

Strategic Programme

Enhancing Climate Resilience: Implications for CAP

Iain Brown

James Hutton Institute

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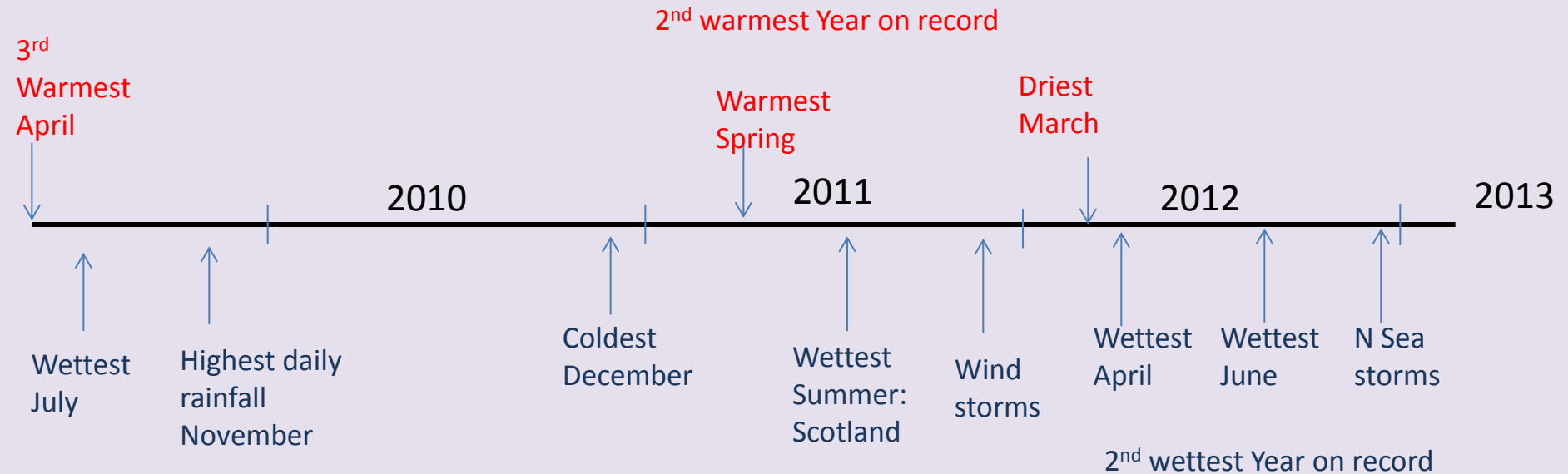


Royal
Botanic Garden
Edinburgh



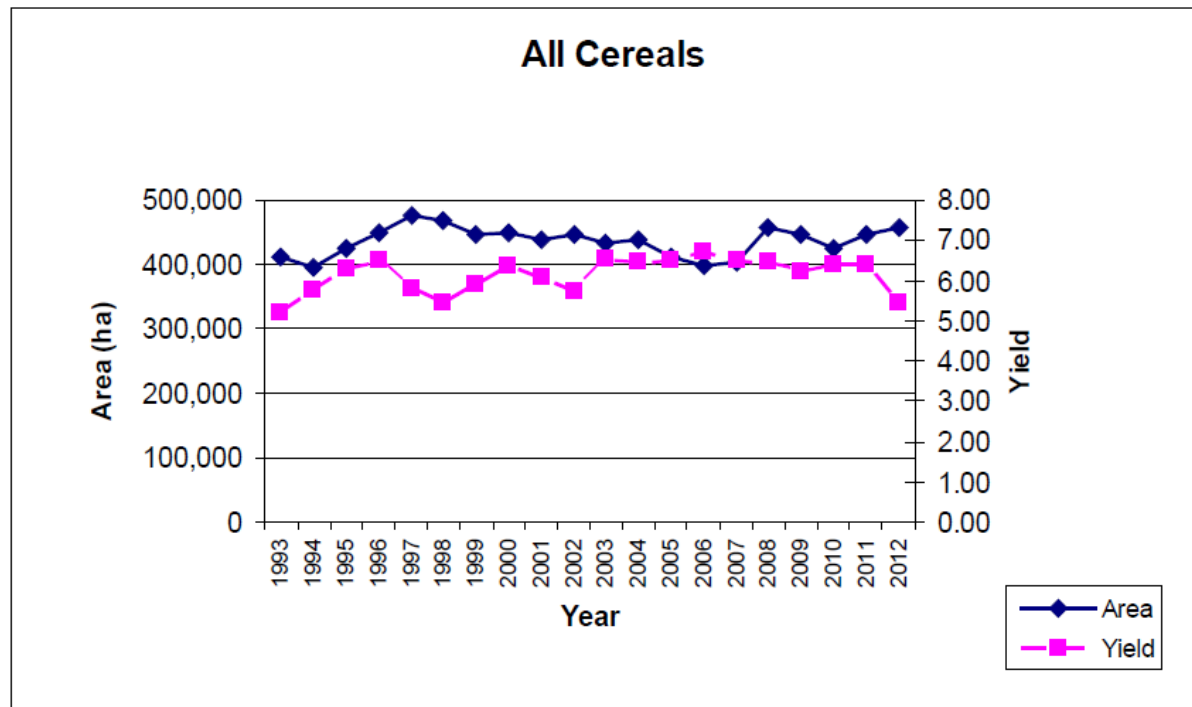
Climate Change and Climate Variability

A catalogue of recent 'extremes'



- Scotland has a variable climate
- Evidence of changing variability
- Sometimes the variability can be counter to the long-term trend

