

Climate risk and climate adaptation





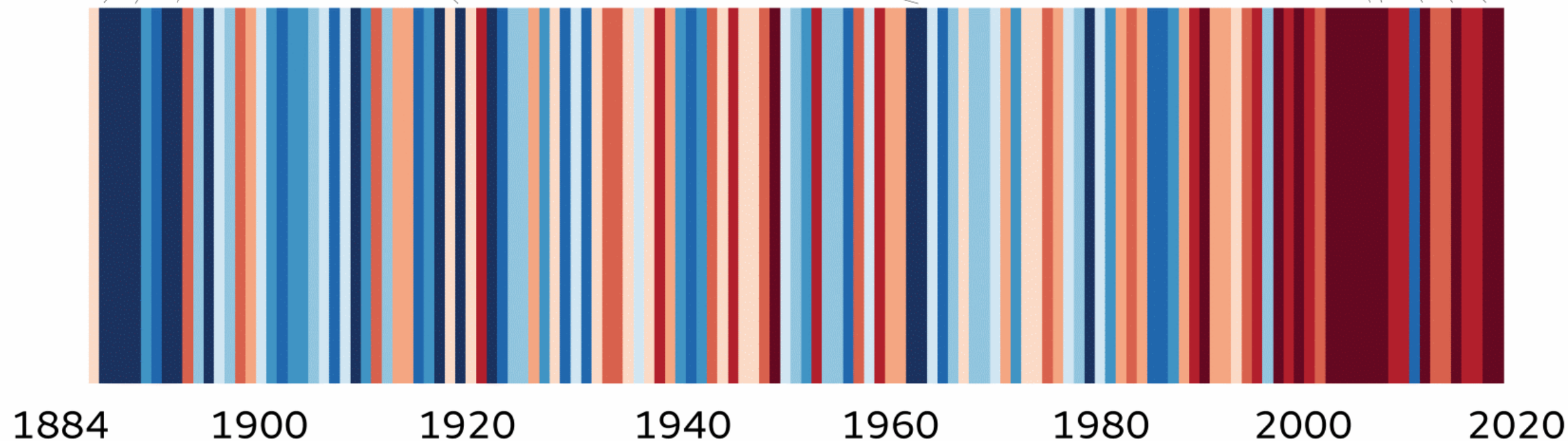
UK annual temperature

5 coolest years

1892, 1888, 1885, 1963, 1919

5 warmest years

2014, 2006, 2011, 2007, 2017





UK warming stripes (1883-2017)

