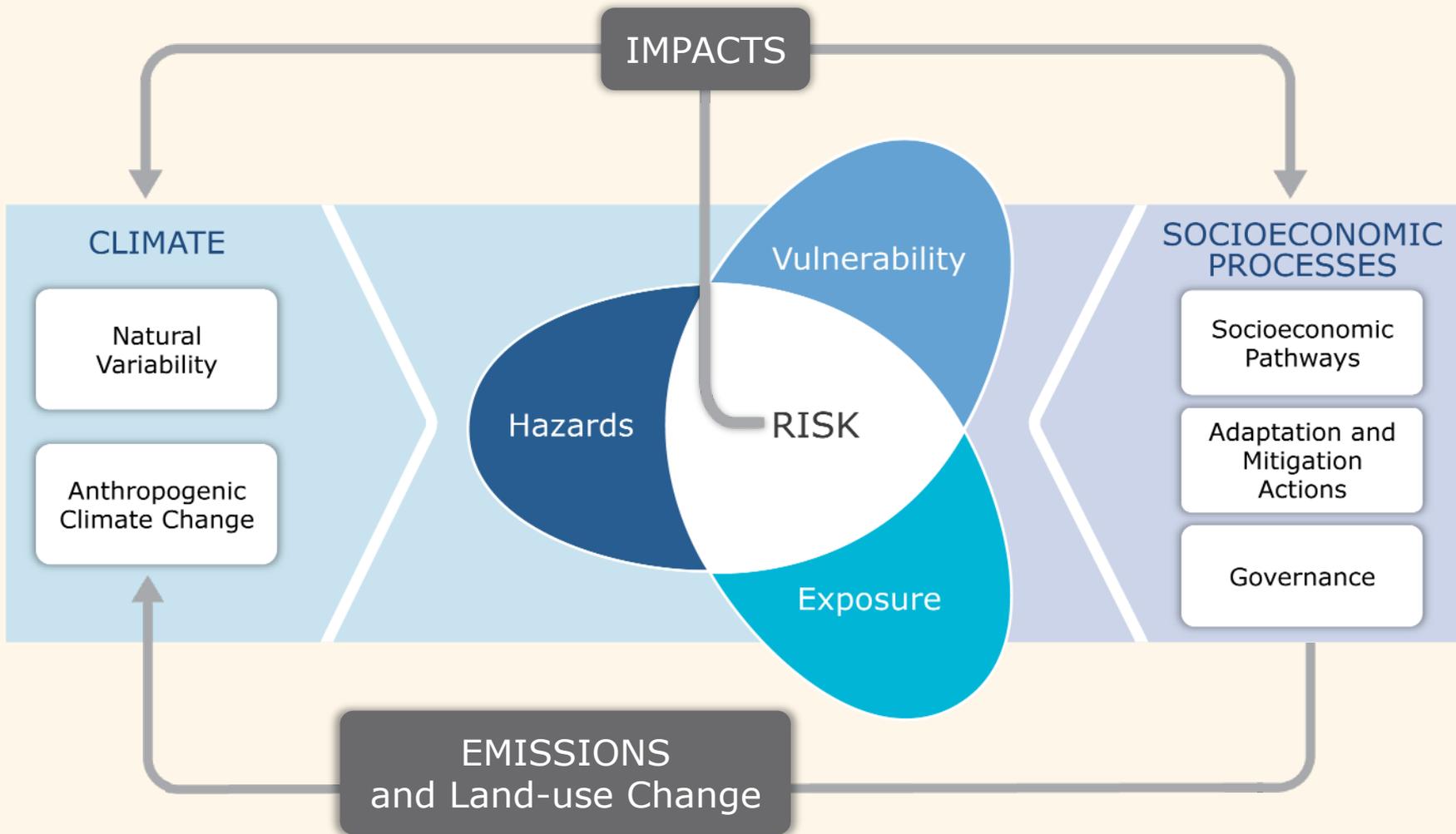


CLIMATE CHANGE 2014: IMPACTS, ADAPTATION, AND VULNERABILITY



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Co-Directors of Science, IPCC WGII TSU

Chris Field
Co-Chair, IPCC WGII



Warming of the climate system is unequivocal

Observed Temperature Change



Based on trend over 1901-2012 (°C over period)

Solid Color

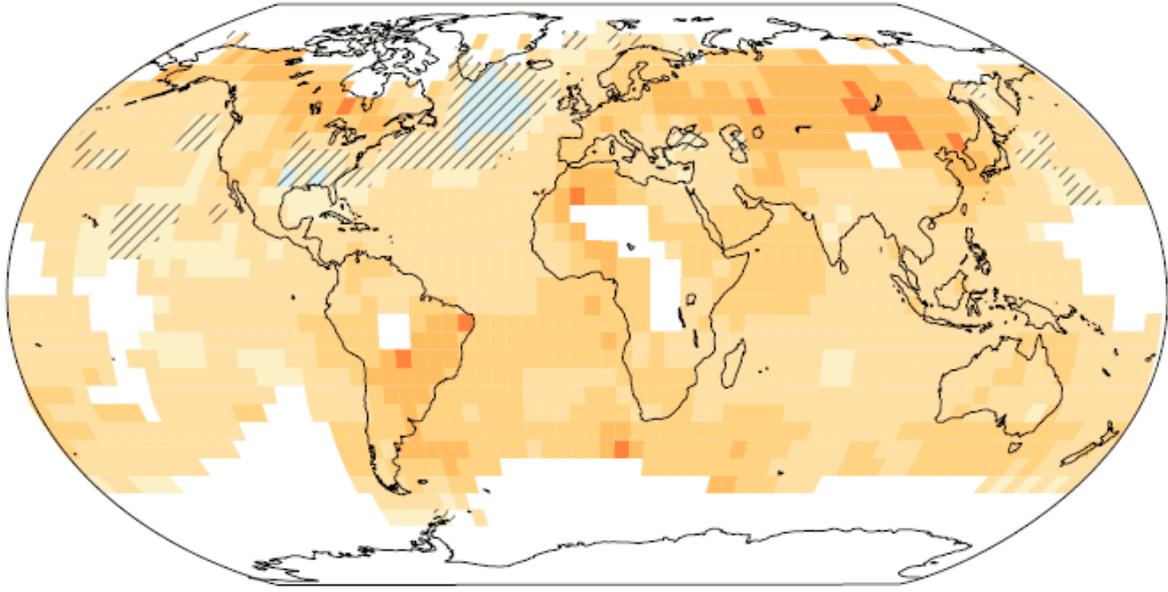
Significant trend

Diagonal Lines

Trend not statistically significant

White

Insufficient data





**WIDESPREAD
OBSERVED IMPACTS**

A CHANGING WORLD

An underwater photograph of a coral reef. The water is a deep, dark green. The coral is mostly brown and white, indicating significant bleaching. A single, healthy-looking green coral head stands out in the center. The overall scene conveys the impact of climate change on marine ecosystems.

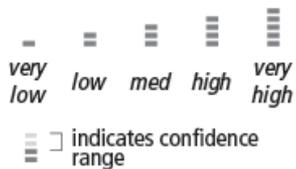
WIDESPREAD OBSERVED IMPACTS

A CHANGING WORLD

(A)



Confidence in attribution to climate change



Observed impacts attributed to climate change for

Physical systems



Biological systems



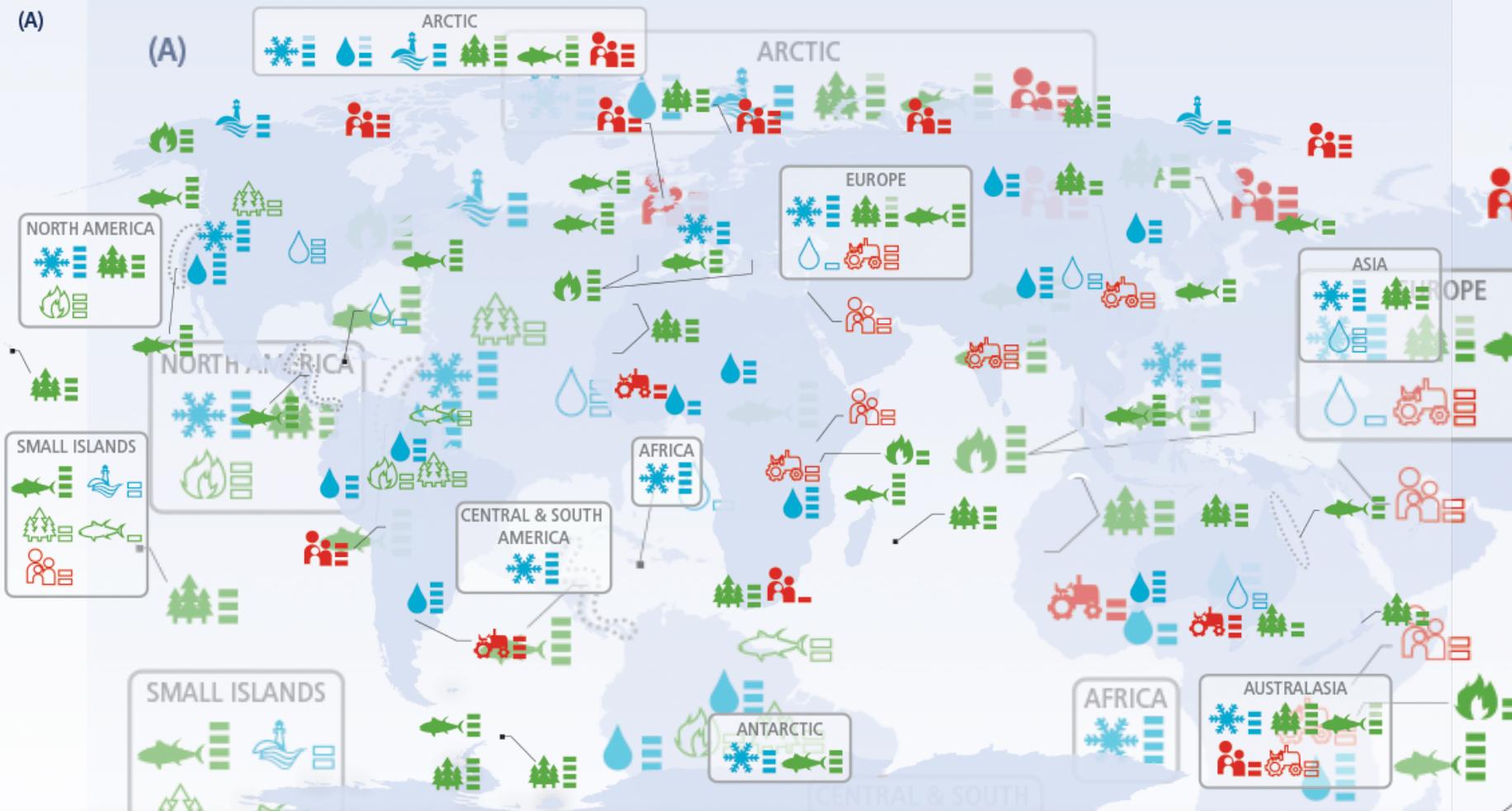
Human and managed systems



□ Regional-scale impacts

Outlined symbols = Minor contribution of climate change
Filled symbols = Major contribution of climate change

