



# Highlights of the IPCC Fifth Assessment Report

IPCC AR5 Synthesis Report

# Key Messages

**Human influence on the climate system is clear**

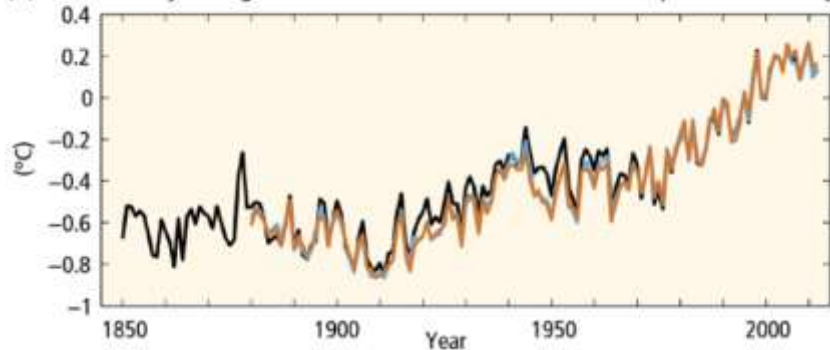
**The more we disrupt our climate, the more we risk severe, pervasive and irreversible impacts**

**We have the means to limit climate change and build a more prosperous, sustainable future**

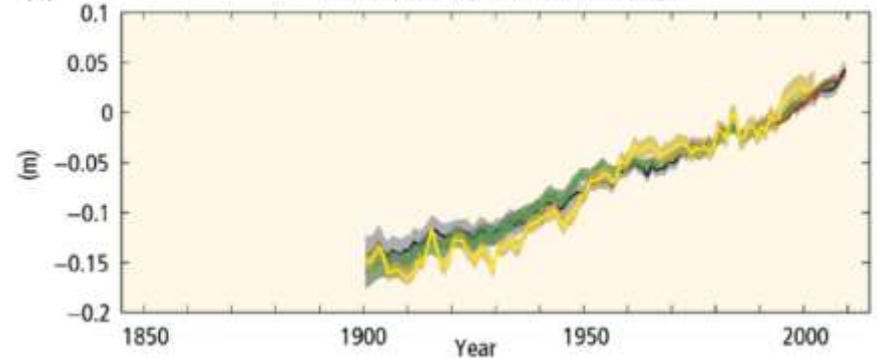
AR5 WGI SPM, AR5 WGII SPM, AR5 WGIII SPM

# HUMAN INFLUENCE: Extremely likely that human influence has been the dominant cause of warming since the mid-20<sup>th</sup> century

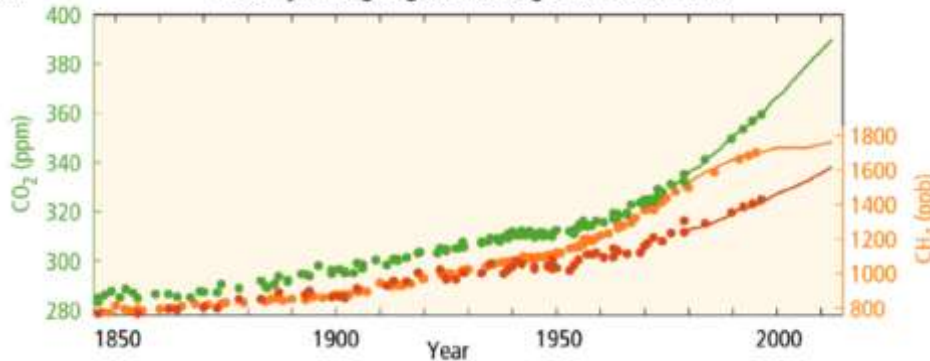
(a) Globally averaged combined land and ocean surface temperature anomaly



