

# Agronomists' Induction: Session 5

Alex Wade



# South East



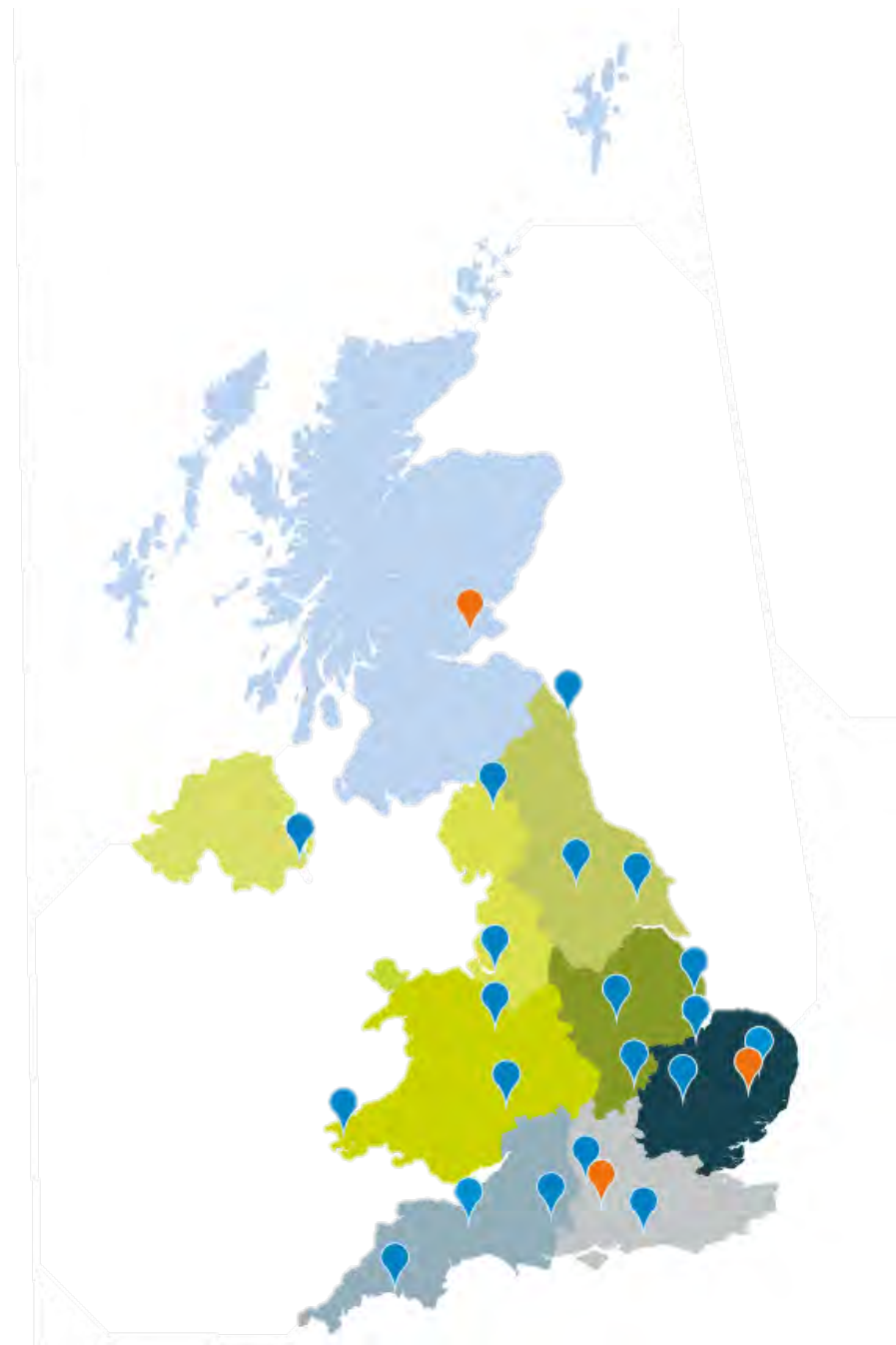
**Newbury**  
Robert Waterston



**Petworth**  
Mark Chandler



**Strategic Farm South**  
David Miller



# East Anglia



**Wisbech**  
Andrew &  
Sam Melton



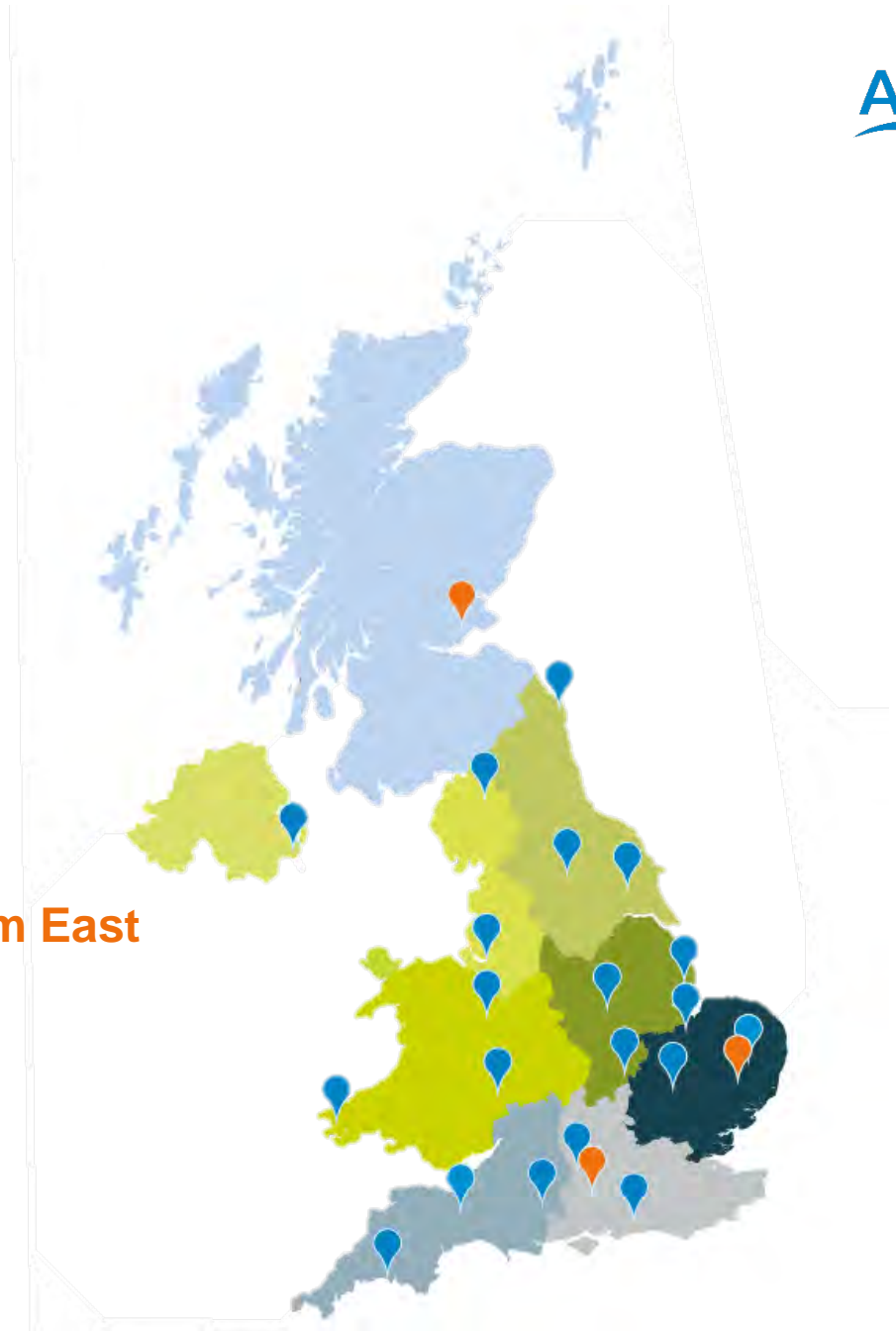
**Diss**  
Richard Ling



**Duxford**  
Tom Mead



**Strategic Farm East**  
Brian Barker



# Agronomists' Induction: Session 5

## **Introducing flowering strips on farm**

Aoife O'Driscoll, Senior Specialist - Crop Protection and Agronomy, NIAB

## **Monitoring and measuring carbon**

Sarah Wynn, Managing Director – Climate Change and Sustainability, ADAS

# Introducing flowering strips on farm

## Agronomists' Induction 2021

*27<sup>th</sup> October 2021*

Dr Aoife O'Driscoll (NIAB)

@allohexaploid @niabgroup





# Introducing flowering strips on farm

- Scene setting, background to Strategic Cereal Farm East
- What's in the flower strips?
- How did we study them?
- Key findings; insect species, floral resources and methodology