(A)



Confidence in attribution to climate change

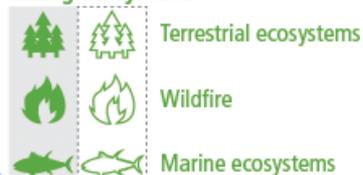


Observed impacts attributed to climate change for

Physical systems



Biological systems

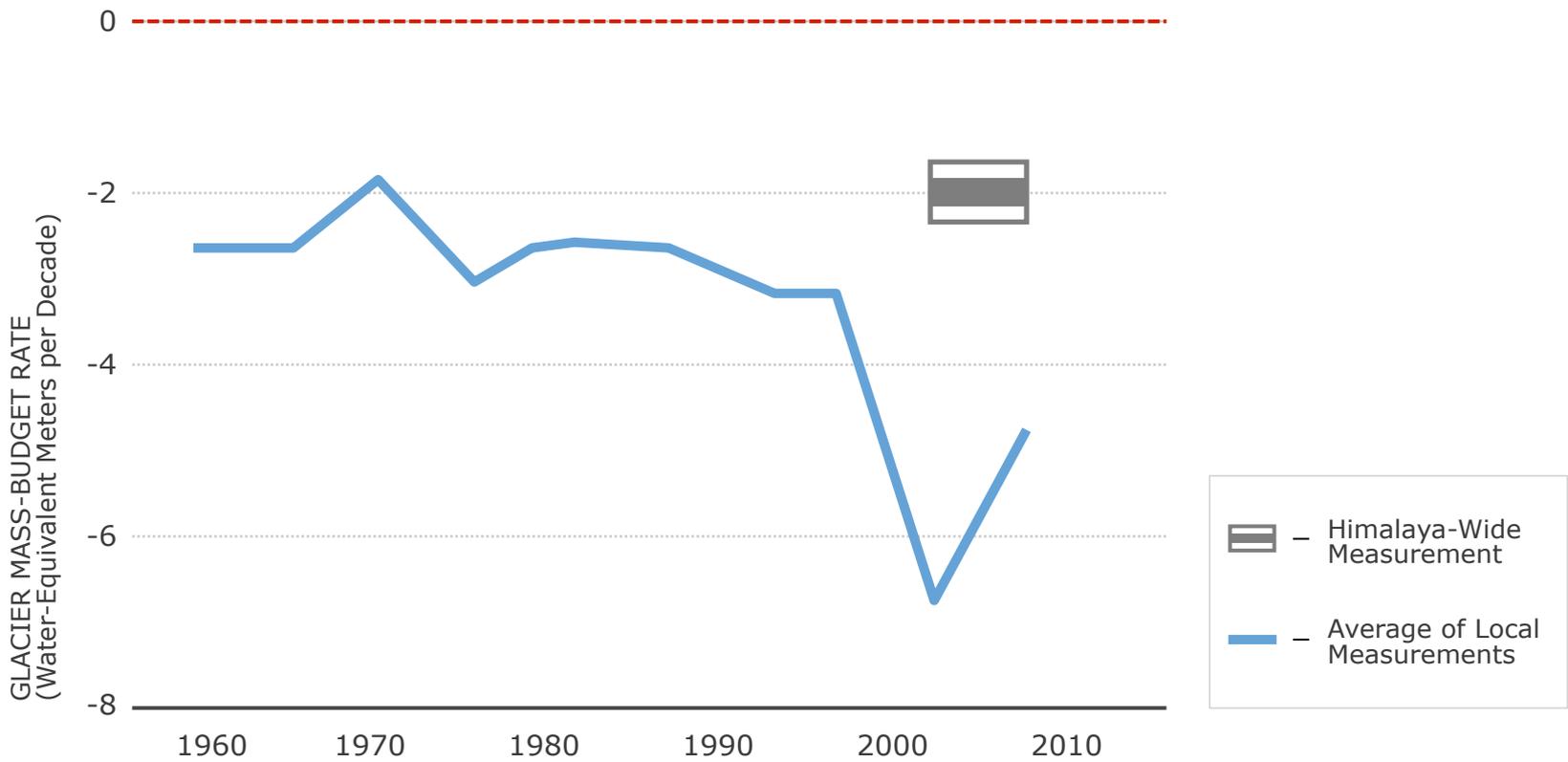


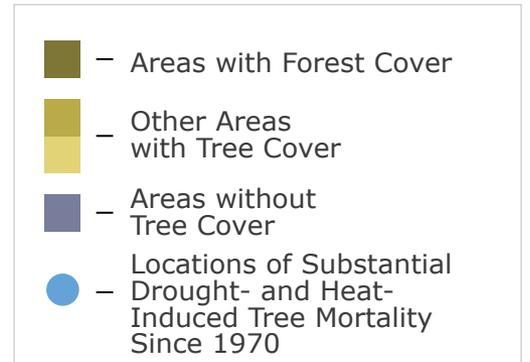
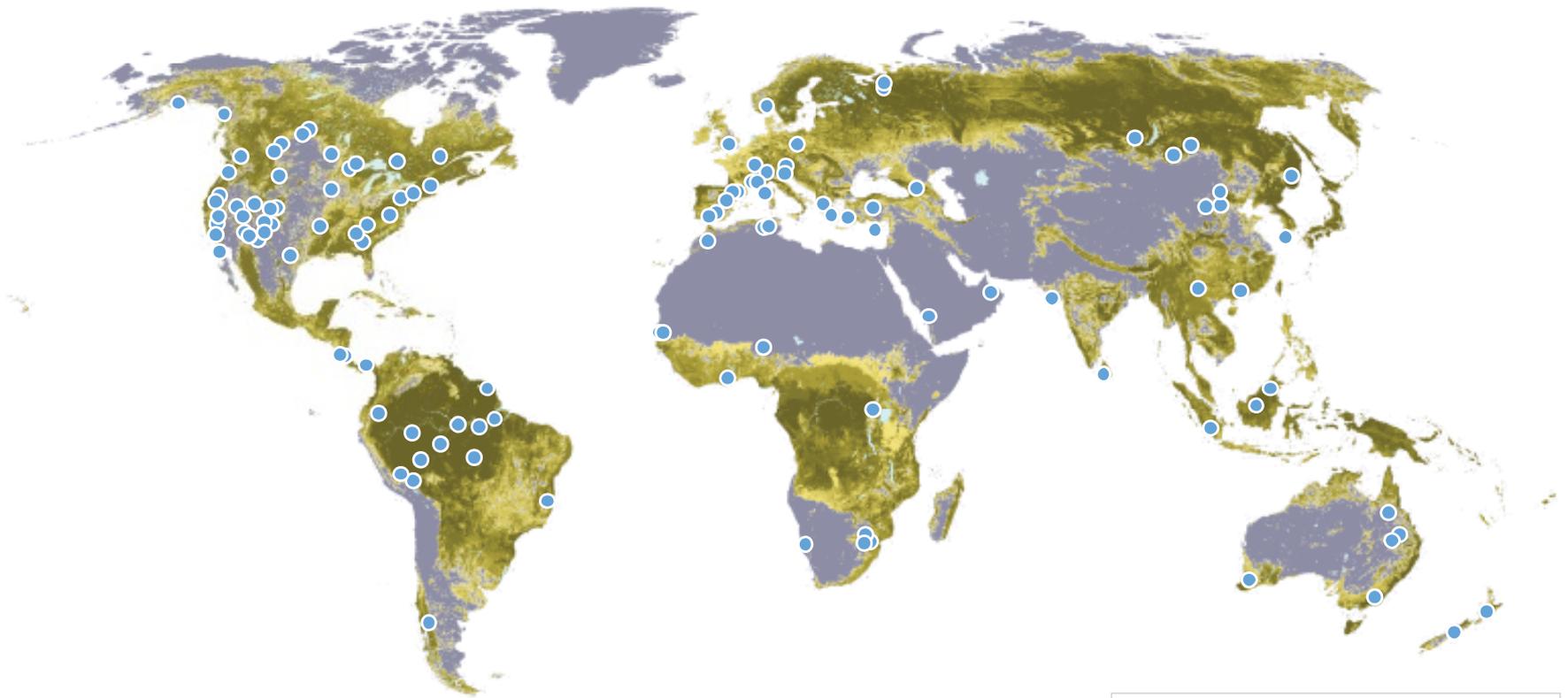
Human and managed systems

