

Climate change: impact & opportunities for potatoes

International year of the Potato

Improving International Potato Production

Dundee



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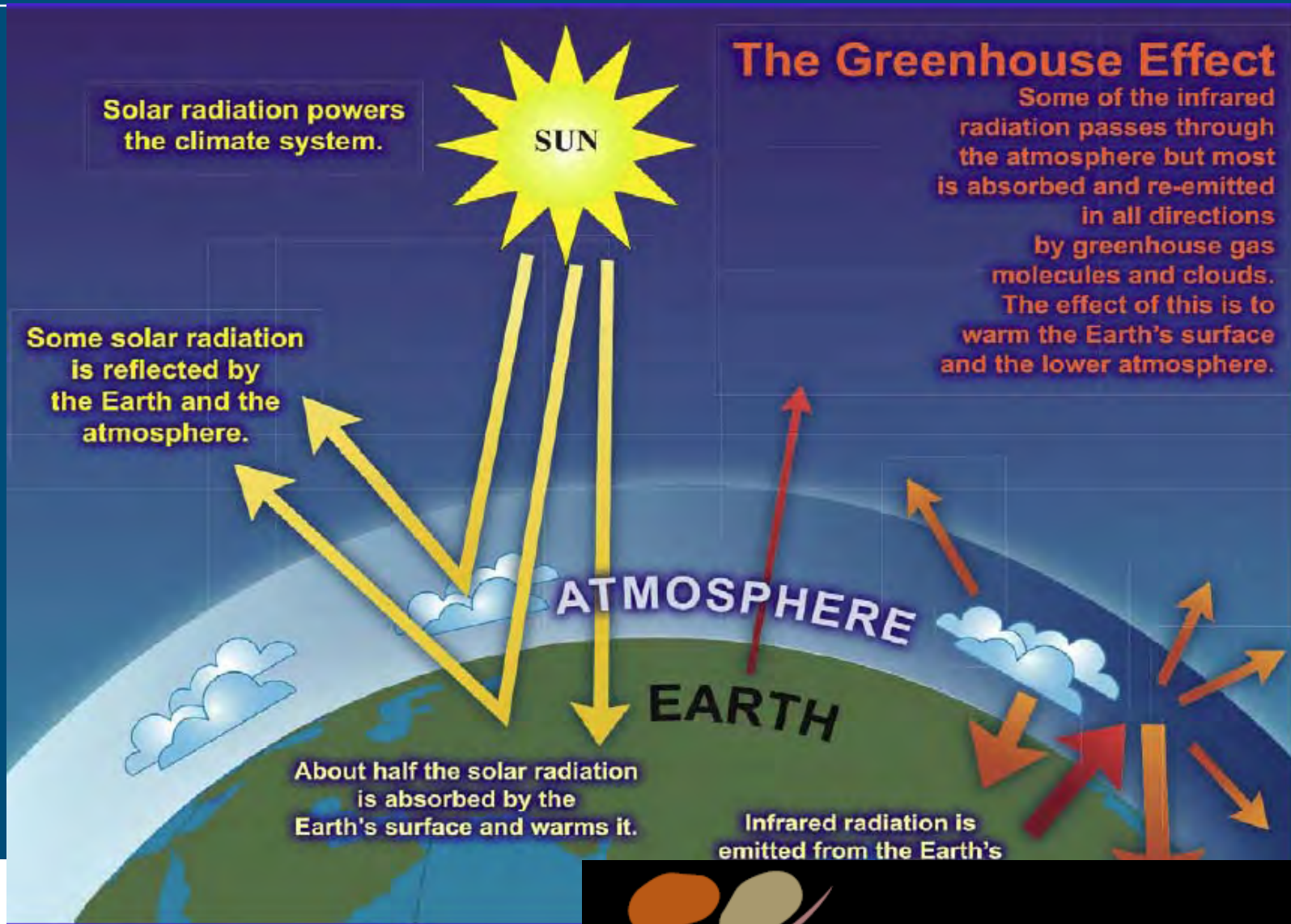
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Presentation

