

Climate change and food safety

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Outline of the lecture

- Climate change an issue for food safety?
 - Results of an international Delphi Survey performed in GO-GLOBAL (EU FP6 project)
- Potential effect of climate change on food safety
- Conclusions

Is climate change an issue for food safety?

Collation of expert opinion of global stakeholders regarding drivers of food safety risks was performed in the EU FP 6 project GO-GLOBAL



www.goglobalnetwork.eu

Method used: Delphi technique

Wentholt, M.T.A., Fischer, A.R.H., Rowe, G., Marvin, H.J.P., & Frewer, L.J. (2010). Effective identification and management of emerging food risks: results of an international Delphi survey. *Food Control*, 21; 1731-1738.

Delphi method: definition

A procedure to:

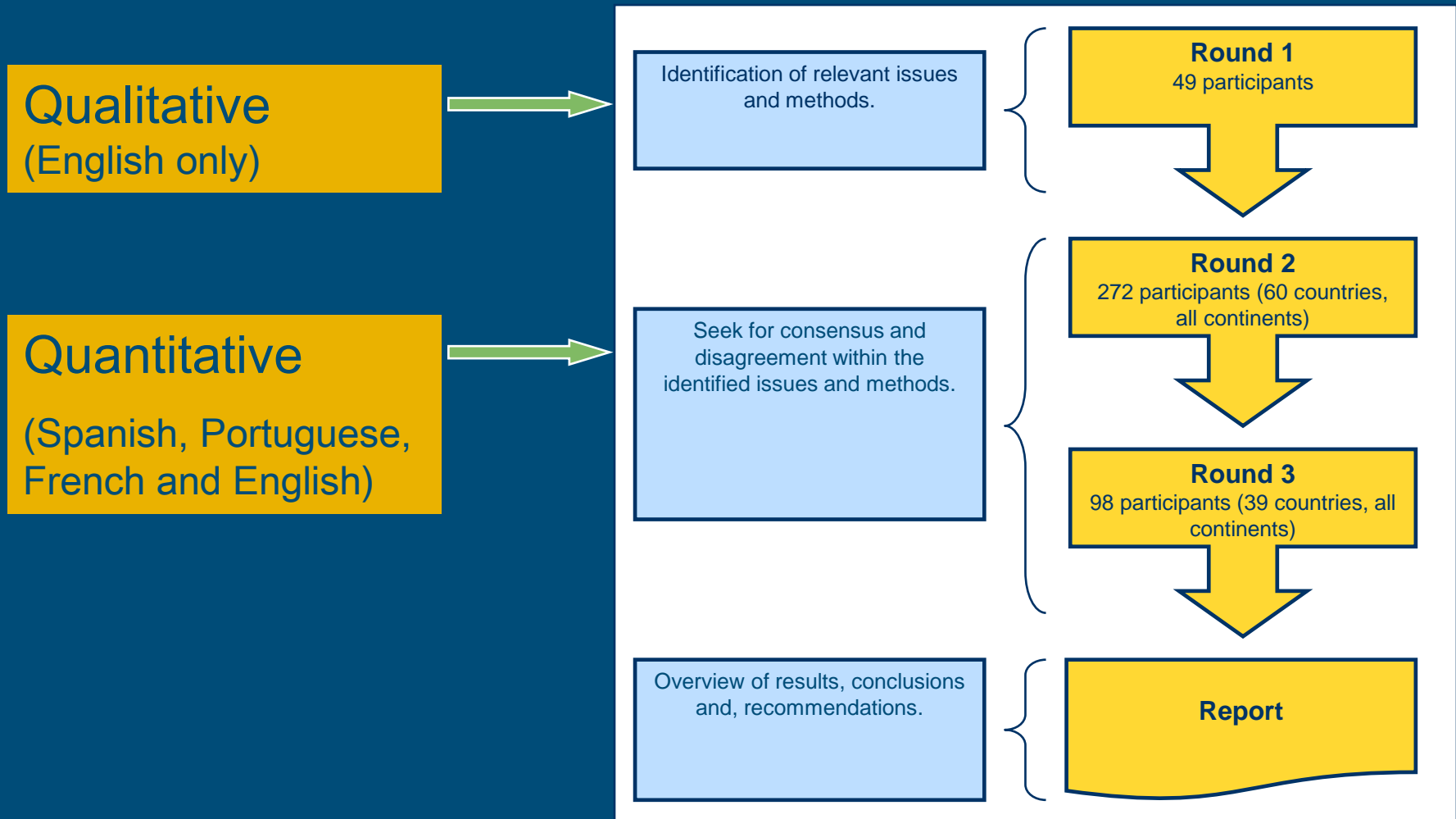
“obtain the most reliable consensus of opinion of a group of experts ... by a series of intensive questionnaires interspersed with controlled opinion feedback”