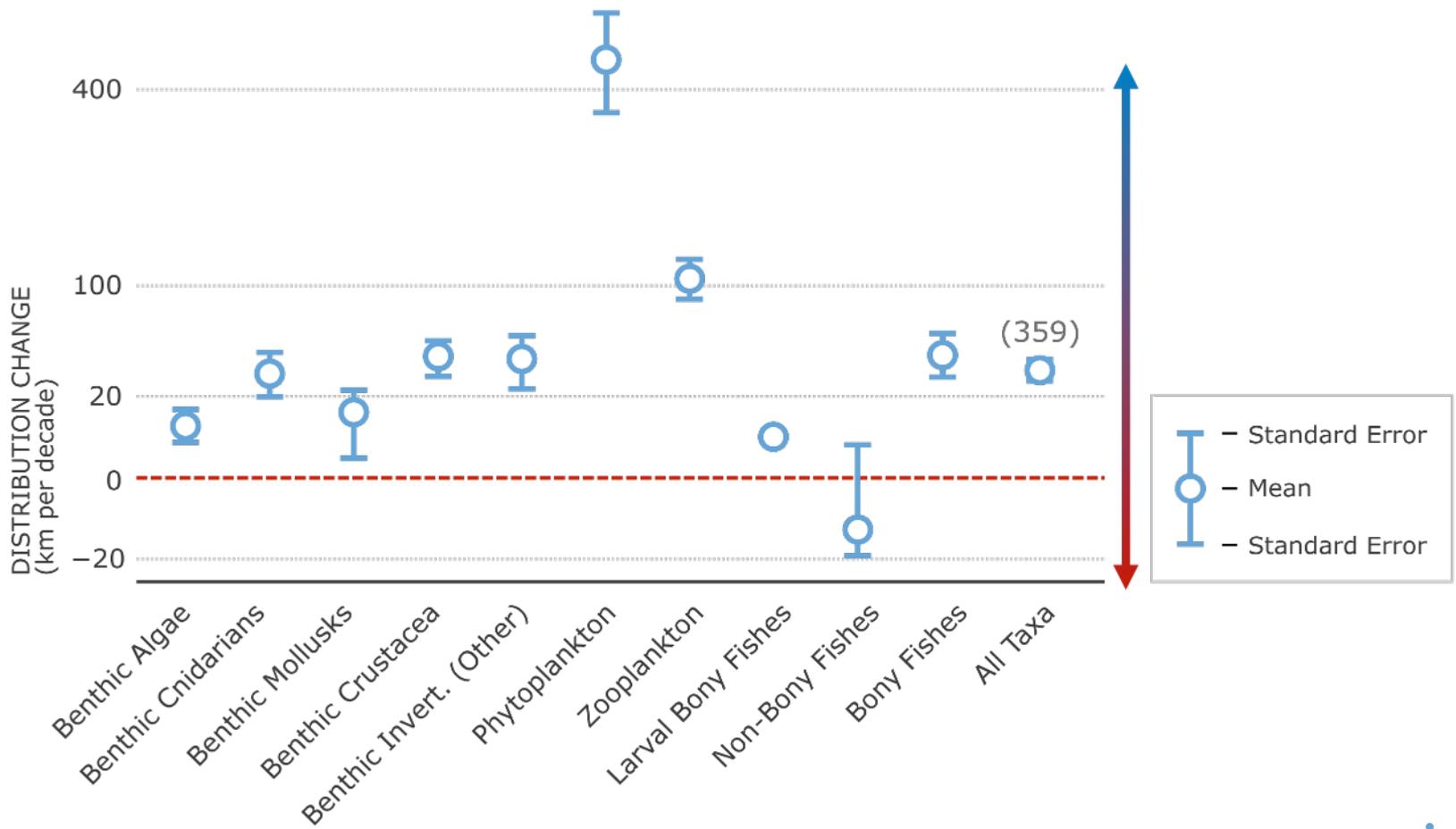


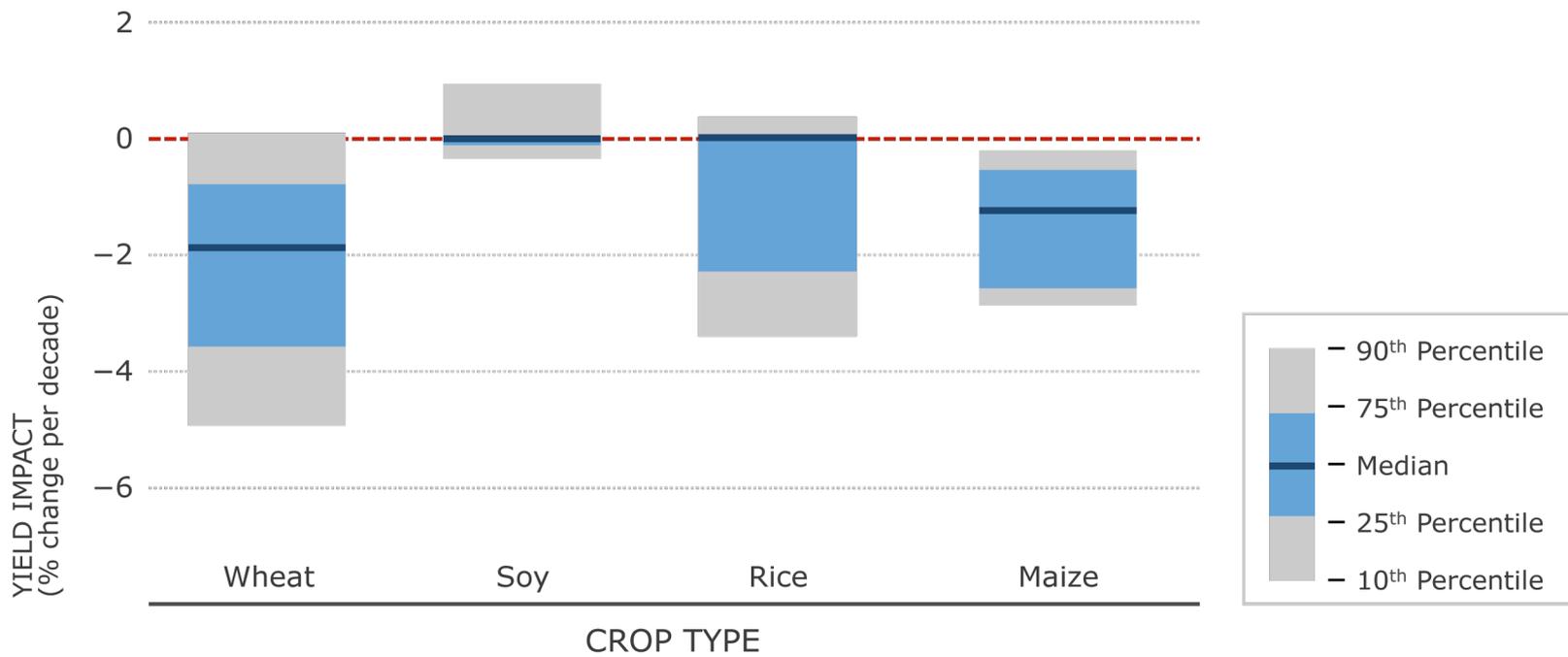
Regional-scale impacts

Outlined symbols = Minor contribution of climate change
Filled symbols = Major contribution of climate change











VULNERABILITY AND EXPOSURE

AROUND THE WORLD

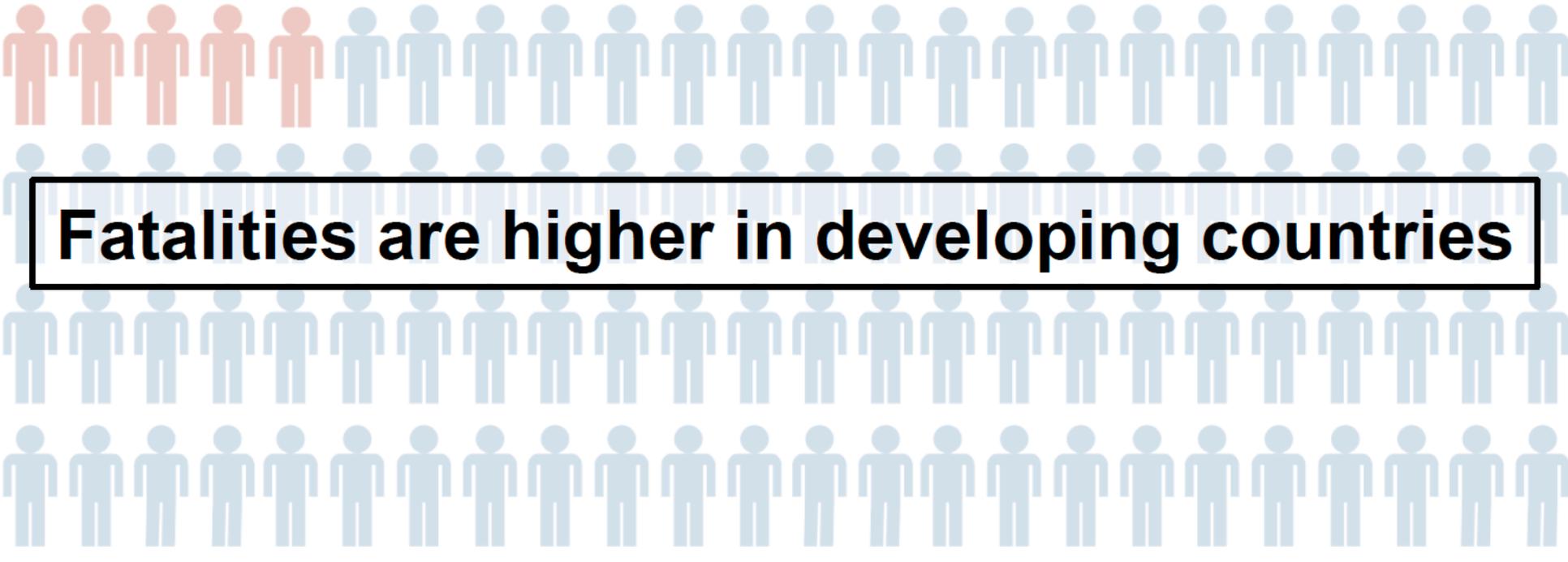
A photograph of a city street completely flooded with water. The water is dark and reflects the surrounding buildings and sky. On the left, a tall brick building with many windows lines the street. On the right, another brick building with a modern glass and metal facade is visible. In the distance, a person in a red shirt is wading through the water, and a dark car is partially submerged. The sky is overcast and grey.

