

THE UNIVERSITY *of York*



YESI

*York Environmental
Sustainability Institute*

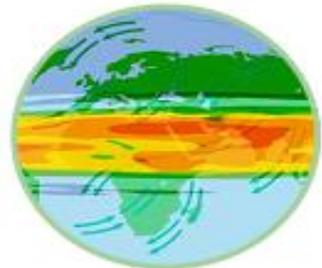
YESI's mission is to deliver world-class interdisciplinary research on environmental sustainability for the research community, industry and policy makers. Our innovative approach is based on an equal partnership between physical, natural and social sciences.

Global Change and Biosphere Interactions

A joint meeting of the
British Ecological Society
and the York Environmental
Sustainability Institute



Sustainable
Environments



Global
Change



Future food
and fuel



GLOBAL ENVIRONMENTAL CHANGE

How can interdisciplinary research help us address the challenge?



THE 2030 CHALLENGE

FOOD

50% increase



WATER

30% increase

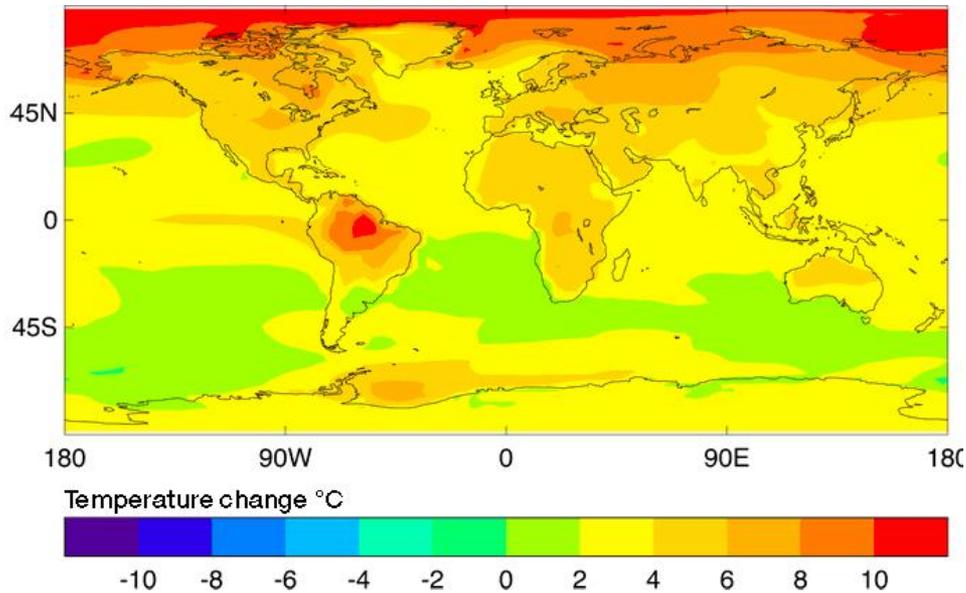
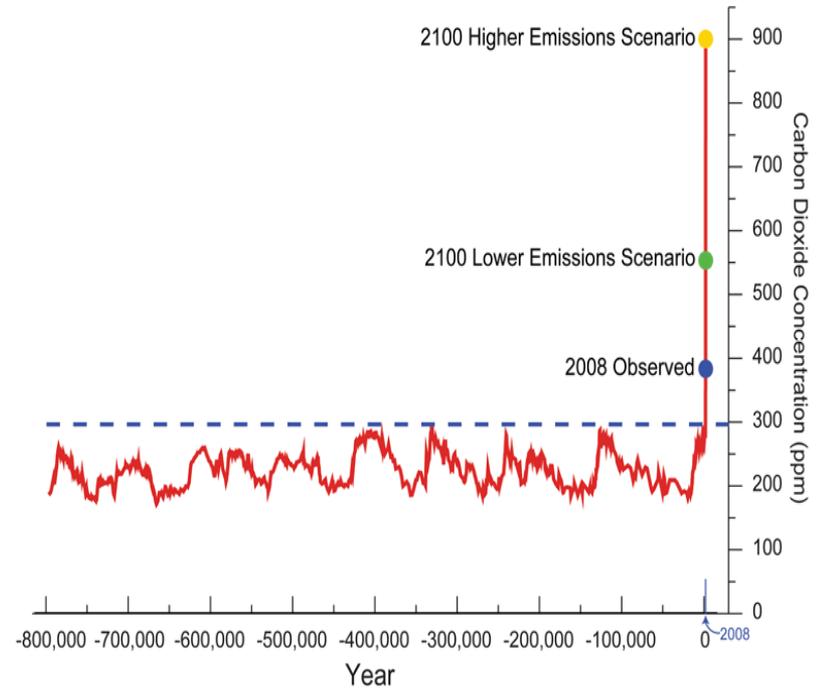
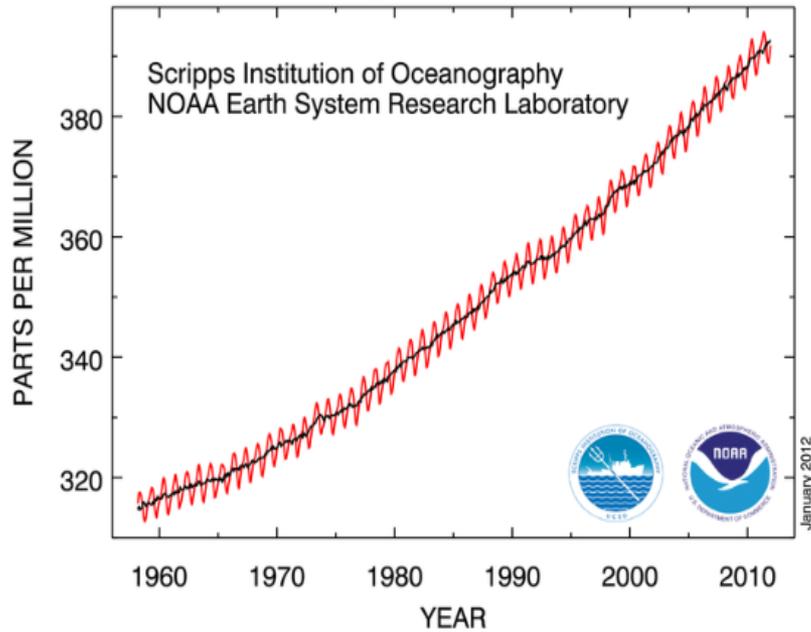