- Take home messages for today and the future



# Flower and grass margins: a hot topic!

## Common questions:

- What are the best flower and grass species to grow for natural enemies of cereal pests?
- Where should my flowering strips feature in the landscape?
- How and where should I look for pests and beneficials in the margins and the crop?
- How do I get started?
- What can I try or do on-farm right now?



# AHDB Strategic Cereal Farms



Strategic Cereal Farm West

Cereals & Oilseeds

The Strategic Cereal Farm West is a platform integrating research and practical farming that has the



Strategic Cereal Farm East

Cereals & Oilseeds

Strategic Cereal Farm East hosts new research in the east of England



Strategic Cereal Farm South

Cereals & Oilseeds

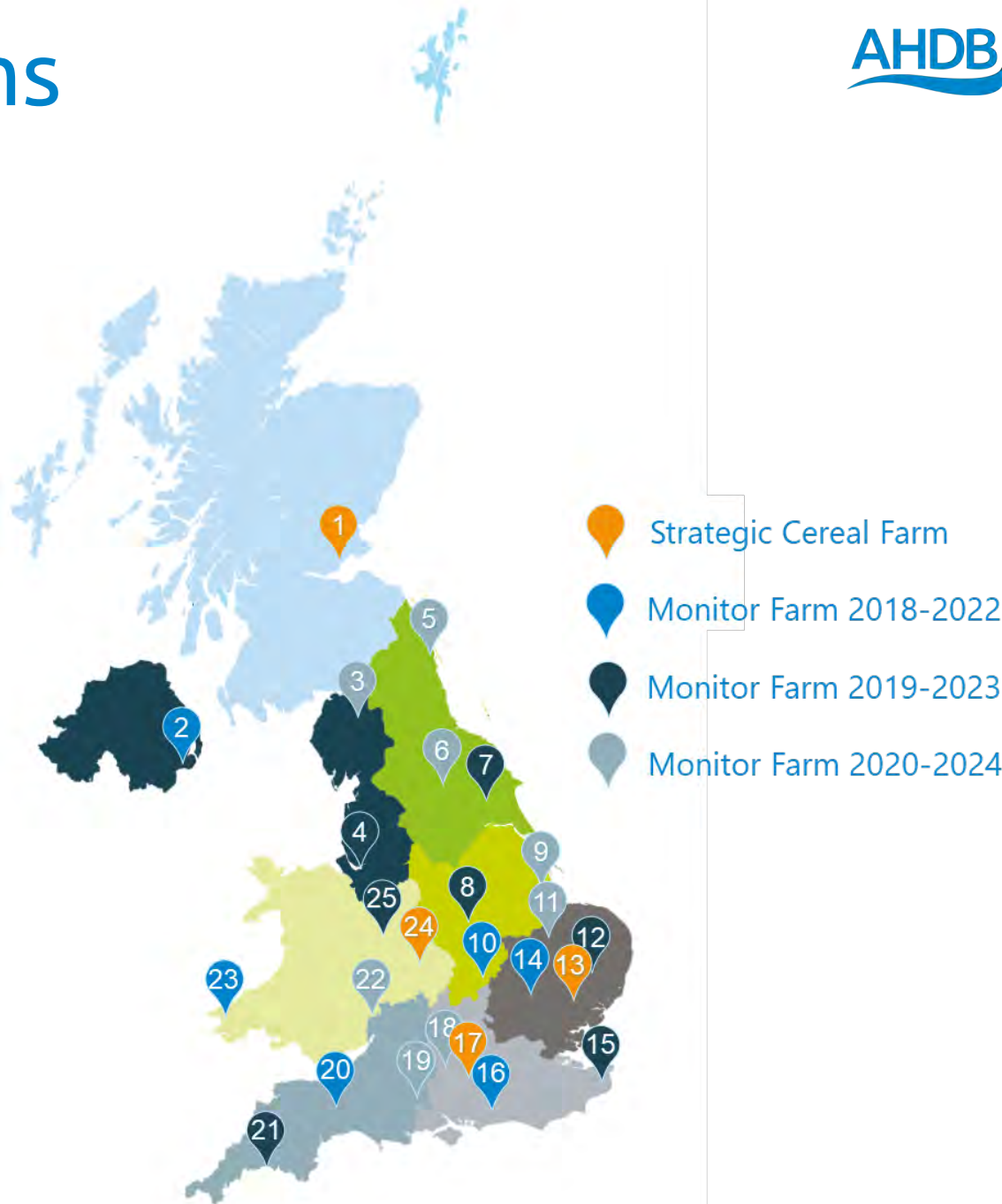
An overview of Strategic Cereal Farm South



Strategic Cereal Farm Scotland

Cereals & Oilseeds

Strategic Cereal Farm Scotland hosts new research in Scotland





# Research question: Can flower strips affect the diversity, distribution and number of pests and beneficials in an arable system?

