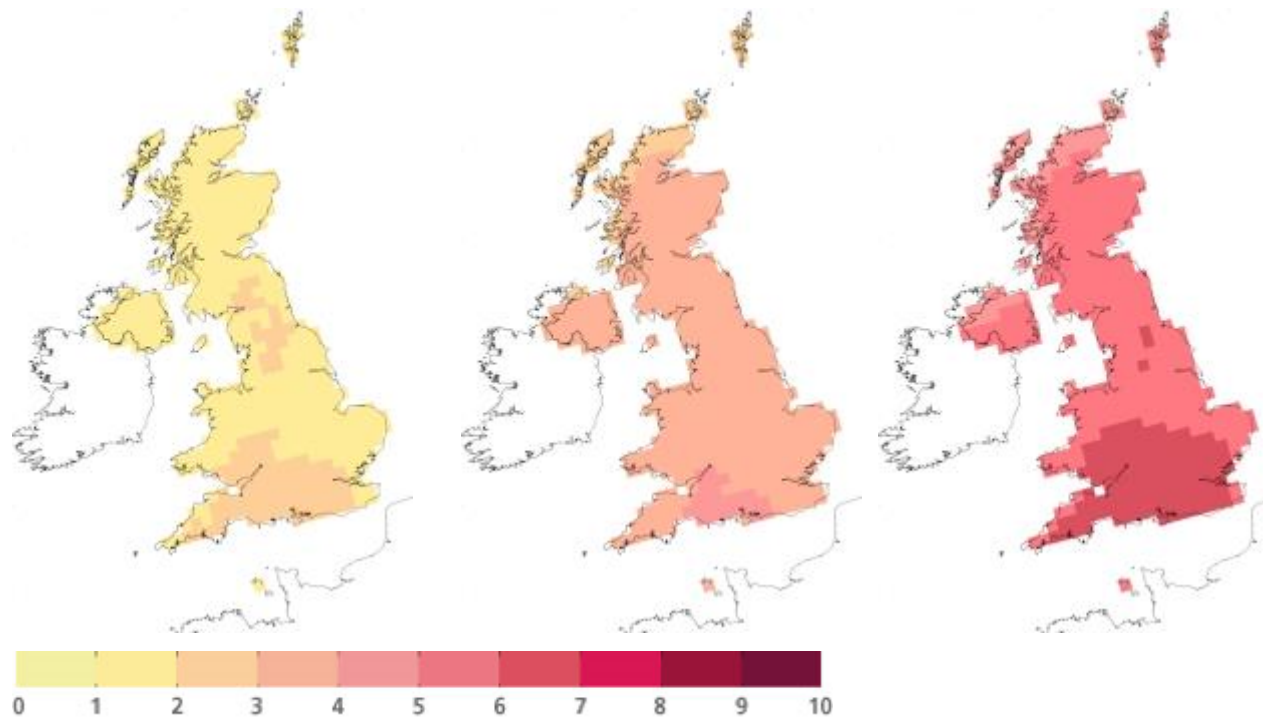
2014 was the warmest year on record, with global temperatures 0.68°C (1.24°F) above the long-term average

Change in summer mean temperature for the 2080s under a medium emissions scenario

10% probability level:
very unlikely to be less than

50% probability level:
central estimate

90% probability level:
very unlikely to be greater than



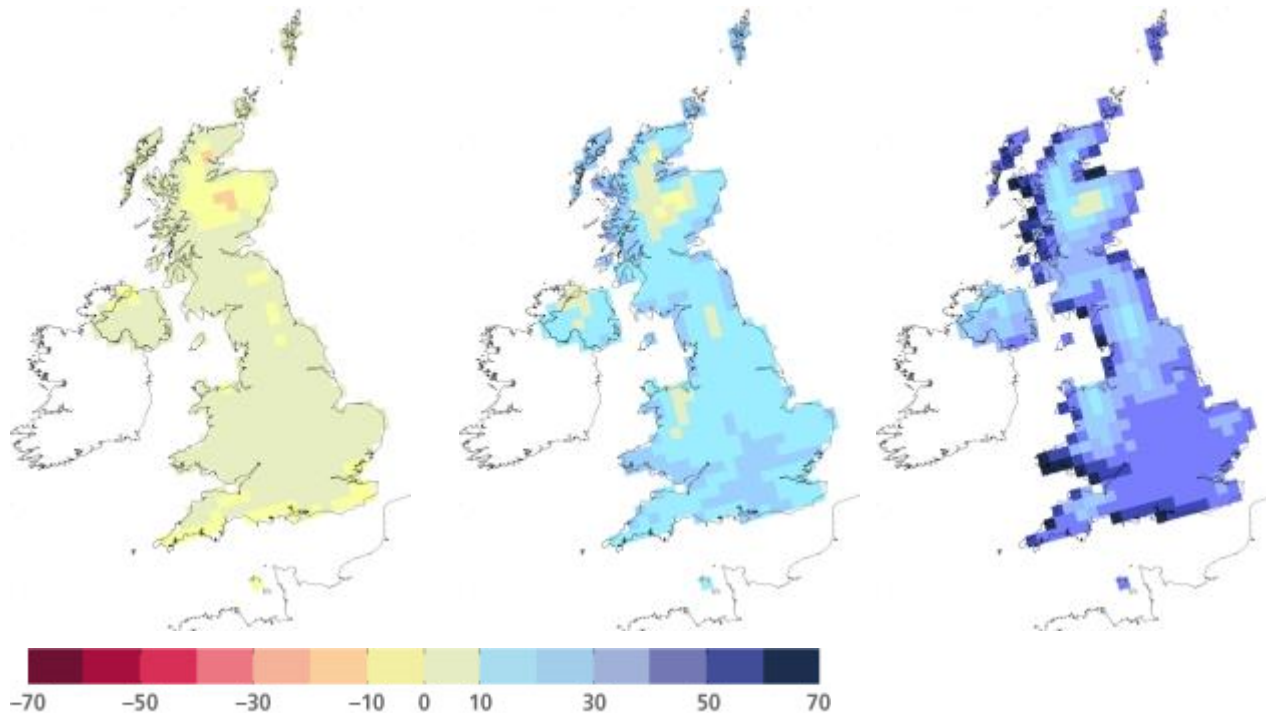
Change in summer mean temperature
(°C) Medium emissions