STORNOWAY

20th century average: 8.2°C



ARMAGH

20th century average: 9.2°C



DURHAM

20th century average: 8.5°C



SHEFFIELD

20th century average: 9.5°C

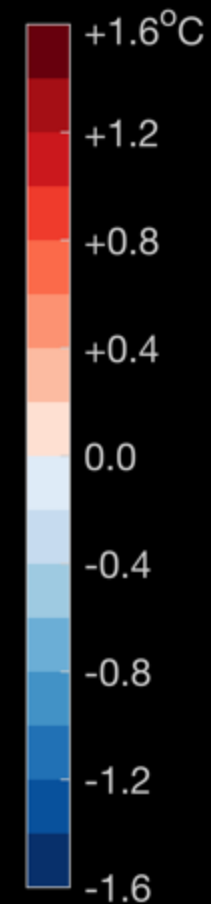


OXFORD

20th century average: 10.1°C

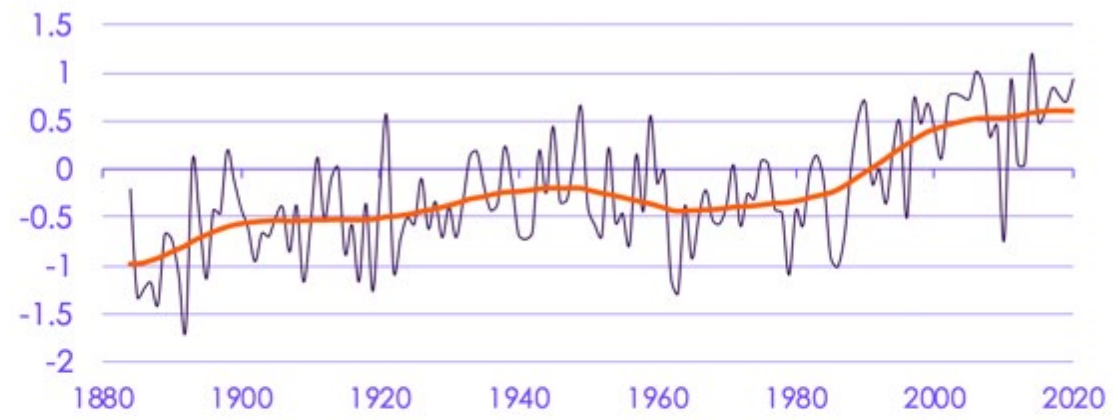


Difference from
20th century
average

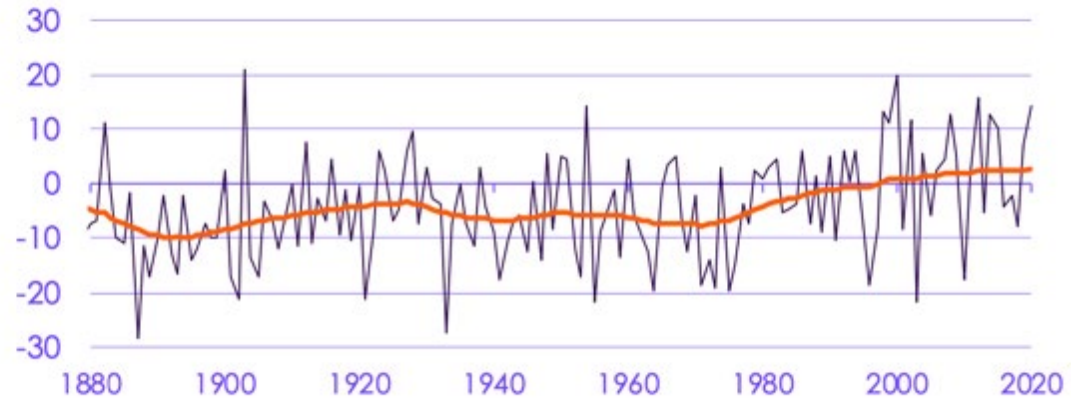


1890 1910 1930 1950 1970 1990 2010

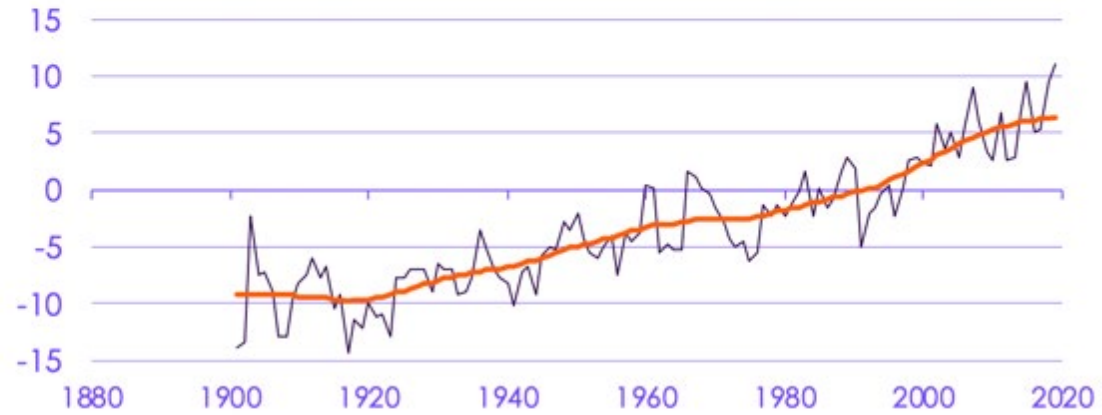
Annual temperature
(°C relative to 1981-
2000)



Annual rainfall (%)
relative to 1981-2000)



Sea level rise (cm)
relative to 1981-2000)





UK Climate Projections (UKCP)

The UK Climate Projections (UKCP) is a set of tools and data that shows you how the UK climate may change in the future.

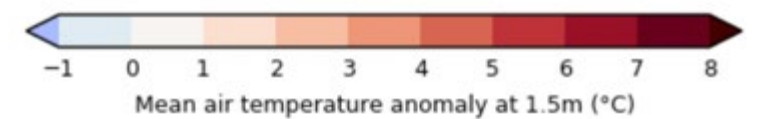
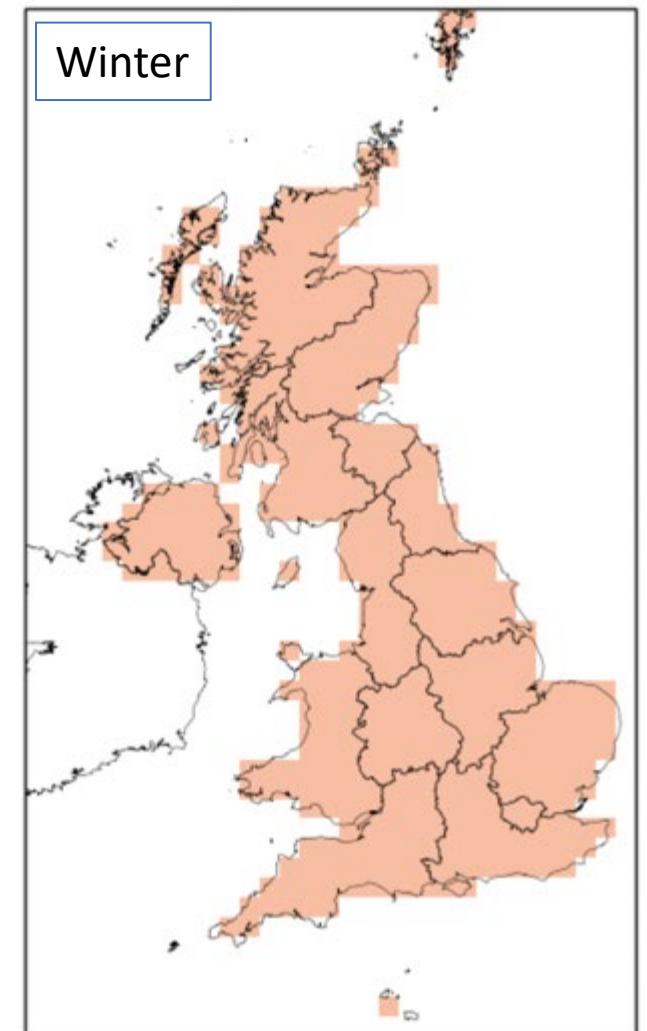
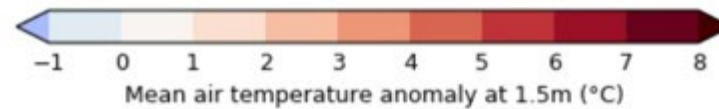
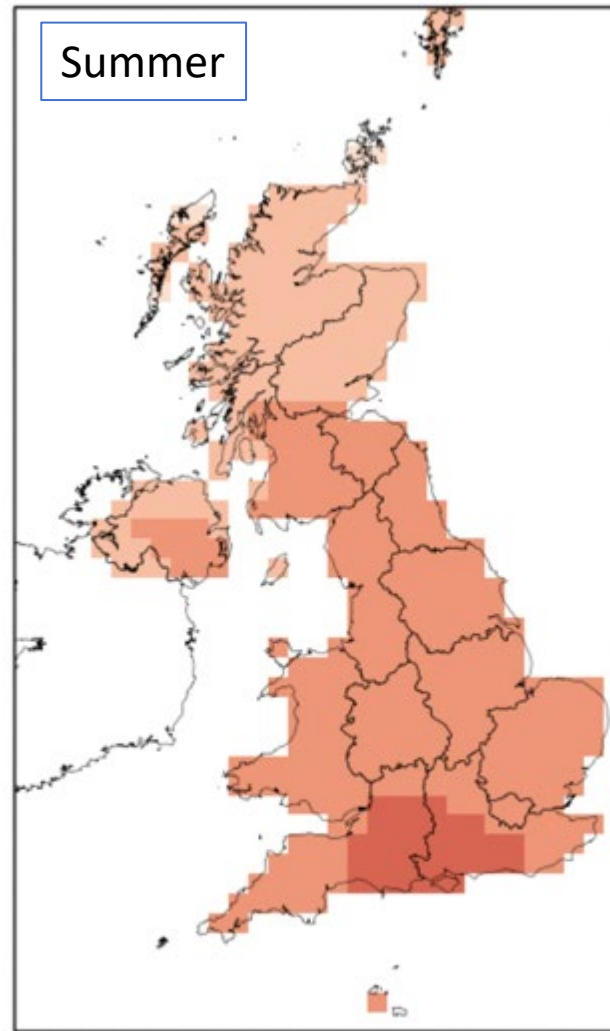
UKCP summaries and headline findings