## Objectives

- Are there different numbers of slugs, aphids and natural enemies in the strips and field?
- Weed abundance: did the plants in the margins encroach on the crop?
- Flowering phenology: presence and abundance of plant species.
- Full results session: 15th November



### Strategic Farm Week: In-field flower strips

Mon, 15 November 2021

12:30 PM - 2:00 PM

[Book Now](#)



*Can insecticide use be reduced with in-field flower strips?*

[Other Events](#)

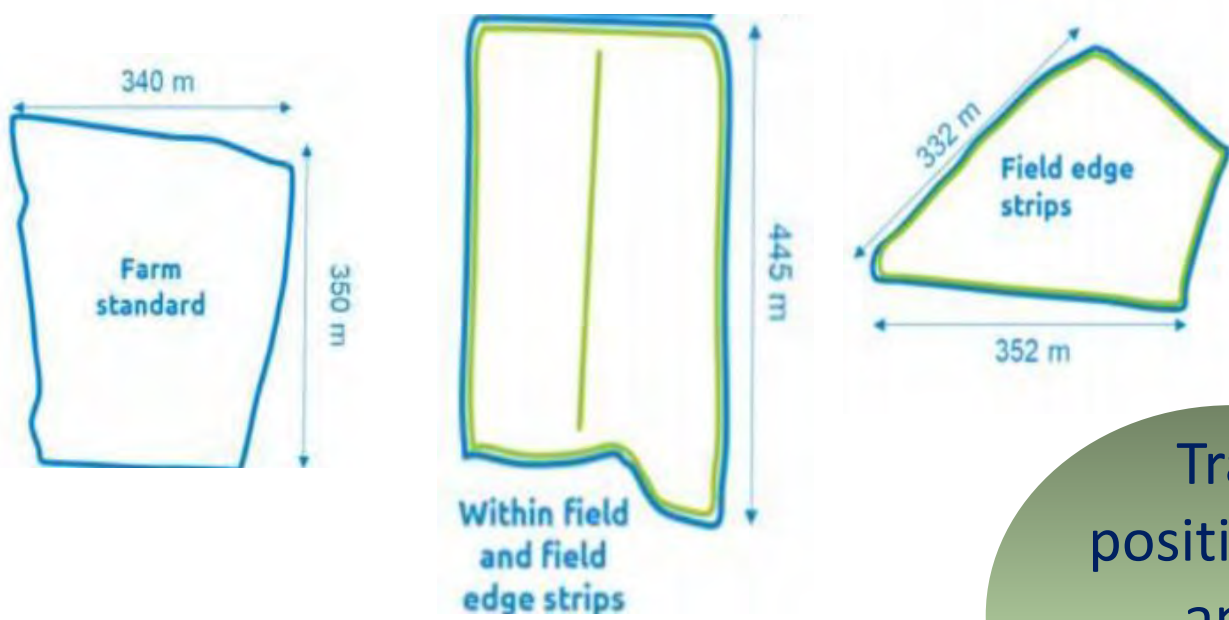


# Sown grass and flower species

Grass mix Sown at 20 kg/ha		Flower mix Sown at 6 kg/ha	
%	Species	%	Species
5	Common bent	12.5	Common knapweed
10	Crested dogstail	15	Wild carrot
20	Sheep's fescue	15	Lady's bedstraw
20	Slender creeping fescue	10	Oxeye daisy
20	Chewing's fescue	12.5	Ribwort plantain
5	Small Timothy	5	Salad burnet
20	Smooth-stalked meadow grass	1.5	Selfheal
		6	Common sorrel
		10	Red campion







Trap positioning and assessment points

+ Within field strips



Farm standard



Field edge strip





# Autumn and summer views

November 2020



May/June 2021





# Monitoring methods

Autumn/winter



Spring/summer



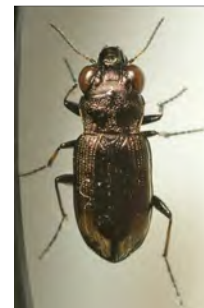
March until August







What do I do with my traps?!



# Common species

- Generalist predators. Active in spring/summer, key pest predators e.g. *Nebria* spp.
- Small generalists. Active in spring/summer. Eat aphids, insect eggs e.g. *Trechus* spp.
- Seed eaters. Contribute to weed suppression e.g. *Amara* spp.
- Specialist Collembola (springtail) eaters e.g. *Notiophilus* spp.
- Omnivores with mixed activity. Like dense habit e.g. *Harpalus* spp.





# Common species

- Money spiders: disperse by ballooning and floating on air currents. Use a small sheet web to trap and feed on a range of pests.
- Ground dwelling spiders: mostly wolf spiders, active predators on the soil surface. They hunt any small invertebrate they can catch and kill.





# Common species

- The soil pest complex: millipedes, springtails, symphylids



- Ladybird and hoverfly larvae



- Predatory midges and larvae



- True flies and sawflies



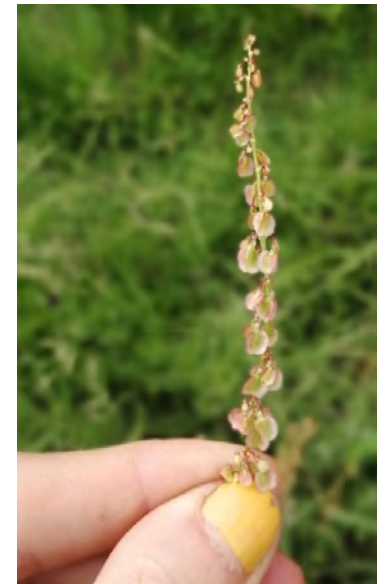
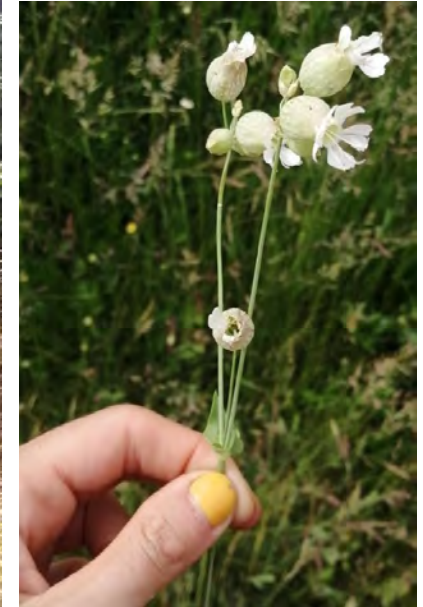
# Plant species counts

Species	Frequency of species present (% of quadrats species present in)				
	Big Guinea Row Edge 1	Big Guinea Row Edge 2	Bottom 59 Edge 1	Bottom 59 Edge 2	Centre margin
Common bent	11	44	9	11	0
Crested dogtail	0	67	82	33	11
Sheeps fescue	56	78	82	33	100
Slender creeping fescue	44	44	100	0	100
Chewing fescue	22	0	0	0	0
Ryegrass	100	100	100	100	22
Small Timothy	44	78	100	89	22
Smooth stalked meadow grass	0	0	100	78	67
Rye brome	0	33	0	0	0



# Plant species counts

Species	Frequency of species present (% of quadrats species present in)				
	Big Guinea Row Edge 1	Big Guinea Row Edge 2	Bottom 59 Edge 1	Bottom 59 Edge 2	Centre margin
Common knapweed	89	89	0	100	78
Wild carrot	89	0	91	100	67
Lady's bedstraw	22	0	0	0	33
Oxeye daisy	89	100	82	78	100
Ribwort plantain	44	67	18	33	44
Common sorrel	67	67	27	0	22
Red campion	44	56	18	0	0
Musk mallow	67	44	9	67	11
Yarrow	11	33	0	11	67
Spear thistle	11	0	0	11	0
Prickly sow-thistle	0	11	55	11	0
Additional species	False oat grass, Ploughman's spikenard, Birds foot trefoil, Yellow rattle				
Species not found	Salad burnett, self heal				



# Key findings

- **Information on:**
  - Abundance and distribution of key plant/insect species for comparison across locations/times.
  - Presence/absence of pest/beneficial species .
  - Ranges were highly variable – lots of zeros with local hotspots.
  - Long term view: Baseline for future years.
- The flowering strips haven't improved crop relevant metrics of pest control-yet!
- Ground beetles and spiders do not require floral resources but will benefit from grasses
- Aphid predators will use the floral resource, but numbers recorded too low to find any change in abundance.
- No two floral strips were alike in their plant species composition.
- Think about:
  - Establishment: ground preparation, weed suppression, soil nutrition.
  - Management: Y1 regular mowing, cut/collect? Weeds common in Y1, composition will change.