VULNERABILITY AND EXPOSURE

AROUND THE WORLD

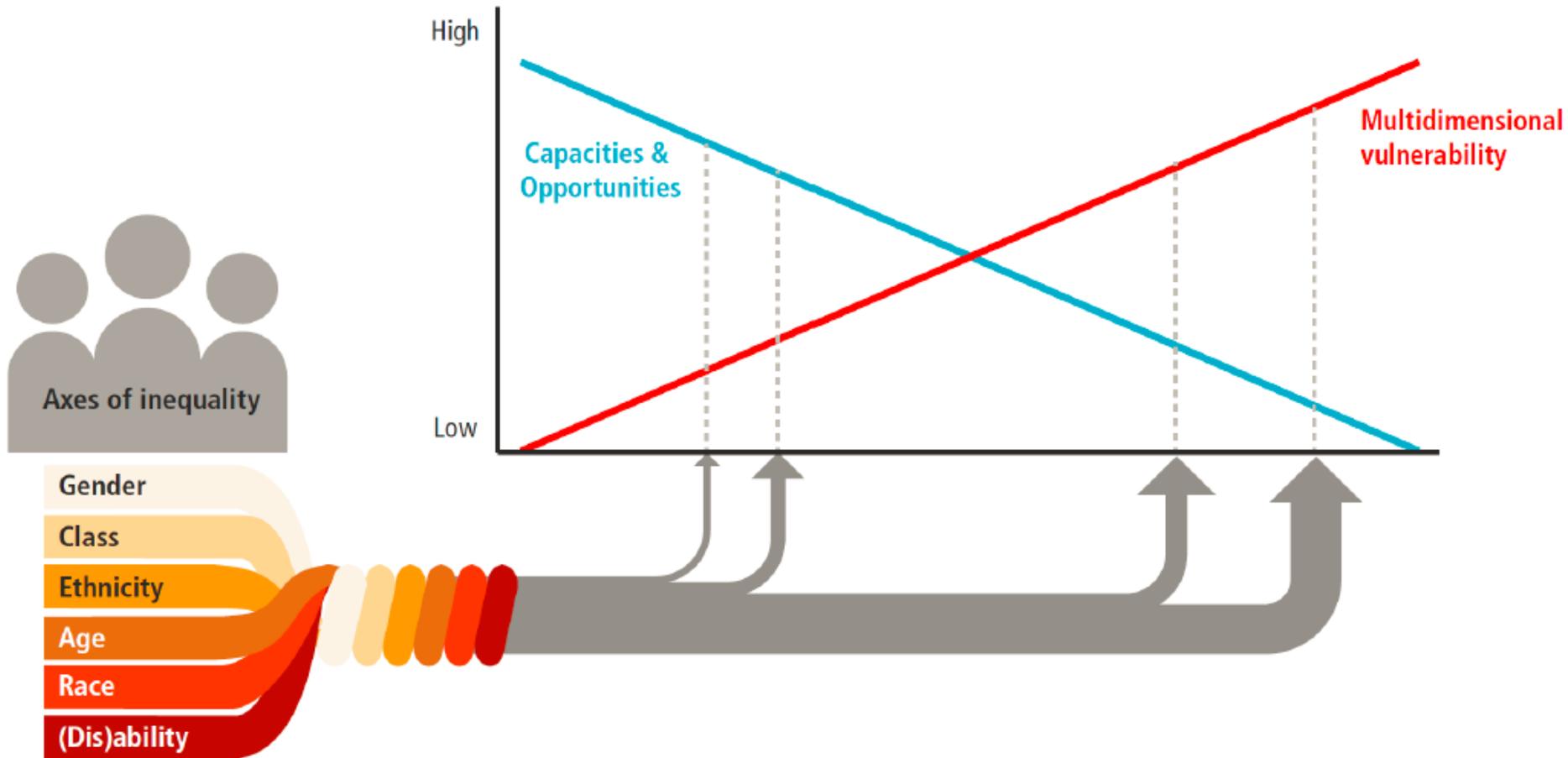


**Economic disaster losses are higher
in developed countries**



Fatalities are higher in developing countries

Many dimensions of vulnerability





ADAPTATION IS ALREADY OCCURRING



**ADAPTATION IS
ALREADY OCCURRING**

Adaptation is already occurring





CLIMATE CHANGE

REDUCING AND MANAGING RISKS

ipcc

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

Warming over the **past** century

Observed Temperature Change



Based on trend over
1901-2012 (°C over period)

Solid Color

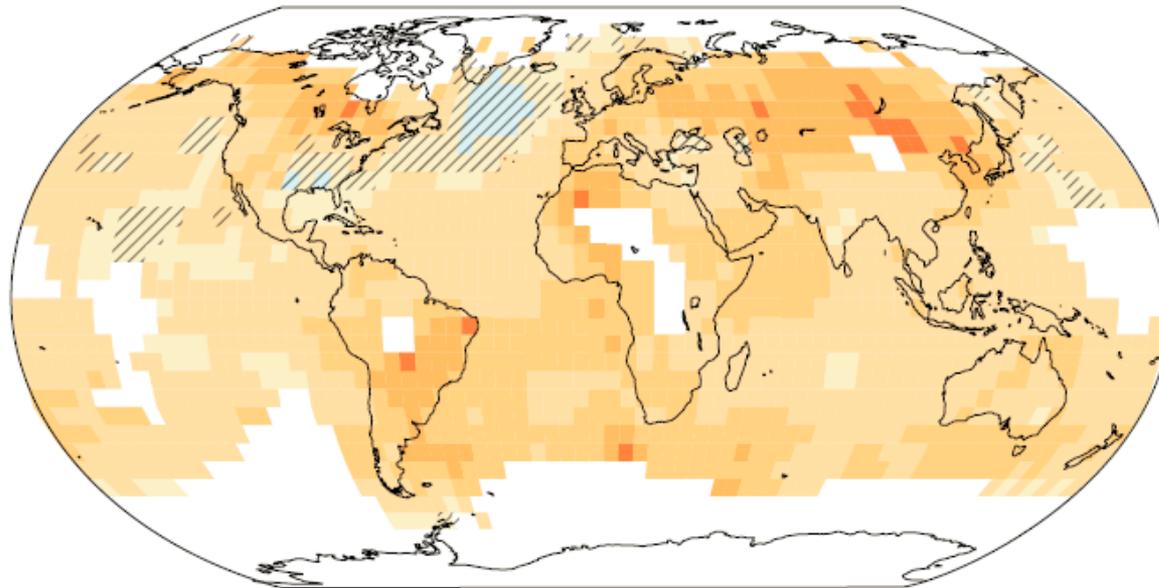
Significant
trend

Diagonal Lines

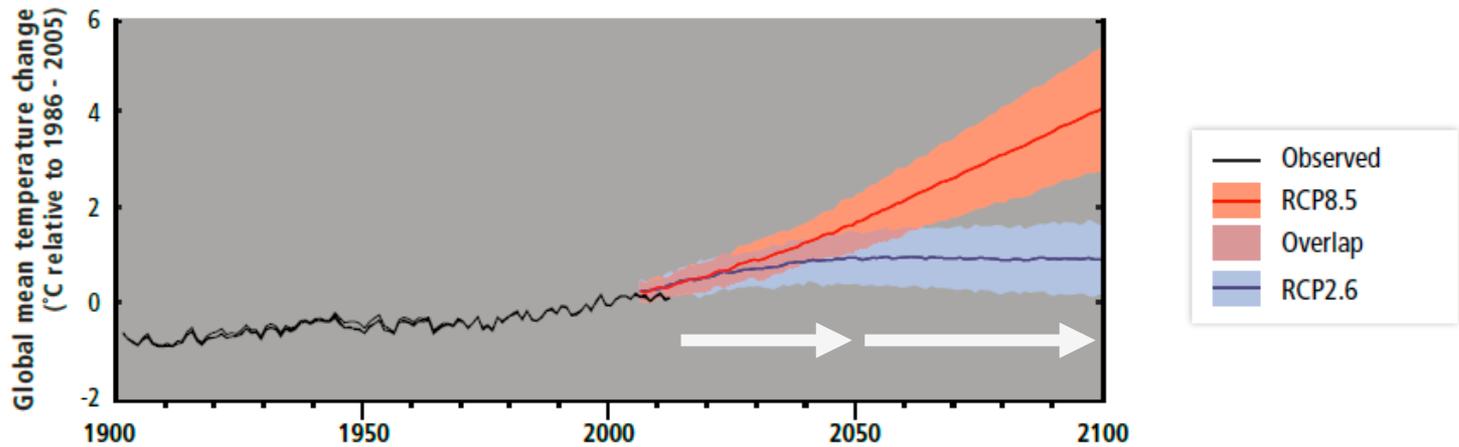
Trend not
statistically
significant

White

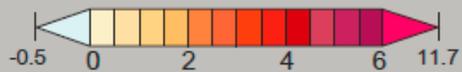
Insufficient
data



Warming over the next century



Projected Temperature Change



Difference from
1986-2005 mean (°C)