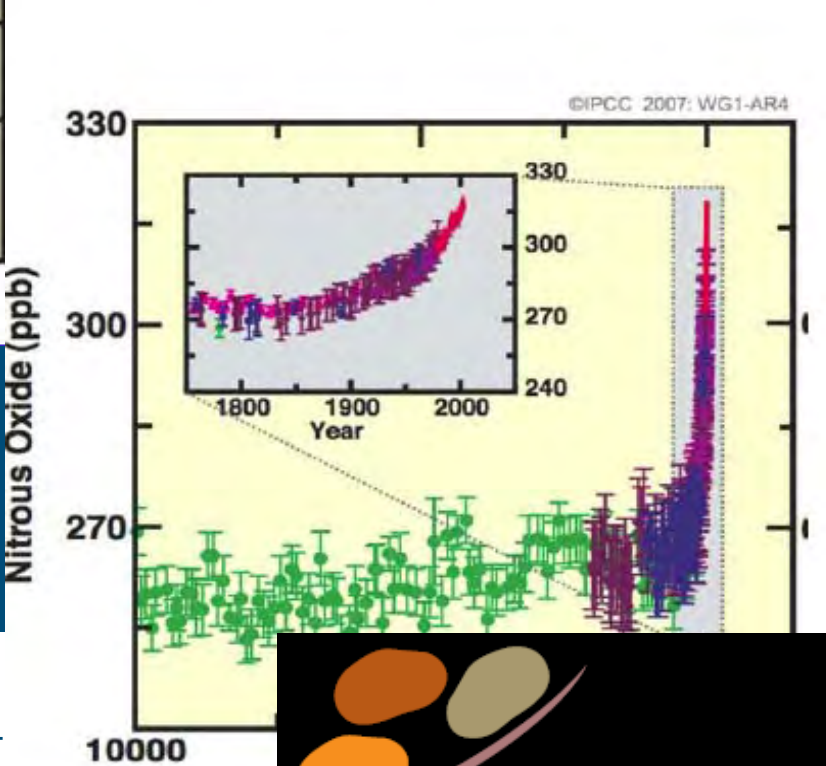
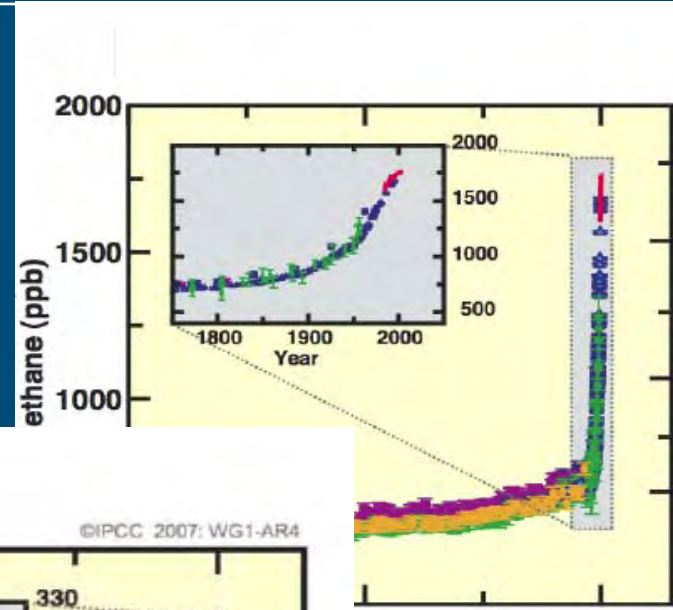
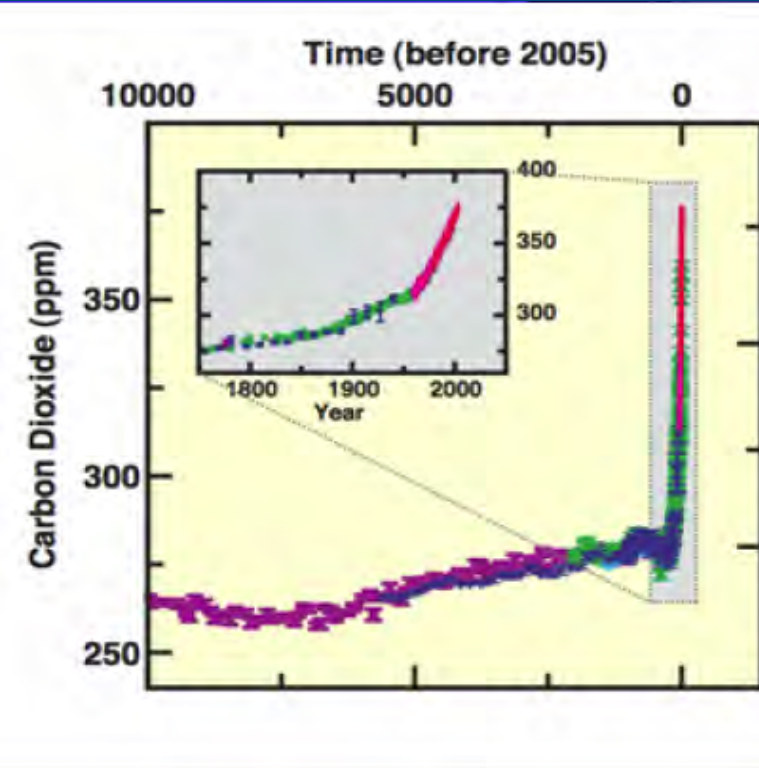
- Drivers climate change
- Changes in weather
- Opportunities for potato
- Threats for potato
- Acting pro-actively



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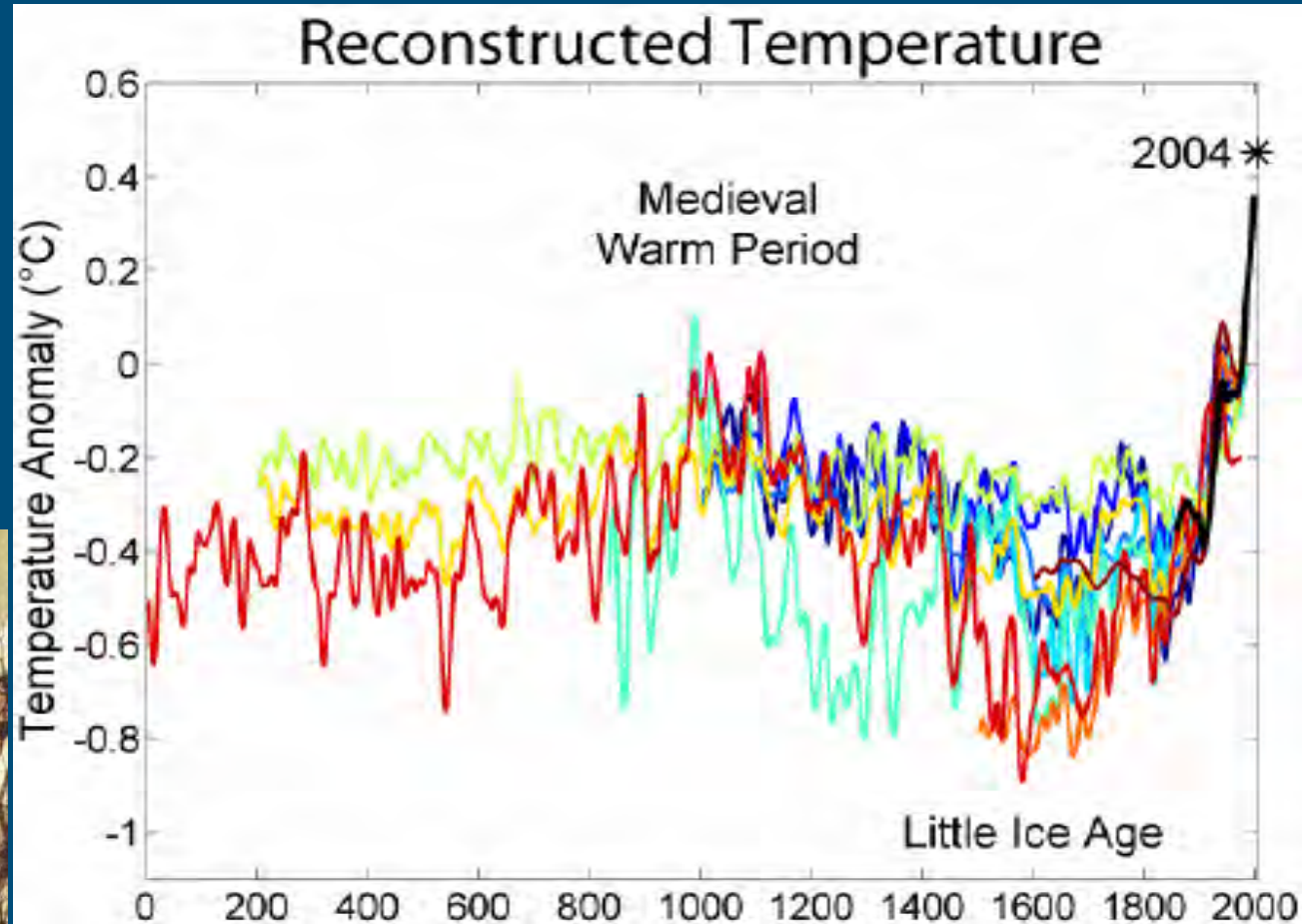


Antarctic ice cores



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.....warmer worldwide.....