Get summaries of UKCP data, including headlines from the latest climate change projections for the UK.

- [UKCP summaries and headline findings](#)

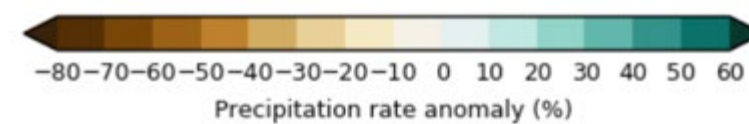
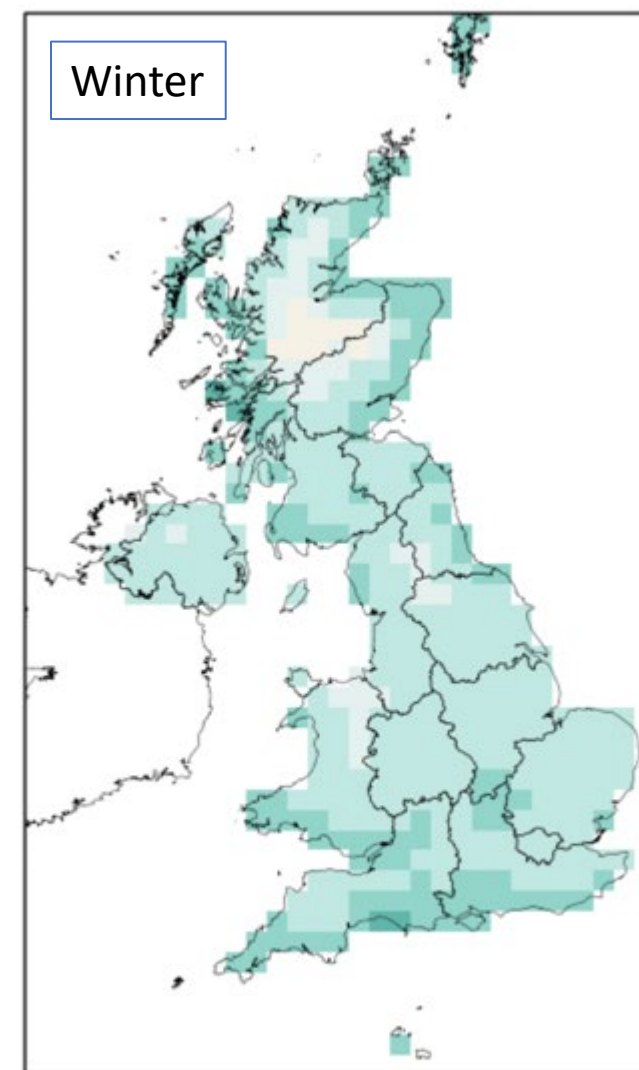
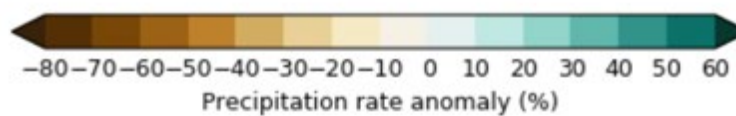
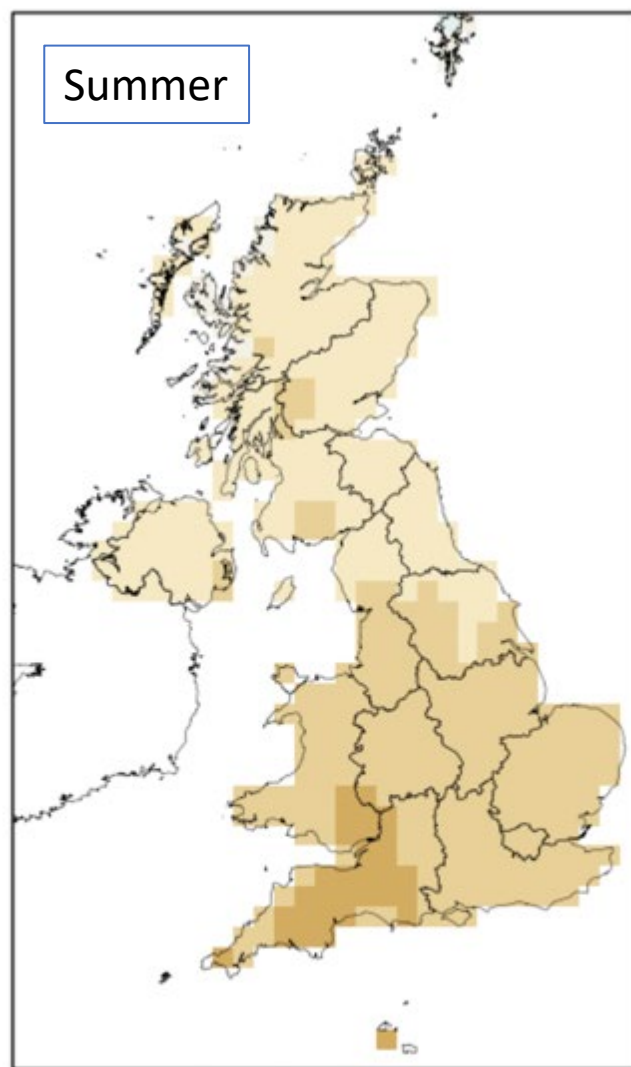
UK temperature 2080