Solid Color

Very strong
agreement

White Dots

Strong
agreement

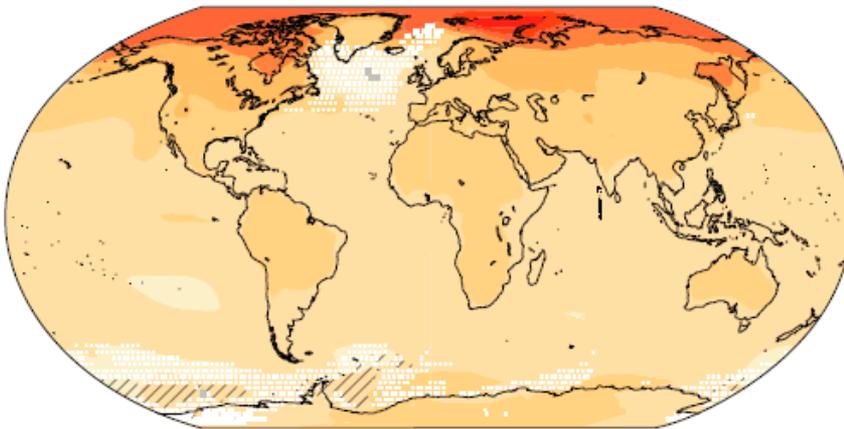
Gray

Divergent
changes

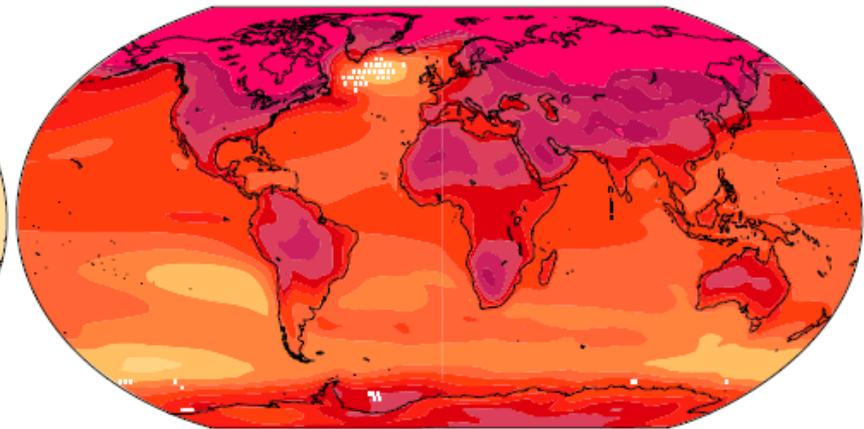
Diagonal Lines

Little or
no change

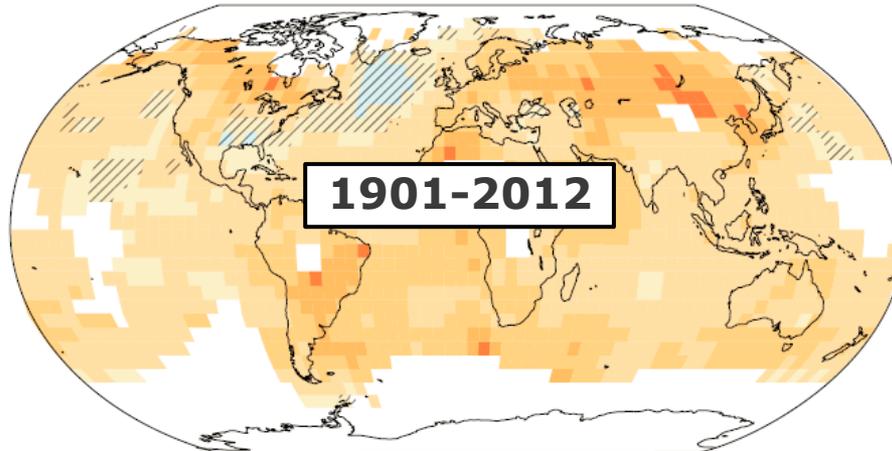
RCP2.6 2081 - 2100



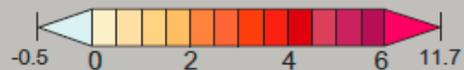
RCP8.5 2081 - 2100



Warming over the next century



Projected Temperature Change



Difference from
1986-2005 mean (°C)

