

SAOS conference 2023

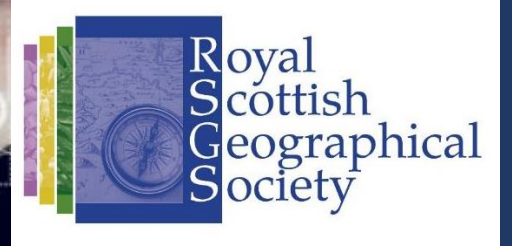
Navigating Through Turbulent Times

Thursday 26th Jan - Dunblane

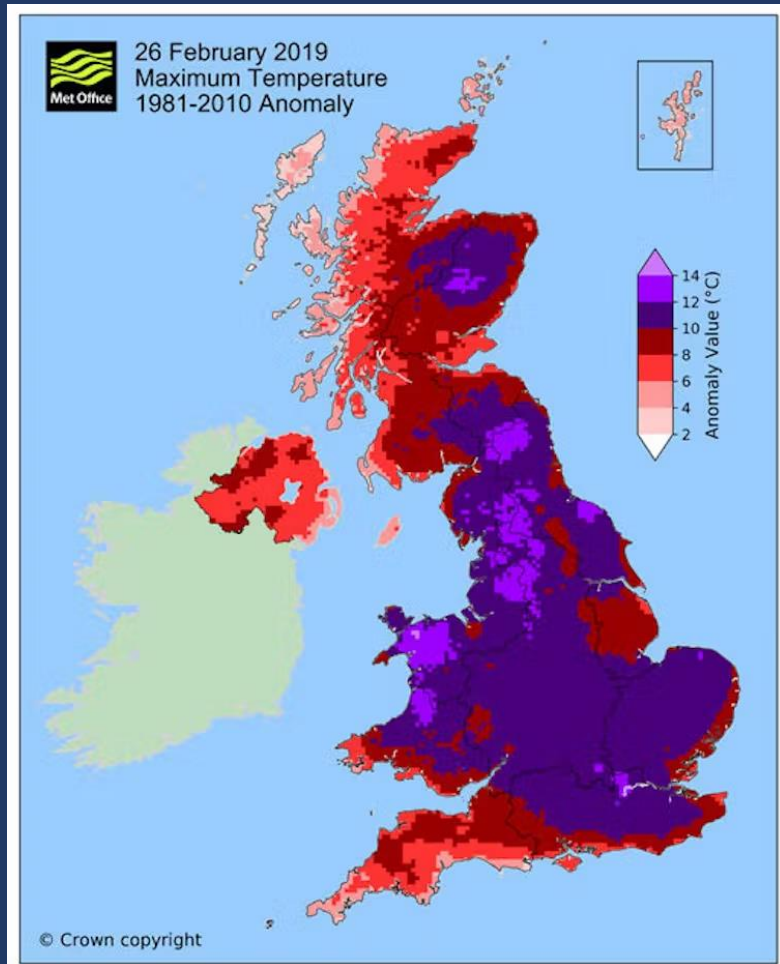


Climate in Crisis
And how it affects Scotland

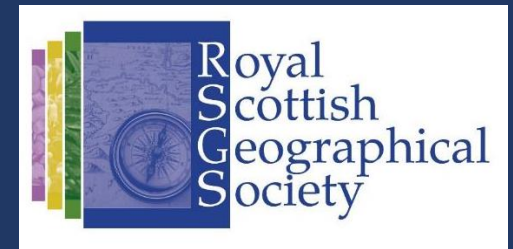
Mike Robinson
Chief Executive, RSGS



A farmer told me there was no such thing as climate change...



- **Scientists**
- **International Governments**
- **EU / trading partners**
- **National Government**
- **Industry**
- **Public bodies**
- **Local Authorities**
- **NFU/ NFUS**
- **Customers**



The science is well established



James Croll
1821-1890

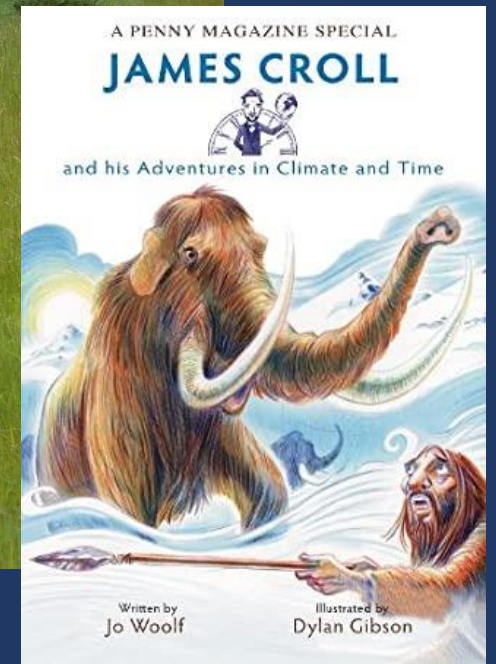
- 1875 – Croll's *Climate and Time* published
- 1878 – Nordenskjold finds 'new mineral powder' in Greenland
- 1896 – Arrhenius formulates Greenhouse law
- 1938 – GS Callendar 'effect'
- 1941 – Milankovitch's "*Canon of Insolation & the Ice-Age Problem*" published
- 1958 – Keeling begins study at Mauna Loa
- 1976 – Shackleton, Imbrie, Hays proxy data
- 1977 – Wm Nordhaus of Yale first suggested 'safe' limit of 2°C in economics paper
- 1979 – Jason Report

One of the first key scientists was a crofter from Perthshire

The science is well established



James Croll
1821-1890



And time is running out

• SAOS founded (1905)	298 ppm CO2
• EU CAP introduced (1962)	314 ppm CO2
• UK Joined EEC (1972)	327 ppm CO2
• COP1 in Berlin (1995)	361 ppm CO2
• Scotland passed Climate Act (2009)	387 ppm CO2
• COP26 in Glasgow (2021)	414 ppm CO2