ENERGY

50% increase

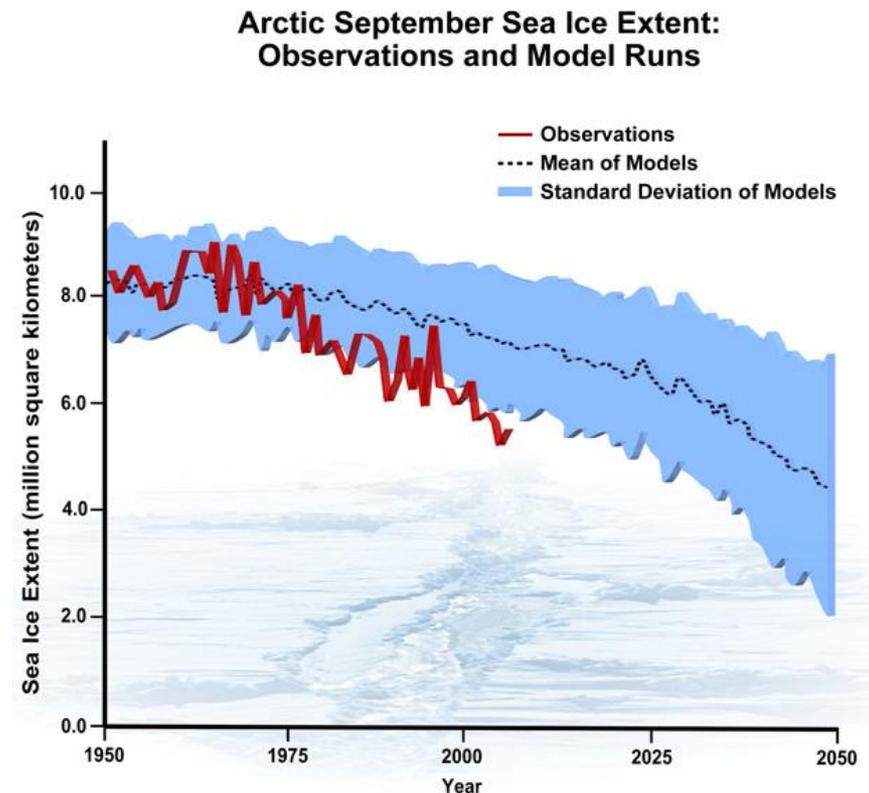


Atmospheric CO₂ at Mauna Loa Observatory



Challenge to get the evidence base

- Collect data at the right temporal and spatial scales
- Interpret, understand and model data to make predictions

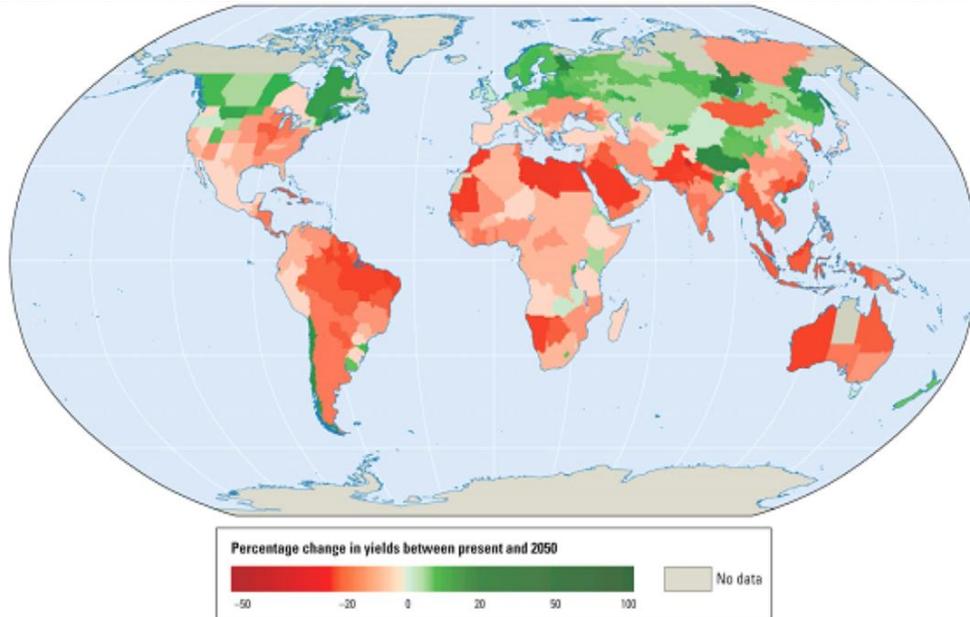


Challenge to understand and mitigate the impacts on the natural world

- Conservation strategies to protect biodiversity and adapt to consequences of biodiversity loss and associated ecosystem services
- Manage land and sea resources sustainably