Solid Color

Very strong
agreement

White Dots

Strong
agreement

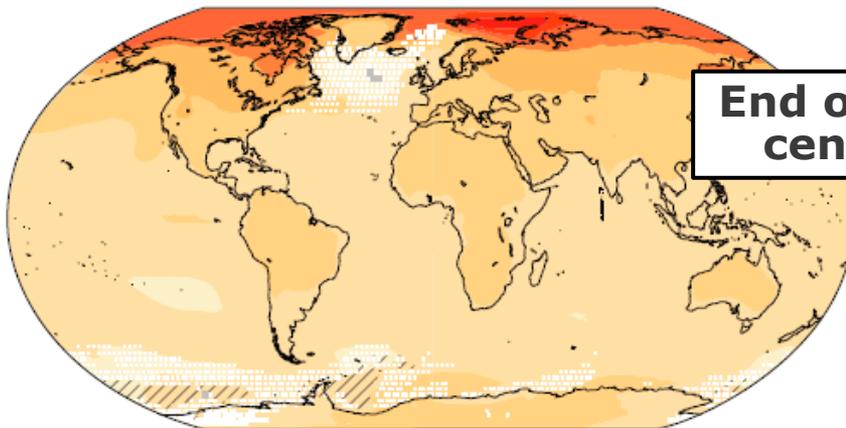
Gray

Divergent
changes

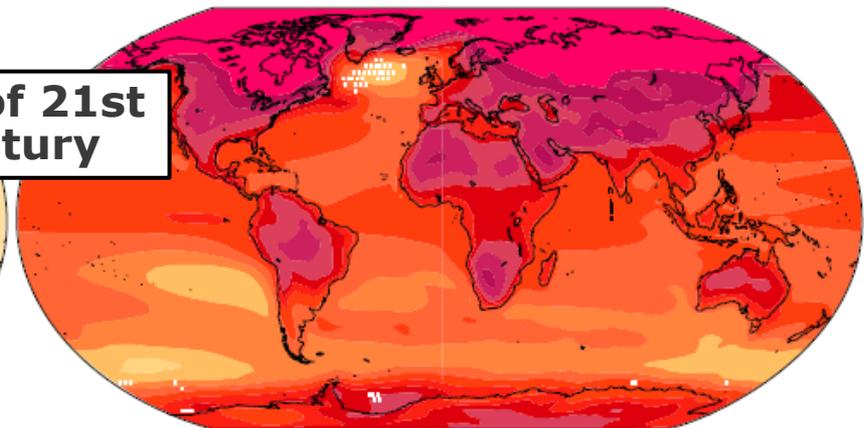
Diagonal Lines

Little or
no change

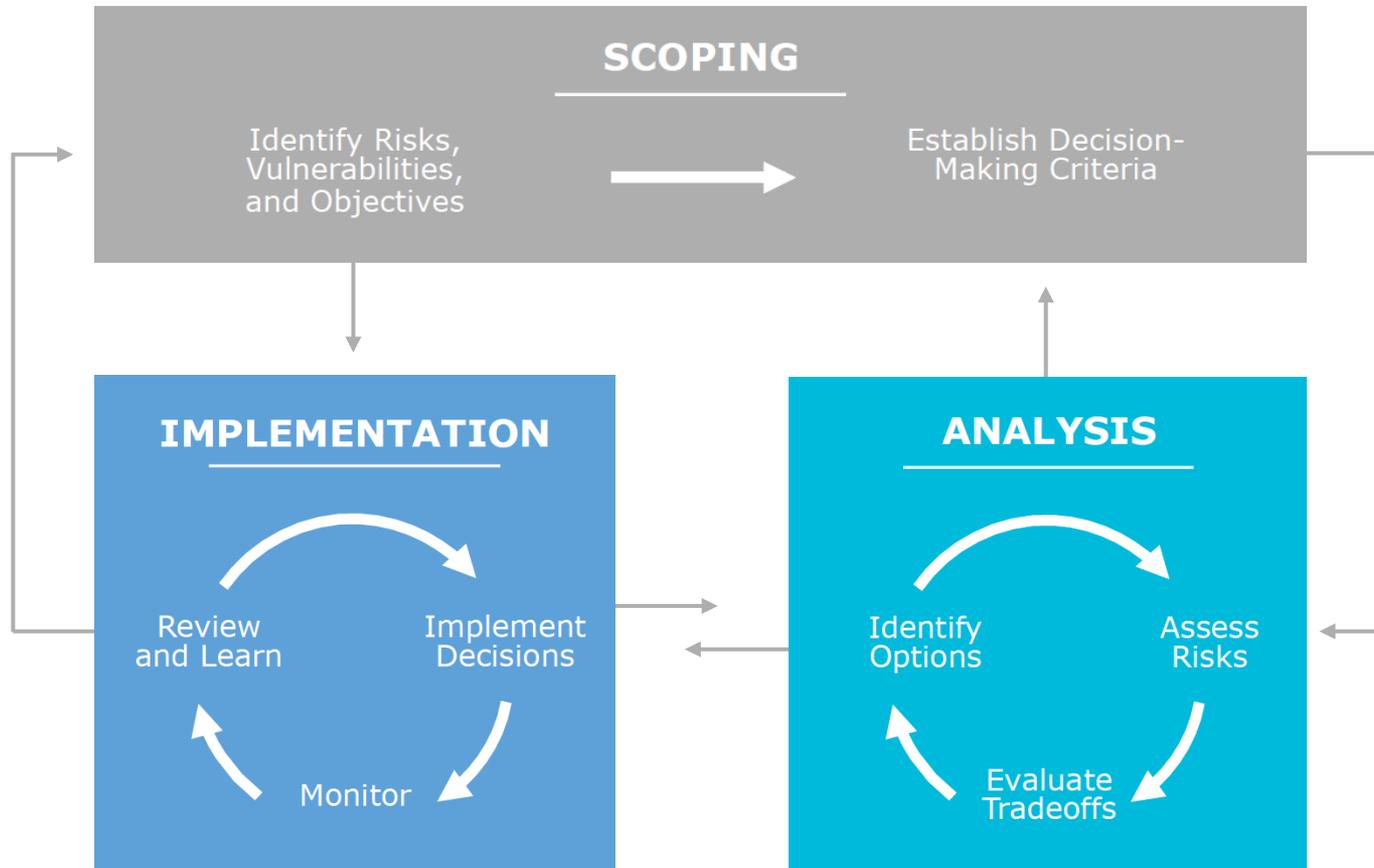
RCP2.6 2081 - 2100



RCP8.5 2081 - 2100



Adaptation as iterative risk management





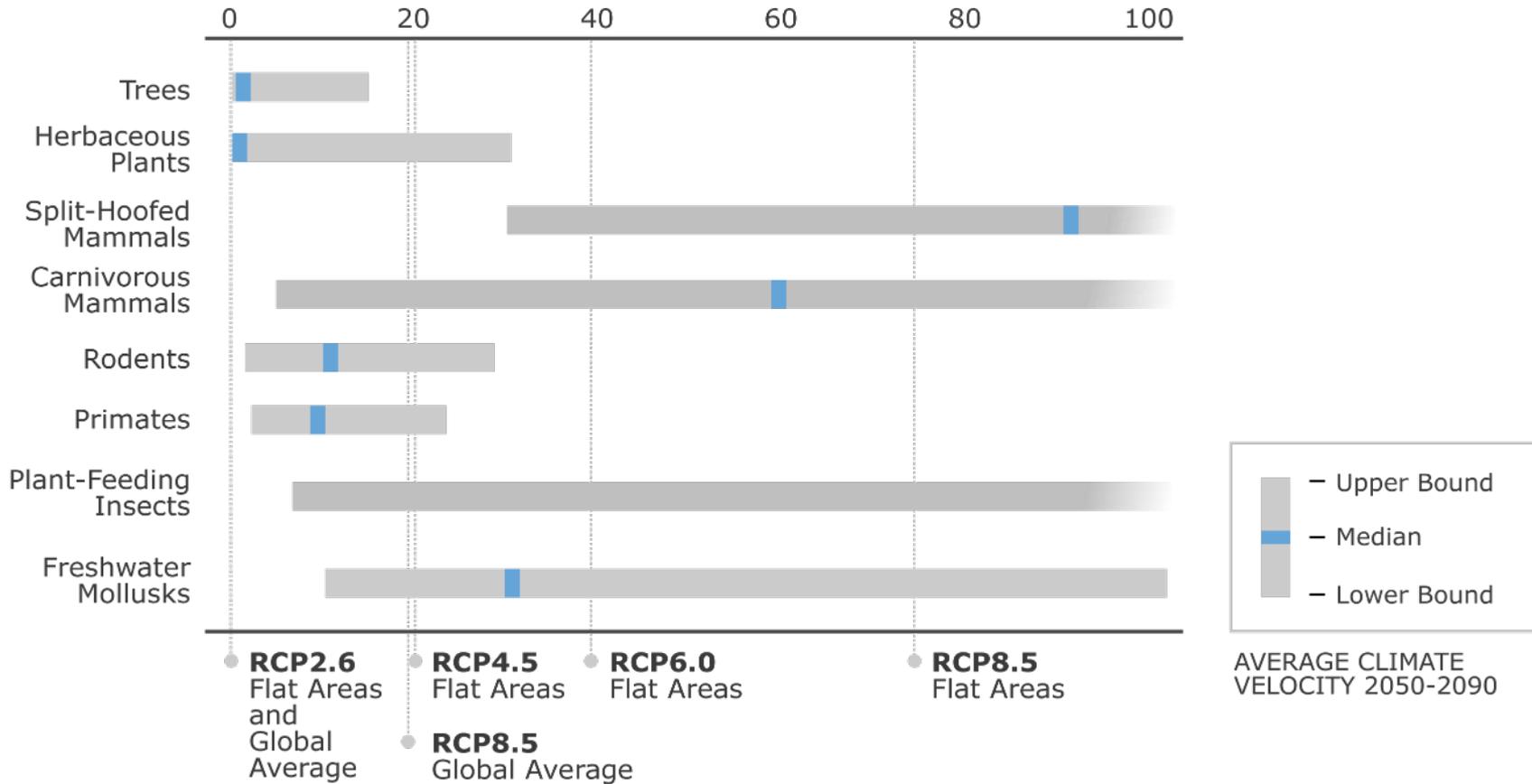
INCREASING MAGNITUDES
OF WARMING INCREASE
THE LIKELIHOOD OF

**SEVERE AND
PERVASIVE IMPACTS**

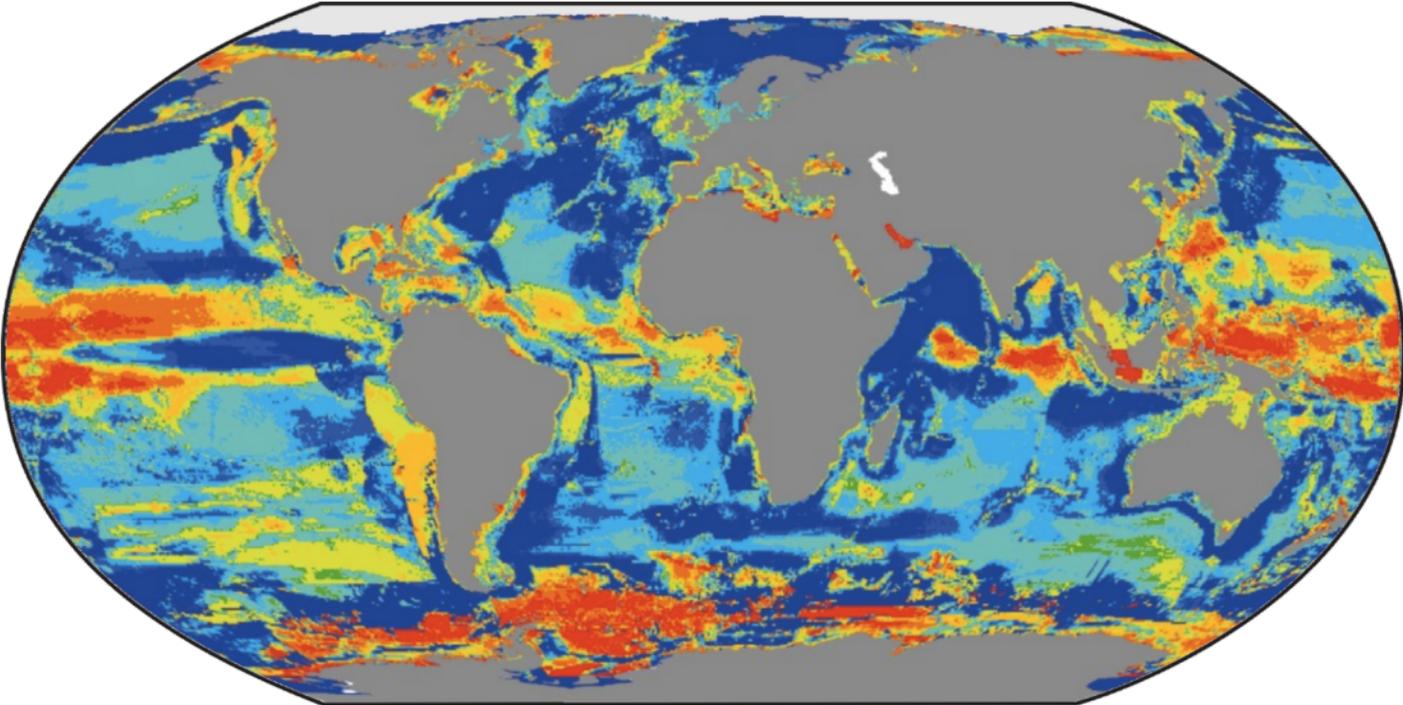


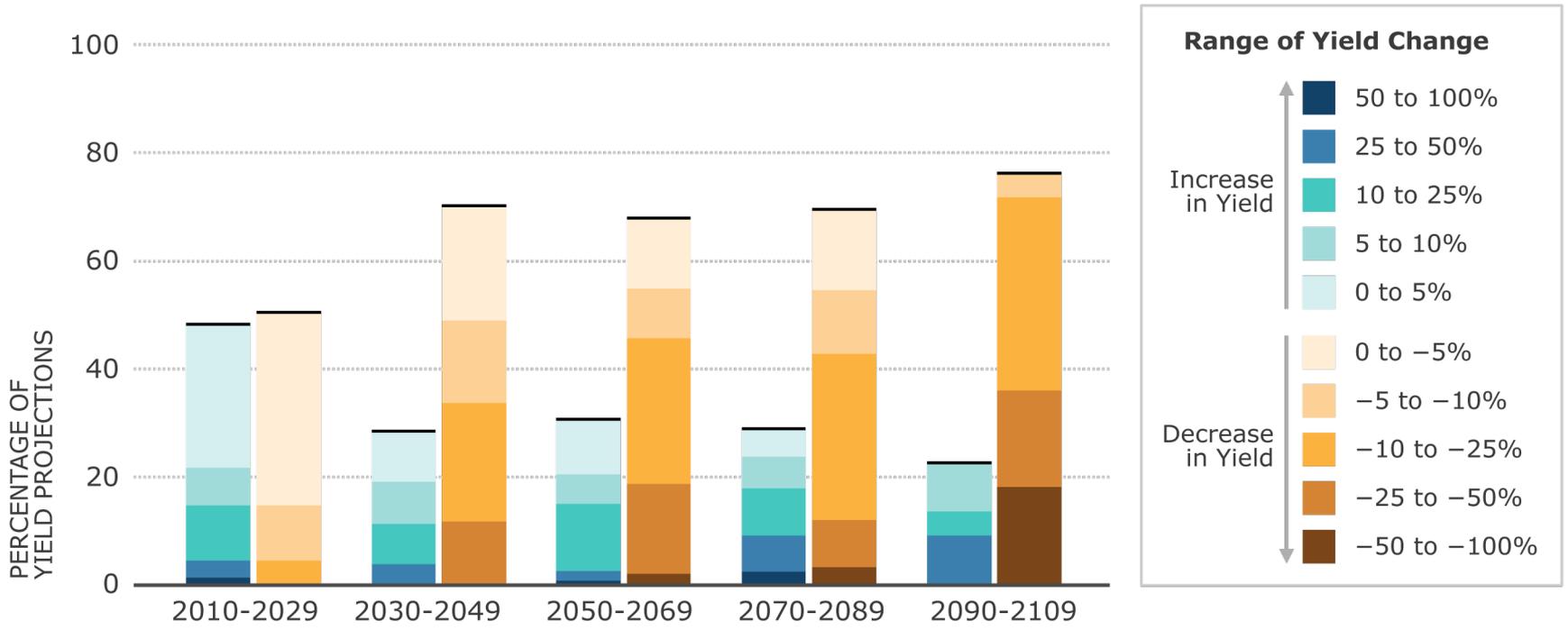
RISKS OF
CLIMATE CHANGE
INCREASE
WITH CONTINUED
HIGH EMISSIONS

MAXIMUM SPEED AT WHICH SPECIES CAN MOVE
(km per decade)