Increasing 2-3 ppm/year and we MUST stay under 450 ppm MAX



*Climate Change policy
is getting stronger
every year*

Policy Summary

- 1979 - World Climate Conference
- 1987 - Montreal Protocol
- 1990 - IPCC – First report
- 1995 - COP 1 – Berlin
- 1997 (2005) - Kyoto Protocol
- 2008 - UK Climate Act
- 2009 - Climate Change (Scotland) Act**
- 2009 - COP 15 - Copenhagen**
- 2015 - COP 21 – Paris Accord**
- 2018 - IPCC & IPBES reports
- 2019 - UKCCC Net Zero Report
- 2019 - Climate Emissions Scotland Bill
- 2019 - Climate Emergency Declarations

I can read the future...

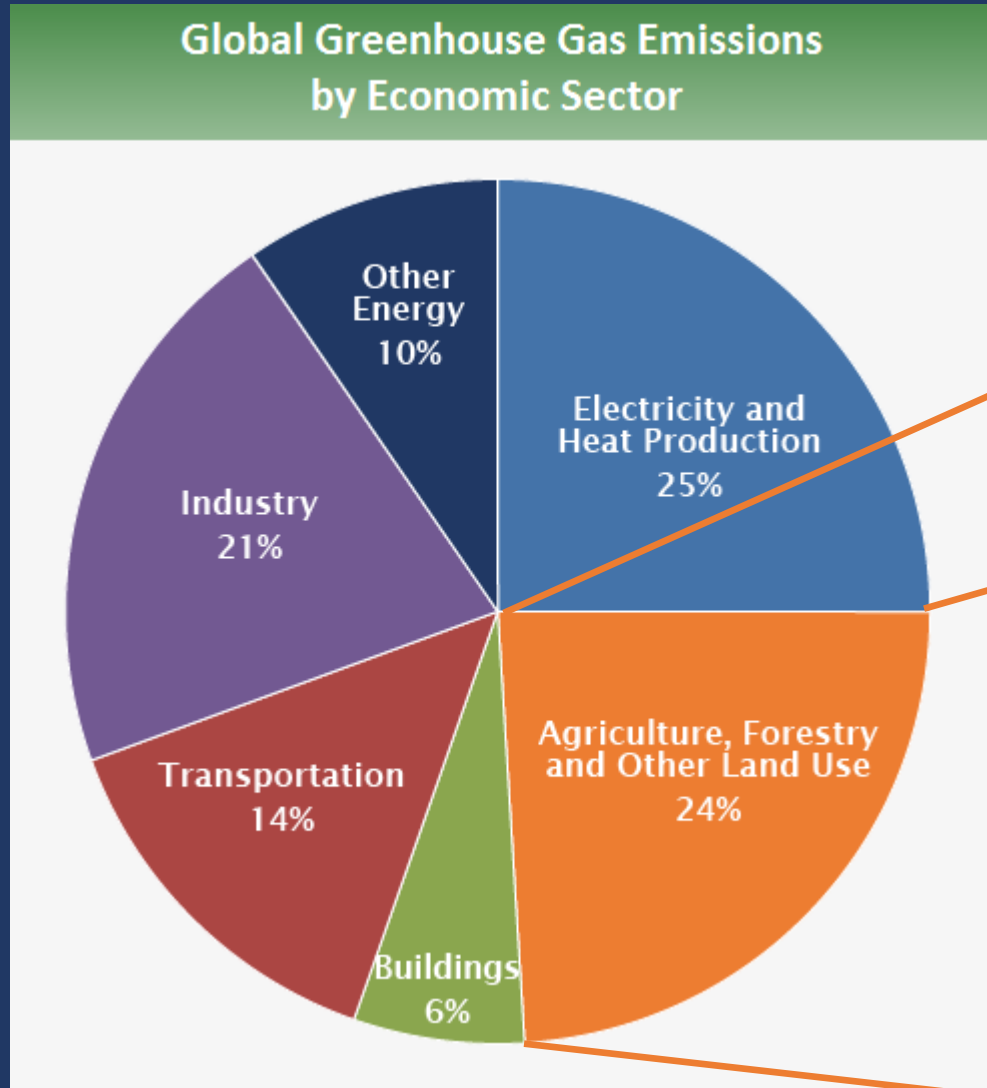


Financial sector...

And so can you...

What is the role of agriculture?