Dalkey & Helmer, 1963, p458

Some characteristics of Delphi method:

- Internet based with several rounds
- Number of rounds may vary
- Anonymous
- Shows issues of consensus

Overview of the GO-GLOBAL Delphi study



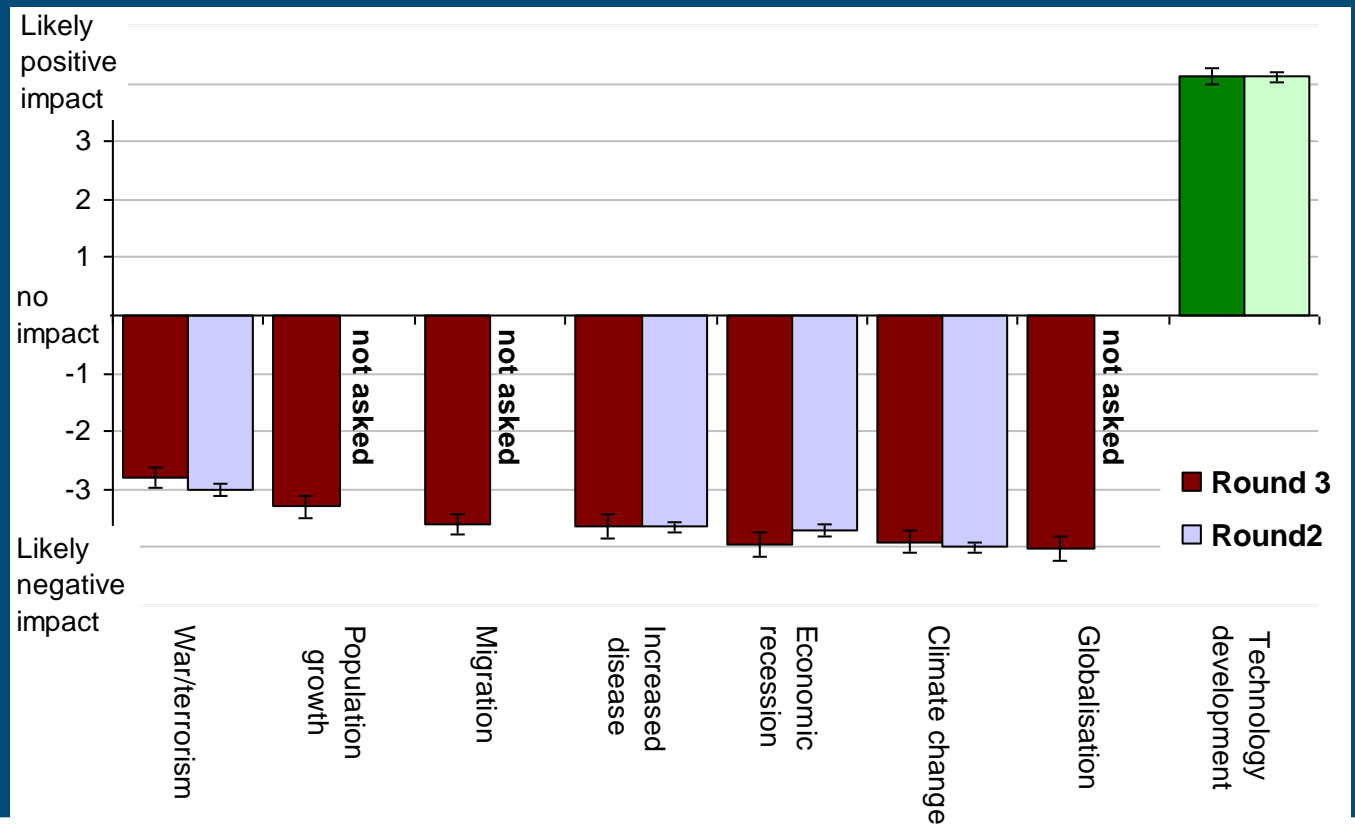
Results of the GO-GLOBAL Delphi (round 1)

First round Delphi (summer 2007)