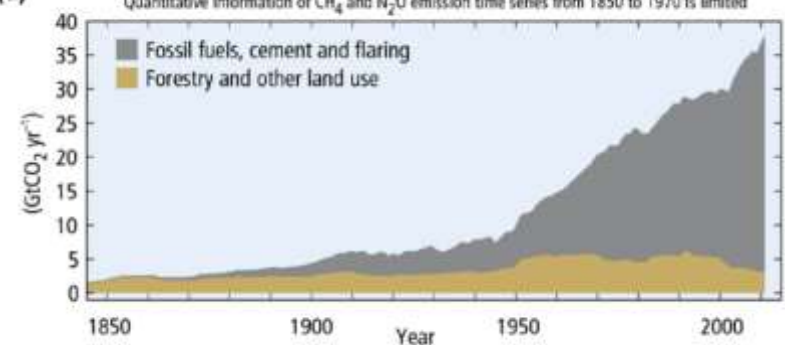
(b) Globally averaged sea level change



(c) Globally averaged greenhouse gas concentrations



(d) Global anthropogenic CO<sub>2</sub> emissions

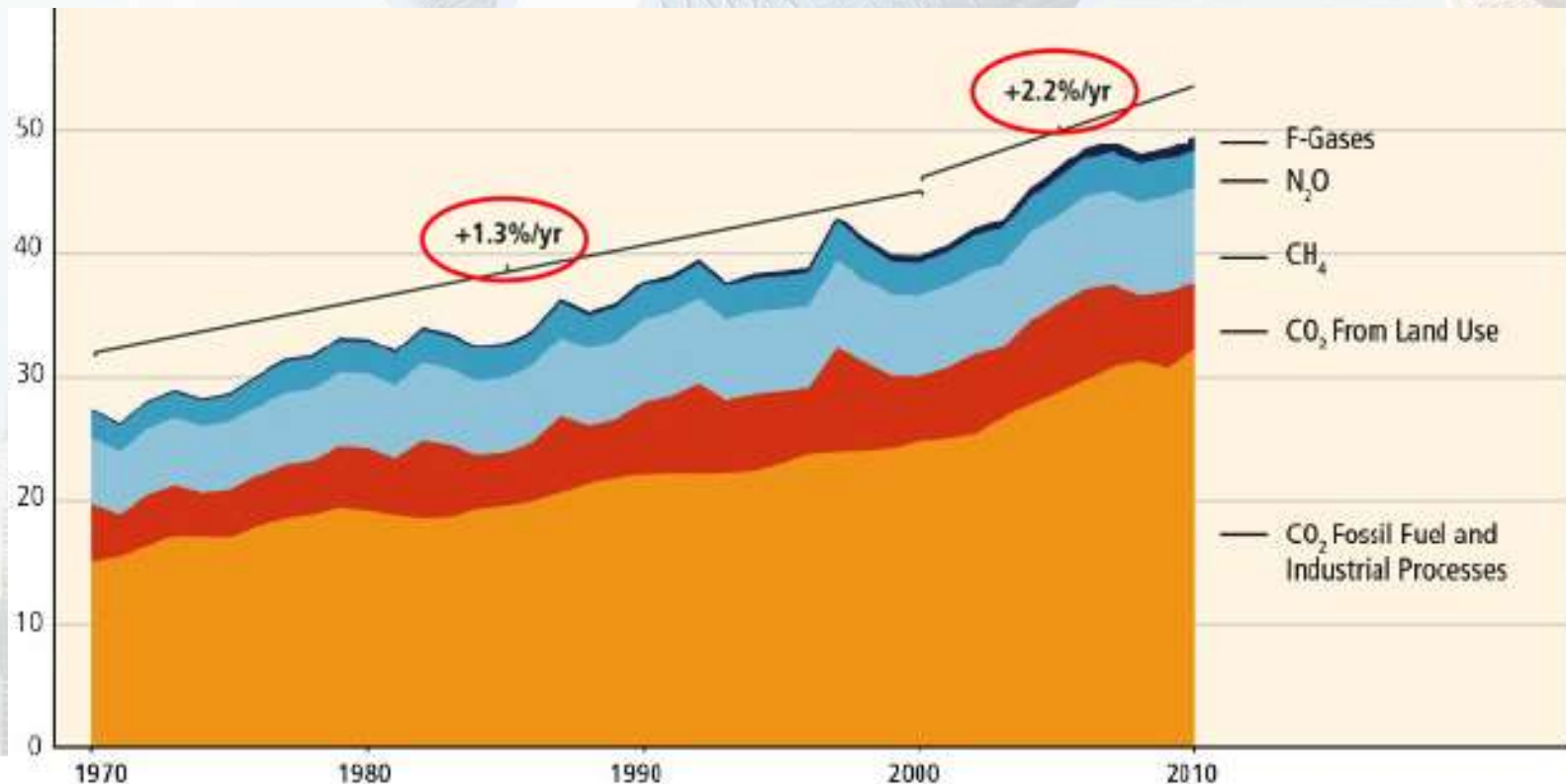




# HUMAN INFLUENCE: Anthropogenic GHG emissions have increased since the pre-industrial era, driven largely by economic and population growth

The atmospheric concentrations of carbon dioxide, methane and nitrous oxide that are unprecedented in at least the last 800,000 years.