# Conclusions: For today

- The scale of monitoring and i.d. skills required to make reliable estimates of changes in insect abundance is very time consuming.
- Easy ways to start investigating-dig a pitfall trap!
- Huge benefit in familiarising yourself with insects on your farm.
- Don't spend a lot of time identifying individual species – get to know some common insects in and around the farm.



# Conclusions: For the future

Thinking about introducing flower margins

- What are the costs?
  - Direct and up front, indirect and long-term benefits.
- Make a business plan
  - 1 page document with Aim, Specific Objectives, main costs and resources needed
  - What you want out of it and by when
  - Summary statement (I am going to do....so that I can....)
- Whole farm approach – how do these fit in?
- Review it every year and tell people about it!







Beneficials found **today**  
Reduce pests in the **future**

Photo credit: Patrick Stephenson





# Carbon Accounting – Why is it useful

Sarah Wynn – Managing Director – ADAS Climate and Sustainability

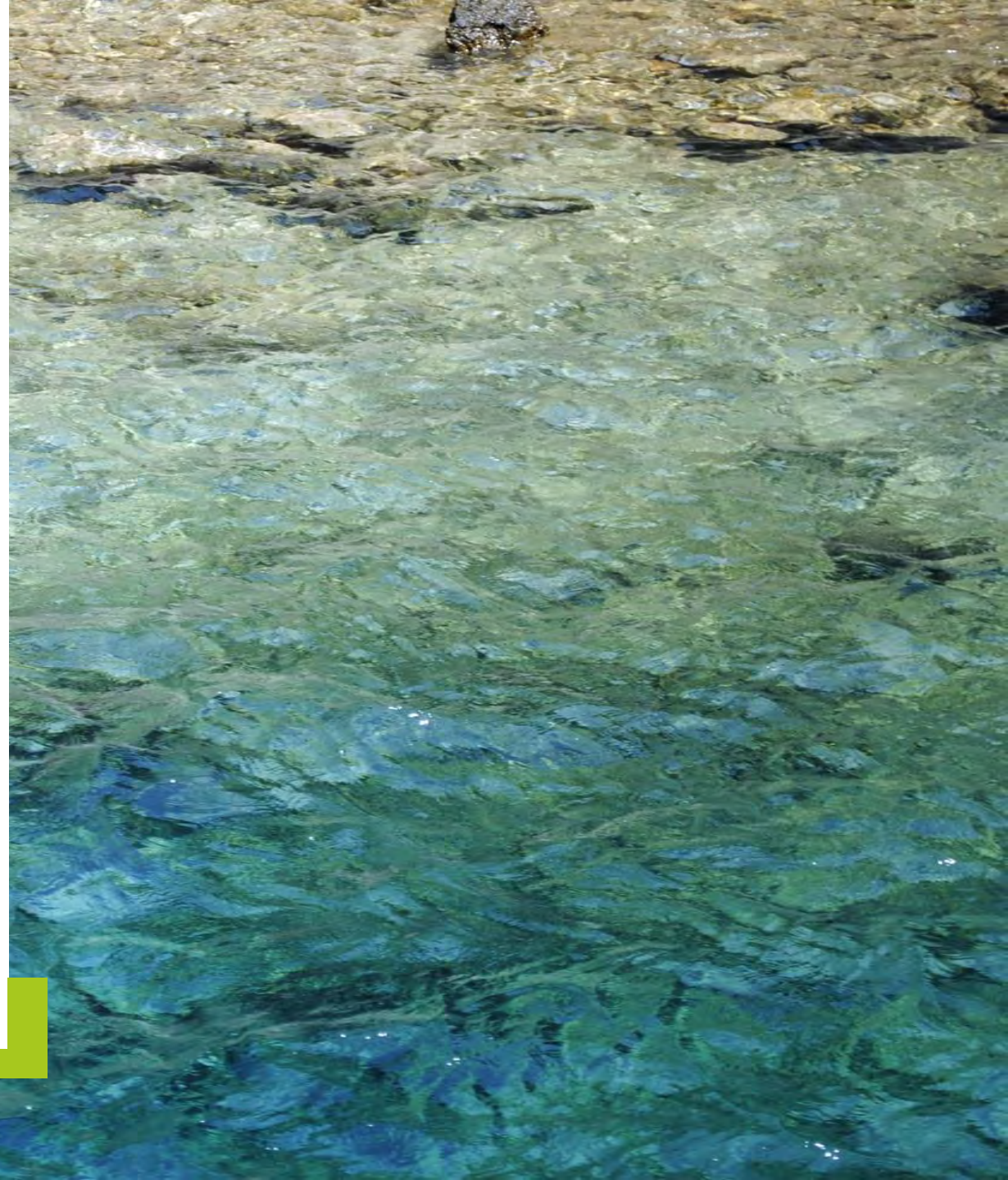
[Sarah.Wynn@adas.co.uk](mailto:Sarah.Wynn@adas.co.uk)





## Carbon accounting

1. Drivers – why should we do it?
2. What is Net Zero?
3. Key sources of emissions from crops
4. Opportunities to reduce, protect and enhance
5. Measurement vs action