- 49 returned questionnaires with usable data
- Global response
- Language: English
- Emerging risk definition needed
- Issues of importance for global society
 - Climate change
 - Increased disease prevalence
 - Development of technology
 - War and terrorism
 - *Economic depression*

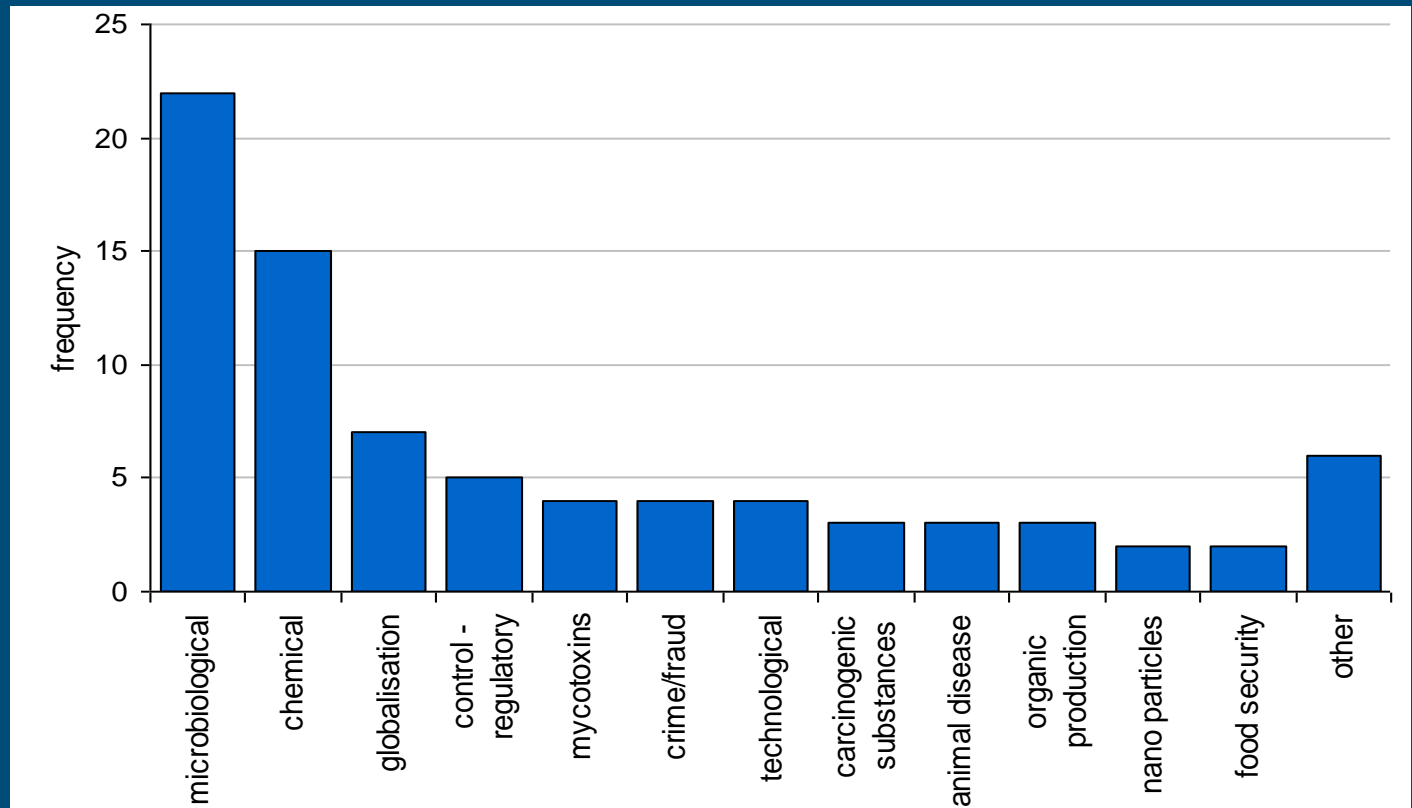
Results of the GO-GLOBAL Delphi (round 3)

Most important drivers of emerging food risks in your country (next 20 years)