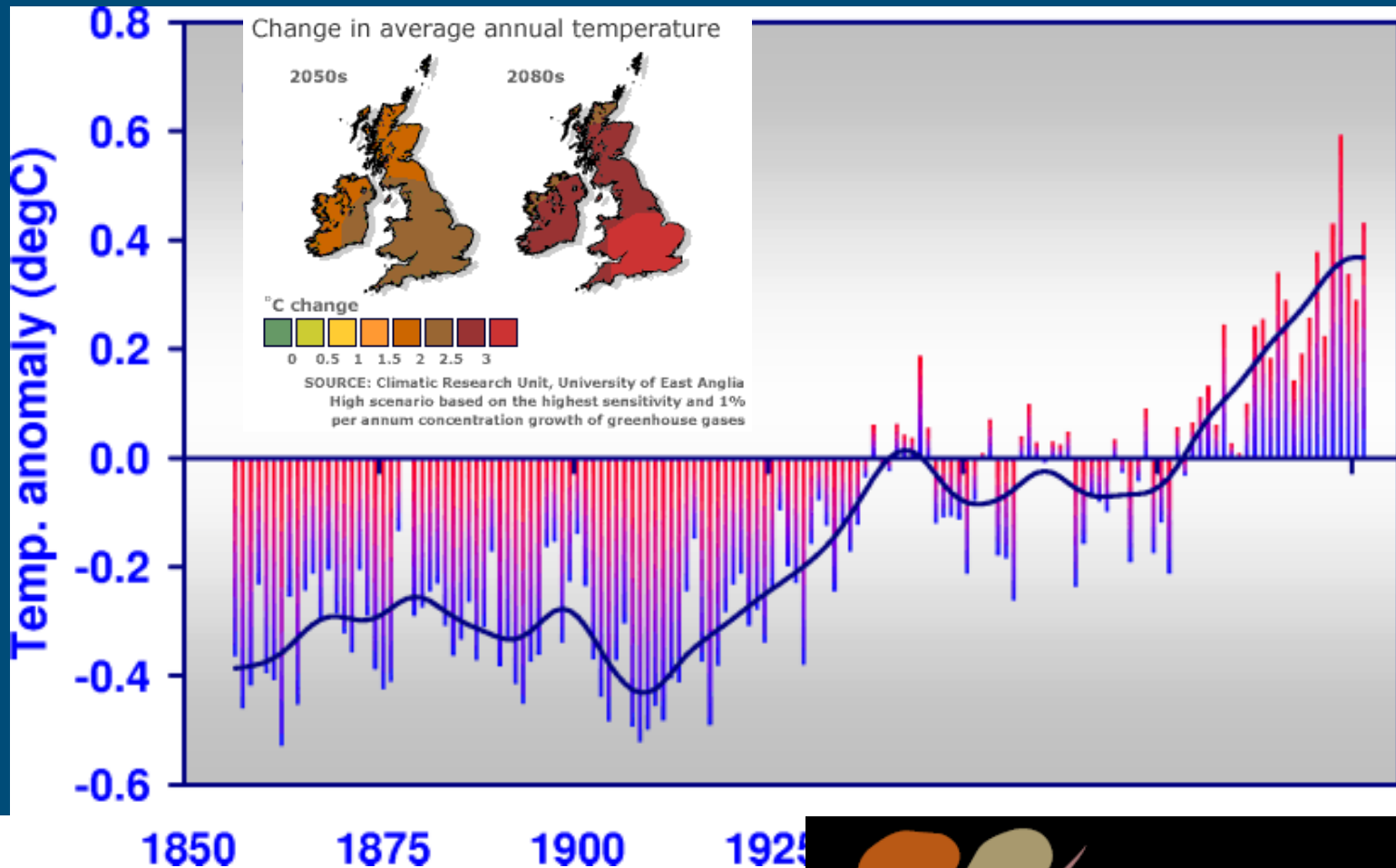


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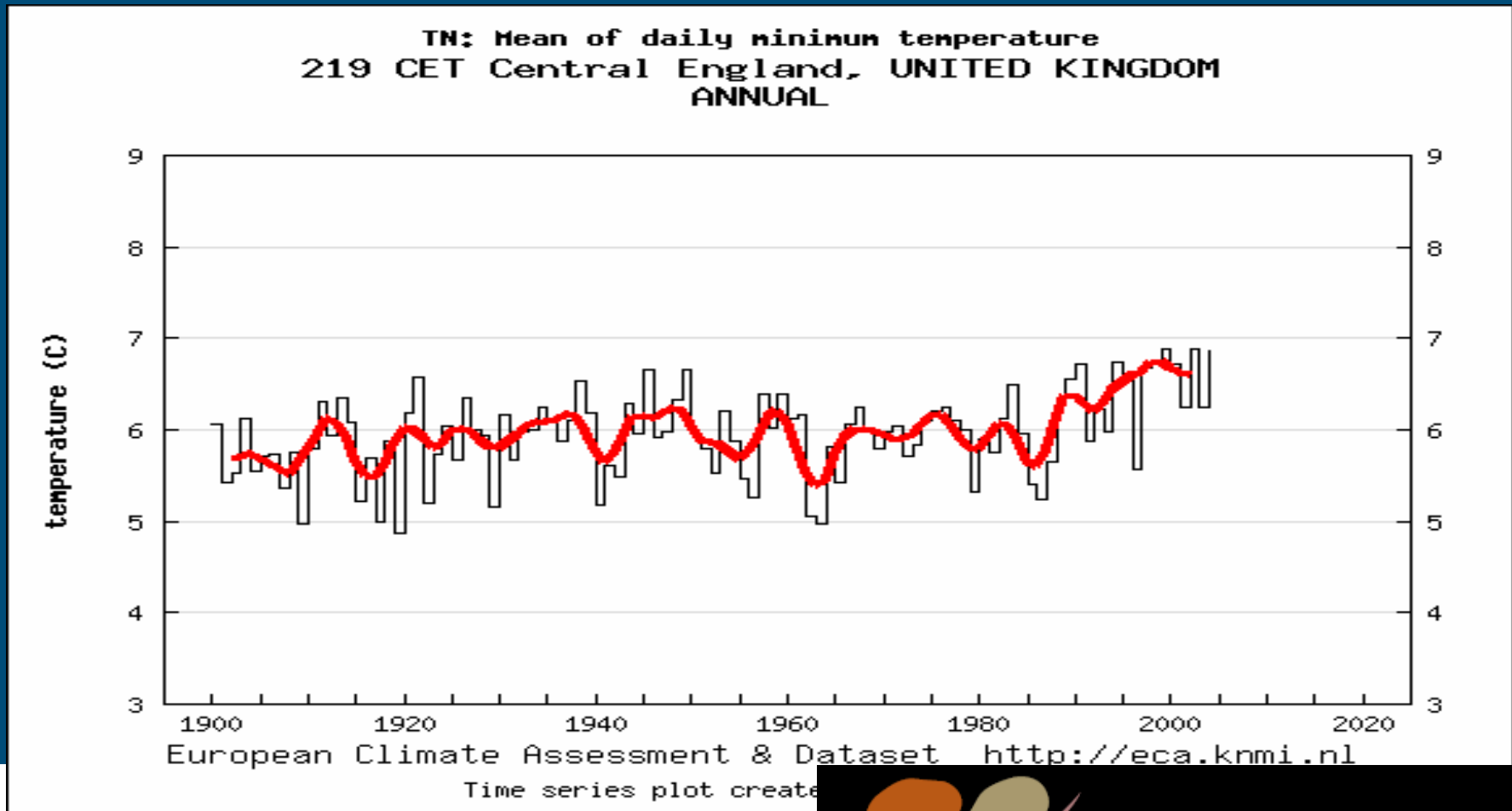
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.... higher average temperatures in the UK....