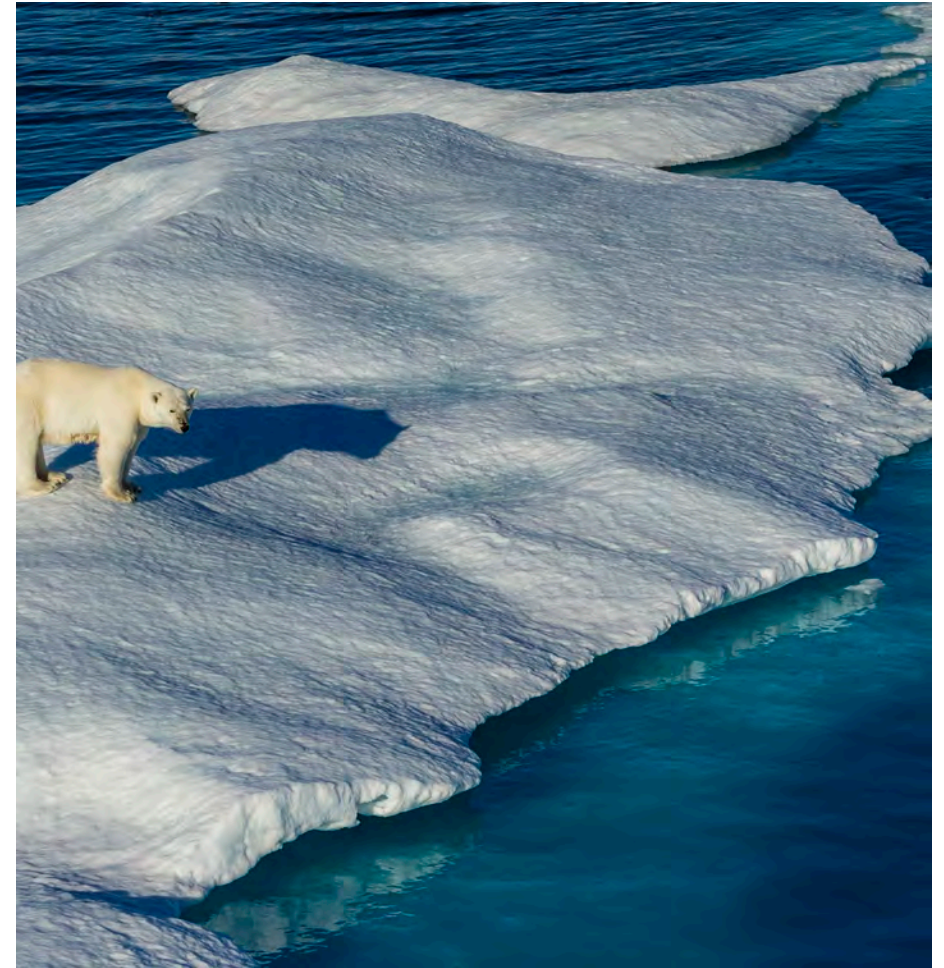




# Paris Agreement

Signed by almost 200 countries

- Legally binding treaty
- Limit global warming to well below 2 degrees Celsius (preferably 1.5)
- Net Zero Legislation coming into place
  - Affects all sectors – including food and agriculture
- Consumer and peer pressure to be seen to act – e.g. Science based targets
- Customer / brand requirements



**31 OCT - 12 NOV 2021**  
**GLASGOW**

# COP26

**IN PARTNERSHIP WITH ITALY**



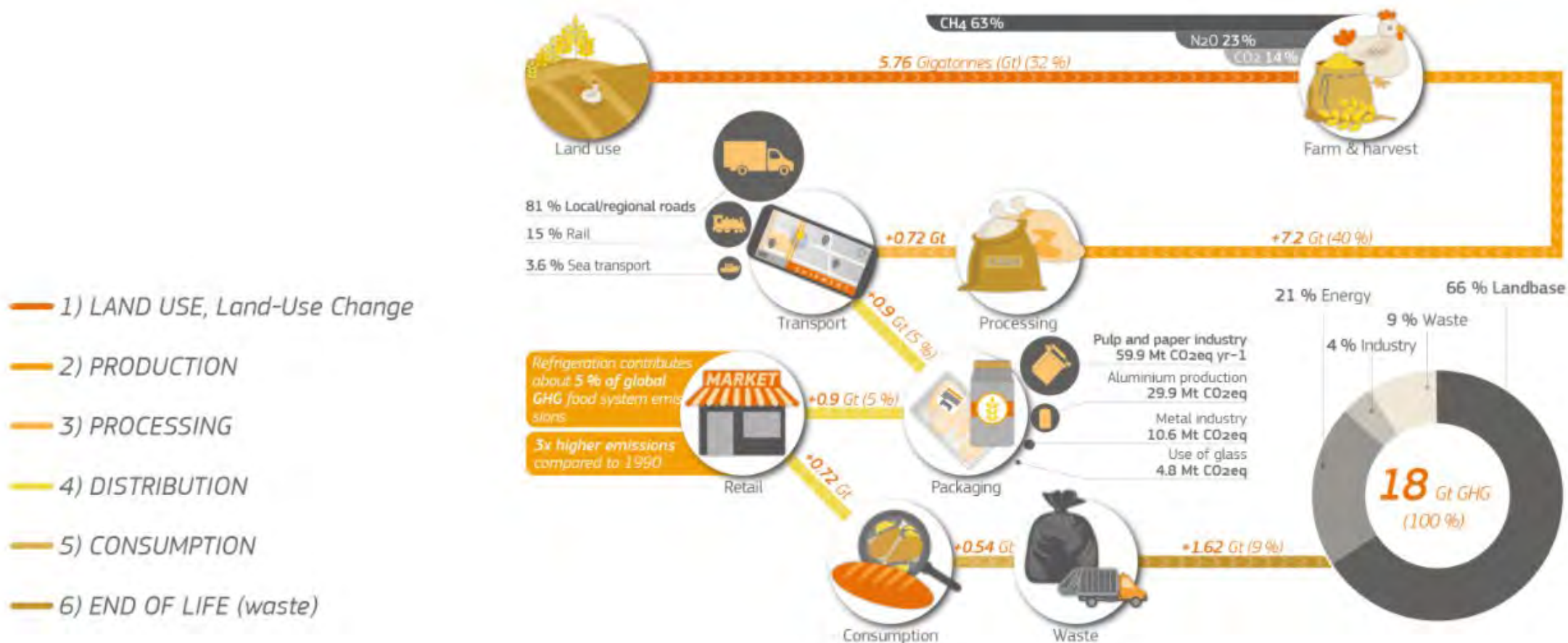
UK Government setting sector level targets, and road maps to Net Zero...

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# Sources of emissions in food chain



