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**No nation is an island:
international dimensions of the
UK Climate Change Risk Assessment 2017**

@AndyChallinor

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- **CCRA presented to Parliament:**
 - by the Government (January 2017)
- **Updated adaptation programmes:**
 - UK (England): summer 2018
 - Scotland, Northern Ireland: 2019
 - Wales: as part of Wellbeing Act
- **Next ASC statutory progress reports:**
 - Scotland: September 2016
 - UK (England): June 2017



UK CCRA 2017: Structure and lead contributors



Synthesis Report (50 pages + annexes)

- *Key messages*
- *Risk groupings*
- *Chapter summaries*
- *Urgency scores*

Authored by the ASC

National summaries (80-100 pages each)

- *England*
- *Northern Ireland*
- *Scotland*
- *Wales*

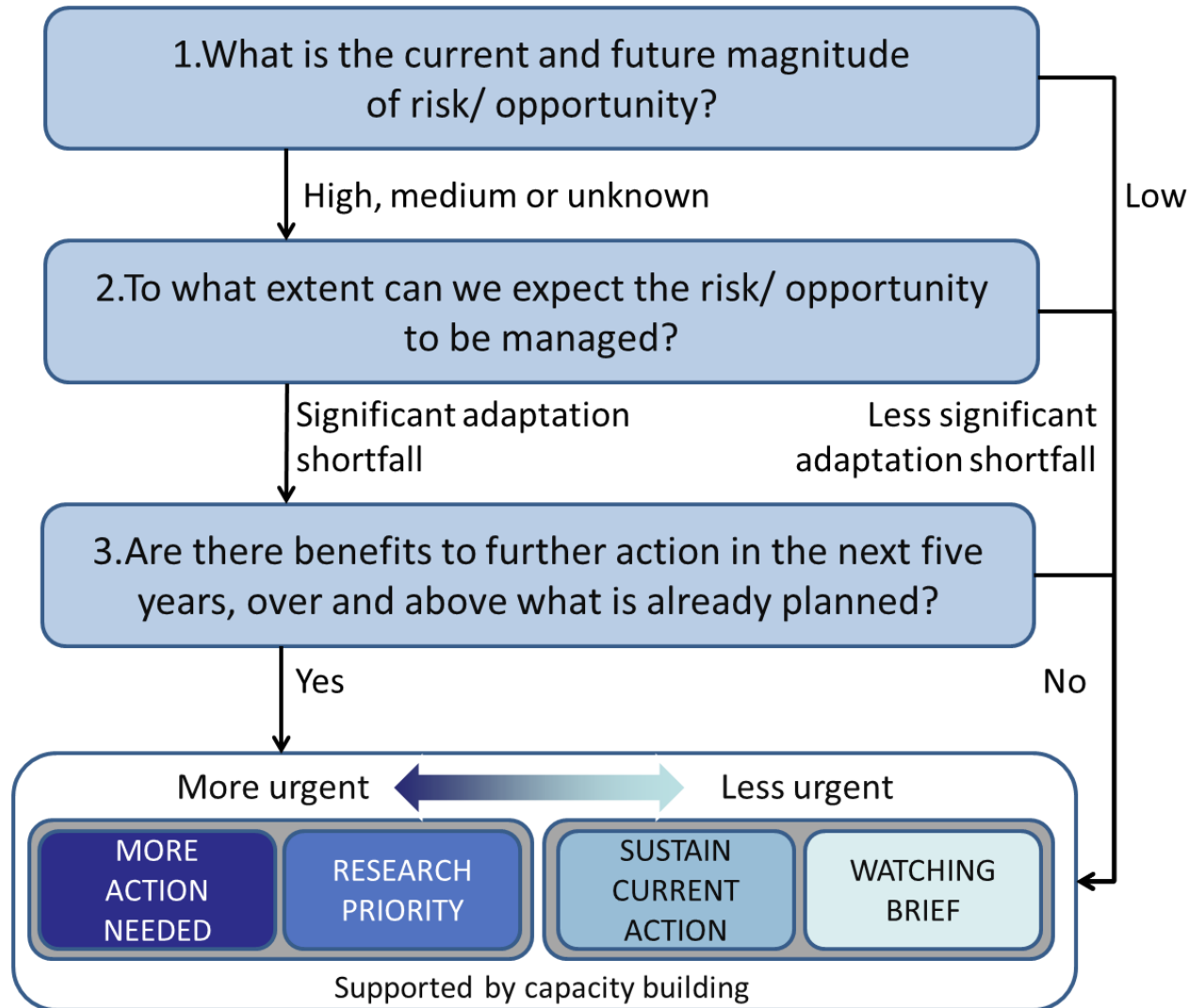
Compiled by the ASC Secretariat

Evidence Report (8 chapters + annexes, ~2,000 pages)

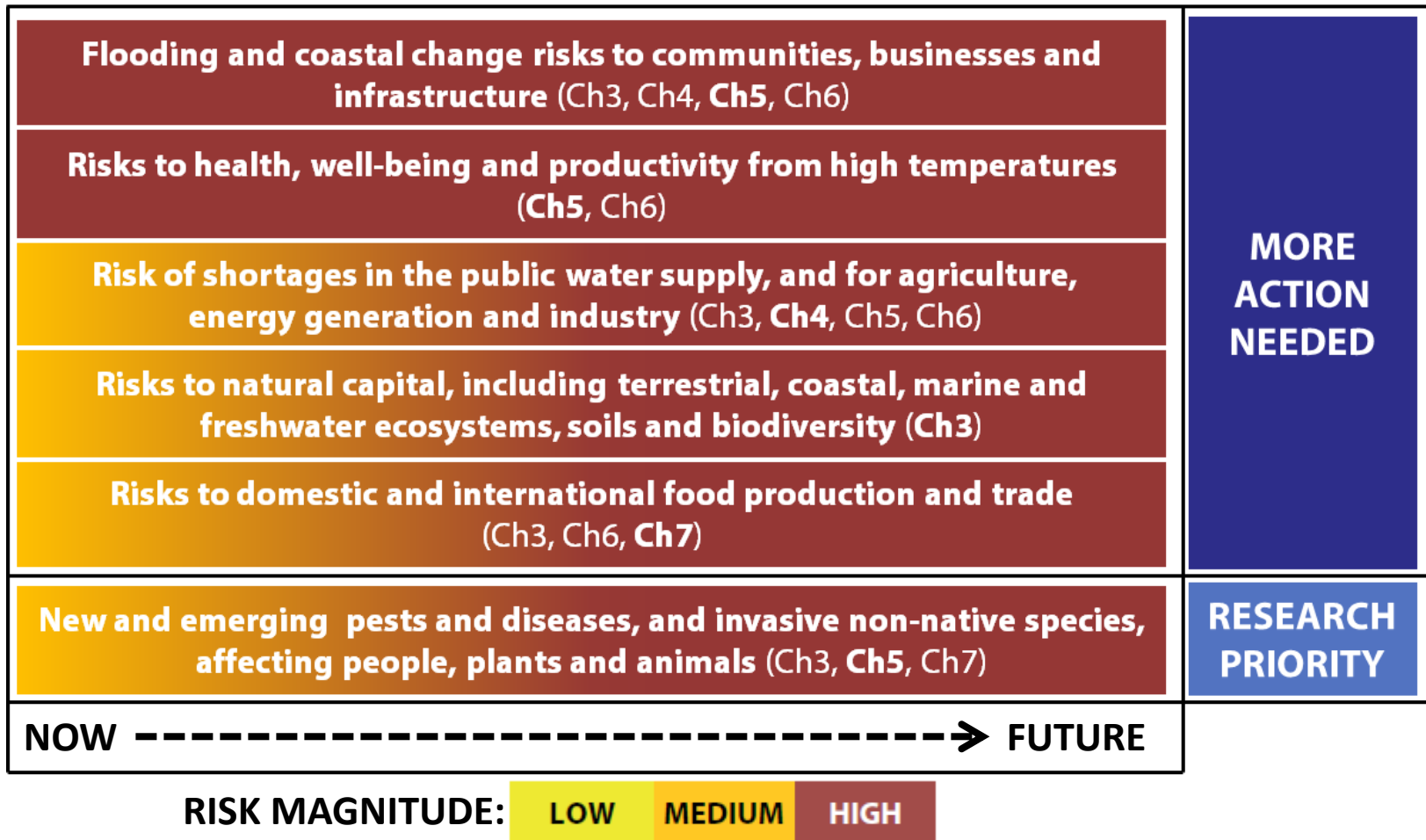
- 1: Introduction (*Kathryn Humphrey – ASC Secretariat, James Murphy – Met Office*)
- 2: Approach and context (*Rachel Warren – UEA*)
- 3: Natural environment and natural assets (*Iain Brown – York*)
- 4: Infrastructure (*Richard Dawson – Newcastle*)
- 5: People and the built environment (*Sari Kovats – LSH&TM, Dan Osborn – UCL*)
- 6: Business and industry (*Swenja Surminski – LSE*)
- 7: International dimensions (*Neil Adger – Exeter, Andy Challinor – Leeds*)
- 8: Cross-cutting issues (*Roger Street – UKCIP*)