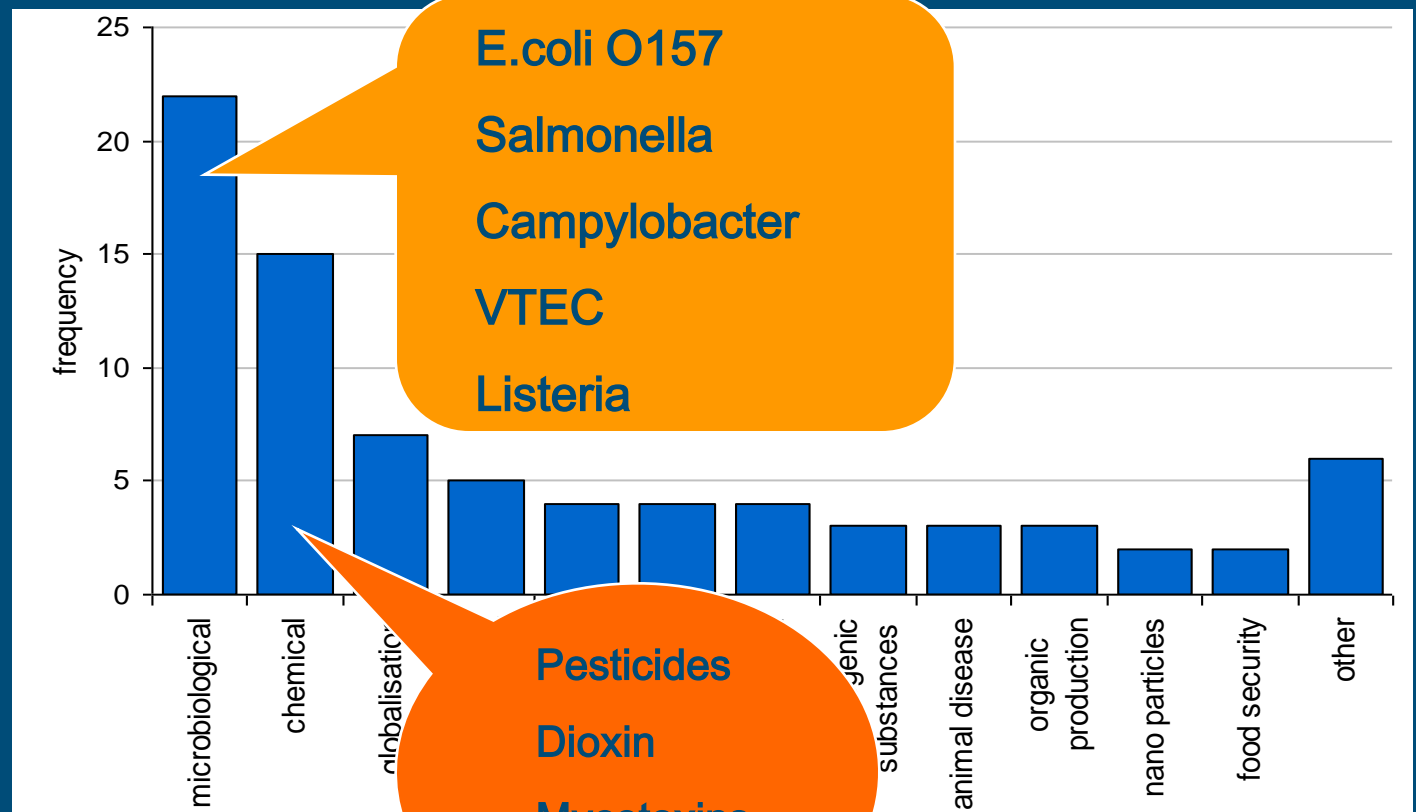
Results of the GO-GLOBAL Delphi (round 3)

What are the most important emerging food risks *in your country*?




Results of the GO-GLOBAL Delphi (round 3)

What are the most important emerging food risks *in your country*?



Major drivers of food safety risks

- Globalisation & changing food trade patterns
- Climate change 
- Technology development (for example nanotechnology)
- Economy