GHG Emissions [GtCO<sub>2</sub> eq/yr]



# HUMAN INFLUENCE: Sources of Emissions

Energy production remains the primary driver of GHG emissions

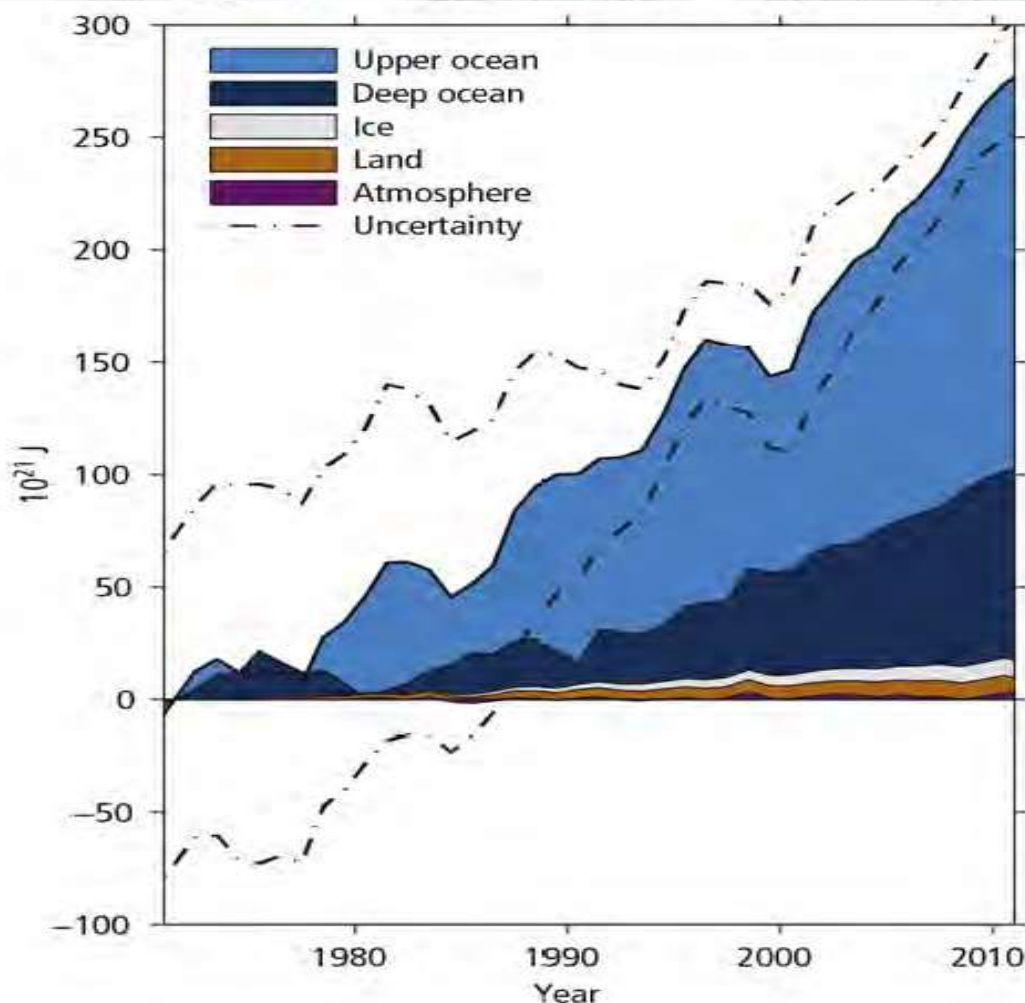


2010 GHG emissions

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# Oceans absorb most of the heat

Energy accumulation within the Earth's climate system



90%+ of the energy that accumulated in the climate system from 1971 and 2010 was absorbed by the oceans

Land temperatures set a record high in 2014 while ocean temperatures continue to climb