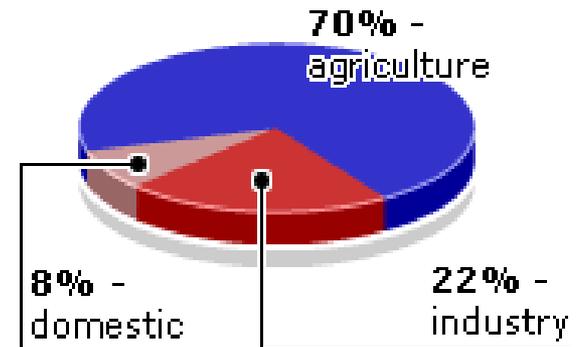


Challenge to our agriculture

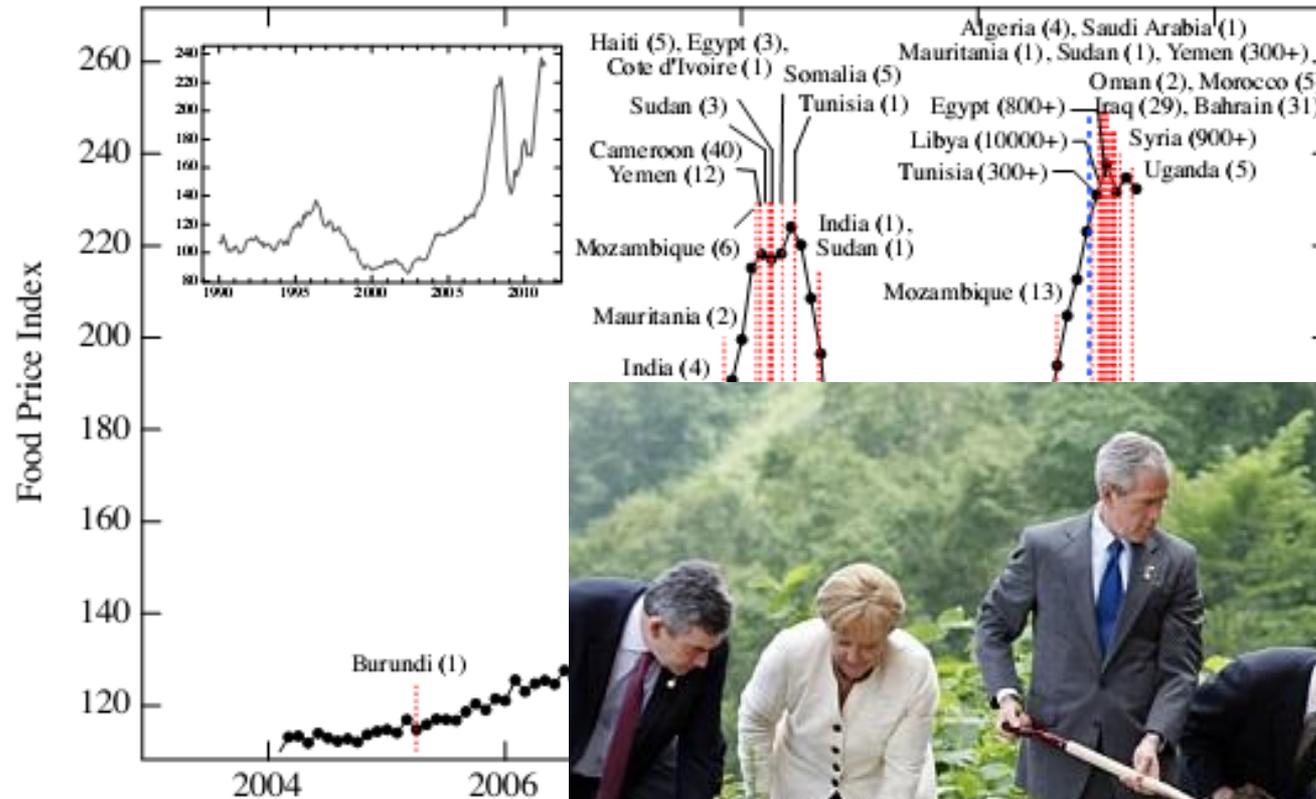


Source: Miller and others 2009.