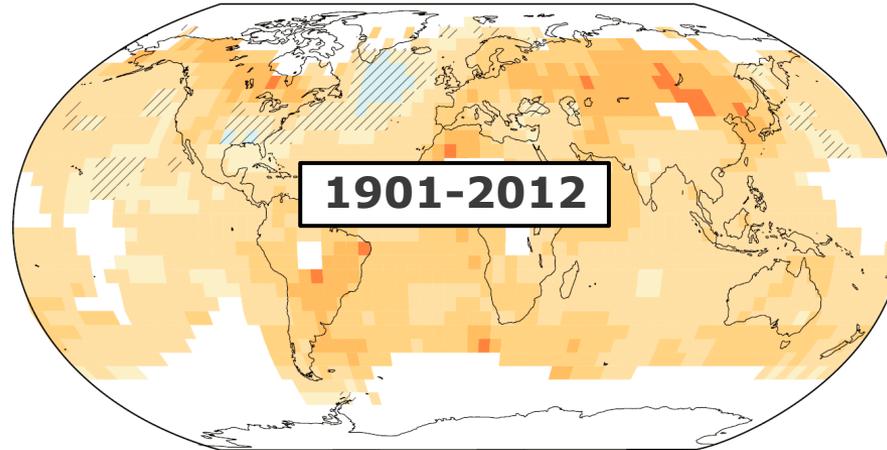


CHANGE IN MAXIMUM CATCH POTENTIAL (2051-2060 COMPARED TO 2001-2010, SRES A1B)





Changing risks around the world



Projected Temperature Change



Difference from
1986-2005 mean (°C)

Solid Color

Very strong
agreement

White Dots

Strong
agreement

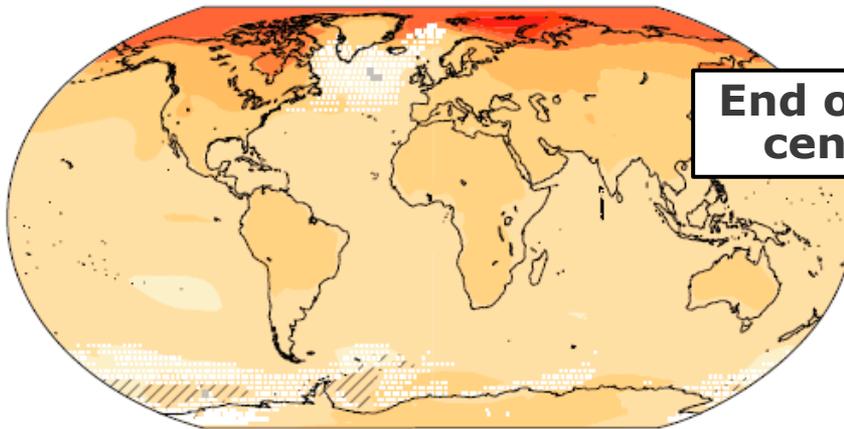
Gray

Divergent
changes

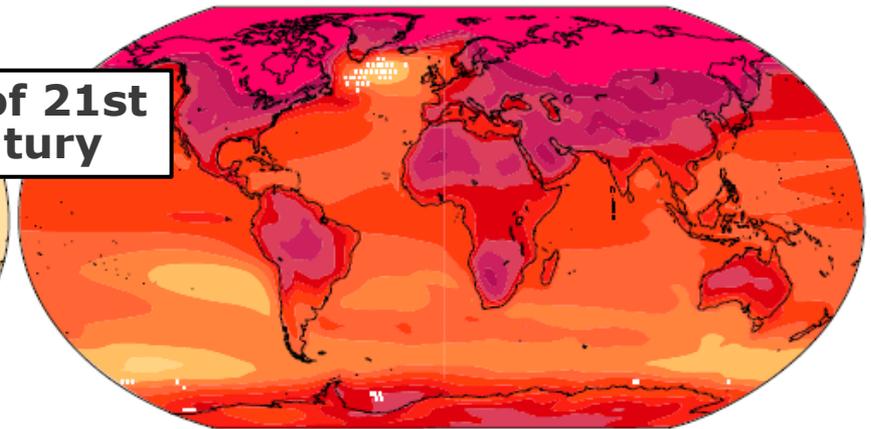
Diagonal Lines

Little or
no change

RCP2.6 2081 - 2100



RCP8.5 2081 - 2100



POLAR REGIONS

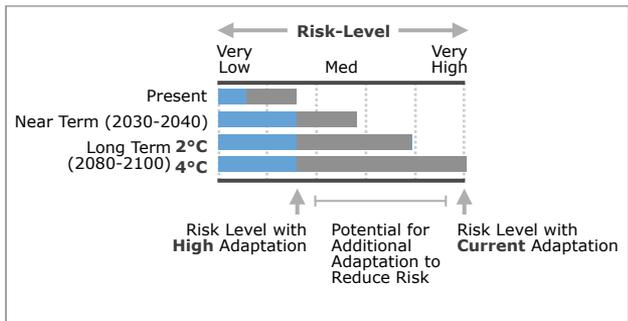
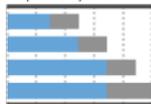
Risks for Ecosystems



Risks for Health and Well-Being



Unprecedented Challenges, Especially from Rate of Change



NORTH AMERICA

Increased Risks from Wildfires



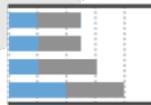
Heat-Related Human Mortality



Damages from River and Coastal Urban Floods



Increased Flood Losses and Impacts

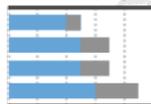


EUROPE

Increased Losses and Impacts from Extreme Heat Events



Increased Water Restrictions



Increased Flood Damage to Infrastructure, Livelihoods, and Settlements



Heat-Related Human Mortality



Increased Drought-Related Water and Food Shortage



ASIA

THE OCEAN

Distributional Shift & Reduced Fisheries Catch Potential at Low Latitudes



Increased Mass Coral Bleaching and Mortality



Coastal Inundation and Habitat Loss



CENTRAL AND SOUTH AMERICA

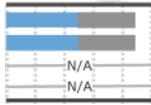
Reduced Water Availability and Increased Flooding and Landslides



Reduced Food Production and Quality



Spread of Vector-Borne Diseases

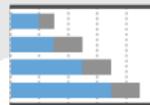


N/A

N/A

AFRICA

Compounded Stress on Water Resources



Reduced Crop Productivity and Livelihood and Food Security



Vector- and Water-Borne Diseases



SMALL ISLANDS

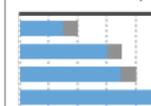
Loss of Livelihoods, Settlements, Infrastructure, Ecosystem Services, and Economic Stability



Risks for Low-Lying Coastal Areas



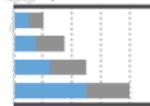
Significant Change in Composition and Structure of Coral Reef Systems



Increased Flood Damage to Infrastructure and Settlements

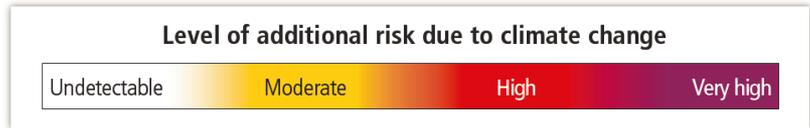
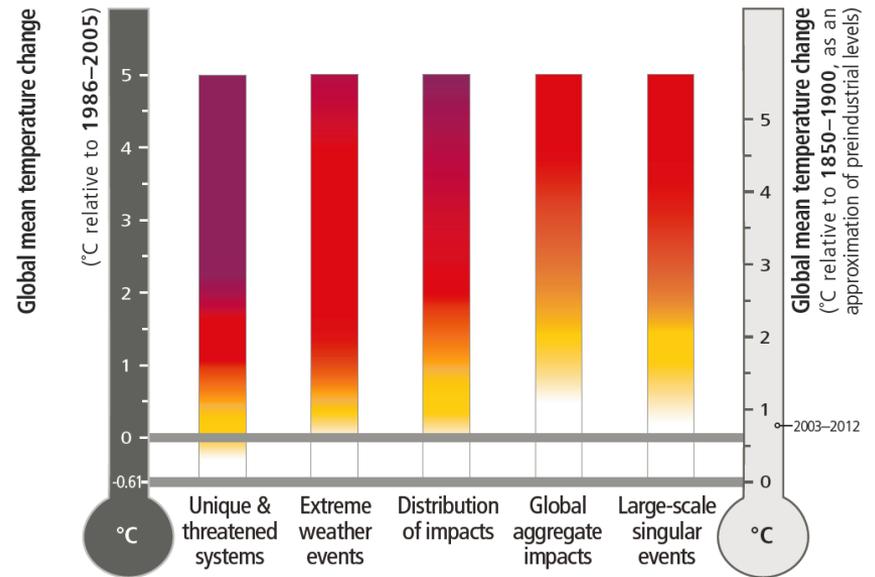
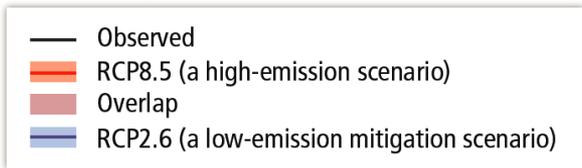
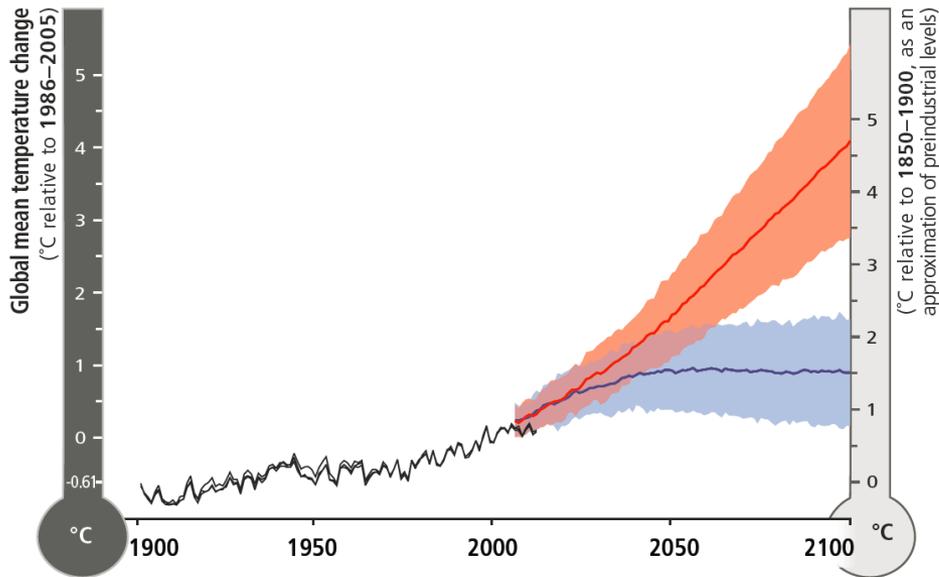