Supported by ~70 contributing authors and members of the ASC Secretariat

Identifying the most urgent risks/opportunities



Six priority areas



Risks from flooding and coastal change



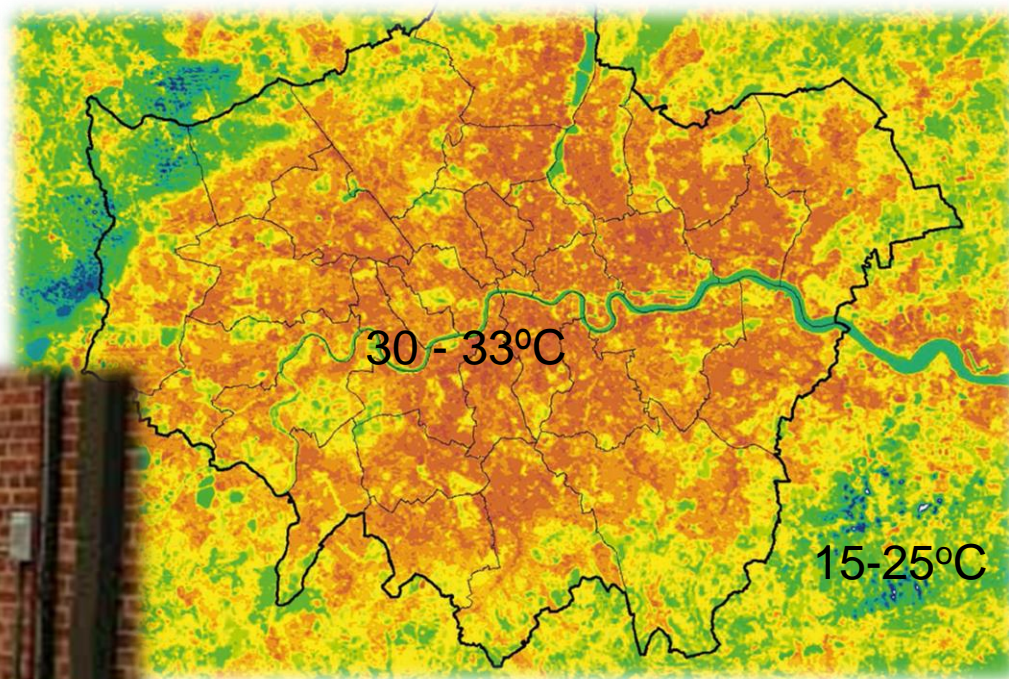
Risks from high temperatures

HIGH MAGNITUDE

HIGH CONFIDENCE

MORE ACTION NEEDED

Urban heat island in London



26th June 2011

Risks to food

HIGH MAGNITUDE

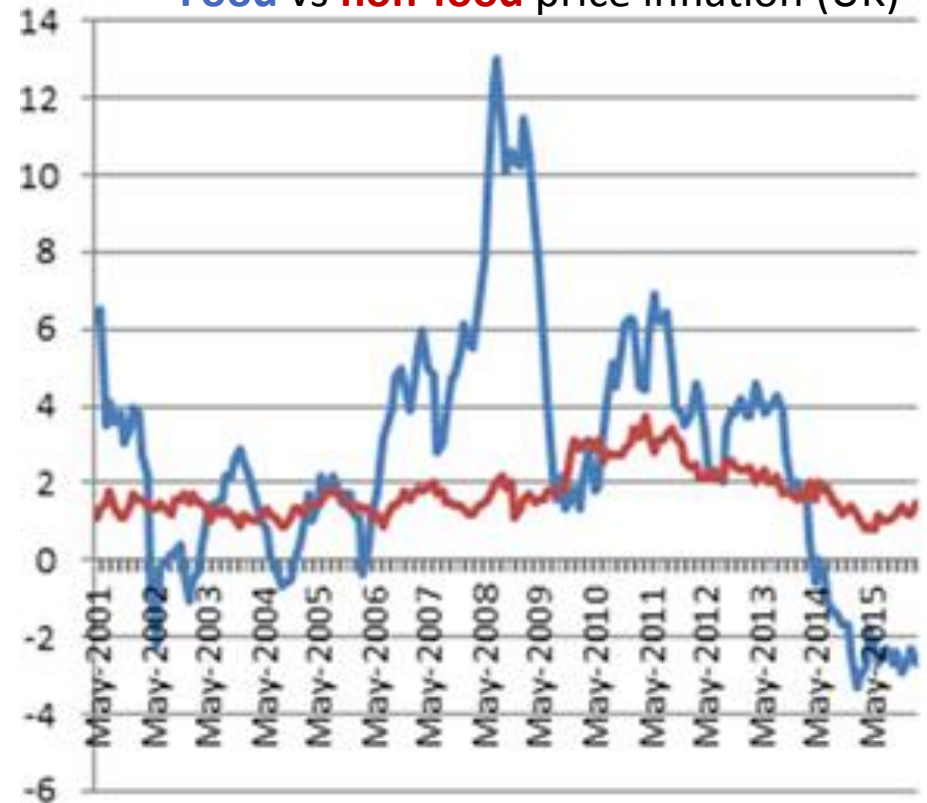
MEDIUM CONFIDENCE

MORE ACTION NEEDED

Origins of food consumed in the UK, 2013



Food vs non-food price inflation (UK)



WHEN PEANUTS ATTACK!

HOME

ABOUT

FOOD ALLERGY RESOURCES

PEANUT ALLERGY FACTS

PEANUT ALLERGY

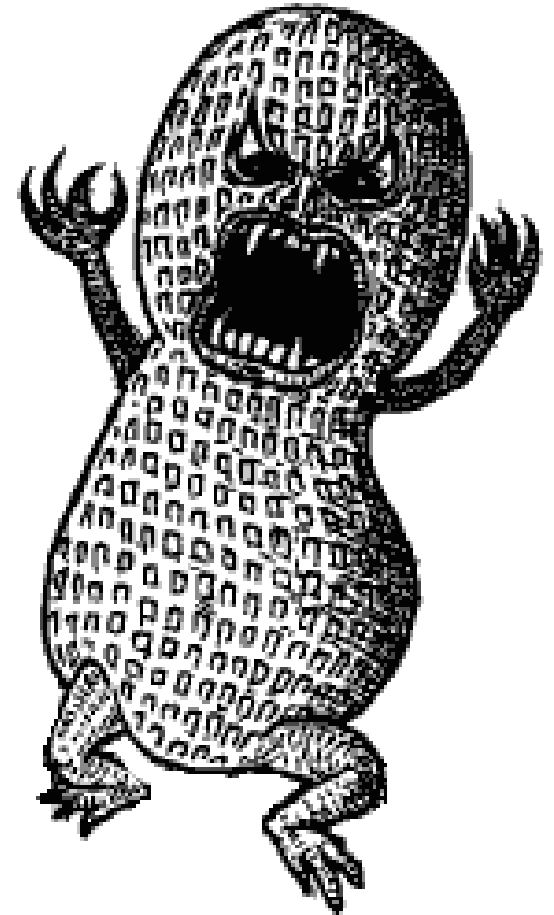
Food safety alert! Peanuts might be in your cumin.

BY JAE LITHE | JANUARY 14, 2015 | FOOD SAFETY



Totally easy to tell apart, right? I'm sure no one would ever mix these up.

After months of [recalls of cumin](#), [spice mixes that contain cumin](#), and [hundreds of thousands of pounds of packaged foods that contain cumin](#) due to the presence of undeclared peanut and tree nut ingredients, on February 18th, the U.S. Food and Drug Administration finally issued a [public advisory statement](#) warning people with peanut allergies “to consider avoiding products that contain ground cumin or cumin powder.”



Agriculture and health

Aflatoxins: highly toxic substances produced by the ubiquitous *Aspergillus* fungi in common staple crops

- ▶ Synergistic with Hepatitis B Virus to cause liver cancer
- ▶ Impairs growth and development of children
- ▶ Suppress immune system - increased susceptibility to diseases, e.g., HIV, malaria?
- ▶ Death (>200 people in Kenya)
- ▶ Trade impact: US\$1.2 billion loss

BBC NEWS WORLD EDITION

Last Updated: Sunday, 13 June, 2004, 12:33 GMT 13:33 UK

[E-mail this to a friend](#) [Printable version](#)

Relief Spoilt maize threatens schools food programme

By LUCAS BARASA

A school-feeding programme for 40,000 pupils in some of Nairobi's slums has been thrown into disarray.

Killer maize sparks Kenya alarm

Several Kenyan politicians have urged the government to declare a national disaster following the death of more than 80 people from contaminated maize.

Twenty-eights bags of poisoned maize were impounded at a girls' school in



Peanut Butter recalled due to aflatoxin levels

Aflatoxin: The Single Pet Food Ingredient to Be Especially Vigilant About

October 09, 2013 | 87,006 views | [Disponible en Español](#)

9K
SHARES



By Dr. Becker

If you're a regular reader of my Healthy Pets newsletter, you know I often discuss the need to feed dogs and cats the right type of protein. And, of course, species-appropriate protein for carnivorous pets comes from animals – not plants.