Crop yields and Crop production



Source: Scottish Government 2012

2012 Yields – ‘back to 1980s levels’

Winter Wheat -20%, Spring Barley -14%, Winter Barley -12%, OSR -25%*

Overall cereal production -15%*

Shift in production from winter crops back to spring crops

* Compared to 2011

Climate variability & Crop yields

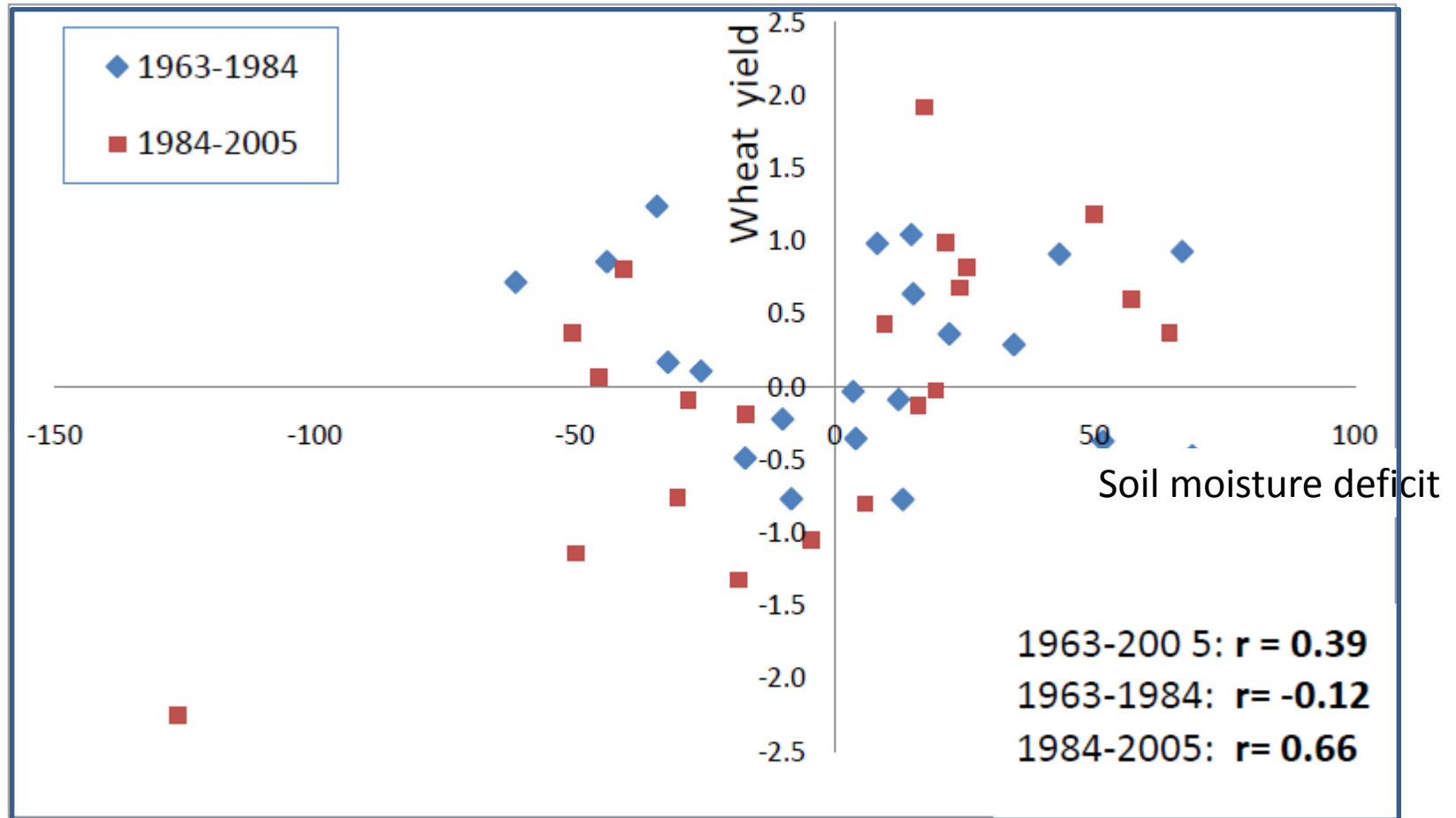
Key climate predictors of crop yields (1963-2005)

Crop Yield	Soil Moisture	Sunshine	Mean Temp.	Precipitation
Wheat	**	June**, July**, Annual**		Nov*, Jun**, Jul**, Annual**
Barley	**	April**, May**, June**, Annual**		Jul**
Oats	*	April**, Annual**		Jul *, Annual**
Potatoes	**	March**, Annual**	Apr*	Apr**