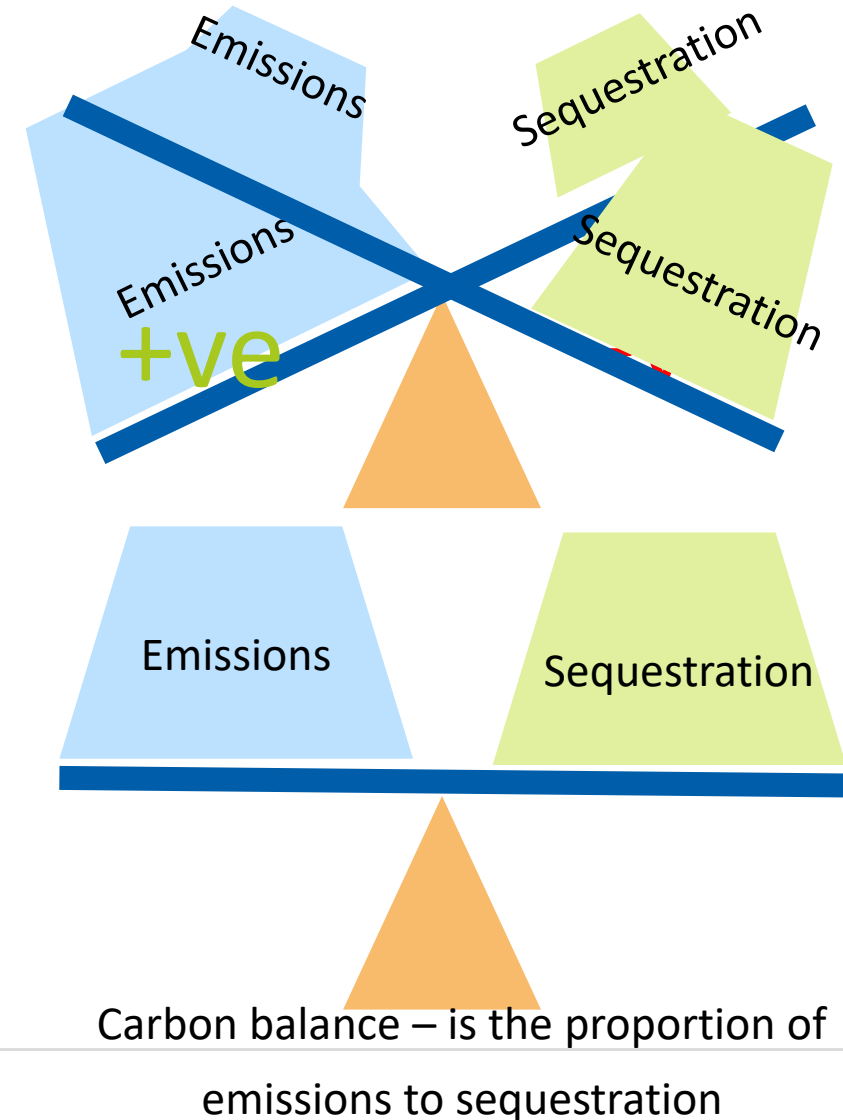


# Some basic terminology

**Greenhouse gas emissions** – these are the losses of greenhouse gases (**carbon dioxide**, **methane** and **nitrous oxide**) to the atmosphere as a result of human activity

**Carbon store** – this is the carbon that is locked up long term in the soils and vegetation present on farm

**Carbon sequestration** – this is the active removal of carbon from the atmosphere and **long-term** locking it up in either vegetation or soil organic carbon



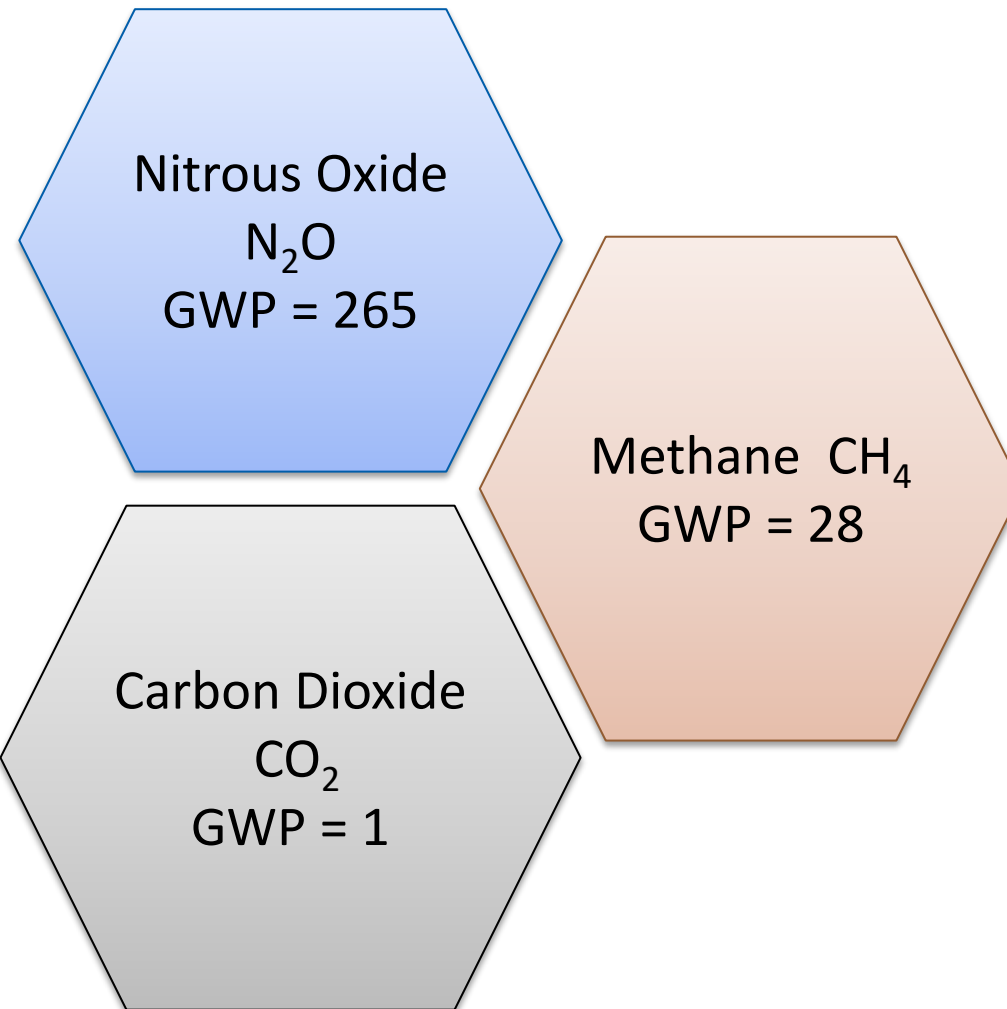


# Agricultural Greenhouse Gases

Different gases have different global warming potentials

- GWPs are compared to carbon dioxide
- The higher the number the more potent a greenhouse gas
- Carbon footprints typically reported in carbon dioxide equivalents