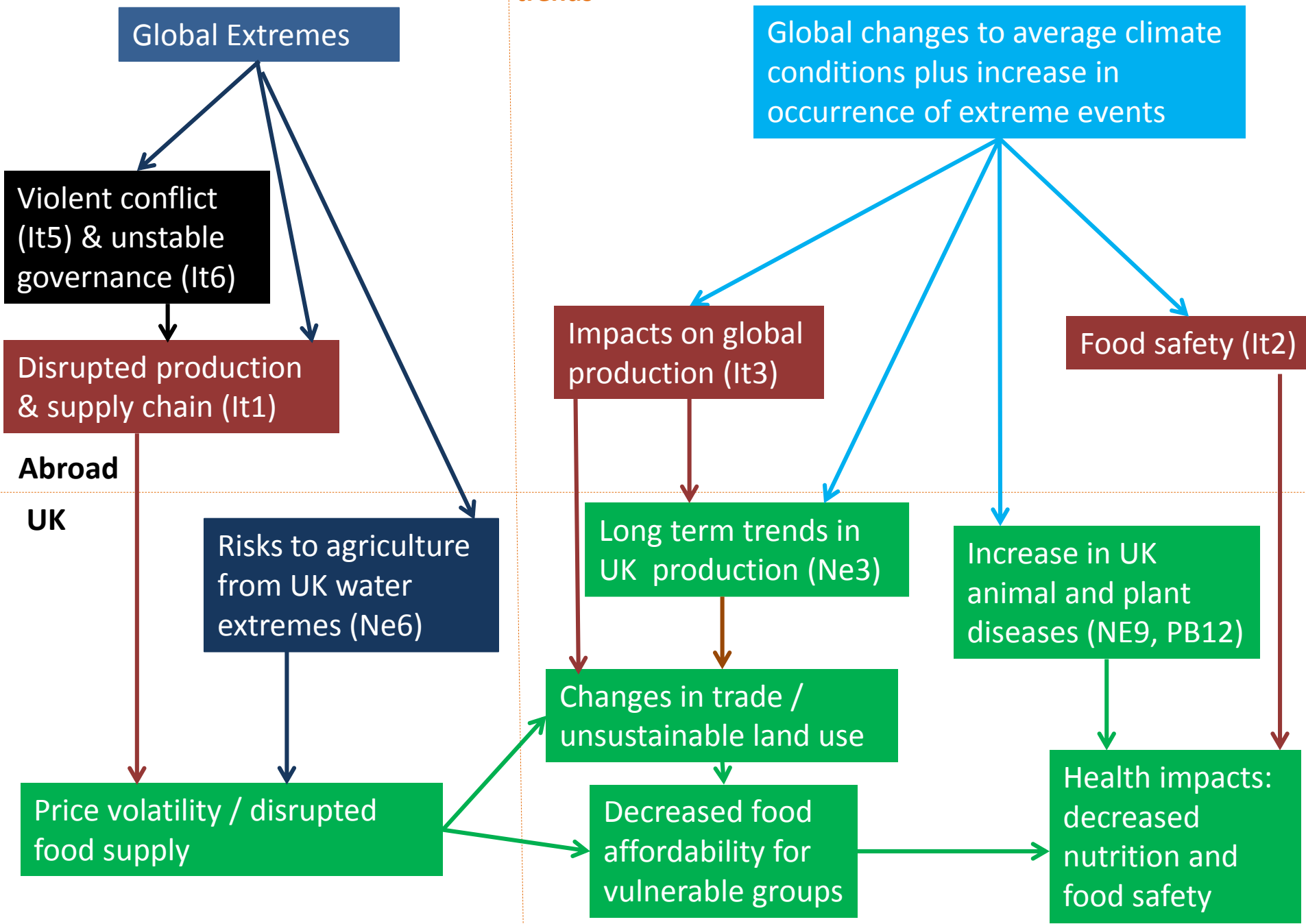
Aflatoxin: Pet Food Contaminant



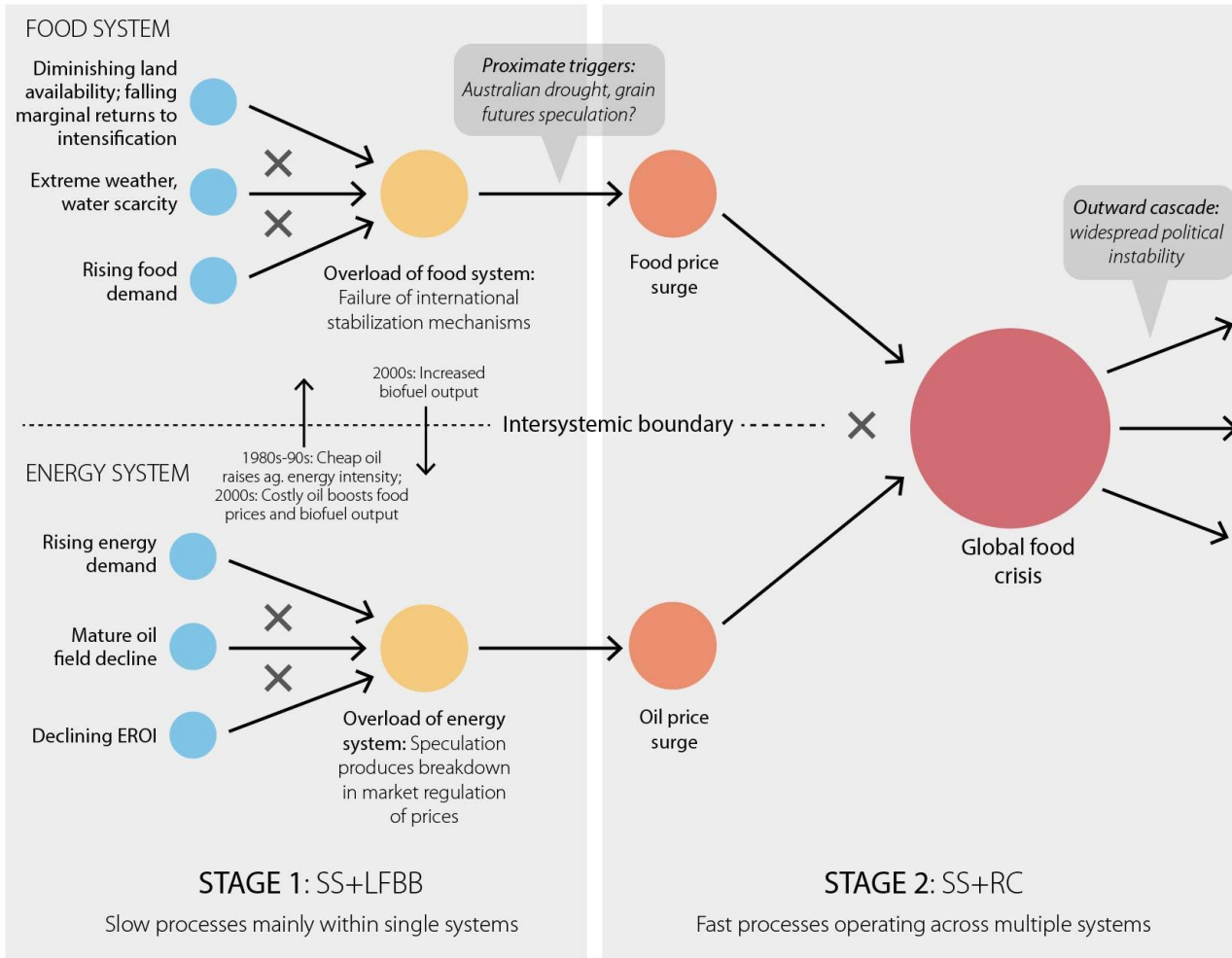
Events in a single year

Long term trends

Food systems risks from UK CCRA report 2017



System(s) failure: role for "plausible futures"





Climate impacts Group

Overview



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I. Changing climates

II. The international dimensions of climate change can dominate

III. Policy gaps

Current policy

The objectives of the Government food security strategy are:

1. UK food security built on access to a wide variety of markets including domestic, the EU and an open, rules-based world trading system.
2. The importance of sustainable intensification of UK agriculture.
3. Making the most of our productivity potential through the agri-tech strategy (Defra, 2015a)

Main conclusion from Chap 7

- Weather extremes abroad identified as a major issue
 - Production shocks
 - supply chains
- **Systemic resilience needed**
 - International coordination
 - National-level strategy on food security needs to cut across many departments, e.g.
 - FSA for detecting emerging food safety threats
 - FCO for interactions between food security and conflict and migration
 - BIS and DEFRA for supply chains



Table 7.3: Policy areas needing strategic coordination to improve resilience of the food system

Description	Policy arena (Dom/EU/Int) and timescale	Actors involved	Address risks	Address opportunities
Functioning of international trade and markets	EU, international Immediate	Defra, BIS, Academia, Industry	It1	
Management of change in the UK farm sector for systemic resilience to climate change	Domestic, EU All timescales, especially short-to-medium	Defra, Academia, Industry	It1, It3, Chapter 6, Chapter 3	Chapter 6, Chapter 3, It3
UK business, innovation and aid aimed at opportunities and adaptation overseas	Domestic, international All timescales	BIS, DFID, industry	It1, It3, Chapter 6	Chapter 6, It7, It3
Resilience into supply chains	EU, international, domestic Immediate	Academia, Defra, FCO, BIS, DoH/ Department for Work and Pensions (DWP)	It1, Chapter 4, Chapter 6	Chapter 6, It3, It7
Emerging food fraud and contamination risks	Domestic, EU, international Begin planning within 5 years	FSA and SFSA (Fraud and contamination) International monitoring?	It2, Chapter5	
Demand-side management	Domestic, EU Immediate action will enable medium-term change	DoE, DoH, BIS, Defra, Department for Communities and Local Government, NHS, consumer associations Big society?	It3, It1, Chapter 3	Chapter 3, It3

Europe

Datablog

UK tops chart of EU food waste

France has announced measures to tackle food waste as the EU throws away 89m tonnes of food each year - and the UK is one of the worst offenders

Ami Sedghi

Friday 22 May 2015
18.50 BST



In the UK, supermarkets are actually responsible for only a small percentage of food wasted; households are the biggest culprit. Photograph: Bloomberg via Getty Images

France's parliament has announced measures to [tackle food waste by passing a law banning supermarkets from destroying unsold food](#). Instead they will be obliged to give it to charities or to put it to other uses such as animal feed.

Government response published 17/1/17

- “In general, the Government endorses the conclusions of the Adaptation Sub-Committee, with the exception of some of those on food security.”