Statistical relationships: ** strongly significant * moderately significant

• Currently awaiting Met Office data to allow update to 2012










Climate sensitivity of crop yields



Climate sensitivity of yields seems to have increased in recent decades

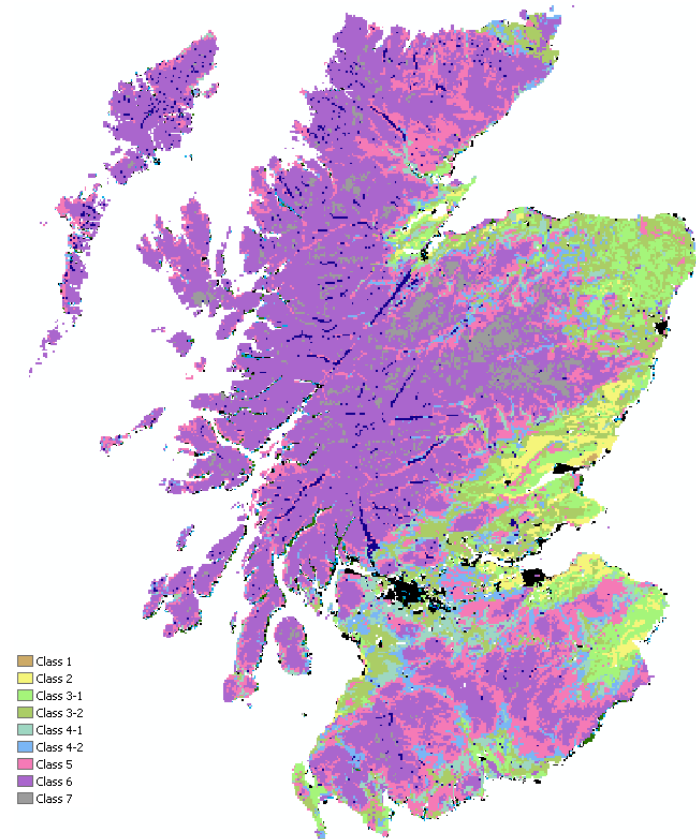
Land Capability for Agriculture

- Official land classification system for Scotland - based upon biophysical constraints (soil, climate, topography)
- Agricultural use – potential productivity and cropping flexibility
- Assumes *'reasonable management'*

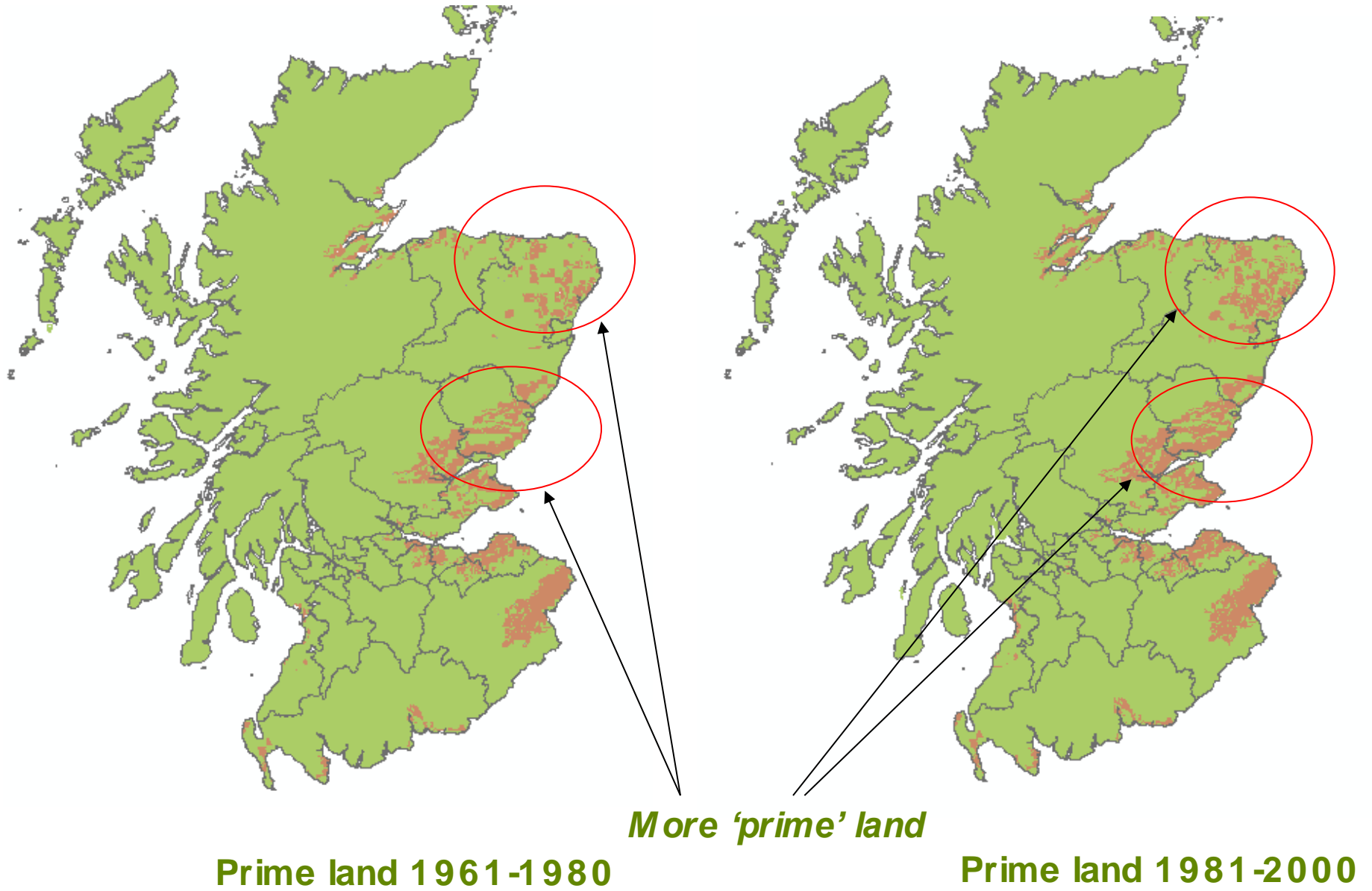
	Class 1 - very wide range of crops
	Class 2 - wide range of crops
	Class 3.1 - moderate range of crops
	Class 3.2 - moderate range of crops
	Class 4.1 - narrow range of crops
	Class 4.2 - narrow range of crops
	Class 5 - improved grassland
	Class 6 - rough grazing
	Class 7 - very limited agricultural value