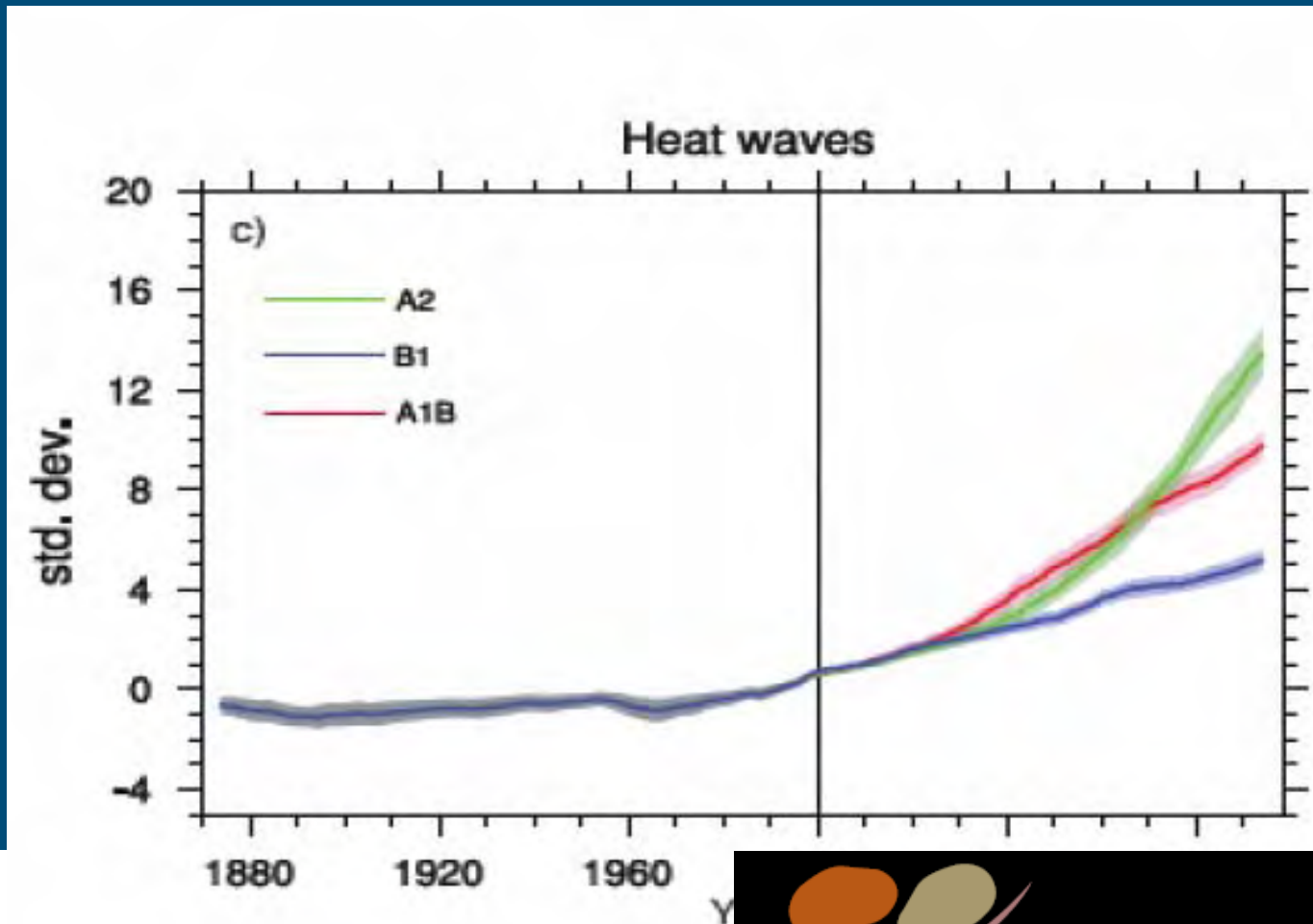
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.....higher minimum temperatures....