CO<sub>2</sub>e



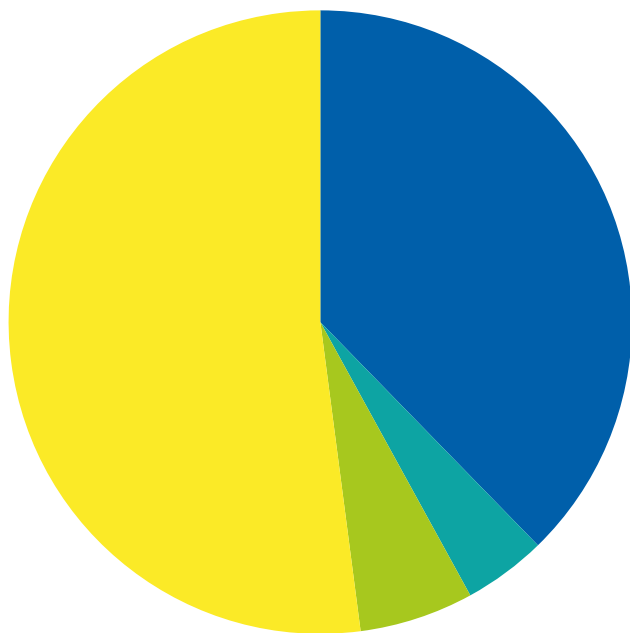




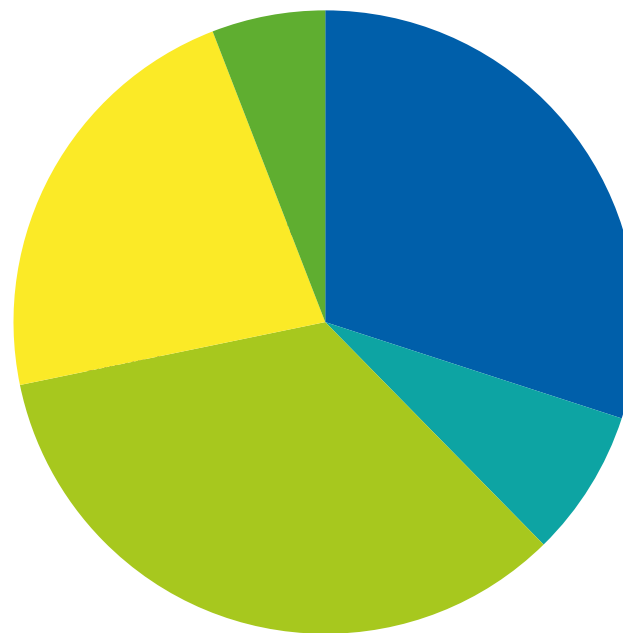
# Where are your emissions coming from – crops?



Feed wheat



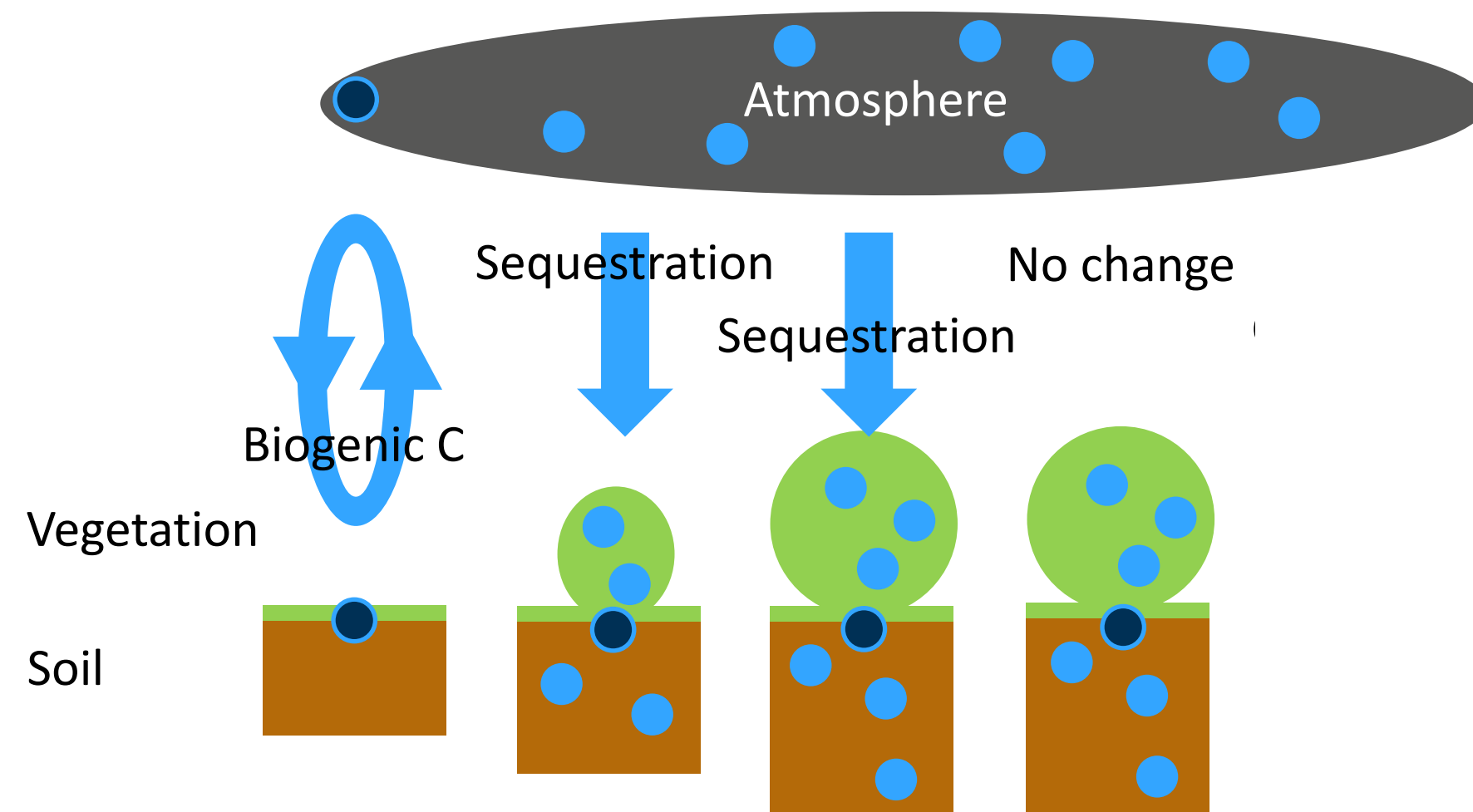
Potatoes



- Fertiliser manufacture
- Pesticides & seed
- Energy
- Soil emissions
- Refridgerants



# Carbon Sequestration



- Increase length, breadth, height of hedgerows
- Increase number of trees on farm
- Increase soil organic carbon levels
- Application of organic amendments
- Use of cover crops



# You can't manage what you can't measure

Why emissions assessment is a useful tool

**Emissions assessment is a means to an end  
it is not the end itself**



# Emissions assessment – Decision support tools

1. Identifies key sources of **emissions**
2. Development of a baseline
3. Scale and **impact** of opportunity
4. Develop a plan to reduce and a model to go forwards
5. How will changes impact emissions?





# Choosing an emissions calculator

There are many tools out there...

- Selecting the right tool helps make better decisions
- Farm vs product assessment
- Ease of use vs accuracy