Prime land

Capable of being
'improved
land'

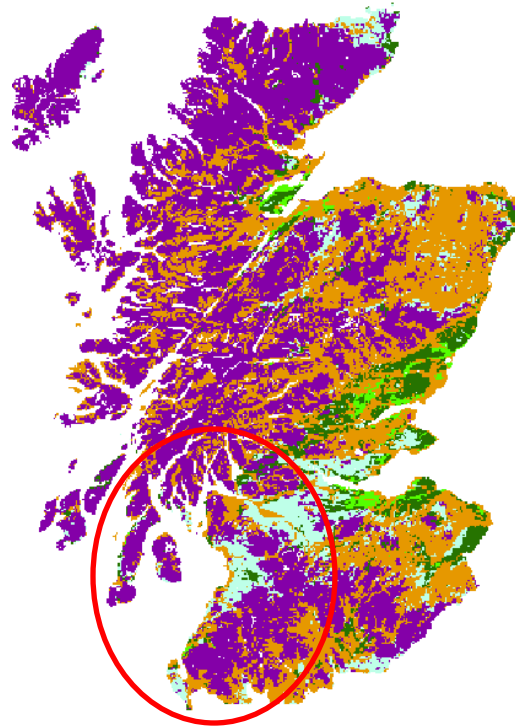


Recent Climate Change and Land Capability



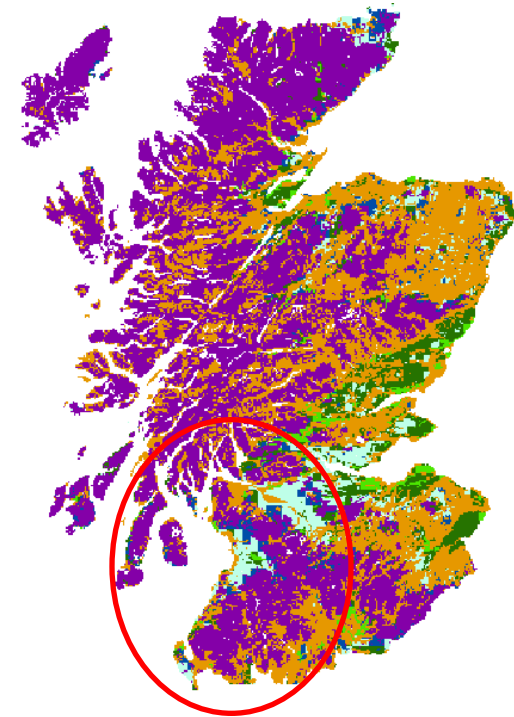
Wetness risk

- Increased risk in some areas - eg. SW Scotland
- Implications for access to land - (workability) and livestock poaching