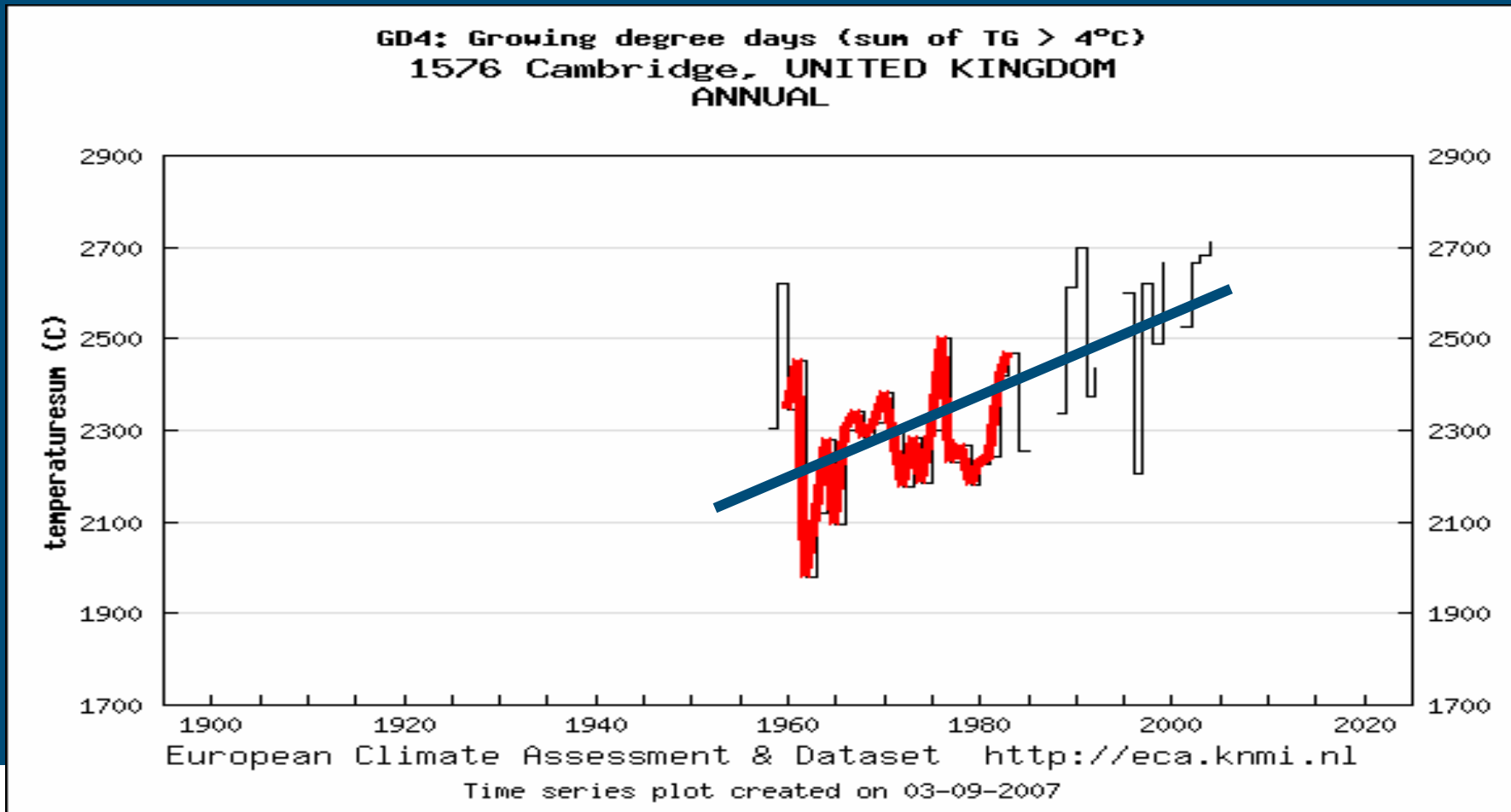
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.....more heat waves.....



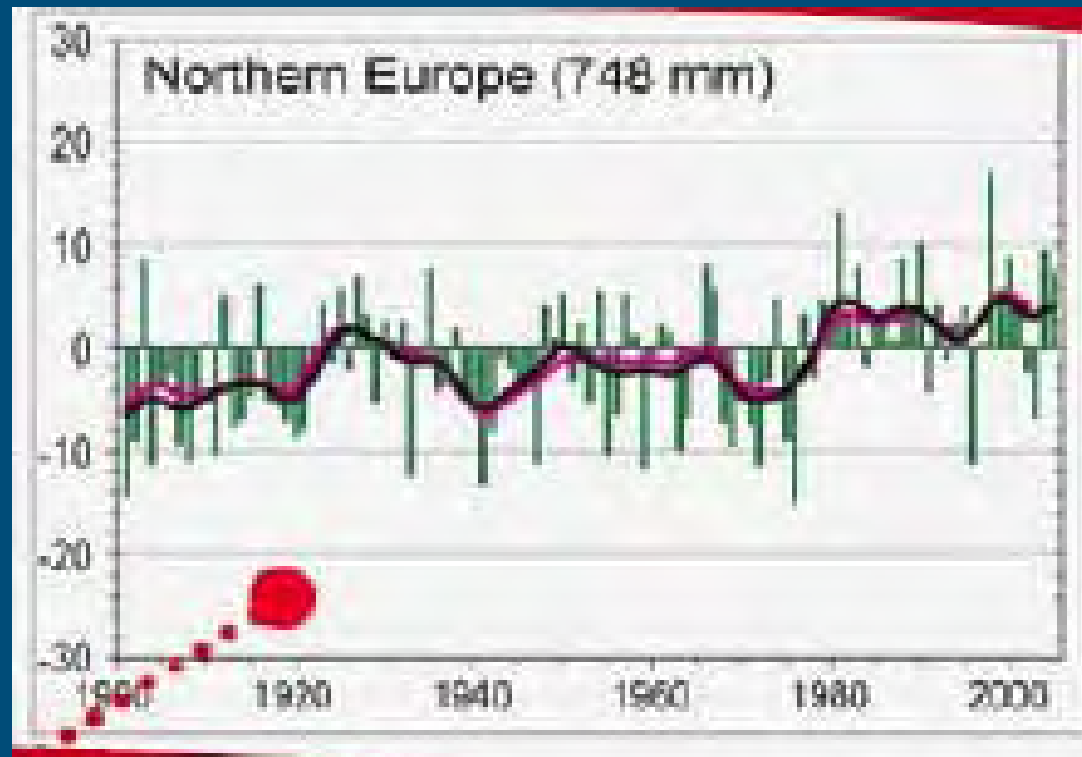
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.....longer growing seasons.....