MEETINGS COVERAGE

GENERAL ASSEMBLY > SECOND COMMITTEE

GA/EF/3242
9 OCTOBER 2009

Food Production Must Double by 2050 to Meet Demand from World's Growing Population, Innovative Strategies Needed to Combat Hunger, Experts Tell Second Committee

ARTICLE IN PRESS

Journal of Rural Studies xxx (2011) 1–10

Contents lists available at SciVerse ScienceDirect

Journal of Rural Studies

journal homepage: www.elsevier.com/locate/jrurstud

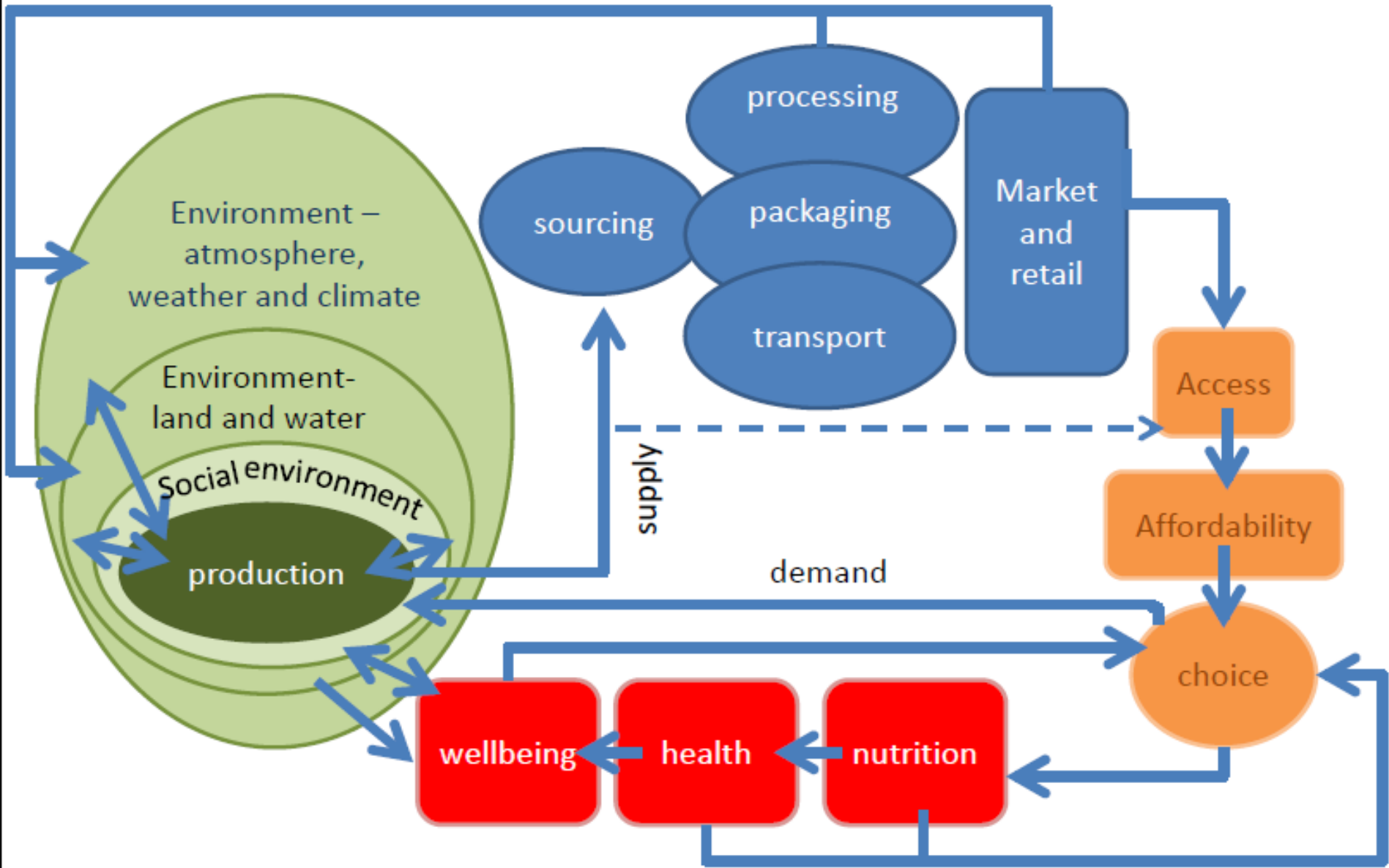
ELSEVIER



Doubling food production to feed the 9 billion: A critical perspective on a key discourse of food security in the UK

Isobel Tomlinson*

Soil Association, Policy Department, South Plaza, Marlborough Street, Bristol BS1 3NX, UK



Complex system: who has the power?

Are there any opportunities?



(some) research gaps

- Quantify the covariate nature of risk of multiple food production failures in world regions.
- Assess the risk posed by abrupt change and climate tipping points to global food production including an assessment of the likelihood, impact and geopolitical consequences of climate change and food insecurity.
- Characterise and quantify food system risks in supply chains, nutrition, and political instability due to extreme weather and climate change.



Reflection: discerning what can and cannot be predicted

- Why humans can't predict
 - Epistemic arrogance and corresponding future blindness
 - Fooled by reductions – especially when told by people in suits
 - Flawed tools of inference from Mediocristan

Mediocristan	Extremistan
<ul style="list-style-type: none">▪ Gaussian▪ Linear (easier to predict)▪ Experts▪ Exceptional is inconsequential	<ul style="list-style-type: none">▪ Black Swans▪ Non-linear (impossible to predict)▪ No experts▪ Exception matters

=> Don't predict, go to parties

The challenge of 1.5 (or 2) degrees

Agriculture needs to be part of the solution

Demand-side issues:

- Food-based emissions will either be the totality or large fraction of 2C budgets
- Changes in diet to achieve targets?

Hedenus et al. (2014) Bajželj et al. (2014)

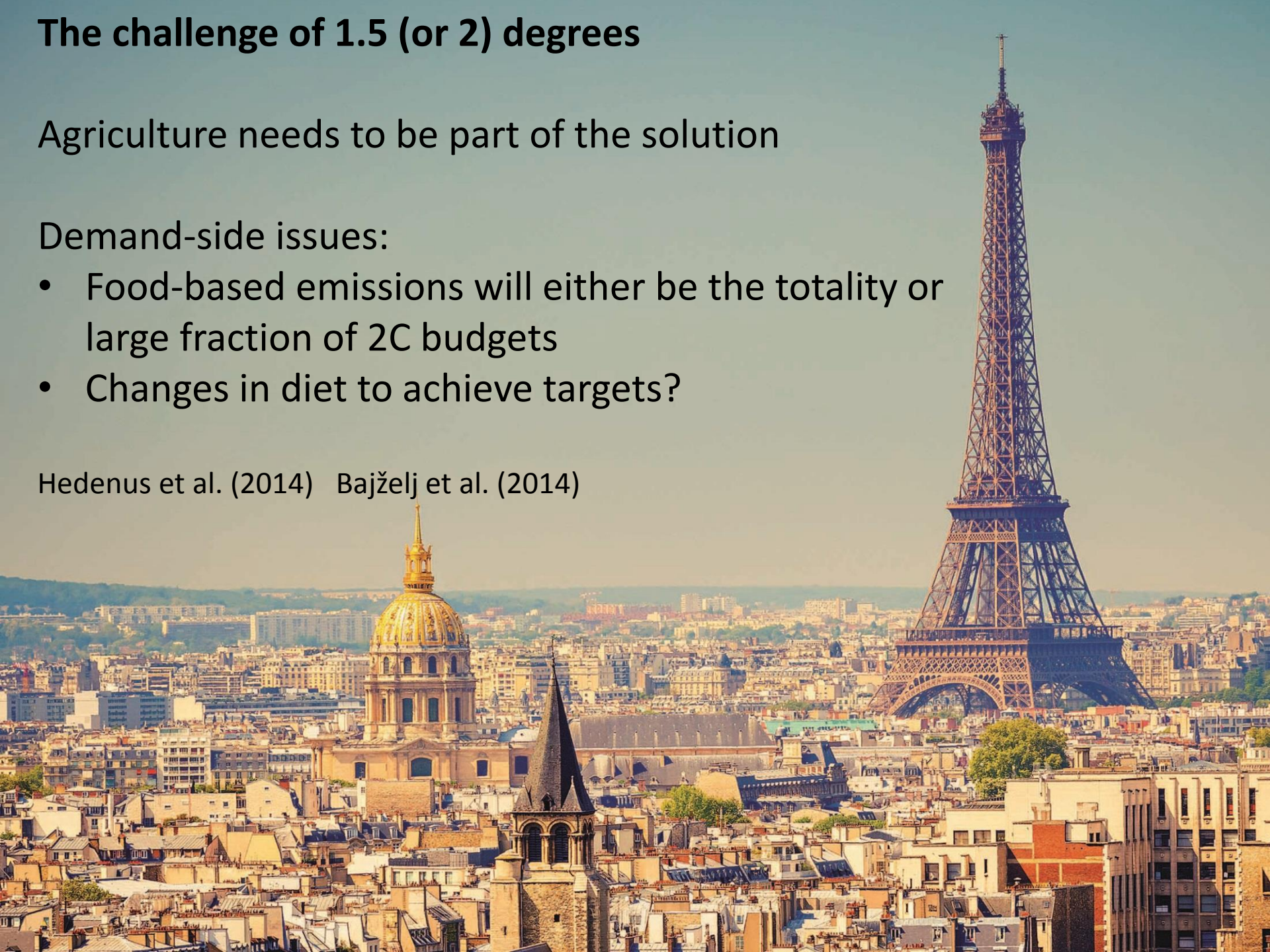
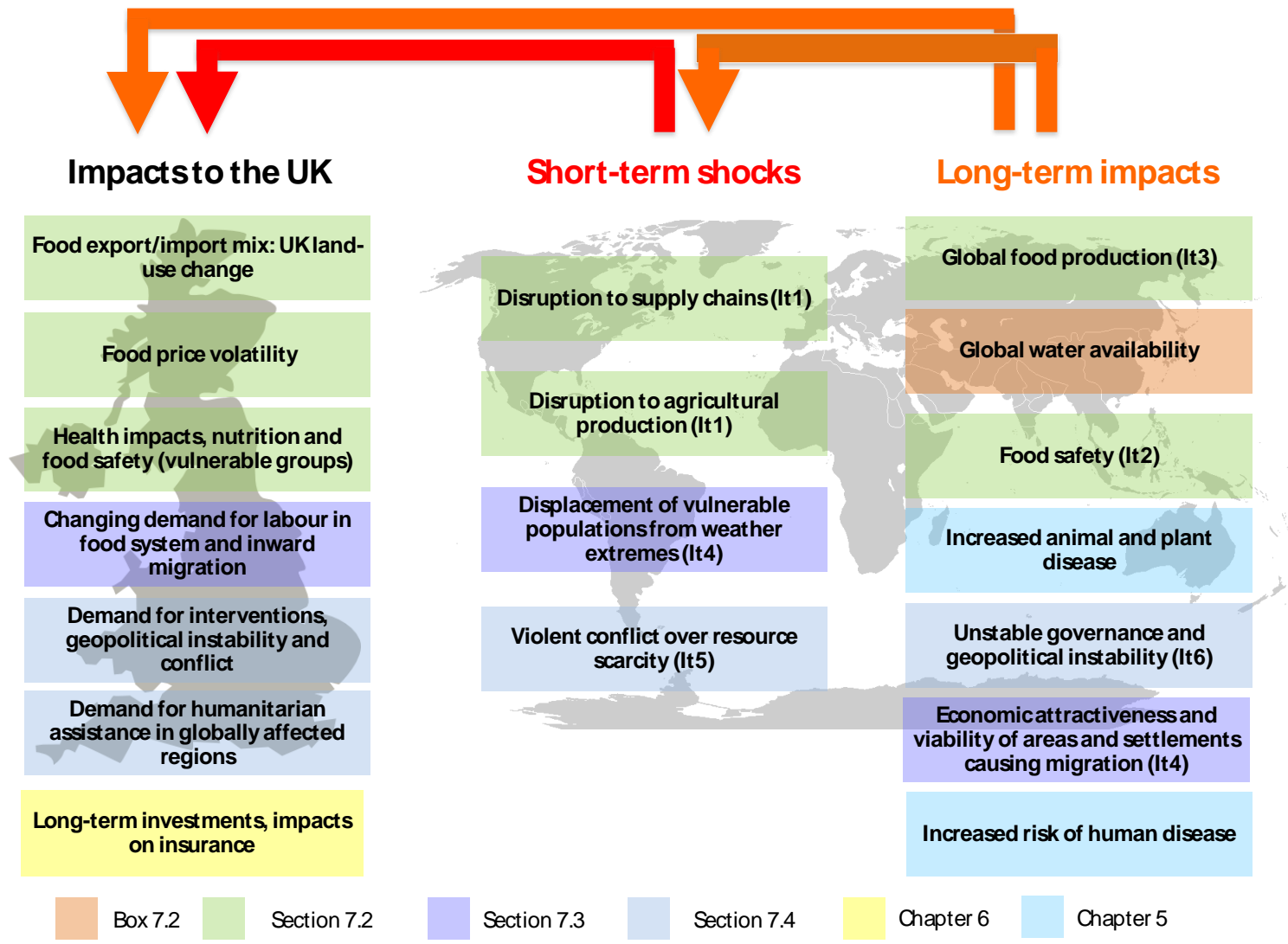