Global water use



Challenge to social and political systems

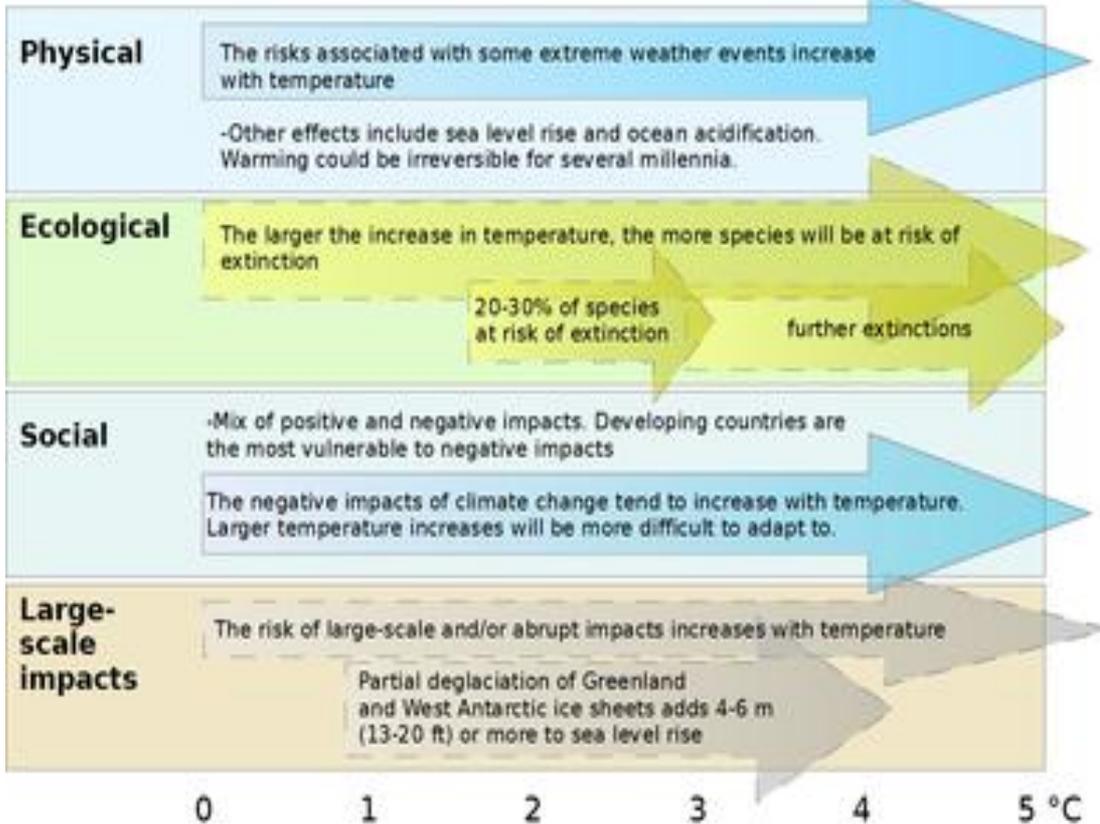


Impacts span disciplines

Summary of global warming impacts

Increase in global mean temperature relative to the late 20th century

0 1 2 3 4 5 6 7 8 9 °F



What can we learn from the past?

- Impacts of past environmental change on ourselves (and other species) – how did we cope?





YESI

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Website: www.york.ac.uk/yesi/



THE AIM OF YESI

- A new interdisciplinary partnership at York to :
 - **Deliver world-leading interdisciplinary research**
 - **Generate the evidence-base for sustainable solutions to environmental change**
 - **Foster equal partnerships between natural, physical & social sciences**
 - **Develop effective and improved policies for environmental sustainability**
- Facilitate interactions across departments to develop new synergies between disciplines
- Focus on collaboration and innovation

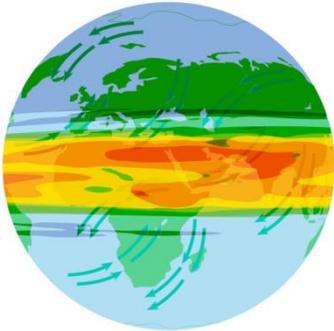


RESEARCH FOCUS



SUSTAINABLE ENVIRONMENTS

- Development of sustainable cities
- Monitoring and managing anthropogenic impacts



GLOBAL CHANGE

- Greenhouse gases and atmospheric processes
- Past environments and human adaptation
- Climate change and biodiversity conservation



FUTURE FOOD AND FUEL

- Food production resilient to climate change
- Fuels and services from plants and ecosystems