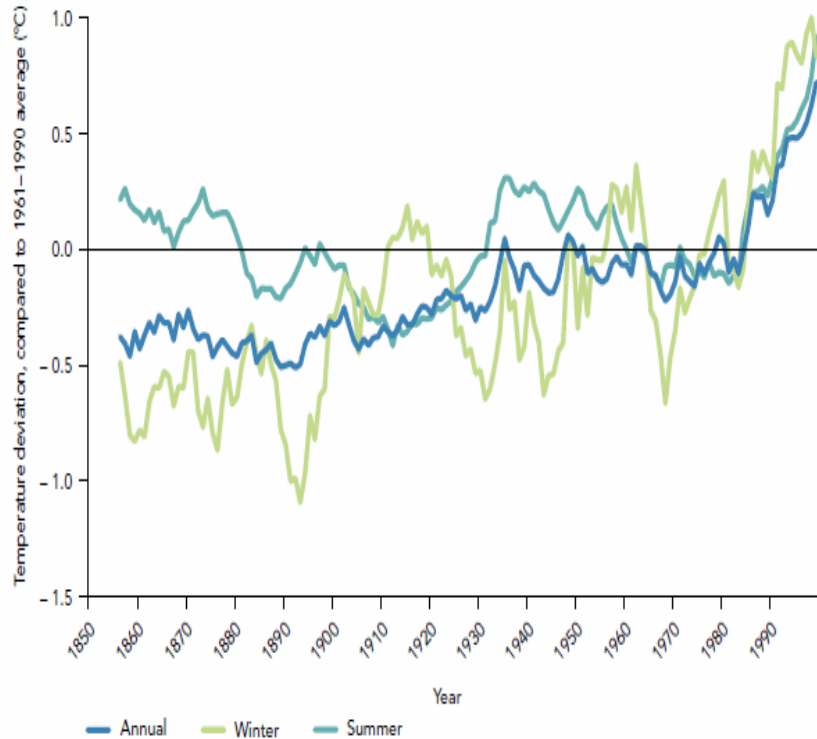
Climate change: driver of food safety risks

Projected effects of Climate change

- Food production (due to elevated temperatures and increased CO₂ levels)
 - Differences per region
 - Temperate regions; an **increase** (e.g. Europe, Canada, China [5-12%])
 - (sub) tropical region; a **decrease** (e.g. India, Mexico, South-Africa, Ethiopia [21-29%])
- Fluctuations in food production and food prices
- Diseases and plagues (shifting and new)
- Food safety
- Changing ecosystems
- Employment
- Migration

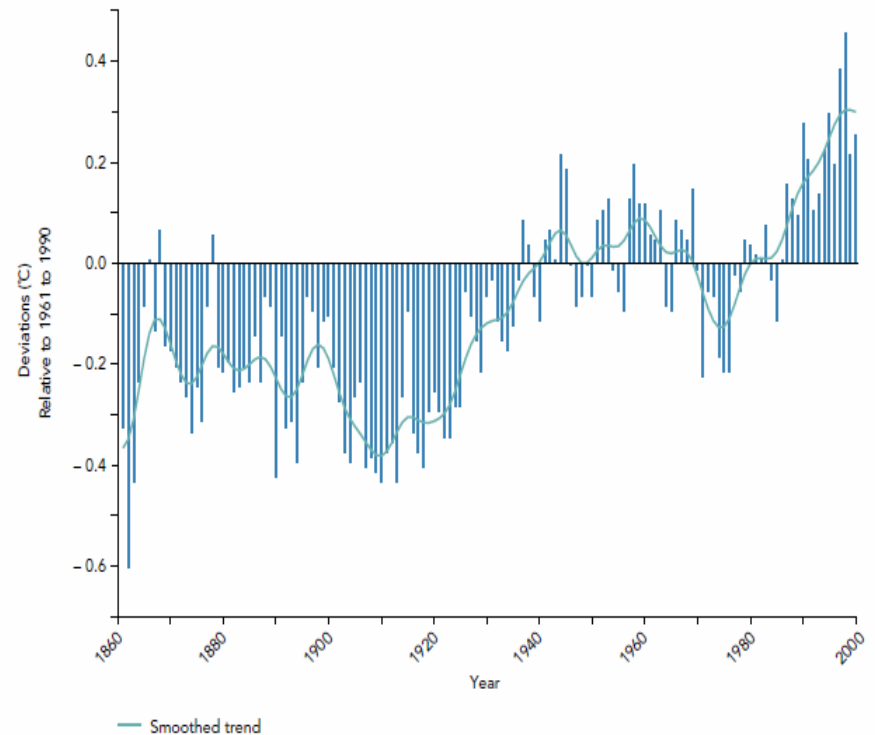
Changing temperature of land and sea in Europe

Figure 3.3 Observed annual, winter and summer temperature deviations in Europe



Source: CRU, 2003; Jones and Moberg, 2003.