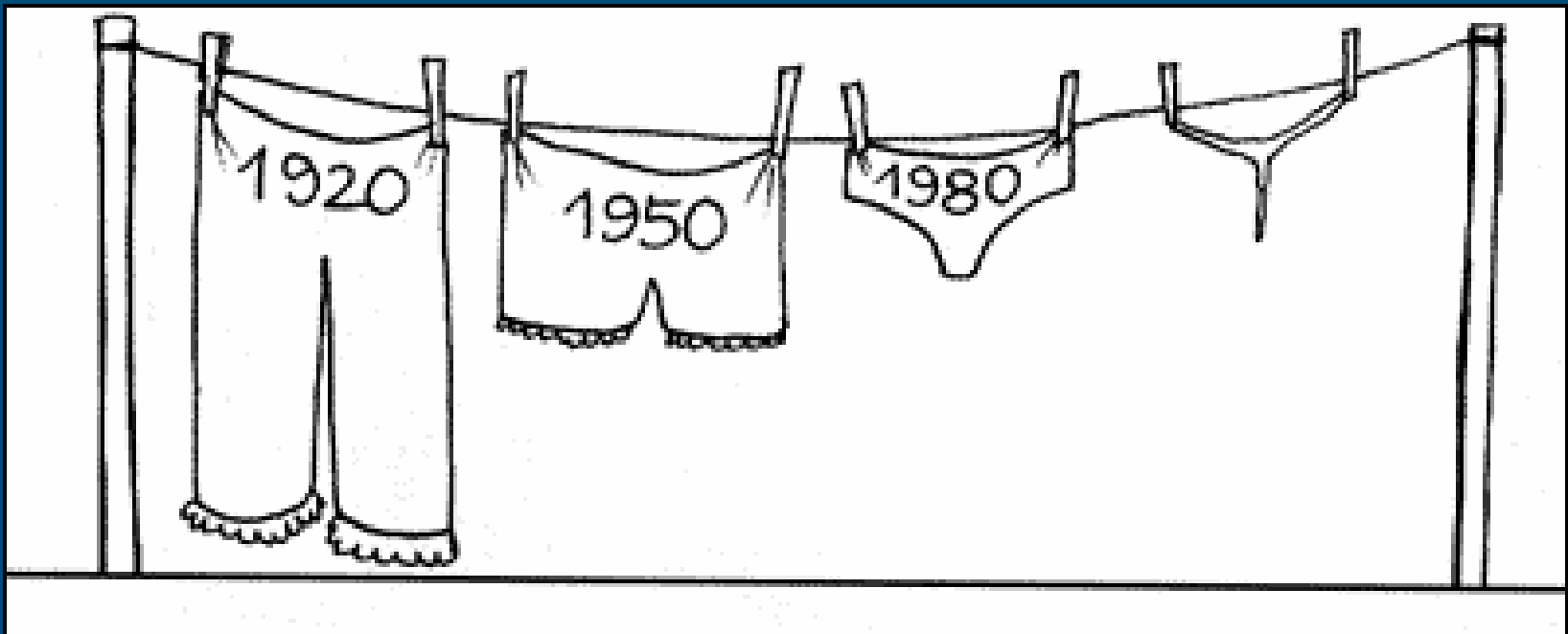
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.....more rain.....



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.....circumstantial evidence....



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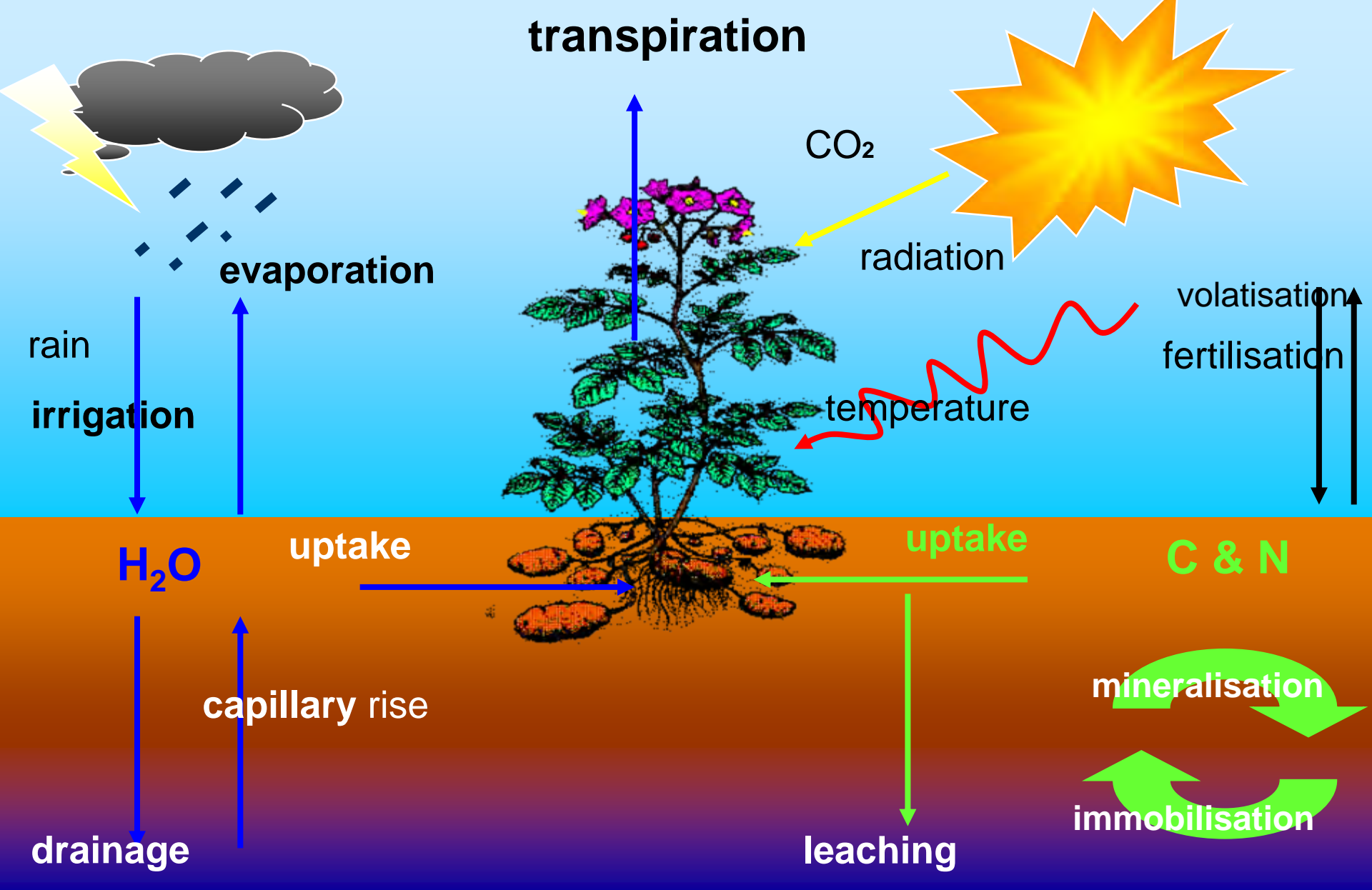


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Climate change in brief:

- Winters and summers get warmer
- Longer growing season
- Winters get wetter in northern Europe
- Summers get hotter in southern Europe
- Less rainfall in shorter but more intense showers
- Rivers flood (Poland, Netherlands, UK)
- More rainy days in winter (North), less in summer
- Increased precipitation deficit in summer (1/3 dry years)
- More extreme weather patterns
- More sunshine
- More CO₂ in the air





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Yields:

- Warmer springs, earlier sowings, longer season: higher yields
- Increased canopy development: more water and nitrogen: higher yields
- More carbon dioxide in the air: higher yields
- Stomata close a bit: less transpiration, improved water use
- Yield decline in dry and warm areas !