Under A1B emissions scenario

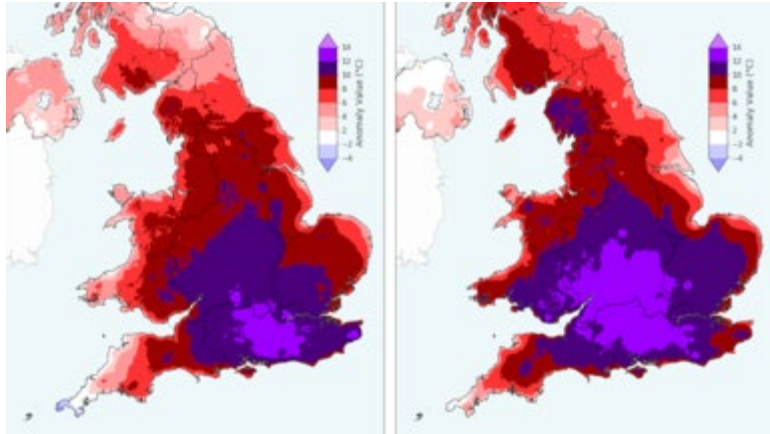


UK rainfall 2080

Under A1B emissions scenario



Extreme events are also impacting the UK



• Heatwaves

- The **Summer 2020 heatwave** was the most significant heatwave of the last 60 years, leading to over **2500 excess deaths** across the UK
- Southern England experienced successive days exceeding **34°C** and **'tropical' nights** exceeding 20°C
- By **2050** hot summers could happen **every other year**



Heavy rainfall

- **February 2020** was the wettest February on record
- **Storm Ciara** saw a month's worth of rain fall across parts of West Yorkshire in just 18 hours, leading to **widespread flooding**
- By **2070**, winter rainfall events, similar to these, are expected to **increase by up to 25%**



Wildfires

- Figures suggest the number of **UK wildfires has been increasing** in recent years
- Wildfires could be **5 times more likely** by 2100 due to increases in high temperatures and low summer rainfall; conditions highly conducive to wildfires

Climate Change Risk Assessment (CCRA3)

June 2021

Independent Assessment of UK Climate Risk

Advice to Government
For the UK's third Climate Change Risk Assessment (CCRA3)