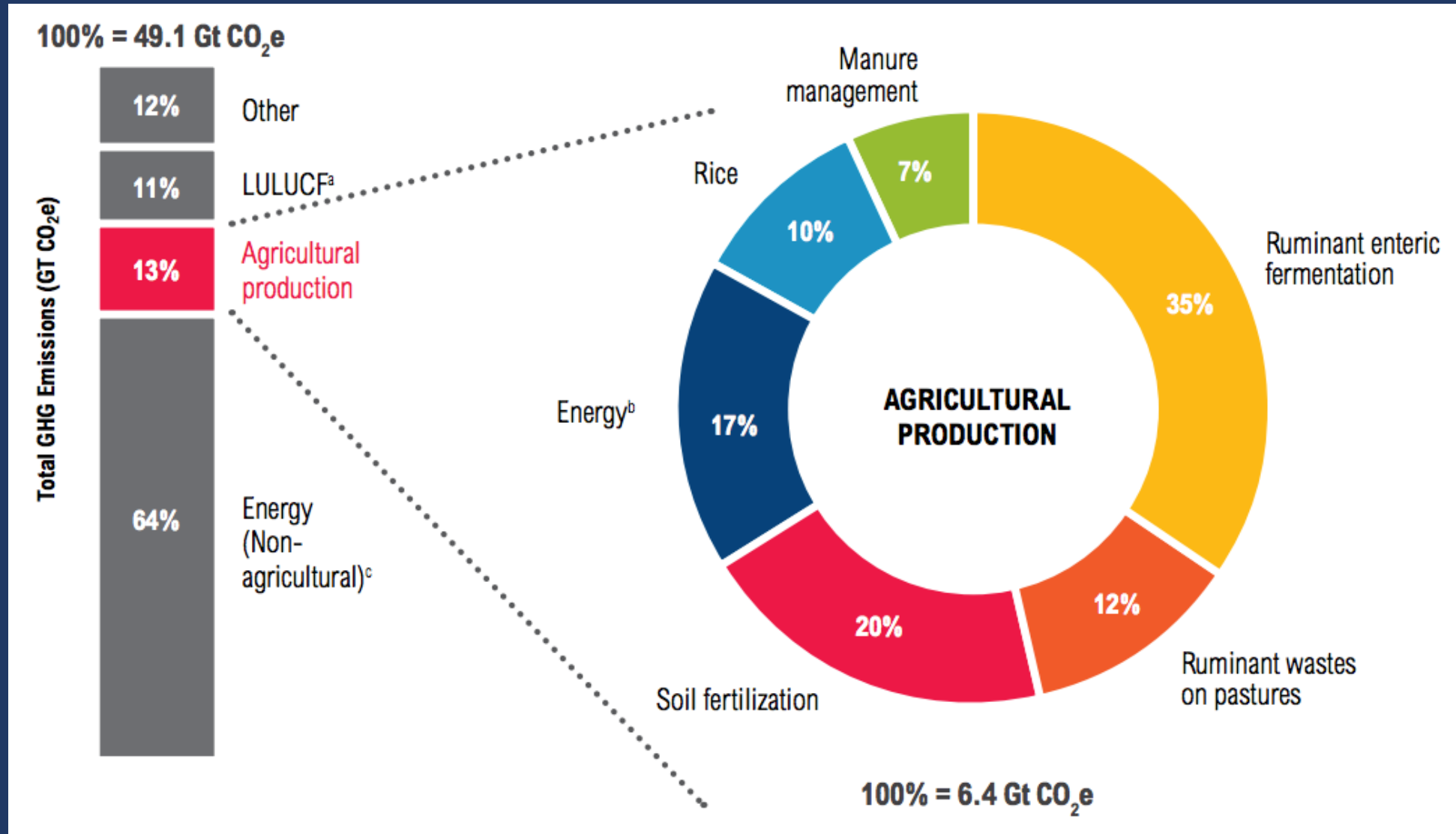
Globally



**Agriculture, Forestry
and Other Land Use
24%**

*Quarter of global
emissions...*

By Agricultural Practice?



Recent role of UK agriculture?

11%

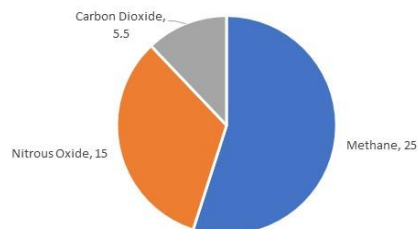
UK emissions in 2020

CH₄ – 25 MtCO₂e (55%)

NO₂ – 15 MtCO₂e (33%)

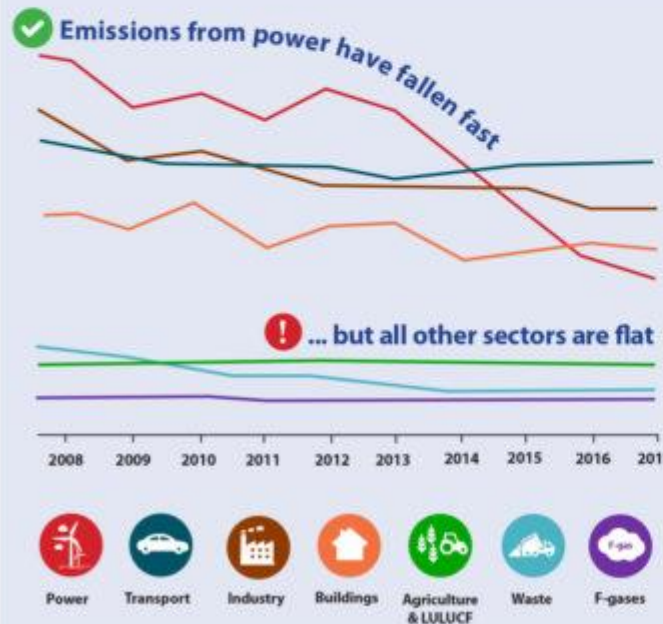
CO₂ – 5.5 MtCO₂e (12%)

MtCO₂e emissions from UK Agriculture (2020)

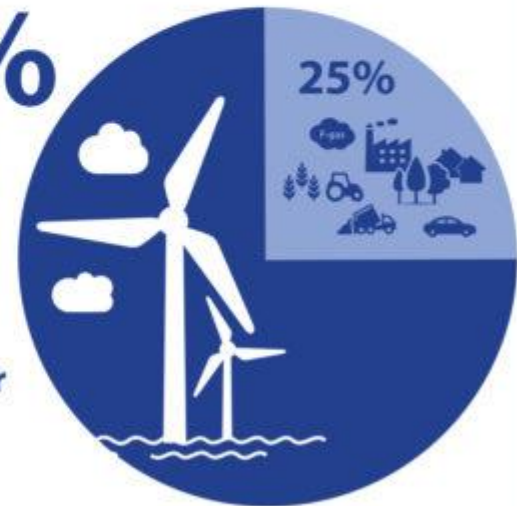


Excellent progress in reducing emissions from electricity generation masks failure in other sectors

The UK's greenhouse gas emissions have reduced by 43% compared to 1990 levels, on the way to a target of at least an 80% reduction by 2050.