1961-1980

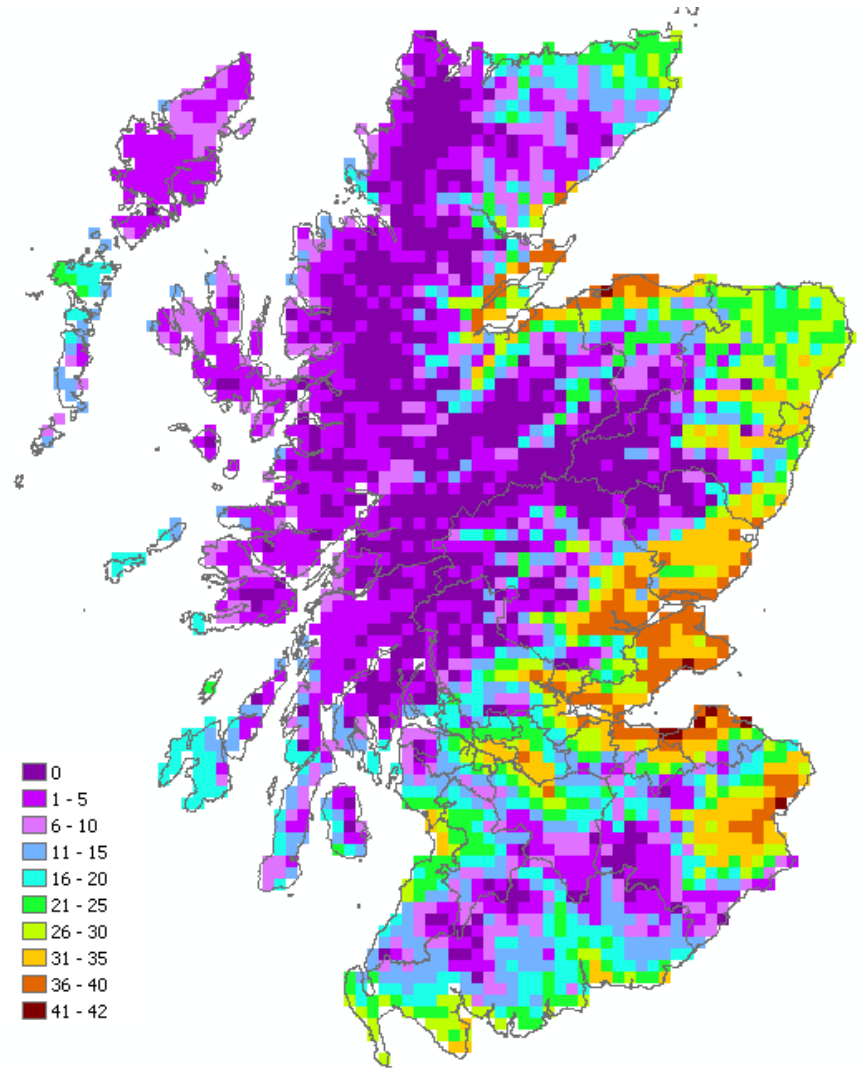
Wetness class



1981-2000

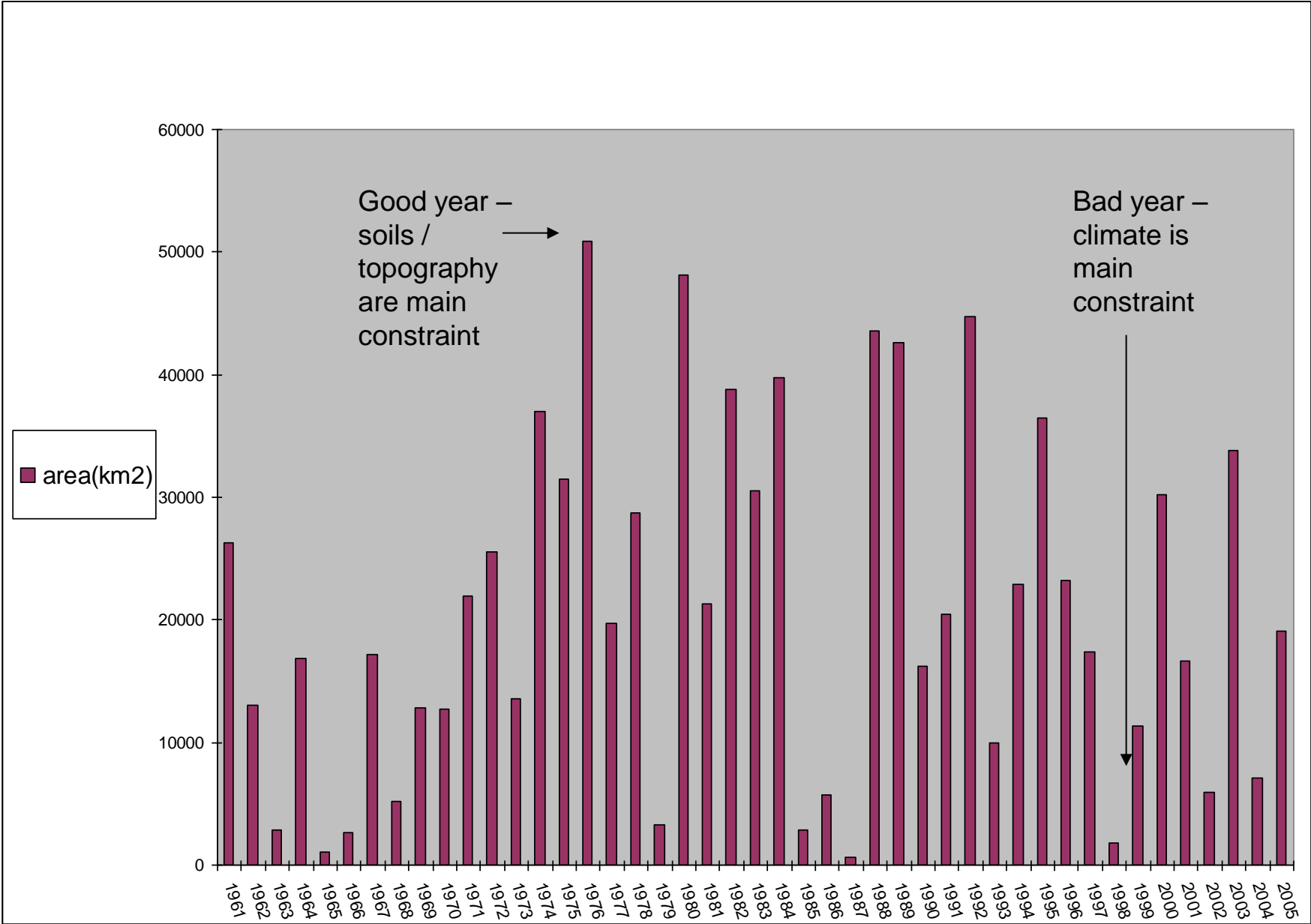
What about climate variability?

- Year-to-year change
- An important factor for land managers
- Not in original LCA – may need to add variability index