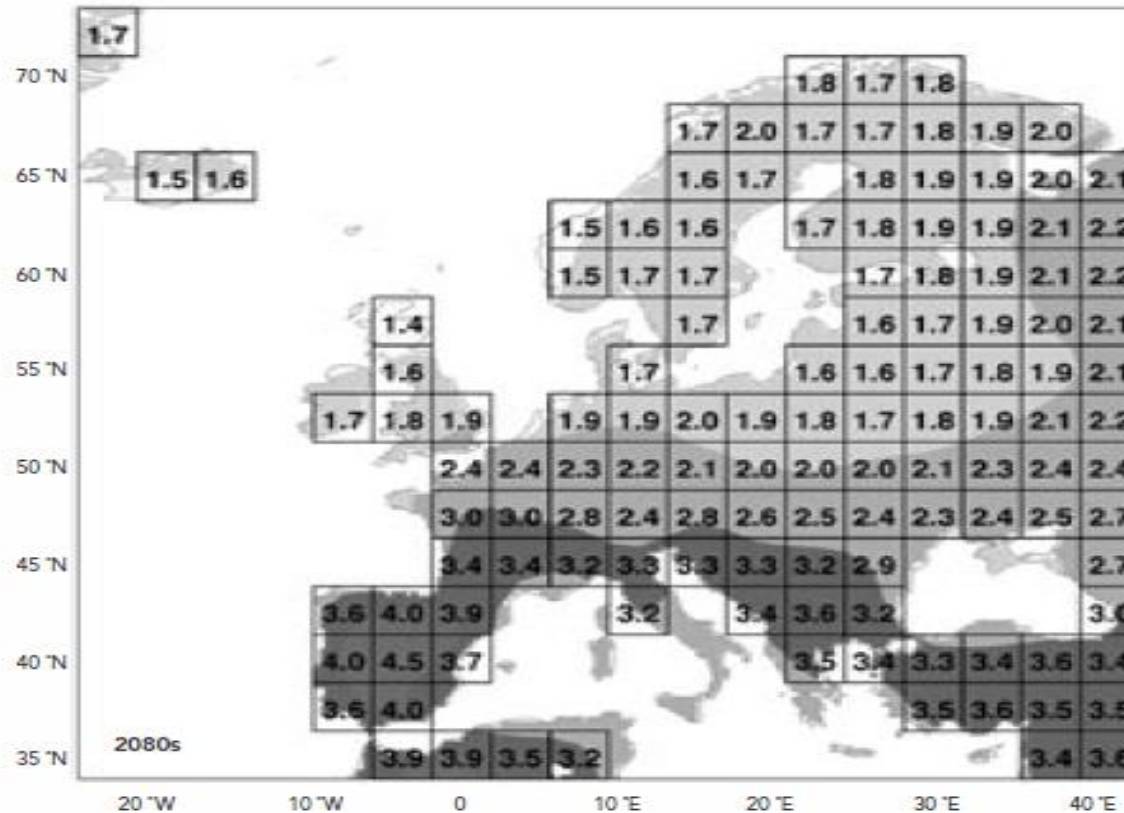
Figure 3.11 Annual sea surface temperature (SST) deviations averaged over the northern hemisphere



Source: IPCC, 2001a.

Projected temperature increase (land) in Europe

Map 3.2 Projected temperature changes in Europe up to 2080



Note: Temperature change (°C). Relative to average temperature in the period 1961–1990. Intermediate ACACIA scenario in a broad range of possible future emissions.
Source: IPCC, 2001b; Parry *et al.*, 2000.

Climate change: driver of food safety risks

Most relevant climate factors related to food safety risks

1. Precipitation
2. Temperature (land and water)
3. Drought
4. Weather extremes
5. CO₂ levels
6. Floods

Examples of expected food safety problems

Climate change driven:

- Increase growth of weeds, plant diseases and effect of pesticides => risk of more residues
- Increased prevalence of natural toxins (mycotoxins, phycotoxins, phytotoxins)
- Increased contamination of surface water (e.g. heavy metals, PAHs, PCBs, etc.) => uptake by crops
- Increased bioavailability of contaminants (e.g. Hg with increasing temperature)
- Increase of animal diseases => increase use of veterinary drugs
- Increase of microbial infections as a consequent of increasing temperature (e.g. *E. coli* O157, *Campylobacter*, *Salmonella*)
- Growth of microorganisms in the fresh chain

Conclusions

- There is general consensus that climate change will have an effect on food safety
- Microbial and chemical contaminations are seen as the most important emerging risks in the future
- Information exchange and data sharing are key elements in a successful strategy to combat food safety risks

Thank you for your attention

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