AR5 SYR



# HUMAN INFLUENCE: Some changes in extreme weather and climate events observed since ~1950 are linked to human activity



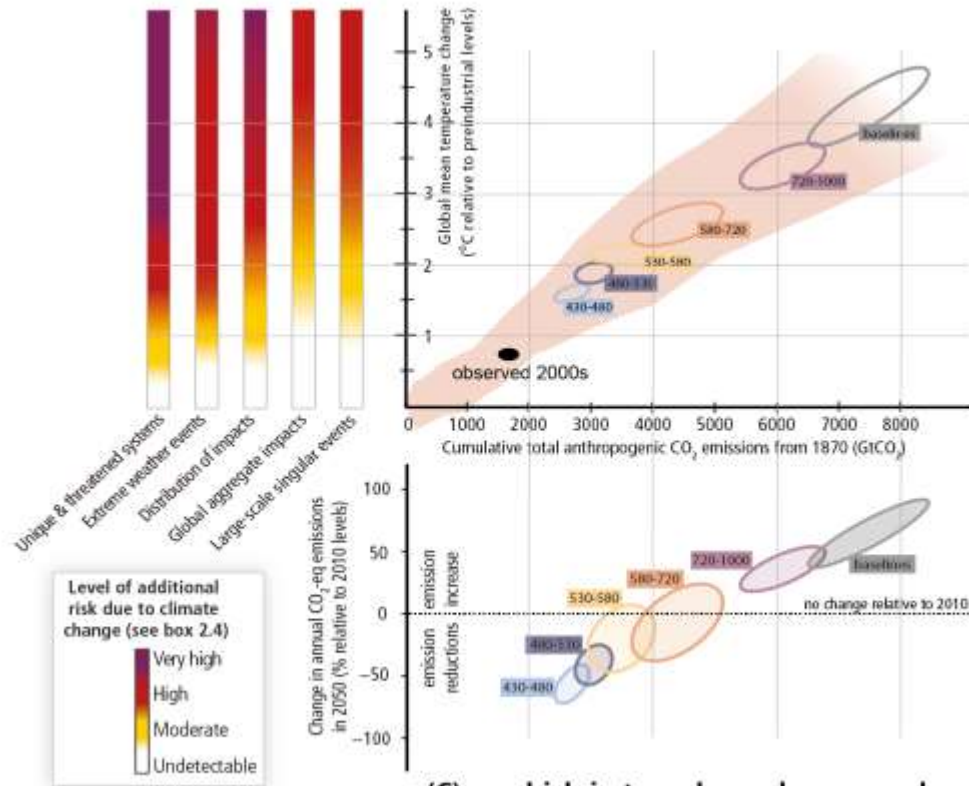
In a number of regions, impacts are already underway:

- decrease in cold temperature extremes
- increase in warm temperature extremes
- increase in extreme high sea levels
- increase in the number of heavy precipitation events

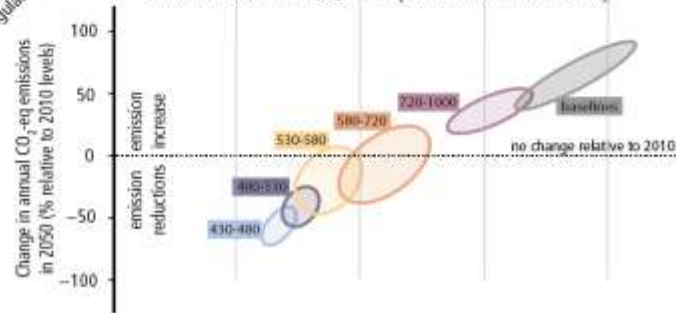
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# RISKS: Depend on cumulative CO<sub>2</sub> emissions

(A) Risks from climate change... (B) ...depend on cumulative CO<sub>2</sub> emissions...



(C) ...which in turn depend on annual emissions over the next decades



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# RISKS: Projected changes to climate system

Continued emissions of greenhouse gases will cause further warming and changes in the climate system



Oceans will continue to warm during the 21st century



Global mean sea level will continue to rise during the 21st century



It is very likely that the Arctic sea ice cover will continue to shrink and thin as global mean surface temperature rises



Global glacier volume will further decrease

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# RISKS: Potential Impacts of Climate Change