CCRA3

identifies 61 risks and opportunities arising from climate change

N1 Risks to terrestrial species and habitats	N2 Risks to terrestrial species and habitats from pests, pathogens and INNS	N4 Risk to soils from changing conditions, including seasonal aridity and wetness	N5 Risks to natural carbon stores and sequestration from changing conditions	N6 Risks to and opportunities for agricultural and forestry productivity
N7 Risks to agriculture from pests, pathogens and INNS	N8 Risks to forestry from pests, pathogens and INNS	N11 Risks to freshwater species and habitats	N12 Risks to freshwater species and habitats from pests, pathogens and INNS	N14 Risks to marine species, habitats and fisheries
N16 Risks to marine species and habitats from pests, pathogens and INNS	N17 Risks and opportunities to coastal species and habitats	I1 Risks to infrastructure networks from cascading failures	I2 Risks to infrastructure services from river and surface water flooding	I5 Risks to transport networks from slope and embankment failure
I8 Risks to public water supplies from reduced water availability	I12 Risks to transport from high and low temperatures, high winds, lightning	H1 Risks to health and wellbeing from high temperatures	H3 Risks to people, communities and buildings from flooding	H4 Risks to people, communities and buildings from sea level rise
H6 Risks and opportunities from summer and winter household energy demand	H8 Risks to health from vector-borne diseases	H11 Risks to cultural heritage	H12 Risks to health and social care delivery	H13 Risks to education and prison services
B1 Risks to business sites from flooding	B2 Risks to business locations and infrastructure from coastal change	B6 Risks to business from disruption to supply chains and distribution networks	ID1 Risks to UK food availability, safety, and quality from climate change overseas	ID5 Risks to international law and governance from climate change overseas that will impact the UK
ID4 Risks to the UK from international violent conflict resulting from climate change	ID9 Risk to UK public health from climate change overseas	ID7 Risks from climate change on international trade routes	ID10 Risk multiplication from the interactions and cascades of named risks across systems and geographies	N3 Opportunities from new species colonisations in terrestrial habitats
N9 Opportunities for agricultural and forestry productivity from new species	N10 Risks to aquifers and agricultural land from sea level rise, saltwater intrusion	N15 Opportunities for marine species, habitats and fisheries	N18 Risks and opportunities from climate change to landscape character	I3 - Risks to infrastructure services from coastal flooding and erosion
I4 Risks to bridges and pipelines from flooding and erosion	I6 Risks to hydroelectric generation from low or high river flows	I7 Risks to subterranean and surface infrastructure from subsidence	I9 Risks to energy generation from reduced water availability	I10 Risks to energy from high and low temperatures, high winds, lightning
I13 Risks to digital from high and low temperatures, high winds, lightning	H2 Opportunities for health and wellbeing from higher temperatures	H5 Risks to building fabric	H7 Risks to health and wellbeing from changes in air quality	H9 Risks to food safety and food security
H10 Risks to health from poor water quality and household water supply interruptions	B3 Risks to businesses from water scarcity	B5 Risks to business from reduced employee productivity – infrastructure disruption and higher temperatures	B7 Opportunities for business - changing demand for goods and services	N13 Opportunities to marine species, habitats and fisheries
I11 Risks to offshore infrastructure from storms and high waves	B4 Risks to finance, investment, insurance, access to capital	ID8 Risk to the UK finance sector from climate change overseas	ID2 Opportunities for UK food availability and exports	ID3 Risks to the UK from climate-related international human mobility
ID6 Opportunities (including Arctic ice melt) on international trade routes				

More Action Needed

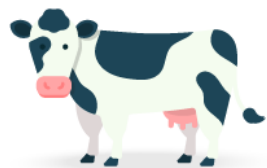
Further Investigation

Sustain Current Action, Watching Brief



N7 Risks to agriculture from pests, pathogens and INNS	N8 Risks to forestry from pests, pathogens and INNS	N11 Risks to freshwater species and habitats
N16 Risks to marine species and habitats from pests, pathogens and INNS	N17 Risks and opportunities to coastal species and habitats	I1 Risks to infrastructure networks from cascading failures
18 Risks to public water supplies from reduced water availability	I12 Risks to transport from high and low temperatures, high winds, lightning	H1 Risks to health and wellbeing from high temperatures
H6 Risks and opportunities from summer and winter household energy demand	H8 Risks to health from vector-borne diseases	H11 Risks to cultural heritage

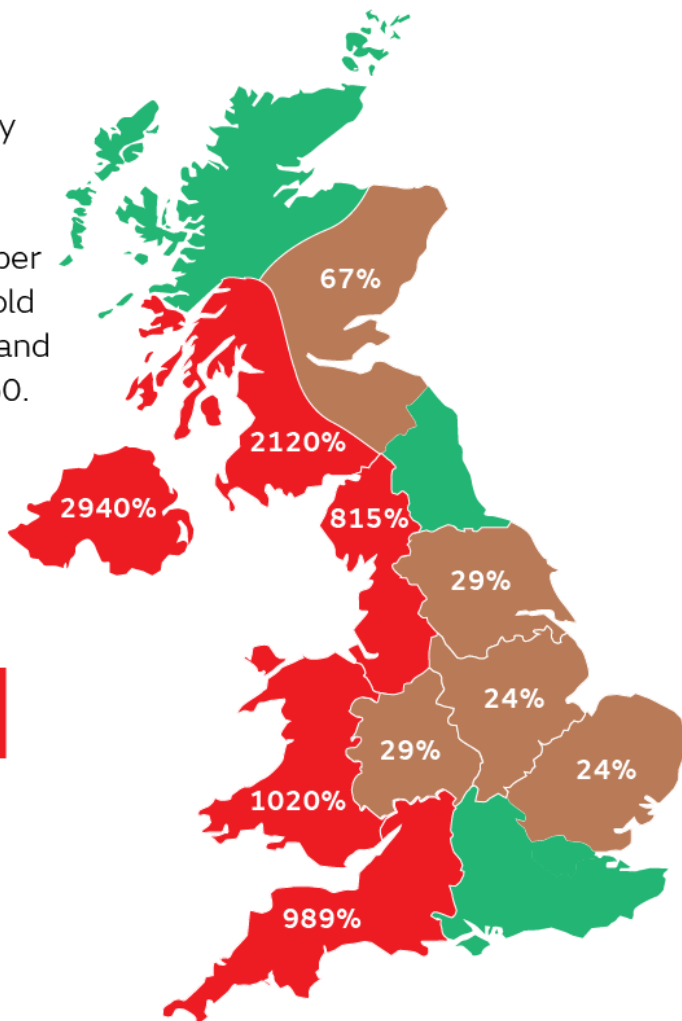
Future projections show UK-wide increases in the frequency and duration of thermal heat stress in dairy cattle and potato blight events. Risk is calculated using the number of days per year that exceed a threshold in the the current climate and the future climate of ~2060.