Figure 7.1: Interactions between food system, migration and geopolitical risks/opportunities for the UK



Source: CCRA authors

Risk/opportunity (relevant section(s) of chapter)	More action needed	Research priority	Sustain current action	Watching brief	Rationale for score
It1: Risks from weather-related shocks to international food production and trade (7.2)	UK				At the present, there is no co-ordinated national approach to ensure the resilience of the UK food system. Coordinated approaches require broad participation across policy, industry and research.
It2: Imported food safety risks (7.2)		UK			There is a gap in surveillance systems to monitor food safety at source and through complex international supply chains.
It3: Risks and opportunities from long-term, climate-related changes in global food production (7.2)		UK			The UK may increase its comparative advantage in specific areas of agricultural production in the future. Trends in global agricultural production and consumption need further monitoring and assessment.

Risk/opportunity (relevant section(s) of chapter)	More action needed	Research priority	Sustain current action	Watching brief	Rationale for score
It4: Risks to the UK from climate-related international human displacements (7.3)	UK				A more proactive strategy to work in partnership with other countries is needed to provide rapid legal and basic assistance to migrants and to build long-term resilience in exposed regions. Otherwise overseas development efforts will increasingly be diverted to provide humanitarian (i.e. emergency) aid.
It5: Risks to the UK from international violent conflict (7.4)		UK			Further evidence is needed to understand the appropriate balance between long-term development aid (resilience building, disaster risk reduction, state stability) and responsive interventions (peace-keeping, humanitarian aid).
It6: Risks to international law and governance (7.4)		UK			There is a lack of systematic monitoring and strategic planning to address the potential for breakdown in foreign national and international governance and inter-state rivalry, caused by shortages in resources that are sensitive to climate change.

Risks from flooding and coastal change

HIGH MAGNITUDE

HIGH CONFIDENCE

MORE ACTION NEEDED



Dawlish, winter 2013

New sheltered housing development, built 2012



Folkestone,
December 2015



Cockermouth, December 2015

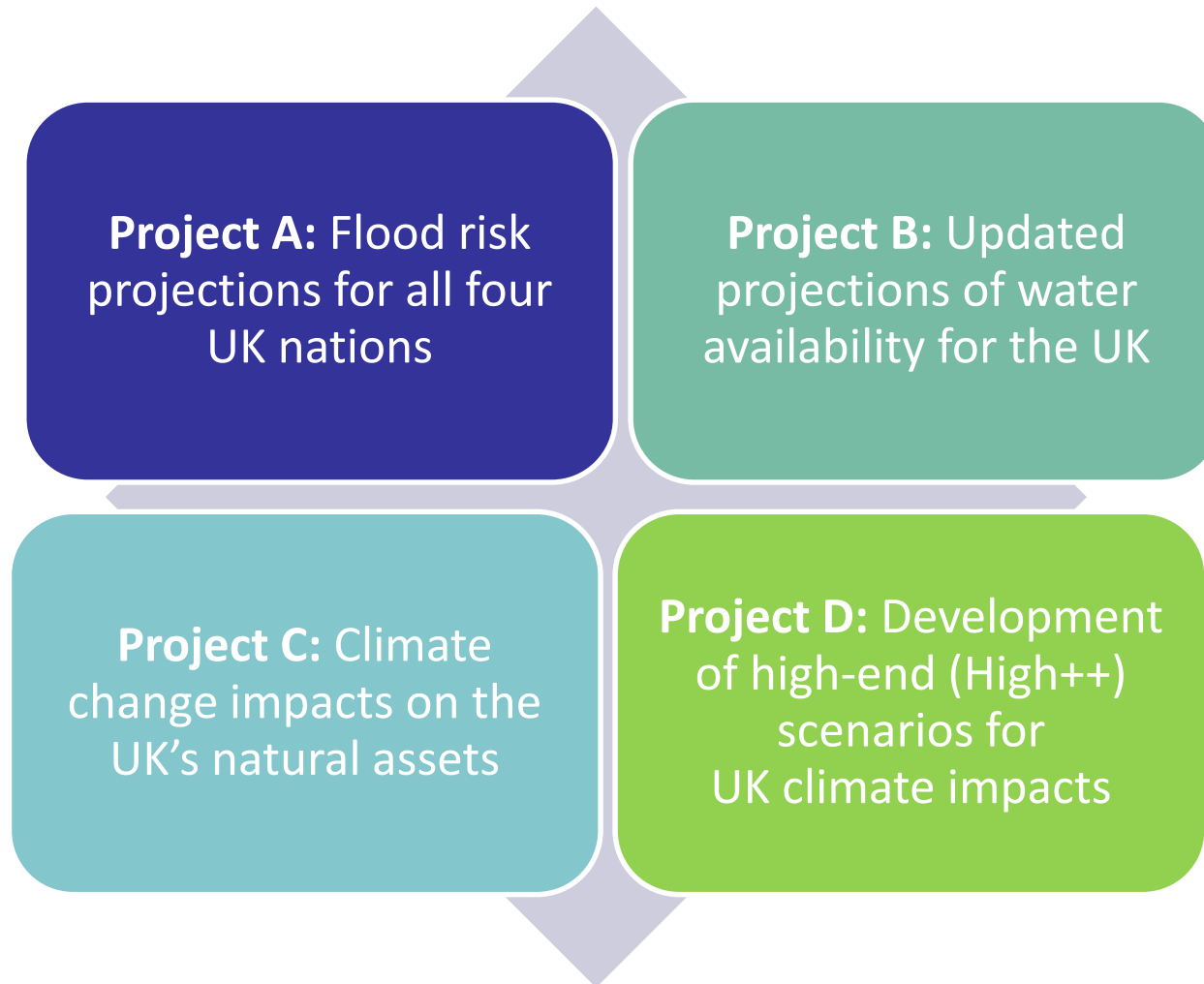
Based on an assessment of climate risks and opportunities, and current adaptation actions, what are the most urgent priorities for the next national adaptation programme and programmes for devolved administrations?