Food and water shortages



Increased displacement of people



Increased poverty

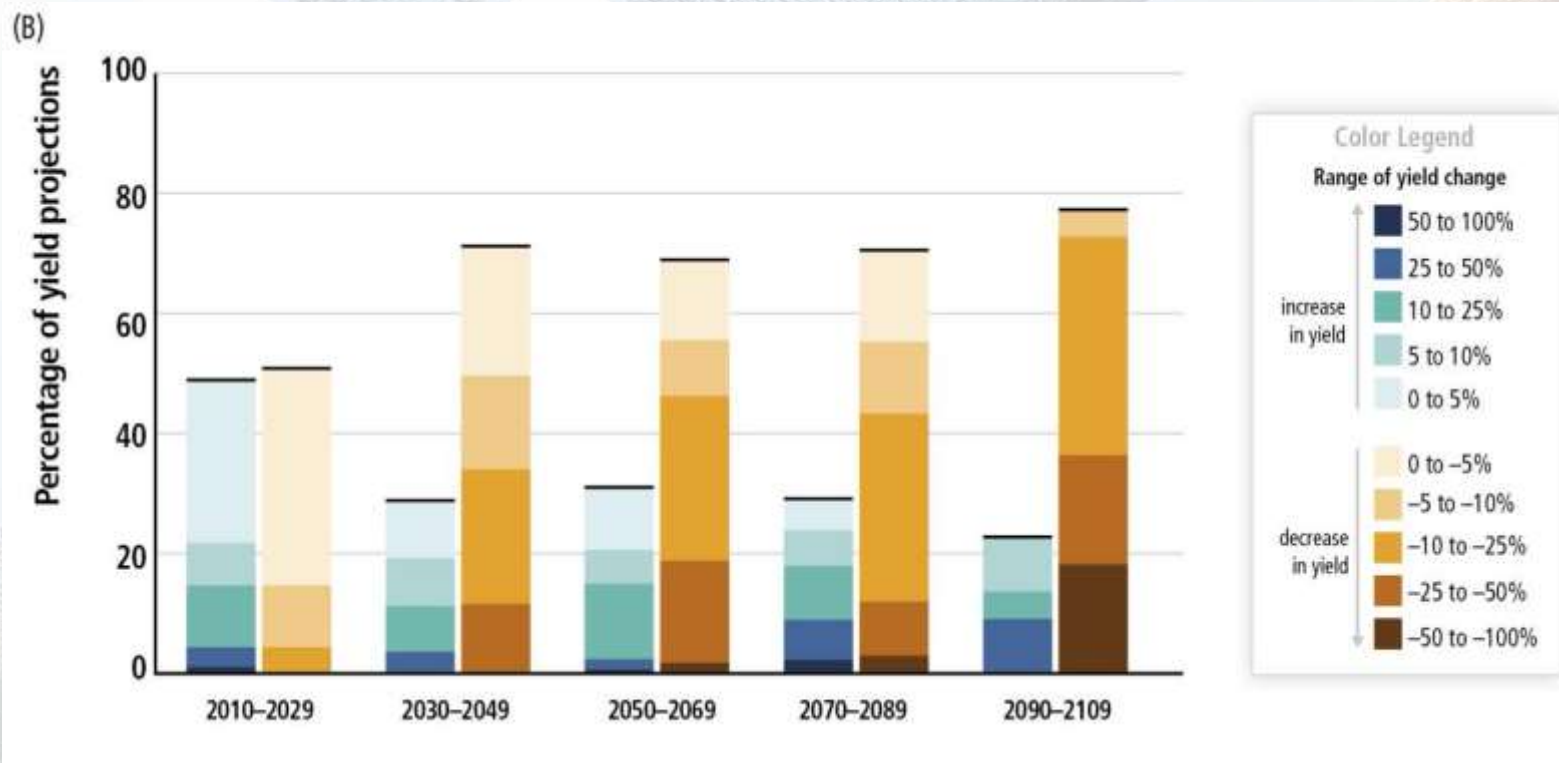


Coastal flooding

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# RISKS: Food Production

Percentage of yield projections



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# SOLUTIONS: Limiting Temperature Increase to 2°C



Measures exist to limit likely warming to 2° C



A combination of adaptation and substantial, sustained reductions in greenhouse gas emissions can limit climate change risks



Implementing reductions in greenhouse gas emissions poses substantial technological, economic, social, and institutional challenges



Ambitious mitigation is affordable: economic growth reduced by ~ 0.06%  
Estimated costs do not account for the benefits of reduced climate change



But delaying mitigation will substantially increase the challenges associated with limiting warming to 2° C

# SOLUTIONS: Mitigation Measures



## More efficient use of energy



## Greater use of low-carbon and no-carbon energy

- Many of these technologies exist today
- Nearly a quadrupling of zero- and low-carbon energy supply from renewable energy by 2050