Change in winter mean precipitation for the 2080s under a medium emissions scenario

10% probability level:
very unlikely to be less than

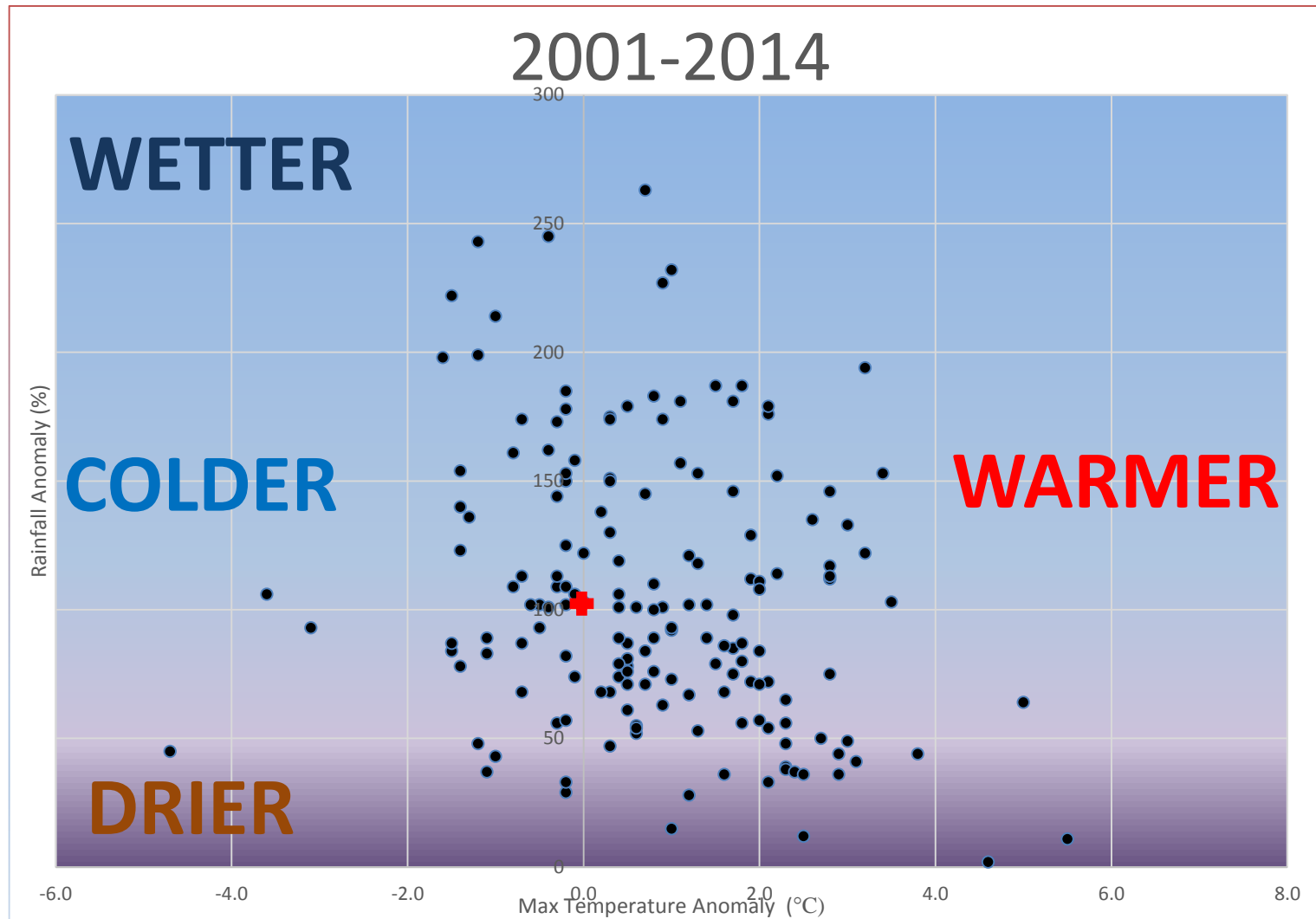
50% probability level:
central estimate

90% probability level:
very unlikely to be greater than



Change in winter mean precipitation
(%) Medium emissions

Rainfall and maximum temperature recorded each month of the year for the East Anglian Region



Comments

- Future climate may present a decrease in potential water availability that will increase stress on local and regional water resources which are *already* under ecosystem and water supply pressures.
- Adaptation to climate change impacts requires the engagement of local communities in solving local problems and the development of sustainable water abstraction.