75%
of emissions
reductions
since 2012
have come
from the
power sector



Clear goals, ambitious strategy and well-designed policies have been effective. These lessons must now be applied to other sectors

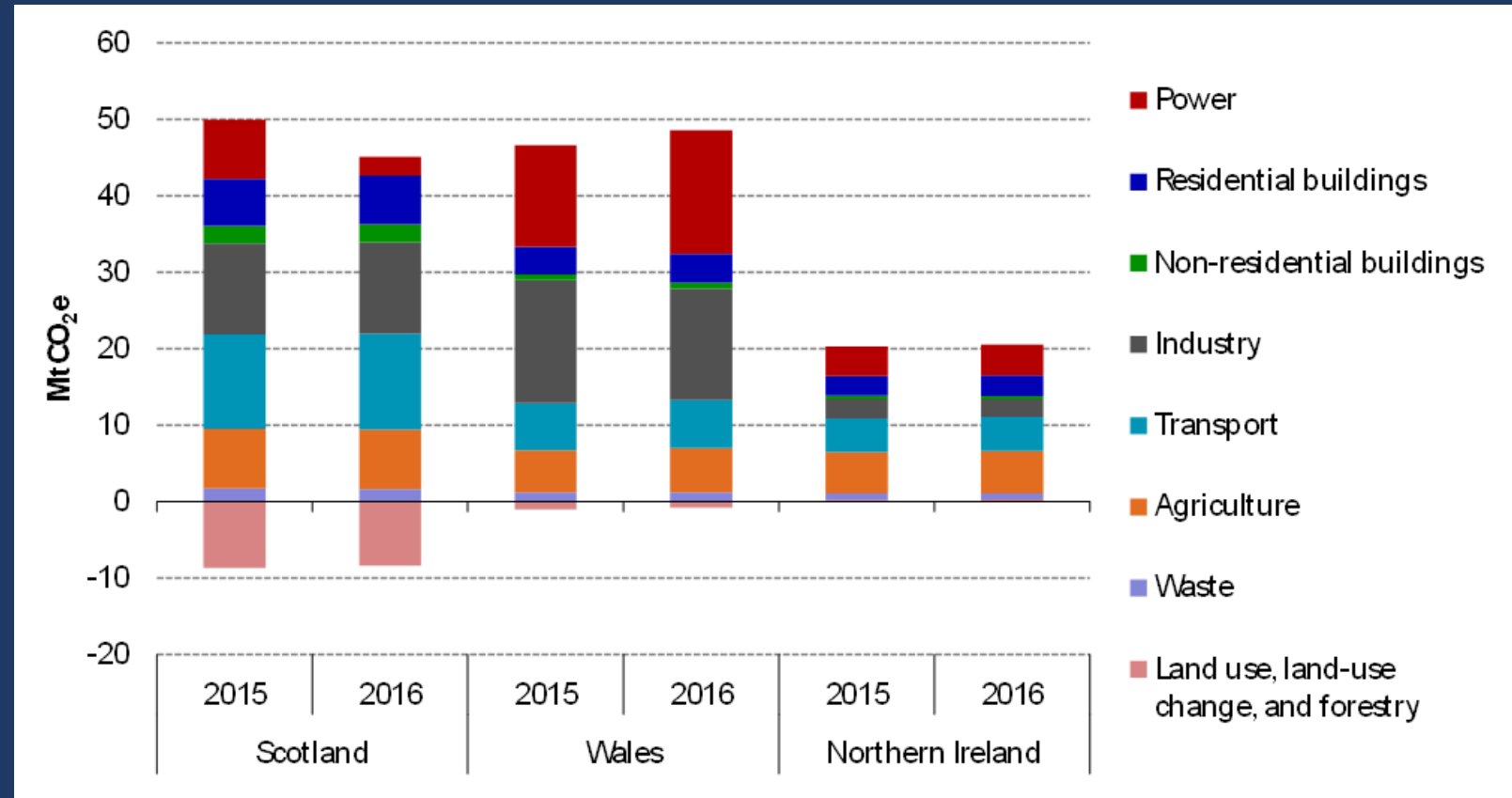
And in Scotland?