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Areas:

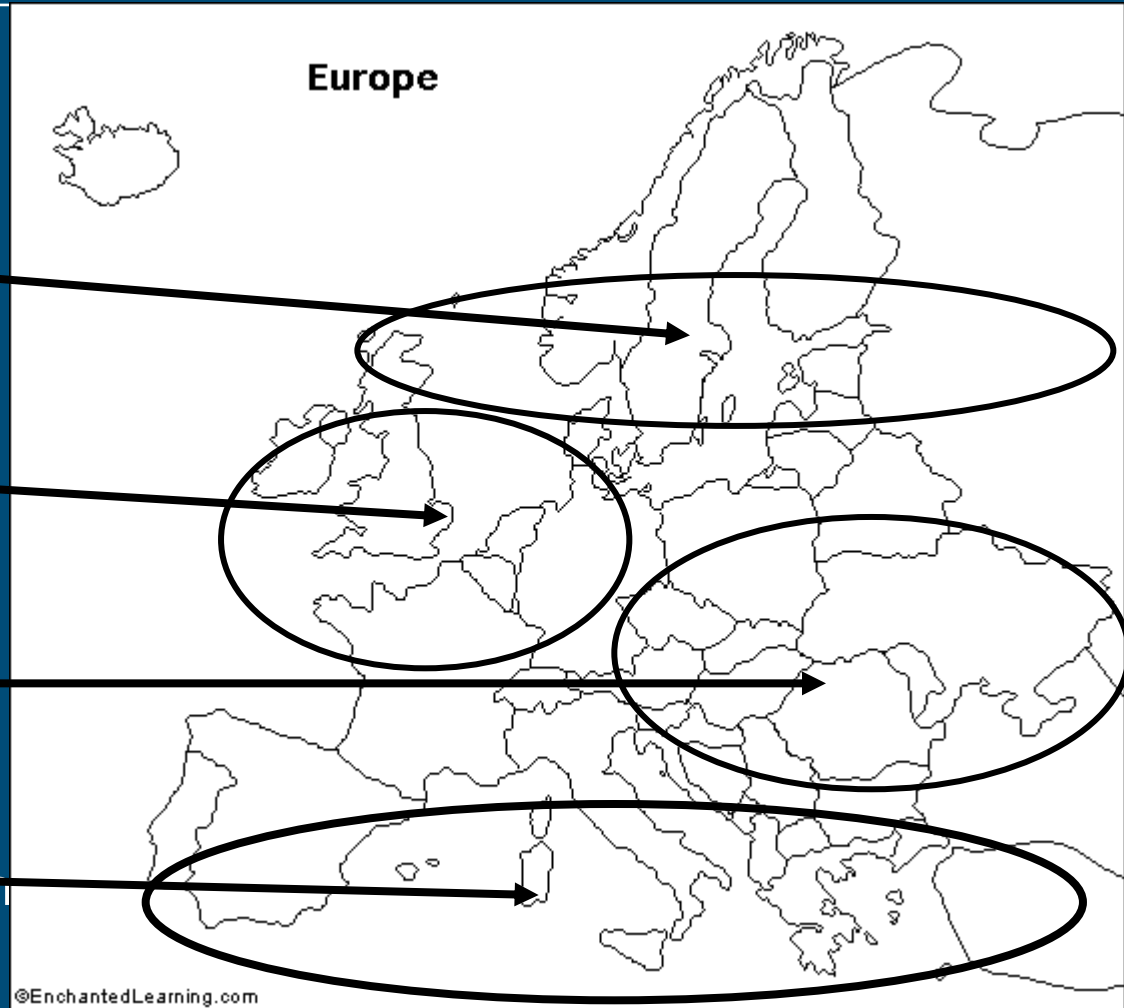
- Threat to niche market: early Cornwall crop
- Move to rainy west part of UK to save water
- More chances of double cropping
- Move North (on continent)



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Areas:

- Increase in the North
- Stable in the West
- Decrease in the East
- Disappearance in the South



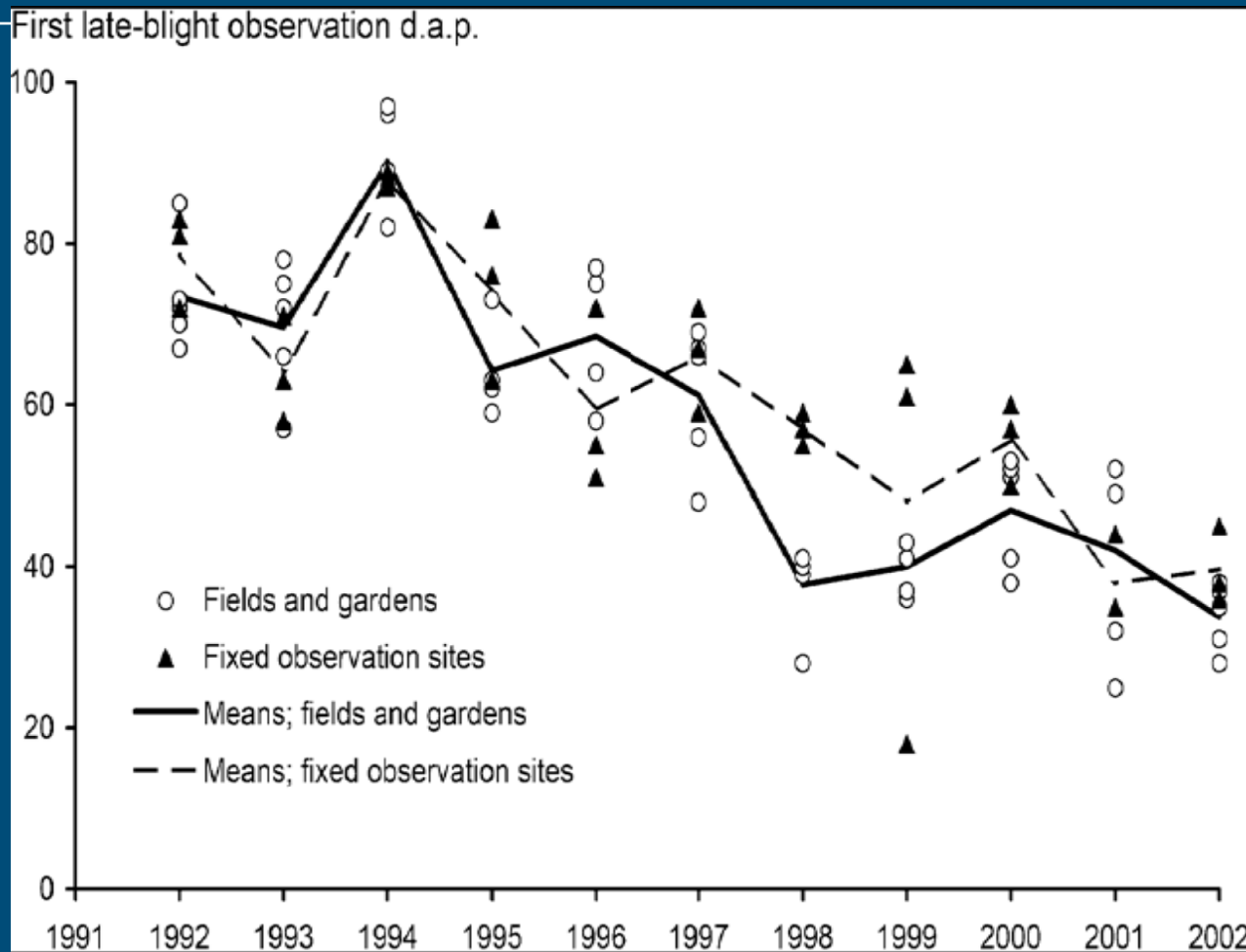
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Quality in northern Europe:

- Increased tuber size
- Increased Vitamine C
- Increased dry matter concentration
- More hollow hearts
- More secondary growth and sugar ends
- Winter temperatures up: reduced storability
- More rotten tubers due to water logging



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(Source Hannukkala et al 2007)



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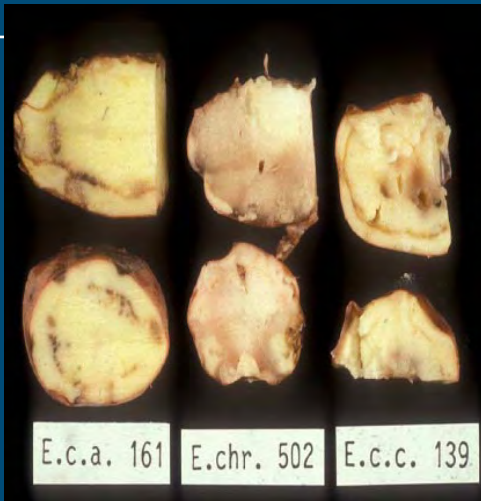
Effects increase temperature: insects and viruses??

Year	PVY-c	PVY-n	PVY-ntn	PVY-nW	PVY-o
1994	39	24	*	*	50
2006	0	0	77	16	11

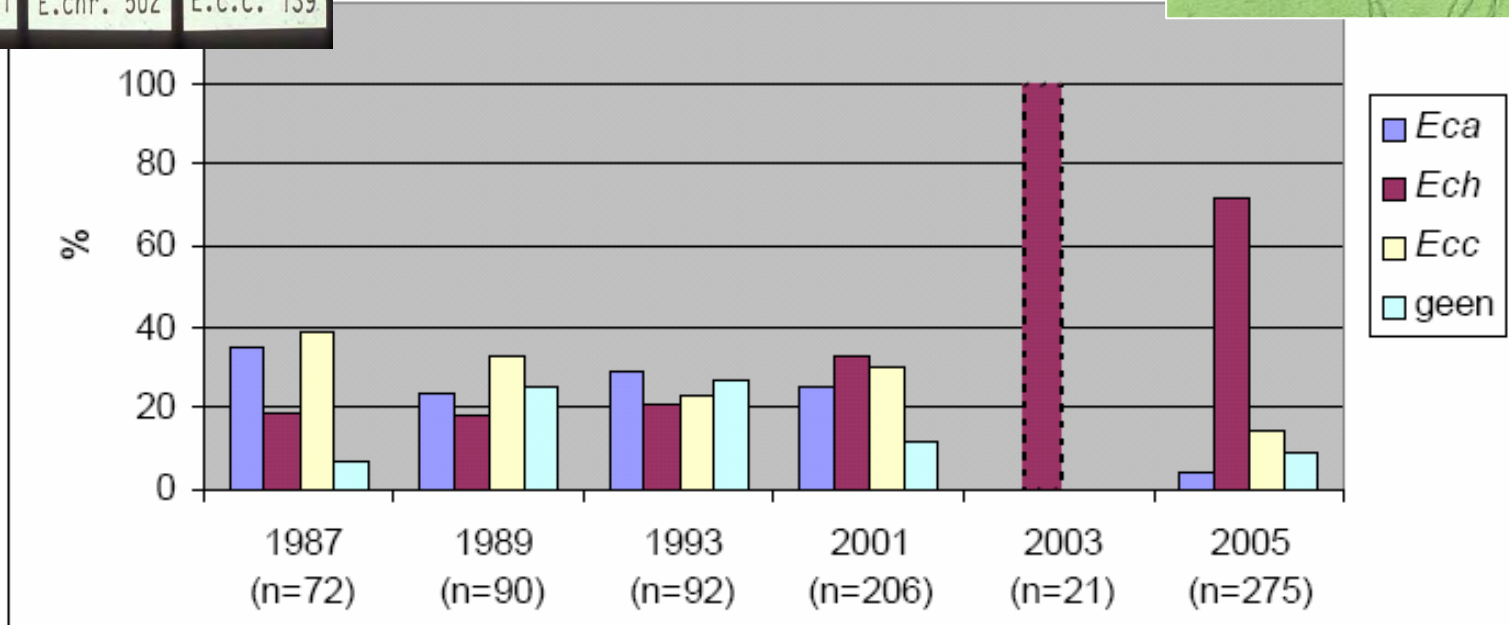
Source NAK-PRI



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Erwinia in planten (surveys)

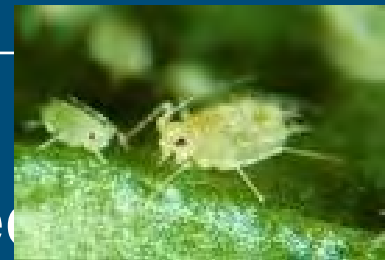


Increased problem of *Erwinia* (*dickeya*)
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Pests and diseases:

- More groundkeepers reduce rotation effects
- Earlier appearance of (late) blight
- Blight control: risk of run off, less field accessibility
- More aphids (negative for seed) and wireworm
- Increased pressure of Q-diseases: brown rot, ringrot
- *Erwinia* spp: *Pectobacterium* and *Dickeya* increase
- Colorado beetle moves North
- More cycles of nematodes



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Adapted varieties:

- Secondary growth: Felsina better than Bintje
- Drought resistance: Remarka better than Bintje
- Early varieties escape drought
- Late varieties overcome transient droughts
- Mediterranean from spring to winter crops



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Options:

■ Deny

■ Ignore

■ Mitigate

■ Adapt



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