Increased Risks to Coastal Infrastructure and Low-Lying Ecosystems



AUSTRALASIA

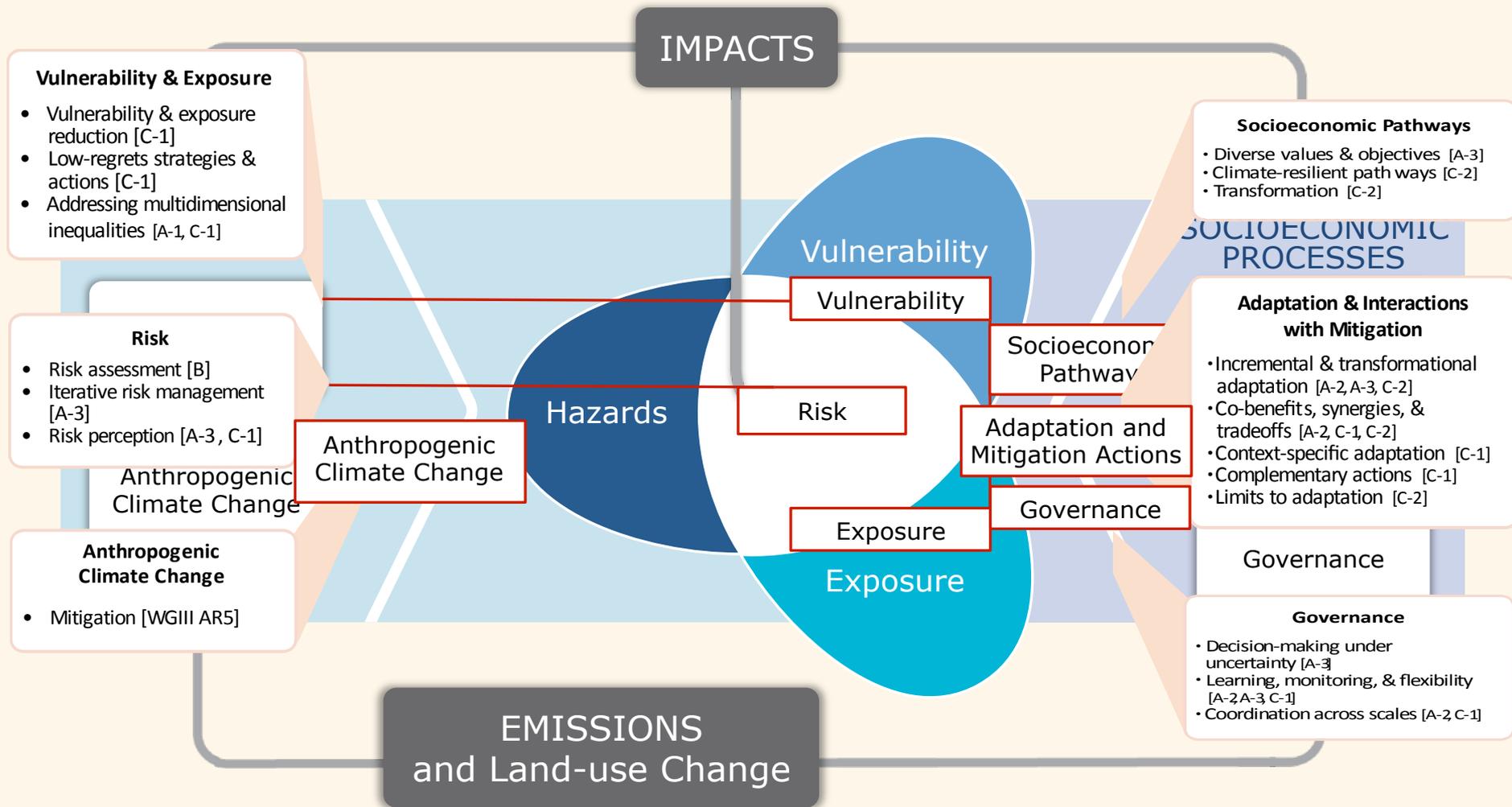
A global perspective on risks





EFFECTIVE CLIMATE CHANGE ADAPTATION

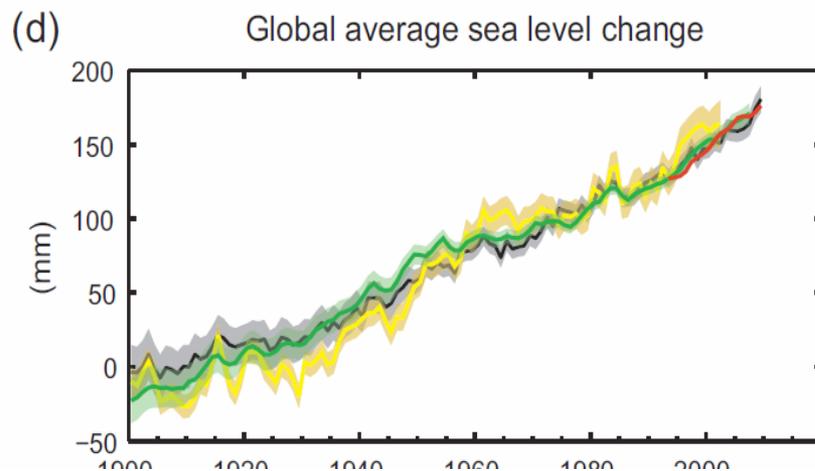
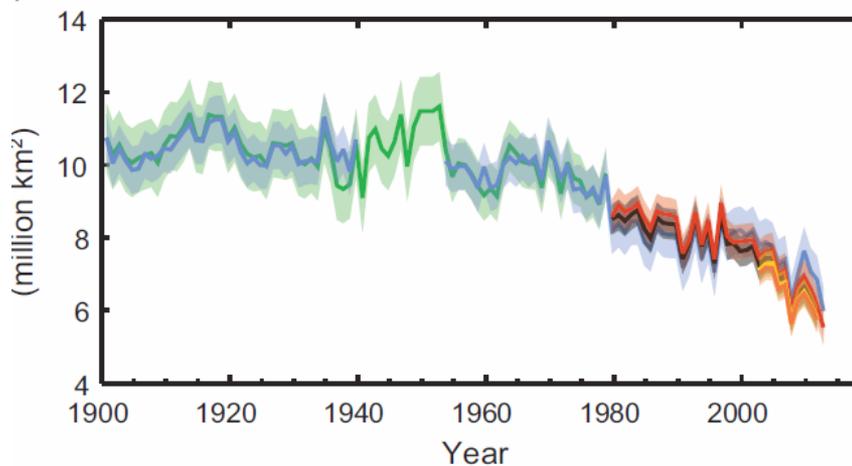
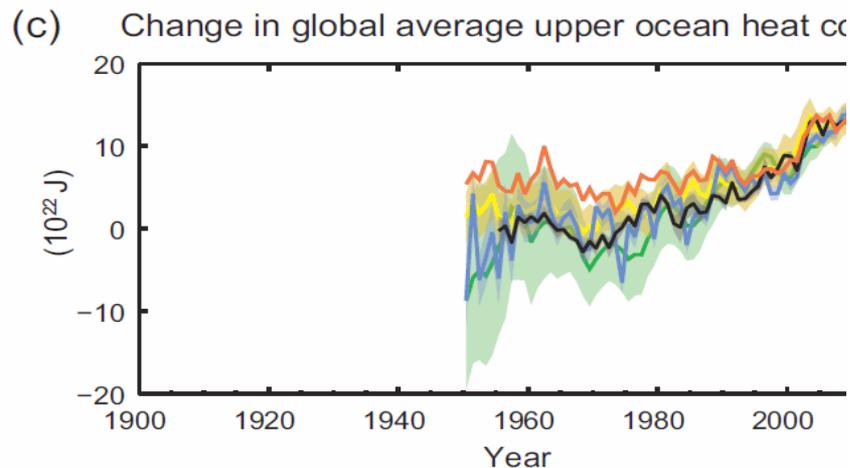
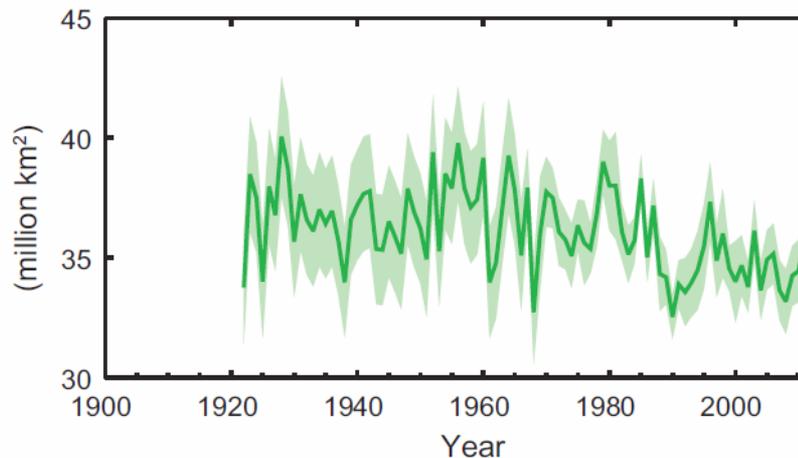
A MORE VIBRANT WORLD





ipcc-wg2.gov/AR5

Since the 1950s, many of the observed changes are **unprecedented** over decades to millennia



Adapted from WGI figure SPM.3