18%

Scotland's emissions in
agriculture

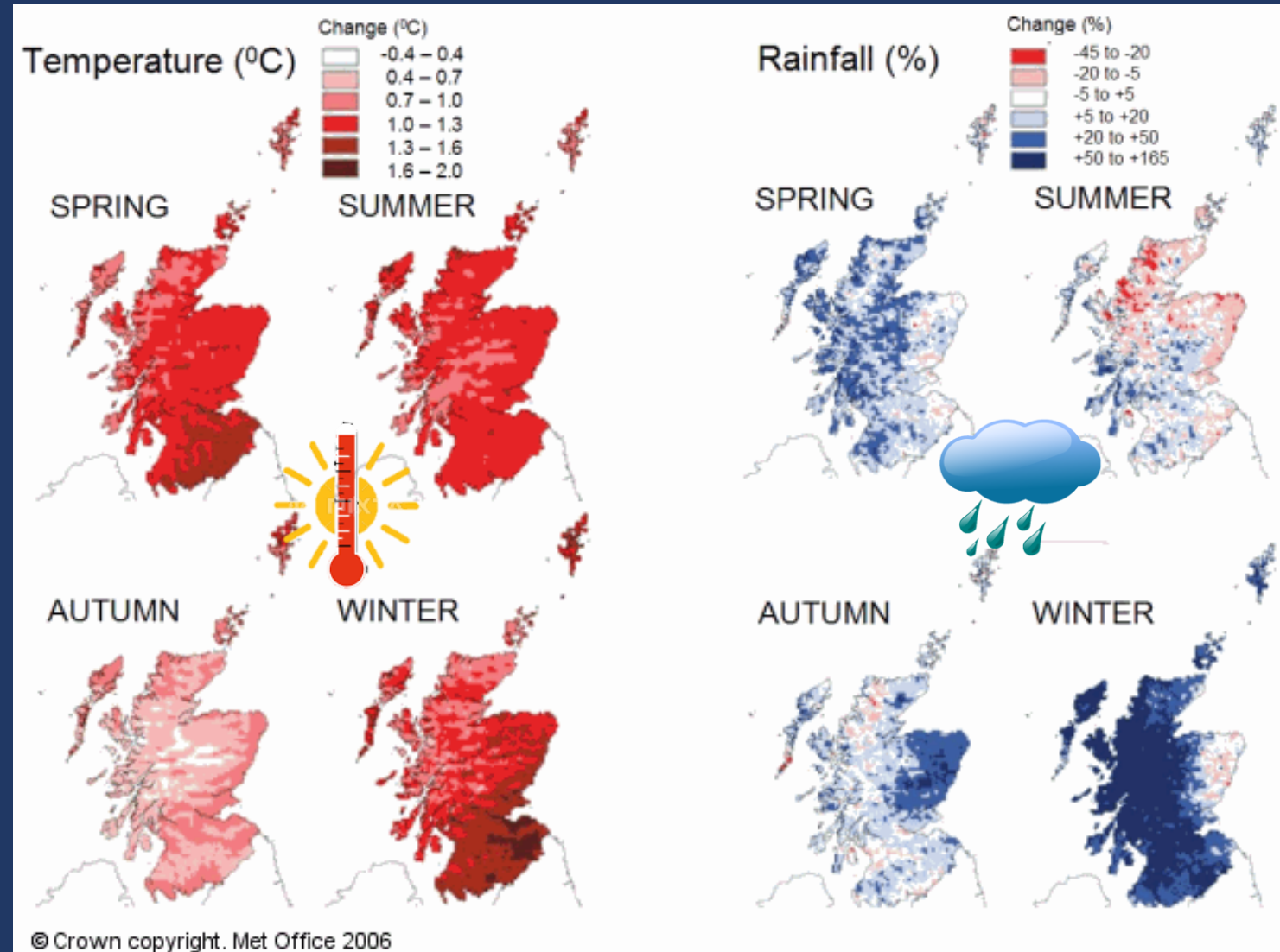
In 2020:
7.4 MtCO₂e

vs 41.6 MtCO₂e



What are the impacts?

1. Milder winters
2. Drier summer in S&E Scotland
3. Wetter autumn/ winter (>50% since 1960s)
4. More extreme winds
5. More extreme drought (1 in 3 years) (was 1 in 20)

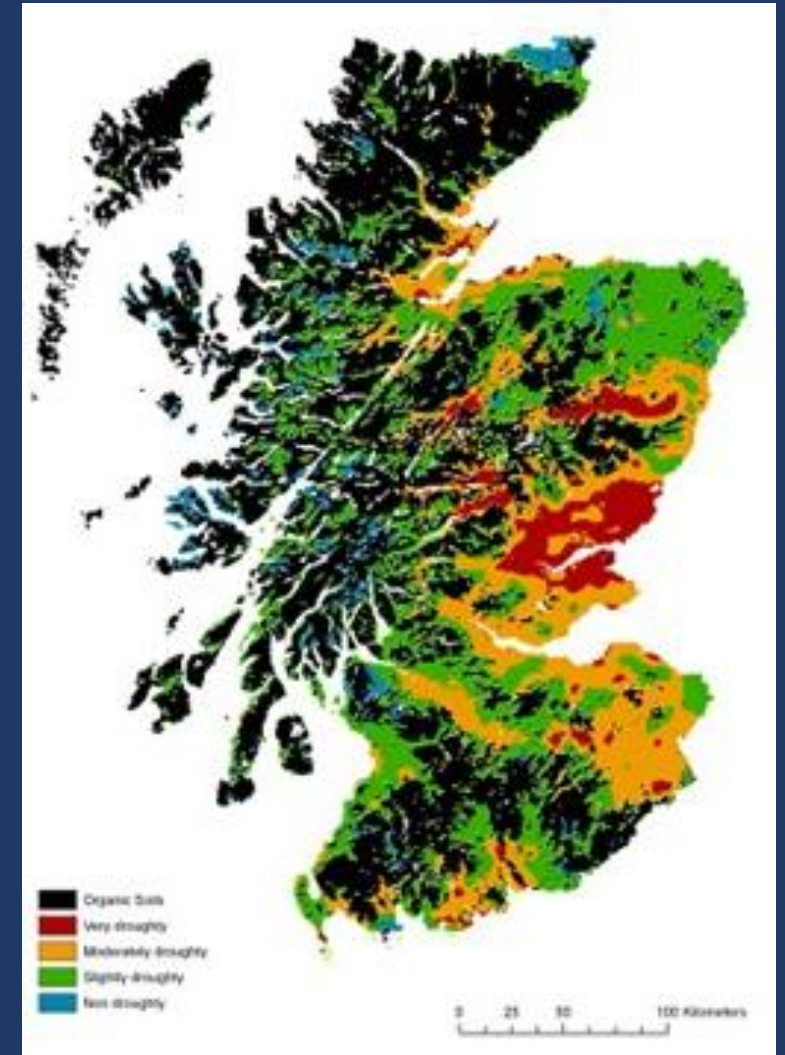


What are the impacts - POSITIVES?