Five regions with high cattle numbers and high risk

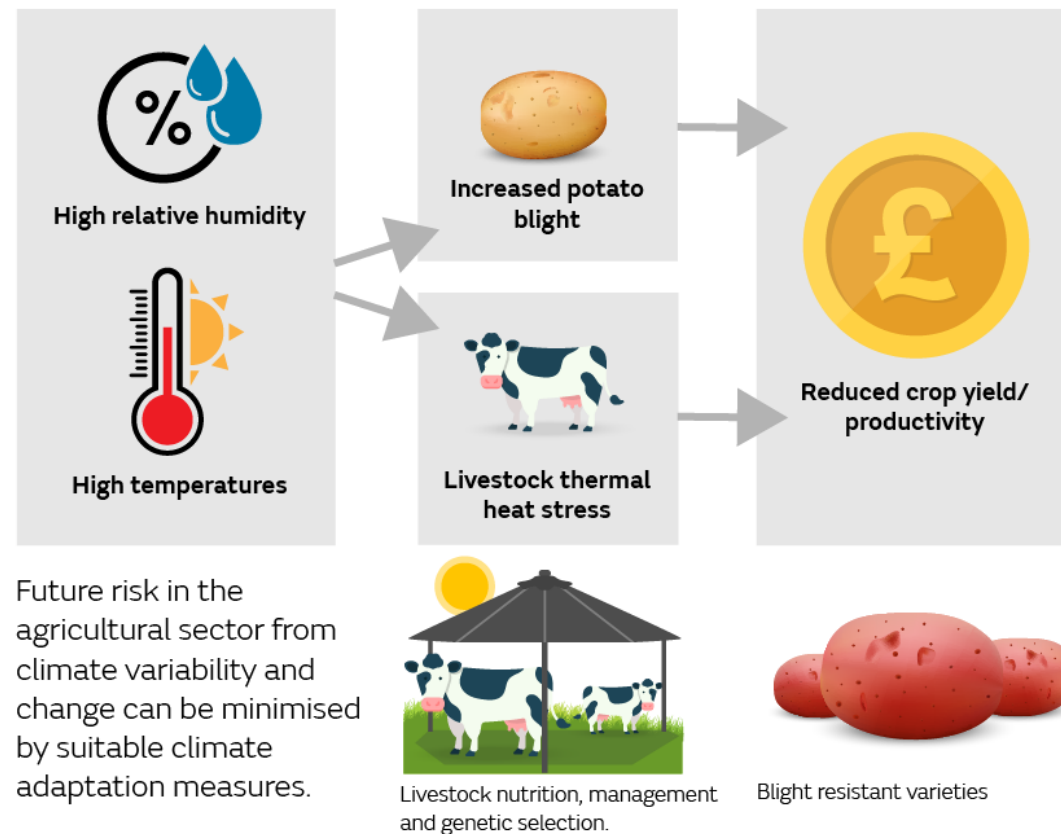


Five regions where most potatoes grown



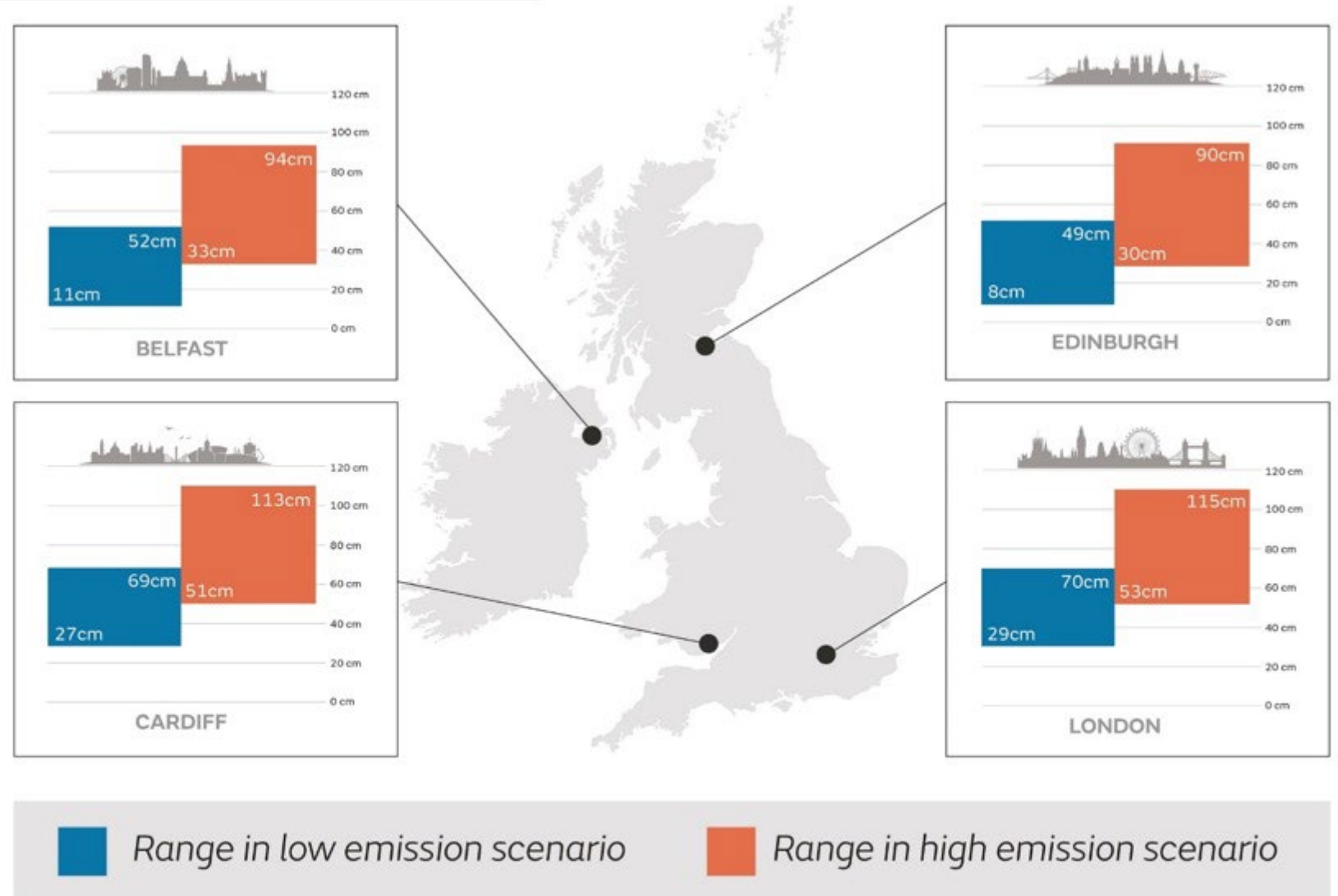
Future climate risks from compound events