- ③ 3 years
- ③ c80 authors
- ③ >2,000 pages
- ③ 6,000 review comments
- ③ 6 priority areas

The most comprehensive assessment of risks and opportunities to date

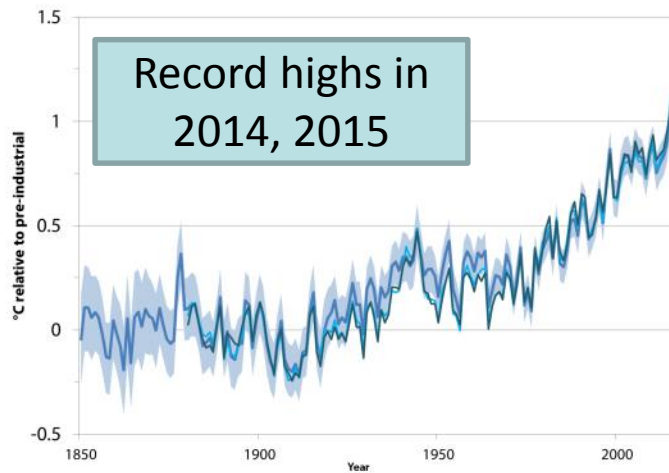
	Direct effects	Indirect effects	Major effects & discontinuities
International: Other international areas of concern	Loss of small island states	Impact on global economy	Large scale global tipping points
UK (imported): Impacts in the UK from international effects	Disruption to trade routes and supply chains	Volatility of food and feedstock prices in the UK	Major shifts in global patterns of food production
UK (domestic): Impacts arising directly in the UK	Flood risks, water scarcity, etc Focus of CCRA1	Cross- sectoral, wider economic	High++ scenarios, major sea level rise Focus of CCRA2