1. Crop species and productivity changes... HOWEVER!
2. Longer growing season
3. More viable land
4. Warmer & less frost

Increasing temperatures have already improved land capability and increased the area of prime agricultural land in Scotland (NA2 Area of Prime Agricultural Land). This favourable situation is complicated however by changes in other aspects of land capability, notably drought risk and wetness risk.

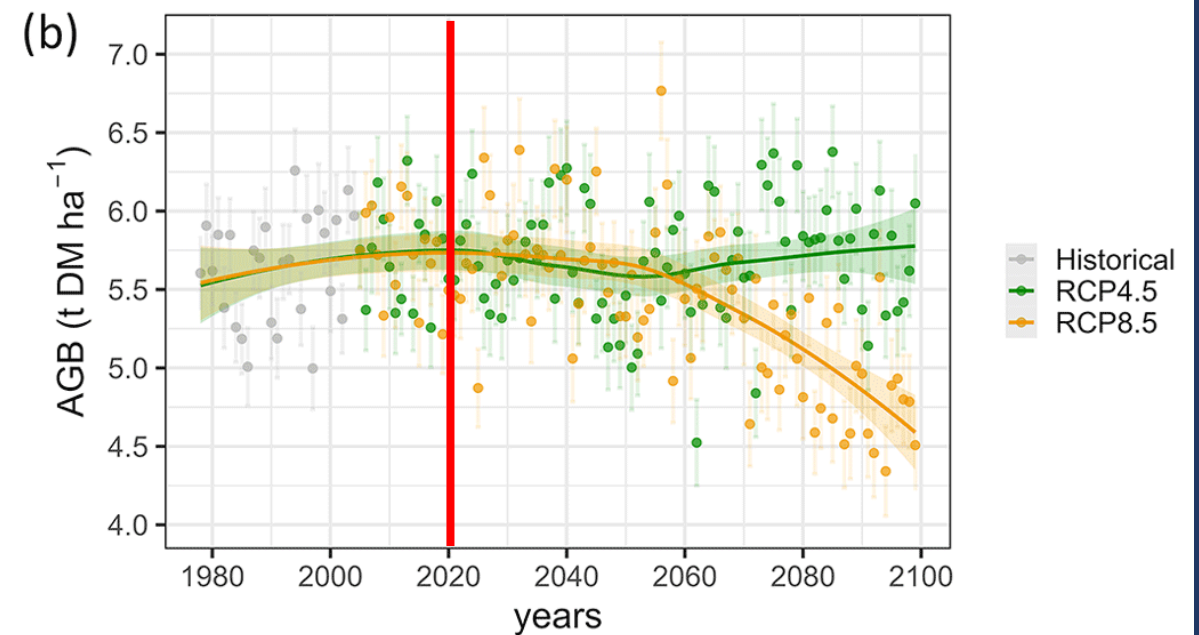
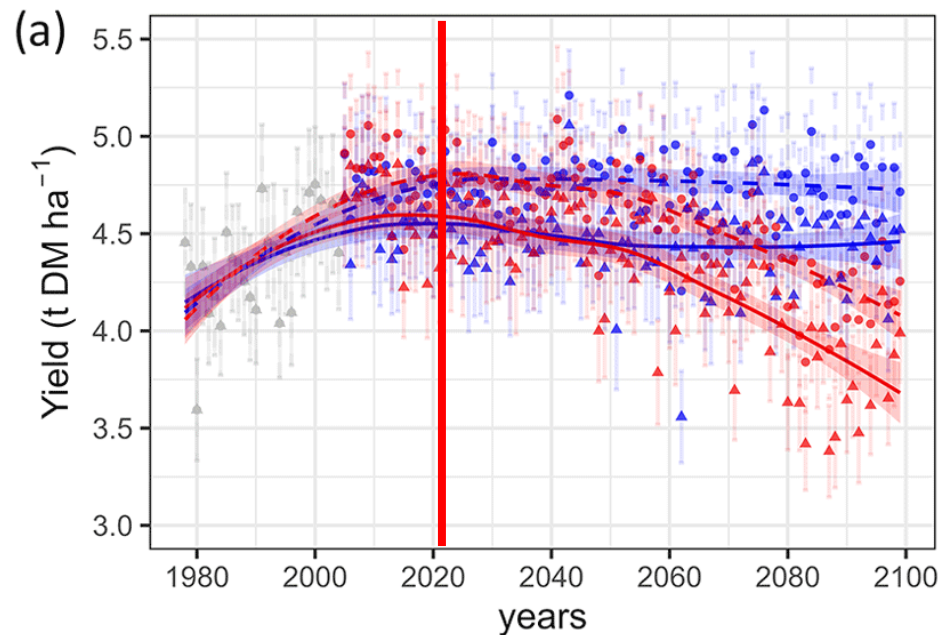
(Climate Exchange)