No. of 'prime' years 1961-2005

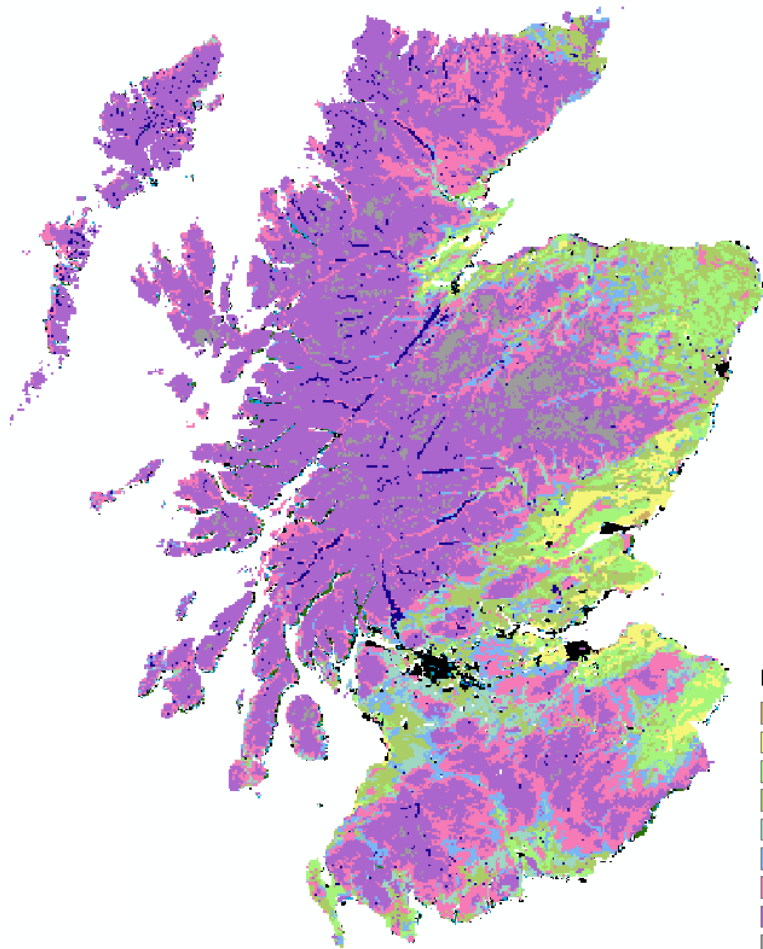
Annual climate variability in 'Prime' Land area



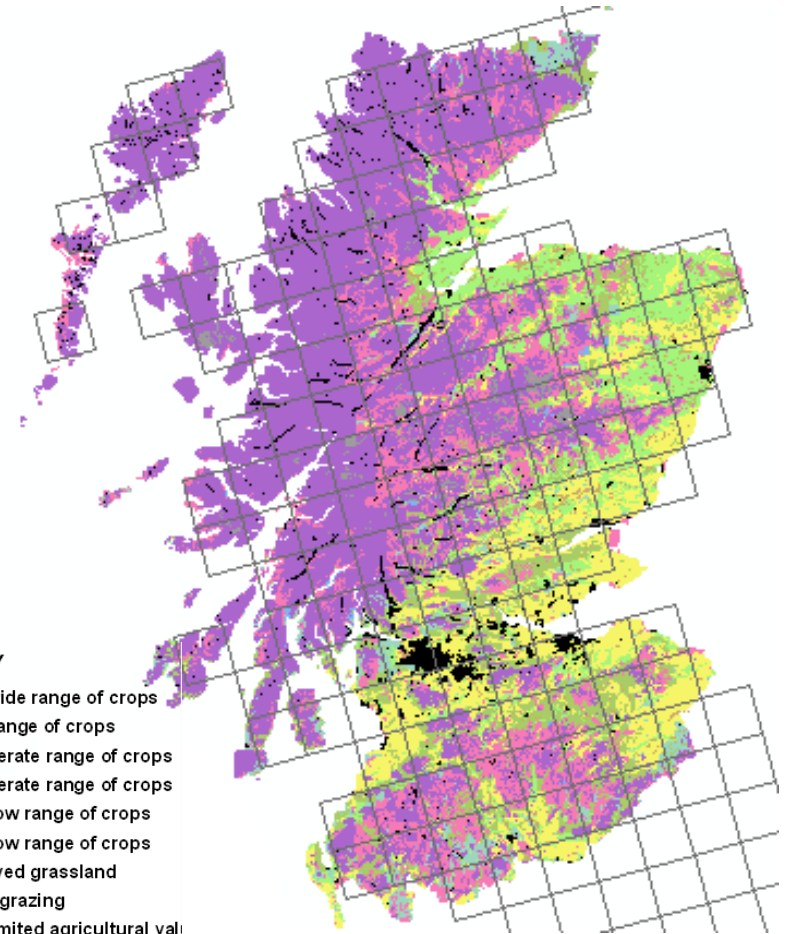
Years 1961-2005

Future Changes in LCA

- excluding soil/climate interactions





Published version [1982]



2050s projection [UKCP09 q3]