Four NERC-funded research projects

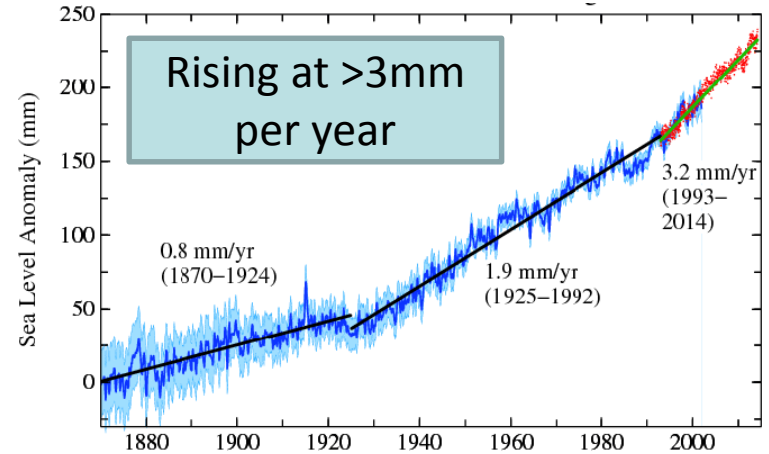


Indicators of climate change

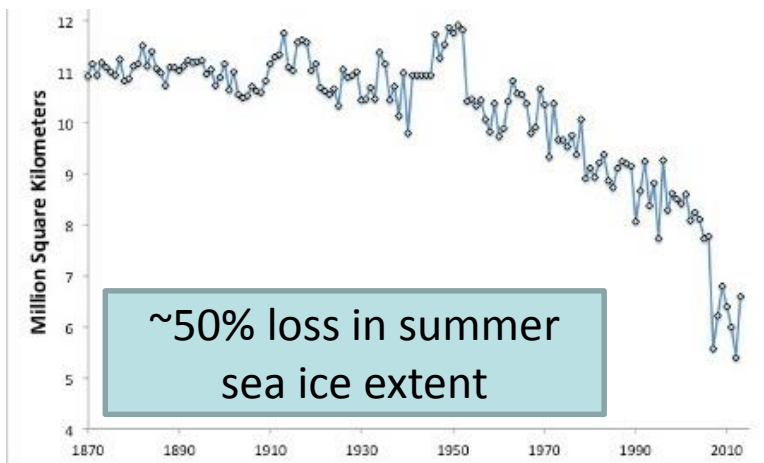
Global average temperature



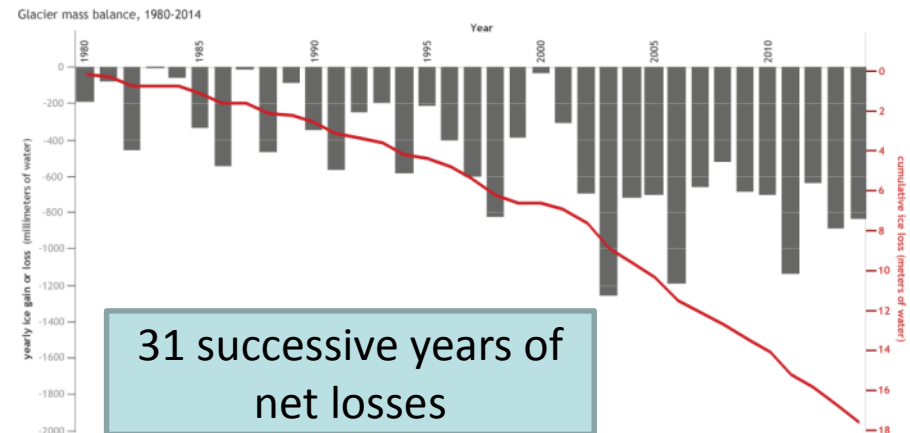
Global average sea level



Summer arctic sea ice extent

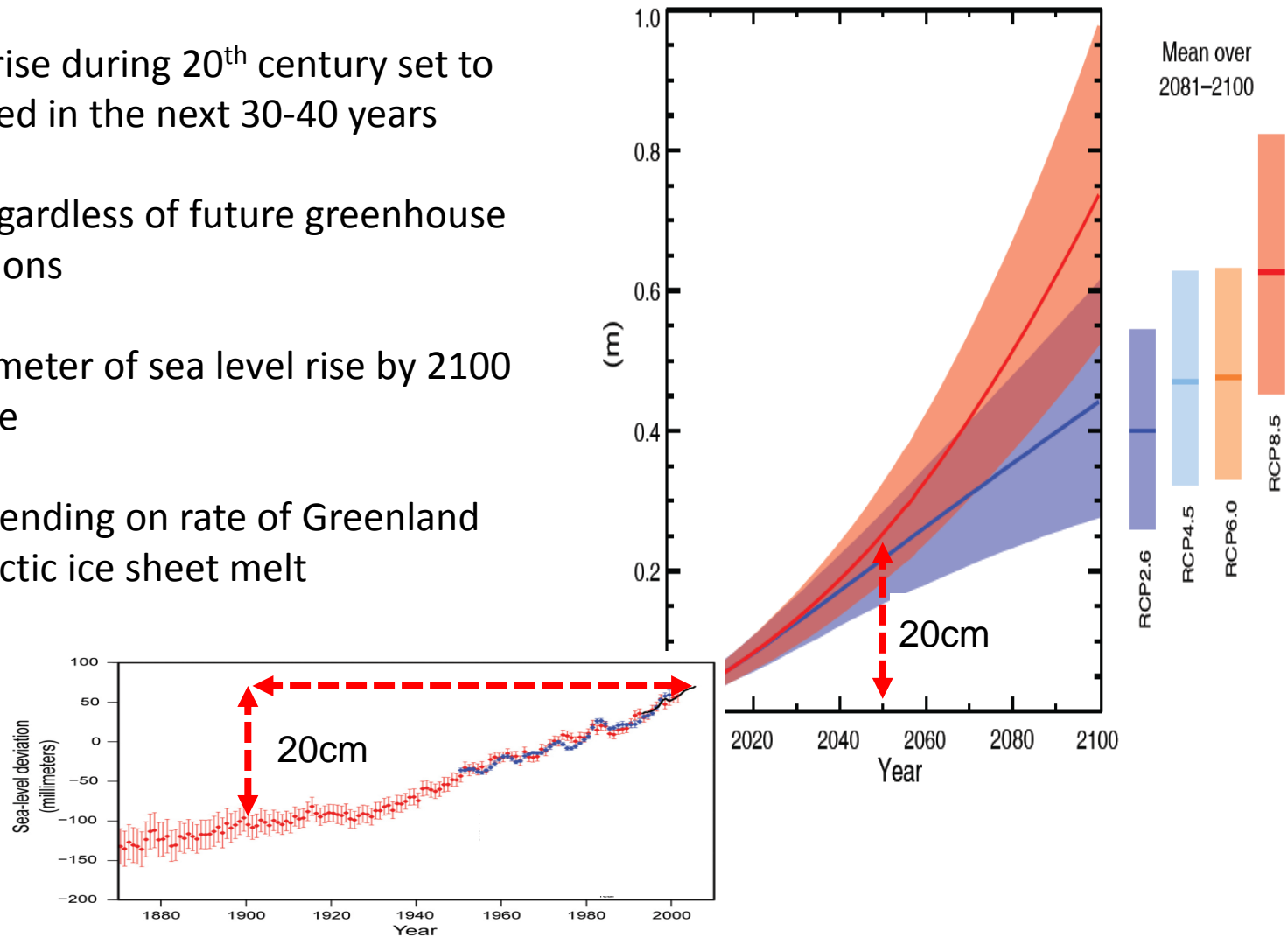


Glacier mass

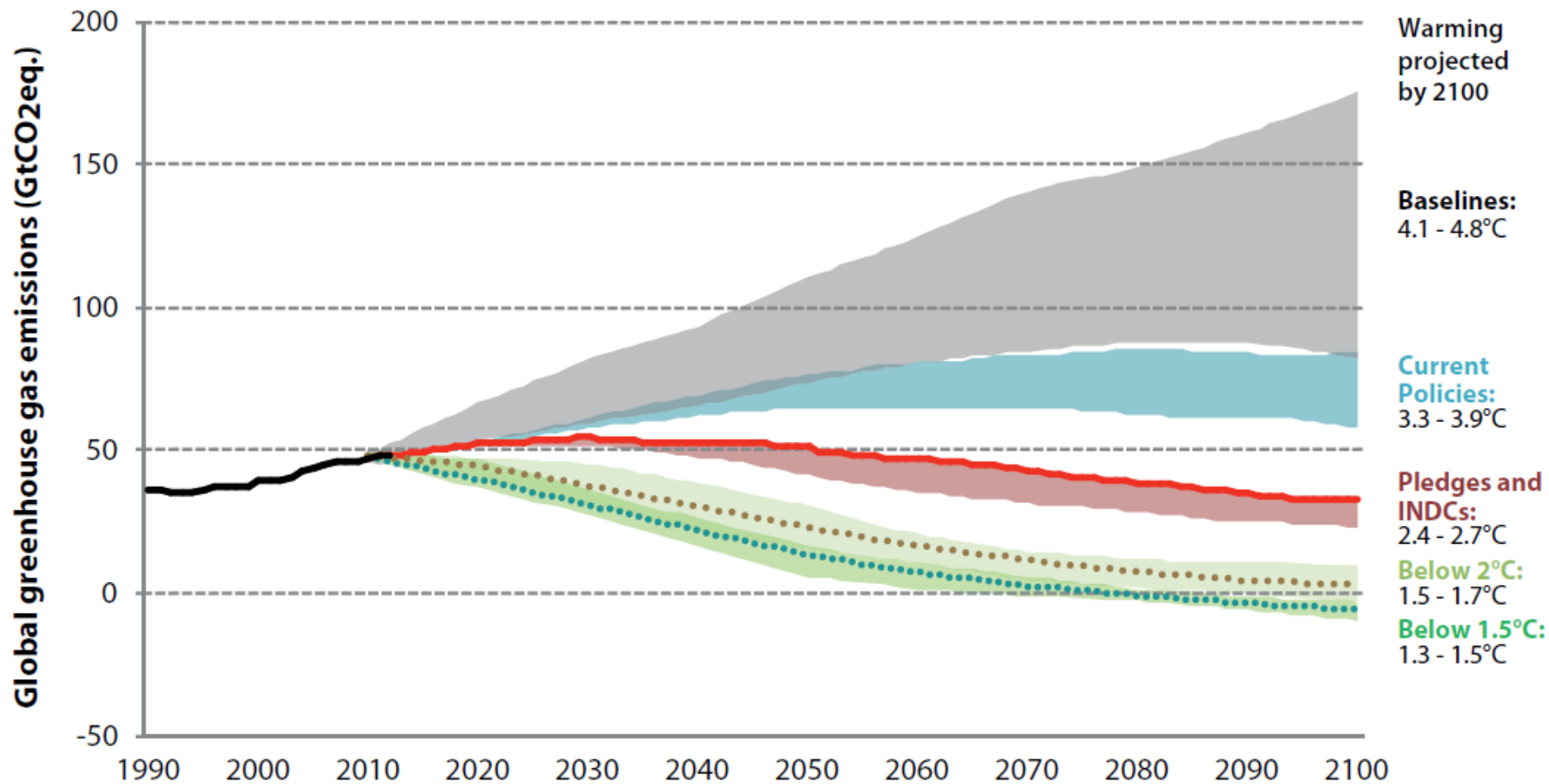


Lag in the Earth's climate system means further changes are inevitable

- Sea level rise during 20th century set to be repeated in the next 30-40 years
- Largely regardless of future greenhouse gas emissions
- Overall a meter of sea level rise by 2100 is plausible
- More depending on rate of Greenland and Antarctic ice sheet melt



Paris Agreement reduces the chance of 3-5°C warming but some risk remains



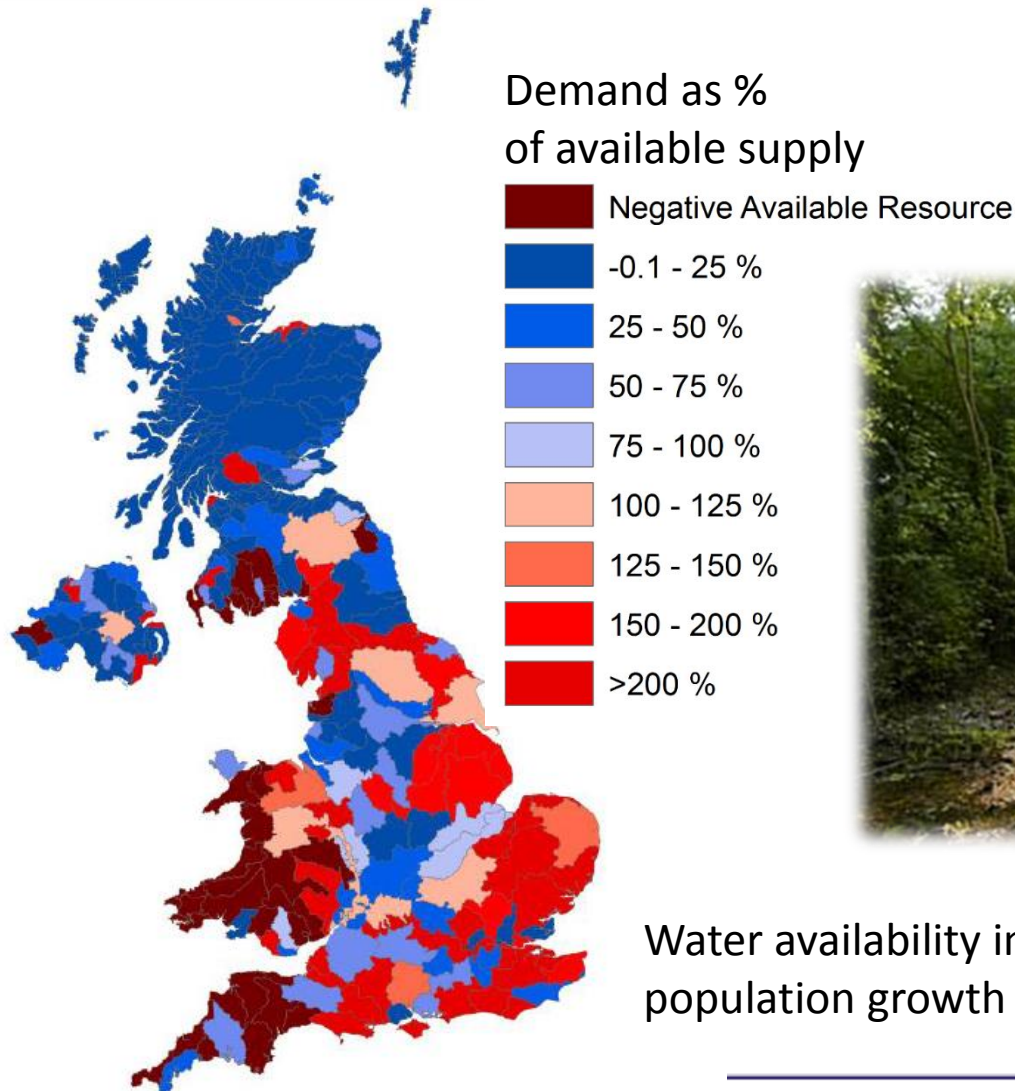
- ④ About 60 risks/opportunities identified
- ④ Distilled into six priority areas for urgent action

Risk of shortages in water supply

HIGH MAGNITUDE

HIGH CONFIDENCE

MORE ACTION NEEDED



River Kennet, 2011

Water availability in the 2080s under a 3.5°C, low population growth and high adaptation scenario