Compound events happen when two or more weather/climate hazards occur simultaneously or in close succession, potentially causing greater impacts than when the hazards occur alone. Two examples from the UK agriculture sector are shown below.



Garry et al. 2021. Future Climate risks to UK agriculture from compound events. *Climate Risk Management for inclusion in Special Issue on "UK Climate Risk Assessment and Management"*

- Projected sea level rise at four UK capital cities by 2100, relative to 1981-2000.
- For reference, UK sea levels have risen by 16cm since the start of the 20th century
- Increase will generally be greater in the south than in the north



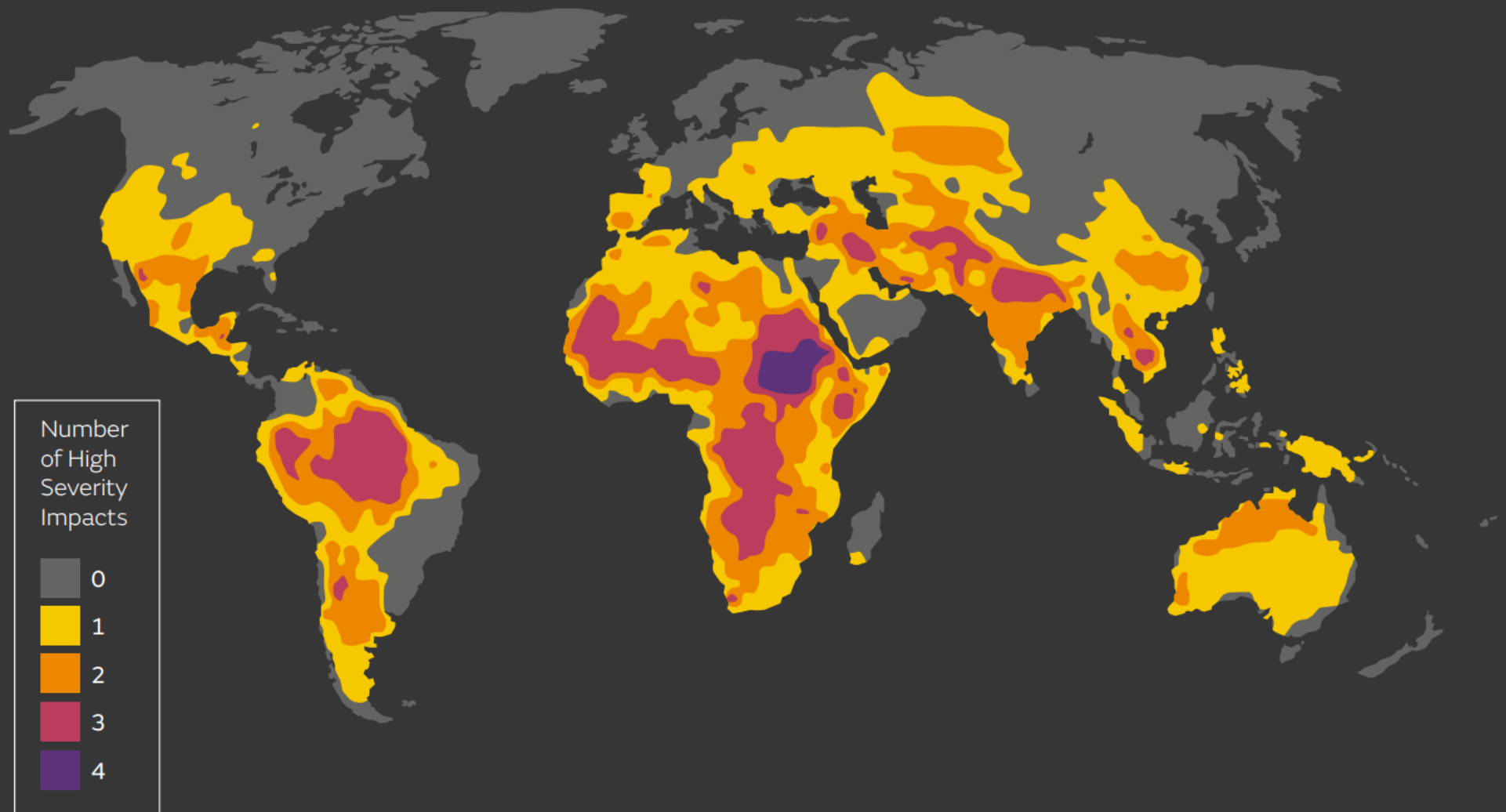
*RCP2.6 and RCP8.5 are the low and high emission scenarios used, as in IPCC AR5. The range is very likely (5th-95th percentile).