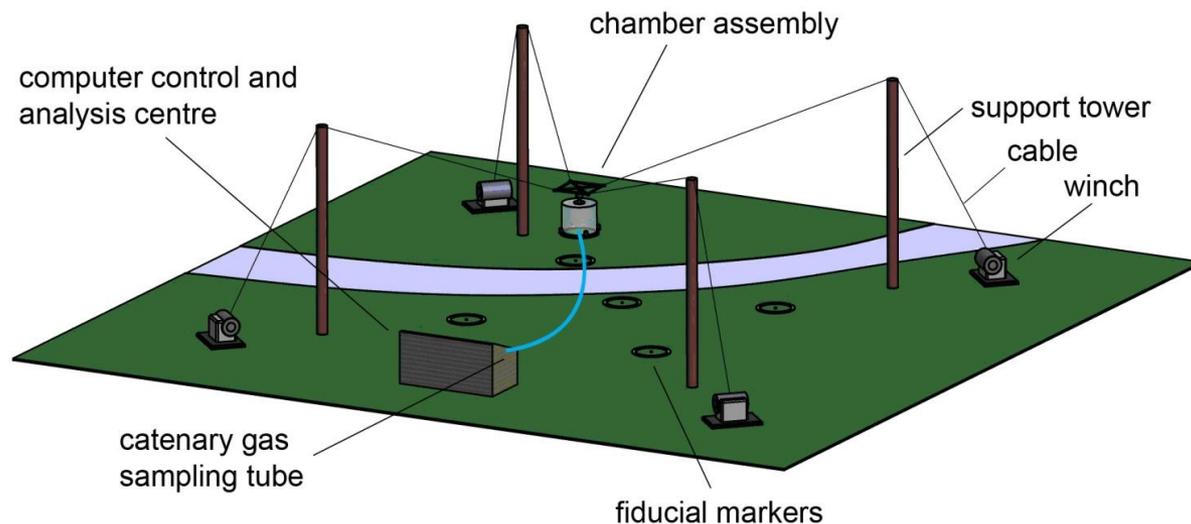
Development of sustainable cities

- Impacts of the built environment on well-being in older life – how do life transitions interact with local infrastructure to affect mobility?
- Sociological evaluation of housing which aims to lower energy use and promote community involvement
- Health scientists, Psychologists, Computer scientists, Social scientists, Transport economists; Experts in Planning, Housing policy, Participatory GIS



Greenhouse gases and atmospheric processes

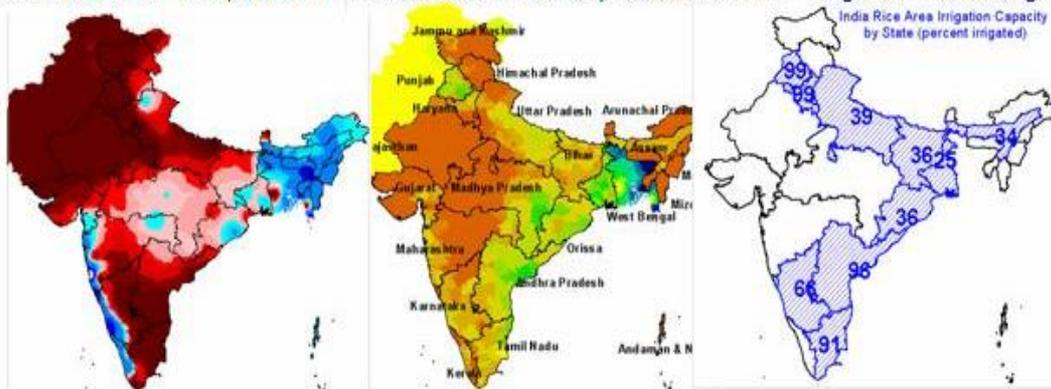
- **SkyGas**: 1st cable-operated trace gas monitoring platform to monitor GHG fluxes from both terrestrial and aquatic systems
- Atmospheric chemists, ecosystem ecologists, electronic engineers (aeronautical control systems)



Food production resilient to climate change

- Cultivated Asian rice (*Oryza sativa*) is 1st food source for 50% of the world's population
- Bred for high yield at expense of other traits e.g. resilience to environmental stress - ancestral varieties may retain better ability to cope with drought
- 45% Indian crop rain-fed so at risk from climate change

Cumulative Precipitation + Production Intensity Distribution + Irrigation Coverage



Exploiting rice's natural abilities

- Introducing beneficial genes from ancestral varieties into elite cultivars
- New varieties may not reach their potential for socioeconomic rather than agronomic reasons
- Climate modellers, crop geneticists, plant biochemists, agronomists, social scientists



“The species which survives is not the strongest, nor even the most intelligent – its the one that adapts best to change” Darwin