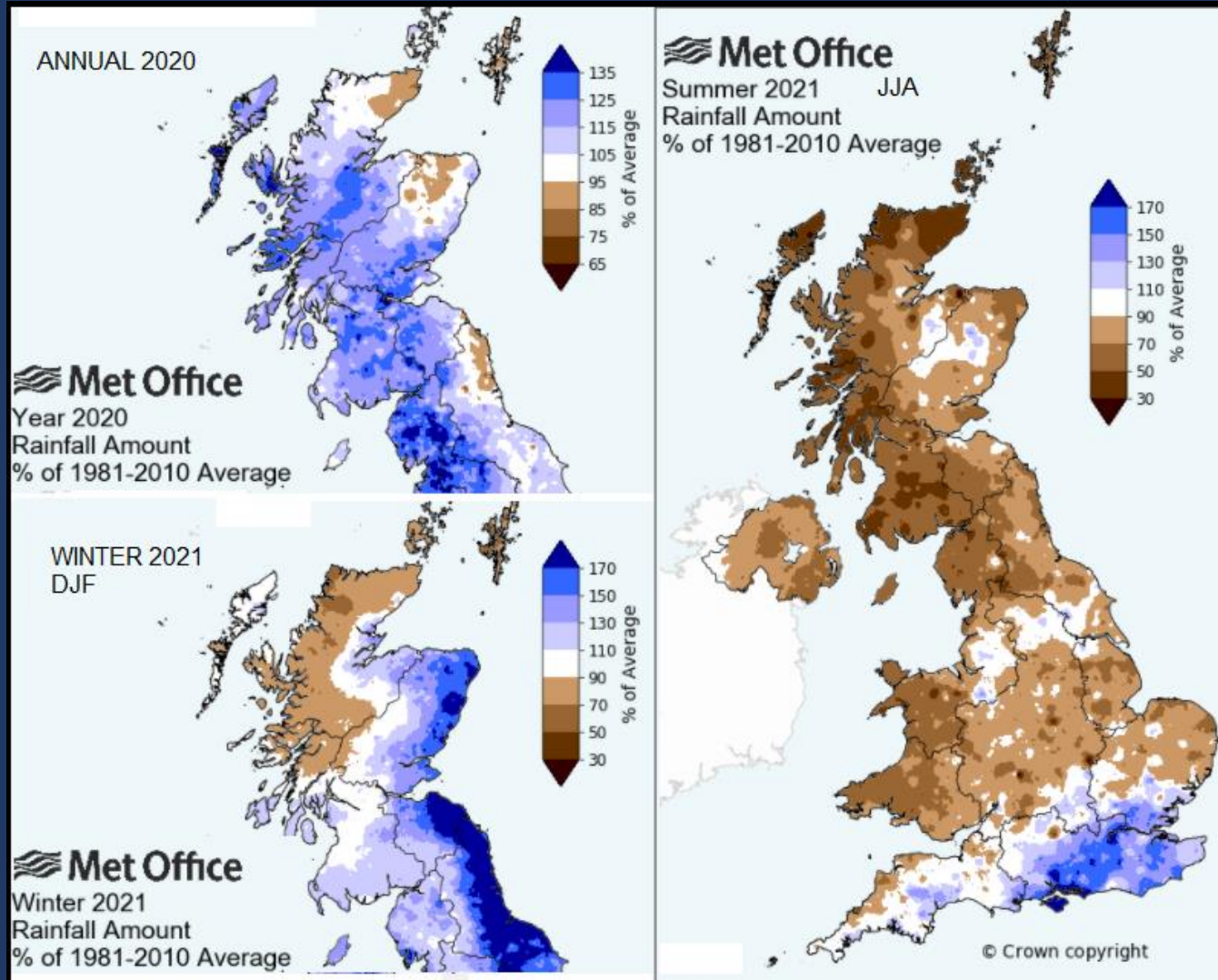
What are the impacts - POSITIVES?