## Improved carbon sinks

- Reduced deforestation and improved forest management and planting of new forests
- Bio-energy with carbon capture and storage



## Lifestyle and behavioural changes

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# Climate change and equity



Issues of equity, justice, and fairness arise with respect to mitigation and adaptation:

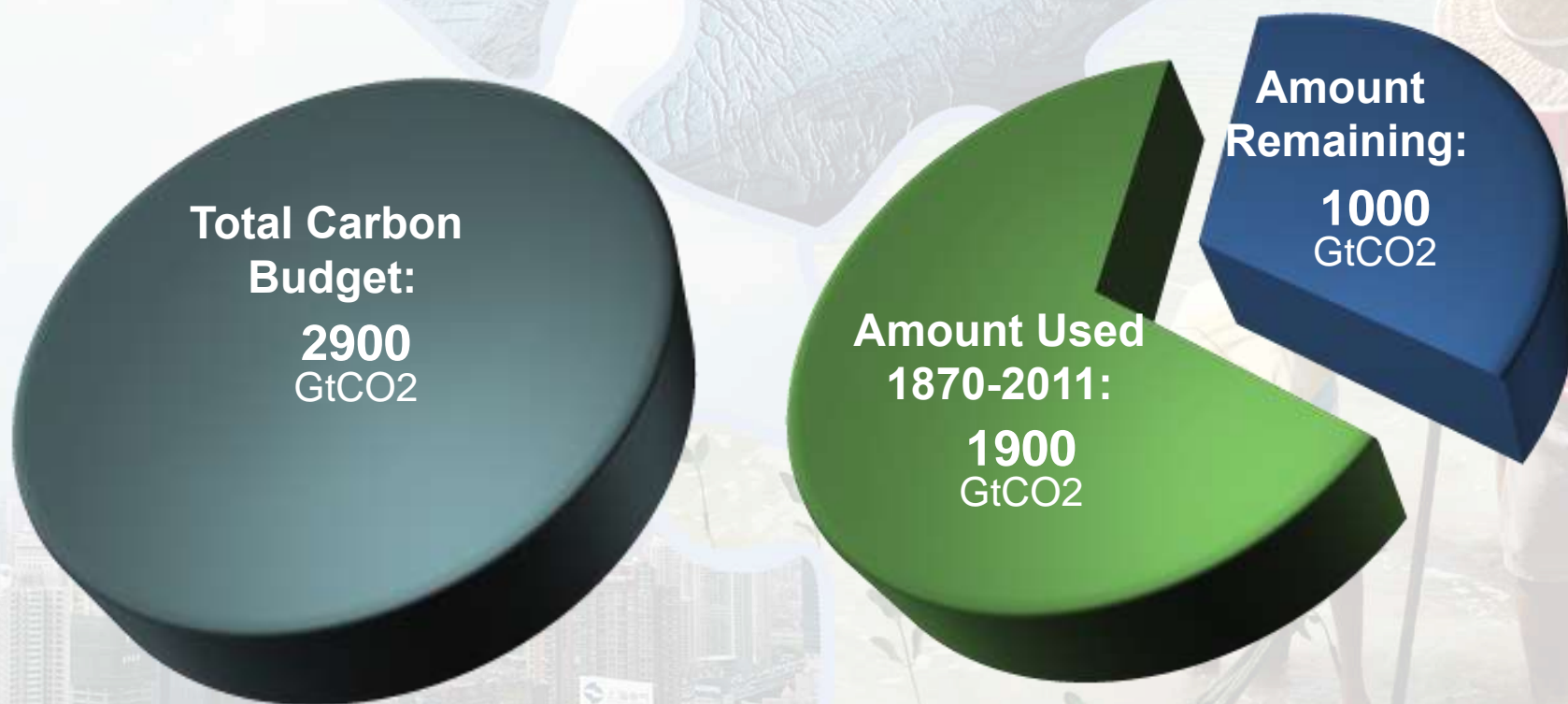
- Different past and future contributions to the accumulation of GHGs in the atmosphere
- Varying challenges and circumstances
- Different capacities to address mitigation and adaptation.

Options for equitable burden-sharing can reduce the potential for the costs of climate action to constrain development.



# The window for action is rapidly closing

65% of our carbon budget compatible with a 2° C goal already used



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# IPCC Fifth Assessment Report

## Synthesis Report