LAND CAPABILITY

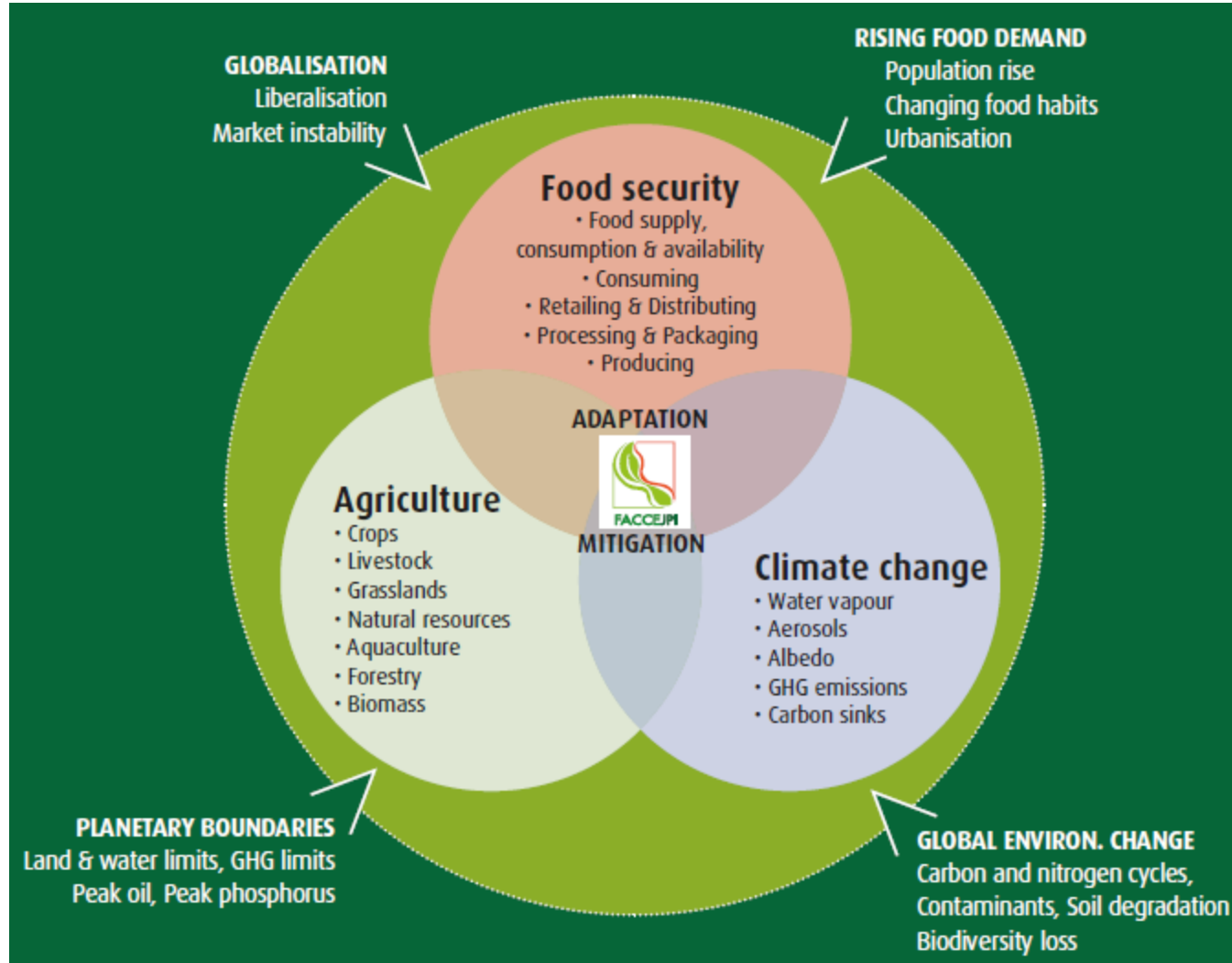
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- Potential increase in extent of prime land
- Some marginal areas = less constraints



**Opportunities for
agriculture
(with adaptation)**

Climate change interacts with other drivers



> Stress-testing of systems against expected and unexpected changes

Water Availability



Implications for:
Water Framework Directive
Habitats Directive

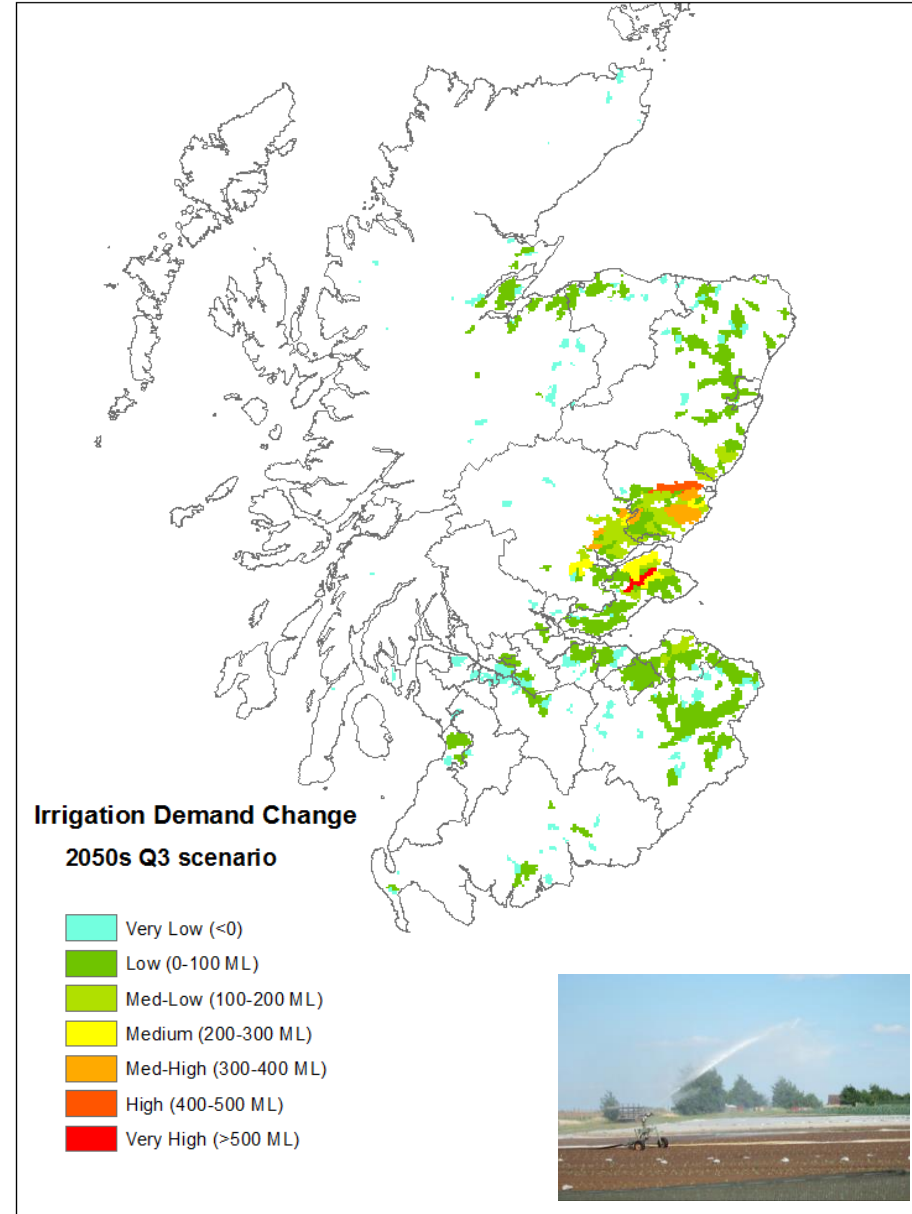
Adaptation options:

Irrigation?

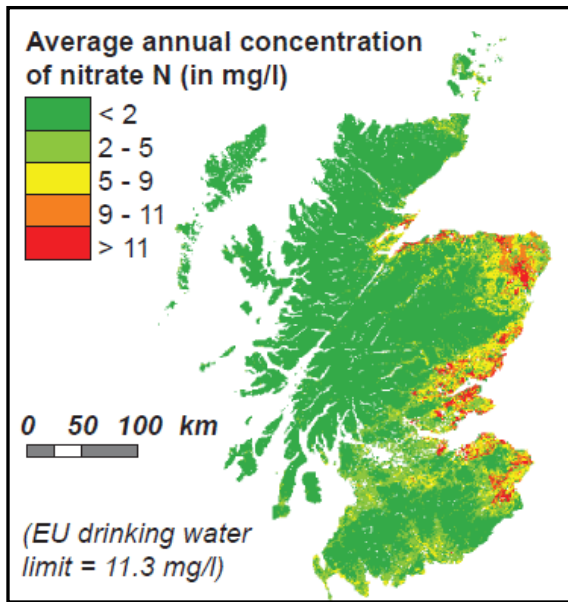
New Crops & varieties?

Changes in management?

Co-operation?

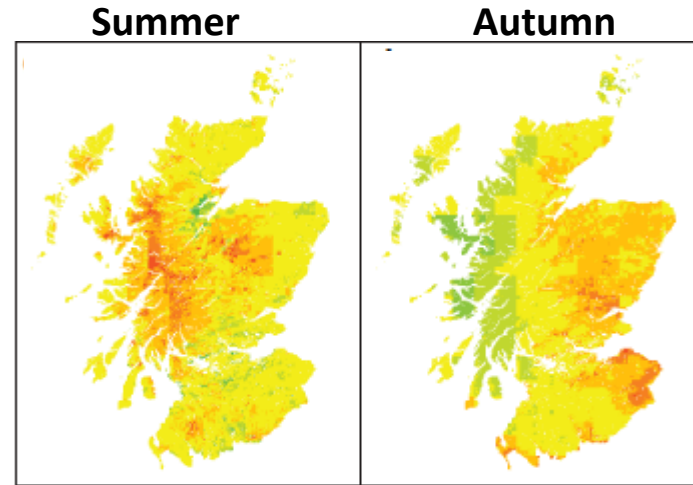


Implications for Water quality – Nitrates

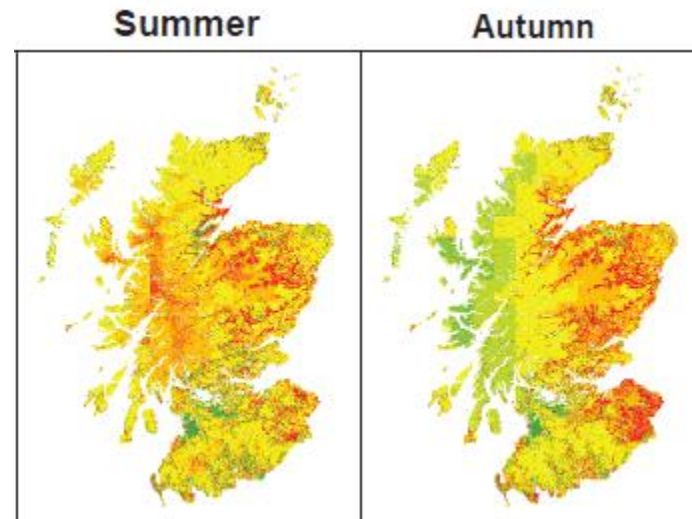


Baseline

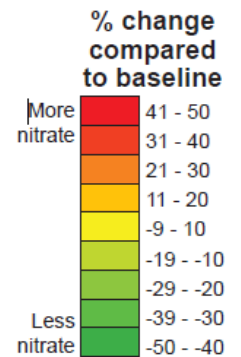
- Indirect effects of climate change (via land use) may be as great as direct effects



Climate change (UKCP09 q3)



Climate change + Land Use scenario
(prime land > arable)



Implications for CAP

- Climate change is happening now
 - Management responses are critical
 - *As shown by differences in yields between farms*
 - Enhancing resilience
 - *diverse systems (farm, landscape, catchment)*
 - *water availability – e.g. on farm water storage ?*
 - *drainage (on appropriate soils)*
 - *conserve organic matter*
 - *risks/opportunities of new crops/varieties*
 - Encourage co-operation
 - Consider co-benefits of adaptation/mitigation ‘on the ground’
- 