...well ish

1. Crop species and productivity changes... HOWEVER!

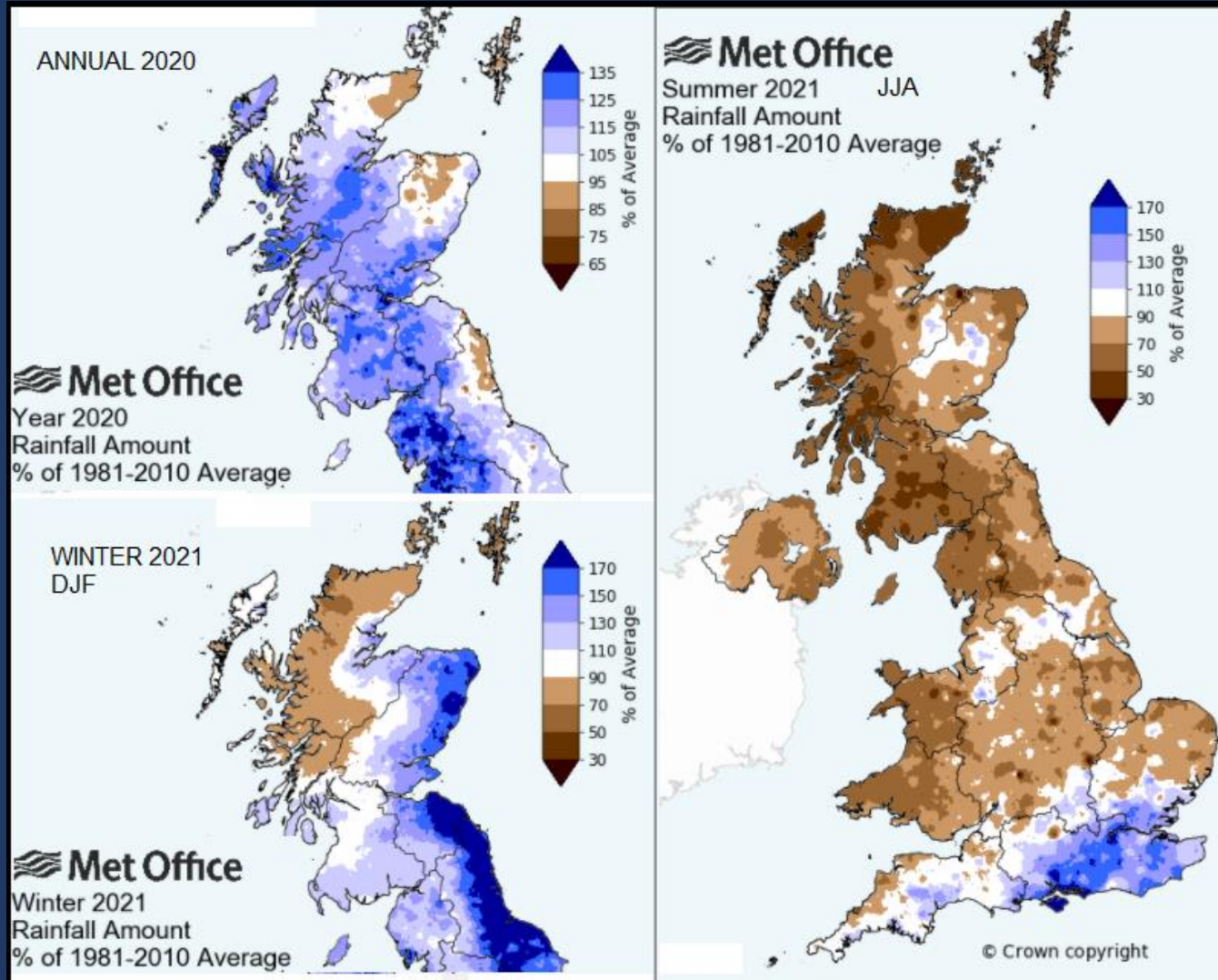


What are the impacts - NEGATIVES?



1. Volatility
2. Pests & parasites
3. Fragility of soils to wind and drought
4. Fragility of natural environment
5. Drought & fire risk
6. Changes to seasonality & even pollination
7. Trade volatility
8. Flooding and storm damage
9. Coastal erosion
10. Marine impacts
11. Disease vectors
12. Business Resilience
13. Buildings stress
14. Energy supply
15. Infrastructure failures
16. Cost of inputs
17. Cost of damage

What are the impacts - NEGATIVES?



The area of best quality agricultural land at risk from fluvial flooding in Scotland is projected to increase by 26% by 2050s (SNIFFER, n.d.).

Extreme weather in 2017 and 2018 contributed to losses of up to £161 million for Scotland's farmers (WWF/ Ecosulis, 2019)

Agriculture is

1. Partly responsible
2. Heavily impacted
3. Part of the solution



But it's not a one-dimensional issue

Who was the Enquiry team?

- Nigel Miller, ex NFUS
- Pete Ritchie, Farmer / Nourish
- Andrew Barbour, Farmer
- Prof Dave Reay, Director ECCI
- Dr Deborah Long, Director Scottish Environment Link
- Prof Geoff Simm, SRUC
- John Smith, Farmer
- Philip Sleigh, Farmer
- Russell Brown, Farmer
- Prof Sarah Skerratt, SRUC/ RSE
- Dr Sheila George, WWF Scotland
- Dr Steven Thomson, Economist, SRUC
- Robert Fleming, Young Farmer



Farming for 1.5°
Independent inquiry
on farming and
climate change in
Scotland

What were we hoping to achieve?

- 1. What can the industry get on with now?*
- 2. What technical, scientific and genetic solutions exist?*
- 3. Suite of options for short term action?*
- 4. Which are the best to test, trial or research further?*
- 5. What system changes are necessary long term?*
- 6. How do we make it as easy as possible for farmers?*
- 7. What Government & others need to do to help*

Agreed principles

- Nature and climate must be tackled together.
- Everyone has to do something, and something in it for everyone.
- We need to reduce emissions while maintaining food production per capita, **not just reduce the intensity of emissions.**
- A high-level, transparent, science-informed **climate and nature literate transformation group** should be established
- Need to respond quickly. **The advisory service is key.**
- There should be **targets for individual gases.**
- Land use change should be planned rather than left to **the market** guided by science.



Phase 1: Underpinning actions

Phase 2: A farmer's mitigation menu

Phase 3: System change to low emission production

Phase 4: Whole farm system change

Phase 5: Land use change

CO₂ - efficiency savings /fully decarbonise farm machinery

Methane - reduction of 25% by 2032 (50% by 2045)

- better animal health,
- improved genetics,
- early adoption of feed additives and
- better management of manures.
- low methane breeding and feed additives.

Nitrous oxide - reduction of 25% by 2032 (50% by 2045)

- more efficient use of bagged nitrogen, manures and slurries,
- increase in the use of legumes and the
- reduction of nitrogen use in the large areas farmed for nature.
- Nutrient budgeting,
- yield mapping, crop monitoring,
- controlled release fertilisers
- variable rate application

In combination, this means a **55% reduction in emissions by 2045**. Our proposals also provide for continuing grassland and arable soil carbon sequestration through best practice management, and significant on-farm sequestration in woodlands and wetlands.



This is about helping future-proof the industry

*It will require a range of responses... and
People and businesses working together
more effectively, up, down and across
sectors and supply chains...*

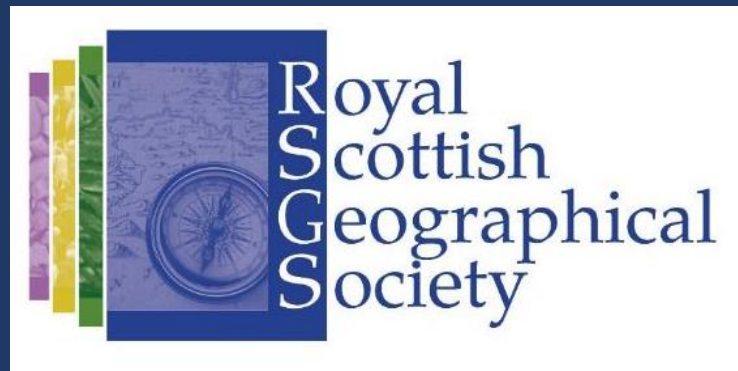
Scotland has a target of Net Zero by 2045

*And agriculture has a
critical role to play...*

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