Climate driver:
Sea level rise and storms

Coastal flooding and erosion damage	Loss of natural flood defence		N/A	Medium
	Coastal squeeze		N/A	High
	Saline intrusion		N/A	High
	Near shore environmental impact		N/A	High
	Coastal building flooded/eroded	Coastal building productivity loss	N/A	Medium
		Coastal building damage	N/A	High



Multiple severe impacts may occur at similar times
at 4°C of global warming above pre-industrial levels.
The multiple severe climate impacts represented here include
extreme heat stress risk, river flooding, drought and wildfire risk,
overlaid with an indicator of present-day food insecurity.



Climate change impacts

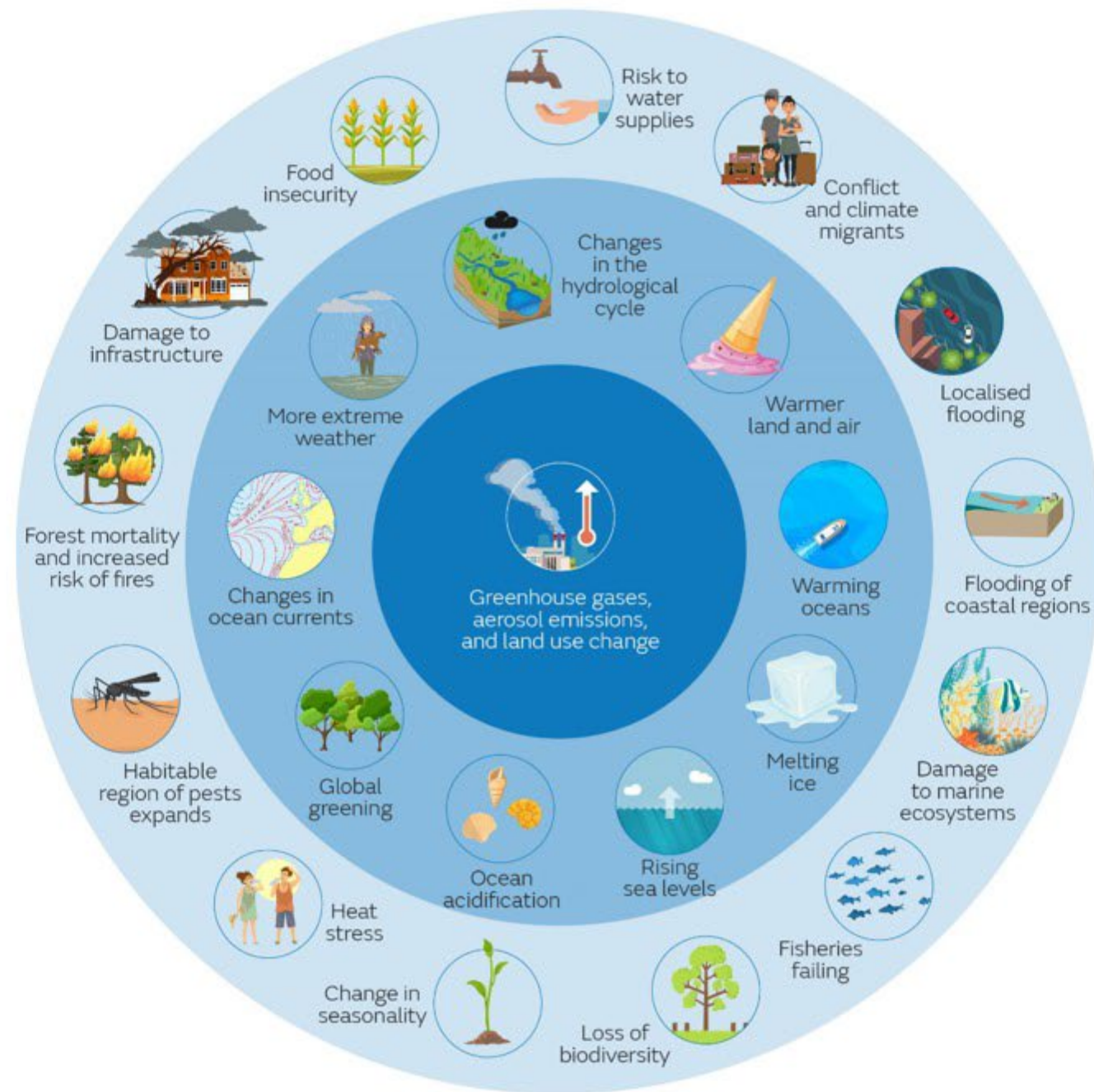
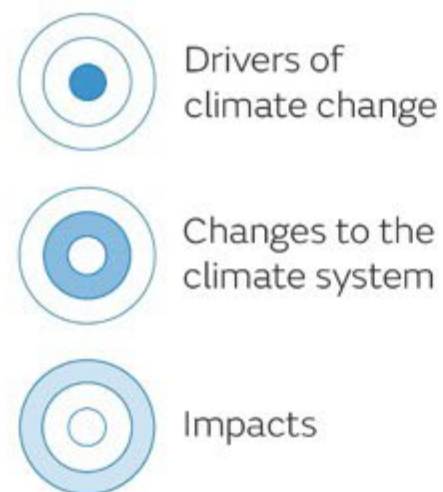


Figure 4.1 Highest priorities for adaptation
in the next five years