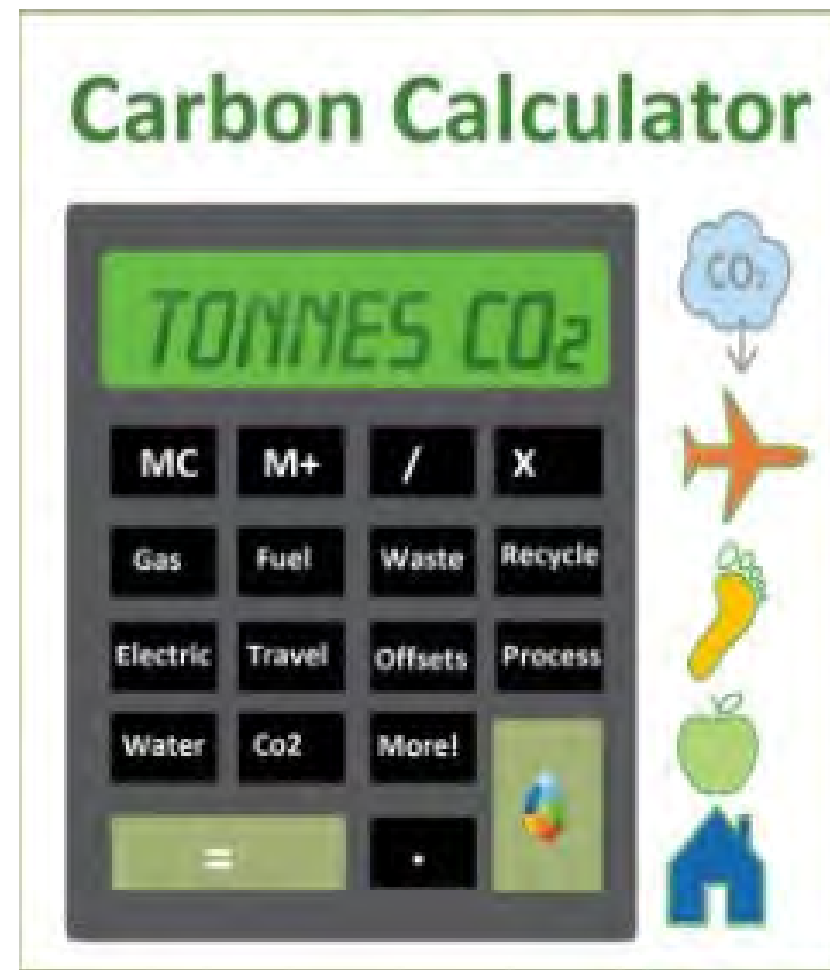


Farm  
Carbon  
Calculator

CFT



agrealc





# No one tool gives 'the correct answer'

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They are all built on assumptions

- Most have a standard approach behind them
- But can make different assumptions
  - E.g. how much embedded carbon is in fertiliser

They can...

- Help identify where hotspots are on farm
- Help you understand how some changes will impact emissions
  - Choice of fertiliser
  - Application method
  - Cultivation method
  - Storage energy consumption

Chose the tool that helps you  
answer your questions...

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# What do tools measure well...



Changes in productivity



Embedded emissions from  
fertiliser manufacture



Fuel usage

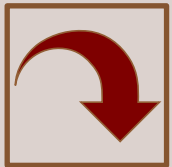


Manure management



Fertiliser application

# What are tools less good at...



Providing detailed mitigation  
– e.g. different manure  
application practices



Carbon sequestration

The tools don't have all the answers

- Sometimes the data requirement is too much
- Sometimes it is 'too difficult'
- And others the evidence may not be sufficiently robust or consistent



# What do you do with results?

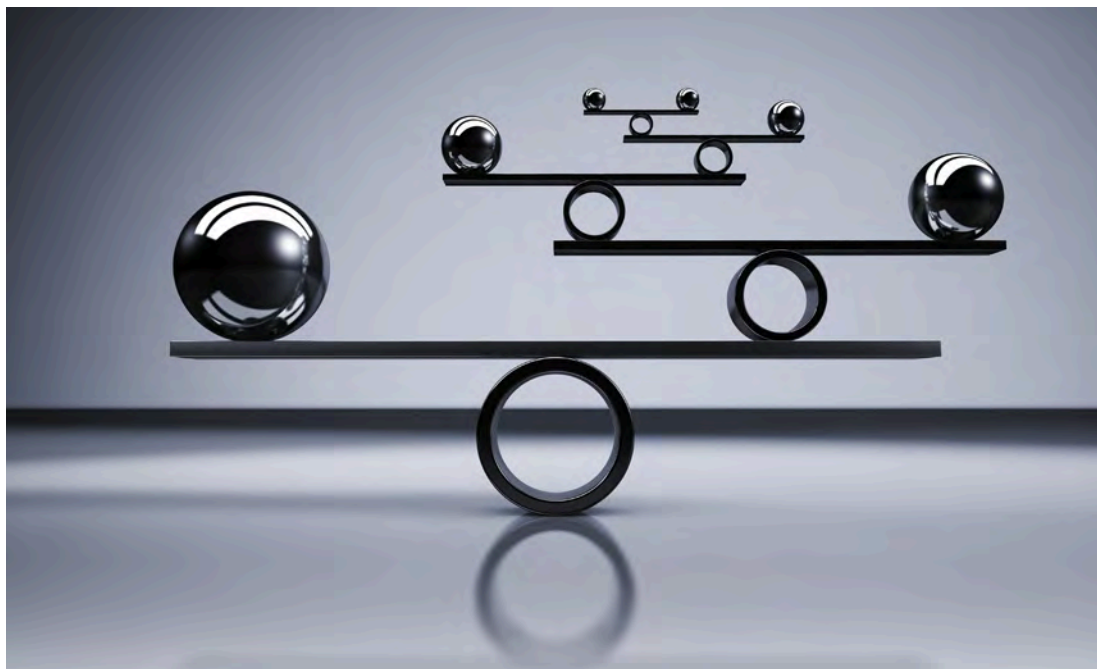
## Action

- Target hotspots
  - Optimise nitrogen, minimize loss to environment
  - Investigate low carbon nitrogen sources
  - Consider fuel efficiency on farm
    - Cultivation system
    - Fuel type
    - Energy source
  - Productivity
  - Crop/variety choice – nutrient use efficiency
- Increase carbon removals





# Carbon credits



## Be careful!!!

- The market is a bit 'Wild West' – unregulated
- What are your current and future emissions?
- Do you have excess carbon to sell?
- Government, customers and consumers will need you to achieve Net Zero in the future – how much will it cost?

## In summary

There is increasing pressure on agriculture to take action to reduce emissions

We have opportunities to increase removals through land management

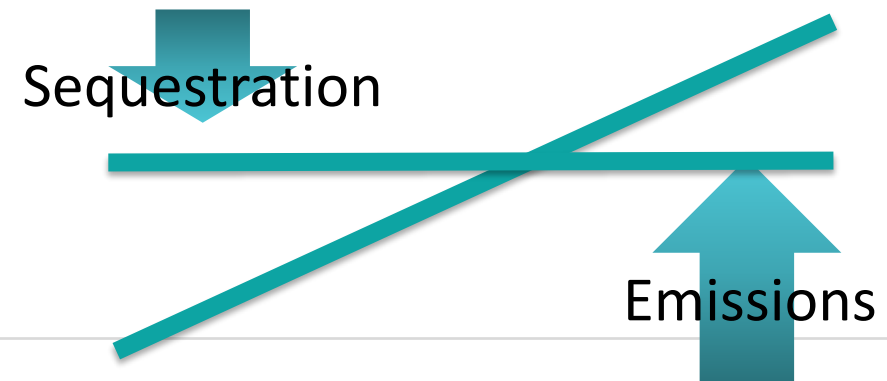
Make sure removals balance emissions before you consider selling any carbon!

Use carbon tools to help


- Identify impacts & opportunities
- Measure scale of change
- Support emissions reduction strategies

But don't rely on them entirely

- They can't measure everything



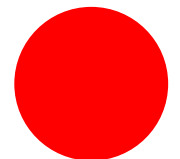




Reducing climate impact is no  
longer a choice, it is a business  
imperative

[Sarah.wynn@adas.co.uk](mailto:Sarah.wynn@adas.co.uk)

## Day 2 Workshop – 09:35

 Red Group – Emperor Suite

 Green Group – Seminar 1

 Blue Group – Seminar 2