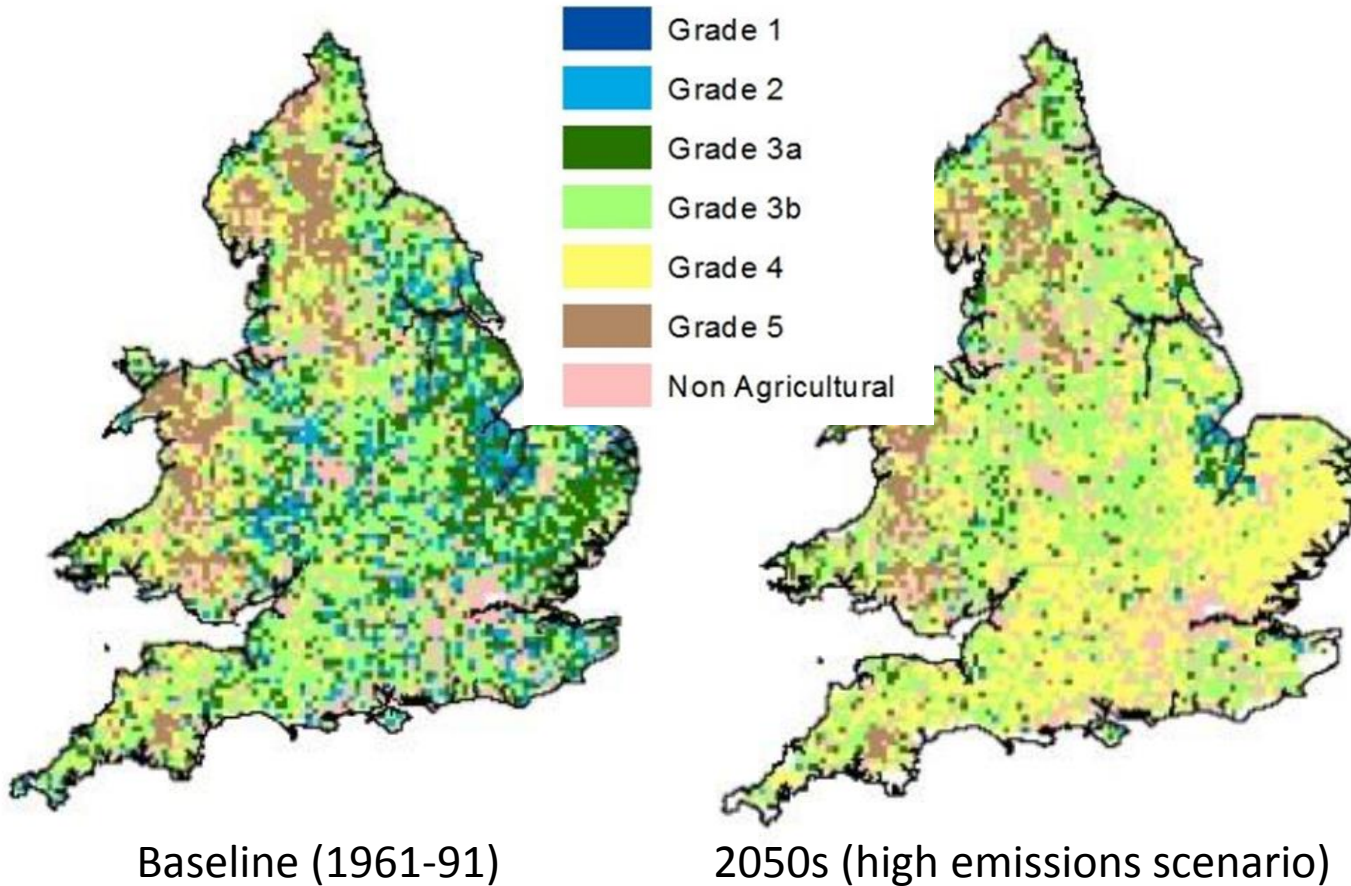
Risks to natural capital

HIGH MAGNITUDE

MEDIUM CONFIDENCE

MORE ACTION NEEDED

Agricultural land classification in England and Wales



Holme post,
nr. Peterborough

Risk from pests and diseases

HIGH MAGNITUDE

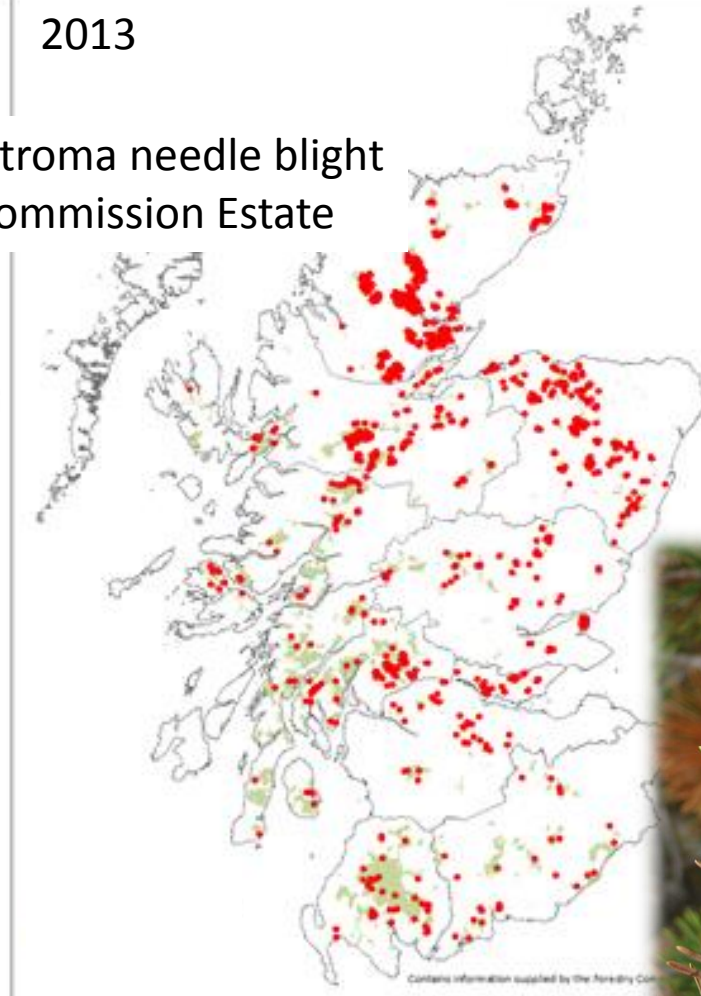
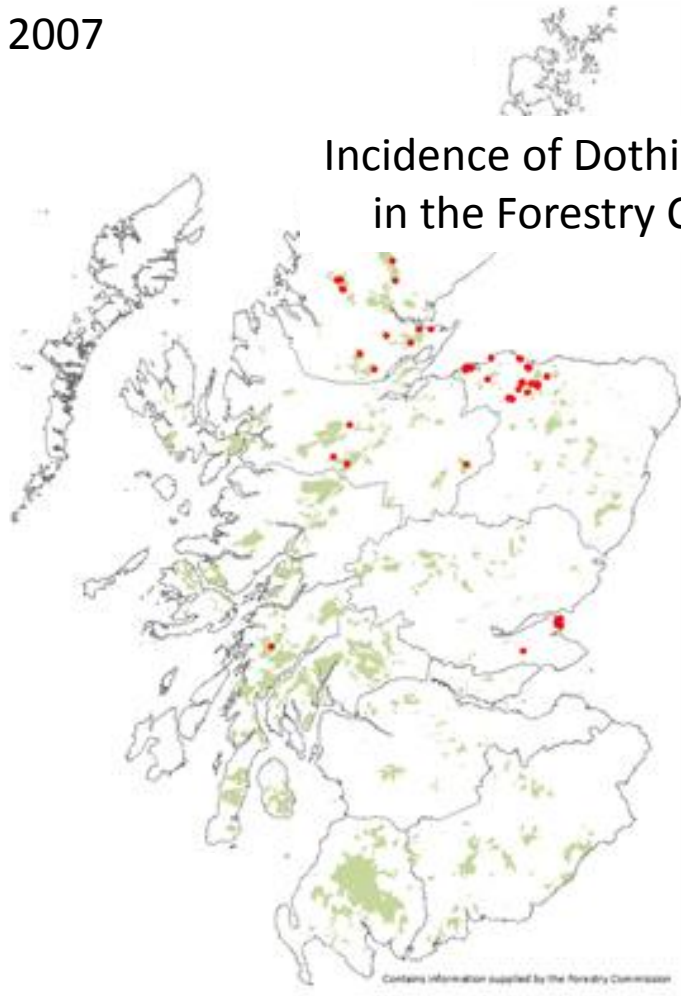
LOW CONFIDENCE

RESEARCH PRIORITY

2007

2013

Incidence of Dothistroma needle blight in the Forestry Commission Estate



Risks in different parts of the UK

Rock Ptarmigan



WETTER DRIER



Cold water plankton

COLDER
WARMER



Coastal squeeze

COLDER
WARMER



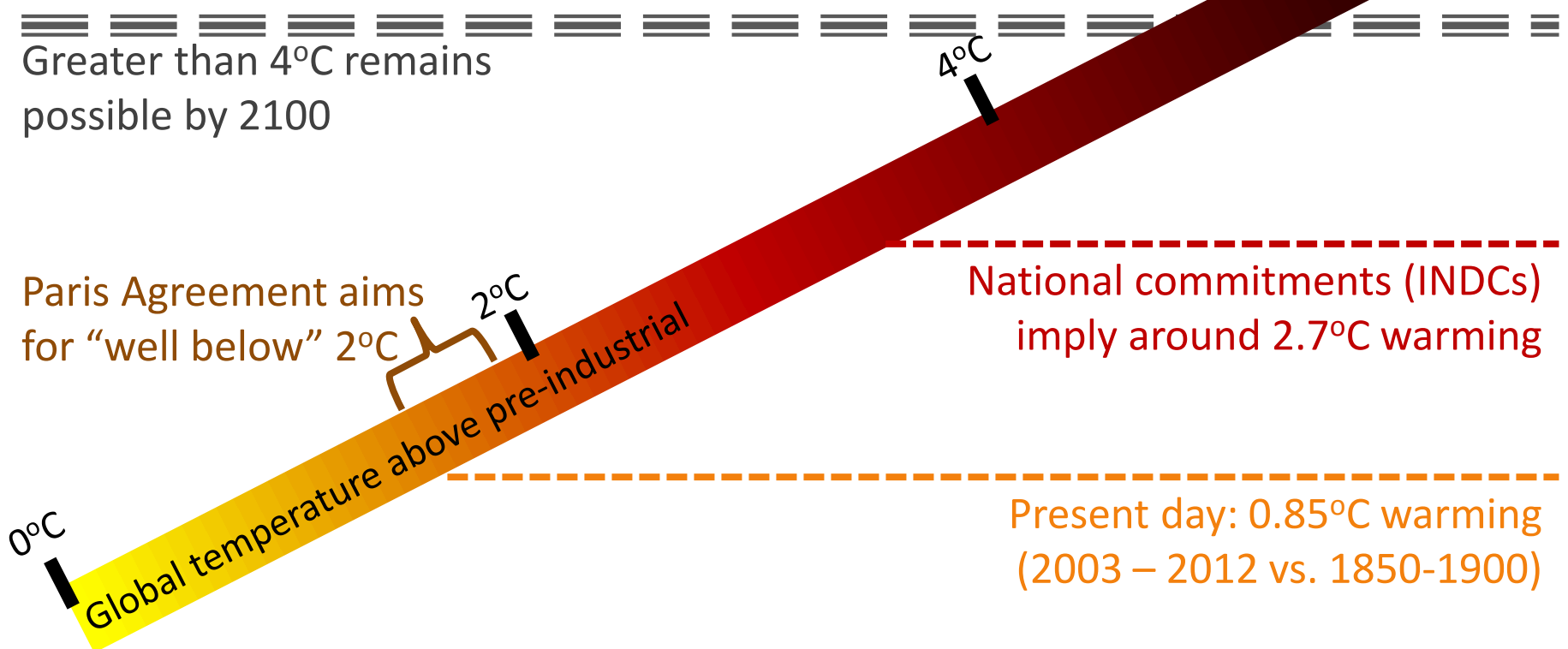
Hemsby, Norfolk

CLIMATIC ZONES FOR
TEMPERATURE AND RAINFALL
(CURRENT CLIMATE)

WETTER DRIER

Uncertainties in the magnitude of future warming and therefore risks

Very large uncertainties, only a small number of studies, greater potential to exceed tipping points in climate, human and natural systems



Next steps

- ◉ **CCRA2 research conference:**
 - joint with Government and the research councils (November)
- ◉ **CCRA presented to Parliament:**
 - by the Government (January 2017)
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