



AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY

The Irish Agriculture and Food Development Authority





GHG emission mitigation & agricultural production

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Issues to be explored today

- Why **Ag. GHG emissions** reductions are **now a priority** in some countries?
- **Challenges** encountered in **reducing Ag emissions** while maintaining or increasing production
- **Need progress in**
 1. **implementing** technical Ag. **GHG mitigation** measures
 2. **measuring** Ag. GHG emissions and **emission reductions**
 3. **implementing economic solutions** to GHG mitigation
- **Policy makers will need data** to understand link between
 - **environmental performance** and
 - **economic performance**
 - as an aid to interpreting **productivity implications**

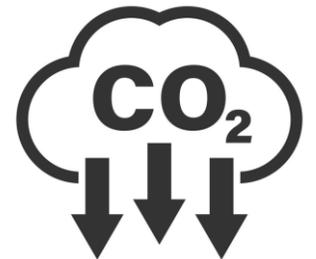


Global Context

- **Climate change** has moved up the **political agenda**
 - e.g. **COP meetings** now have much **higher media profile**
- Significant **international momentum** to reduce emissions
 - **UN SDGs & Paris Climate Agreement**
- Packages of **regional policy initiatives** are emerging
 - e.g. European **Green Deal**
- **National level** reduction **commitments** specified
 - Moves towards **sectoral emission reduction targets** are being made



PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21-CMP11



But climate policy has not really targeted Agriculture. Why?

Features of the Ag Sector...

1. Tends to be a **small share of national GHG emissions**
 - in developed economies
2. **Large number of actors (farmers)**
3. **Longstanding impediments to change within the sector**
 - low profit margins
 - high farmer age profile
 - intense, largely price based, international competition
 - political power of the farming lobby (at least in some countries)
4. **Food production** is recognised for its **global importance**
 - Risk of adversely affecting food supply/food prices



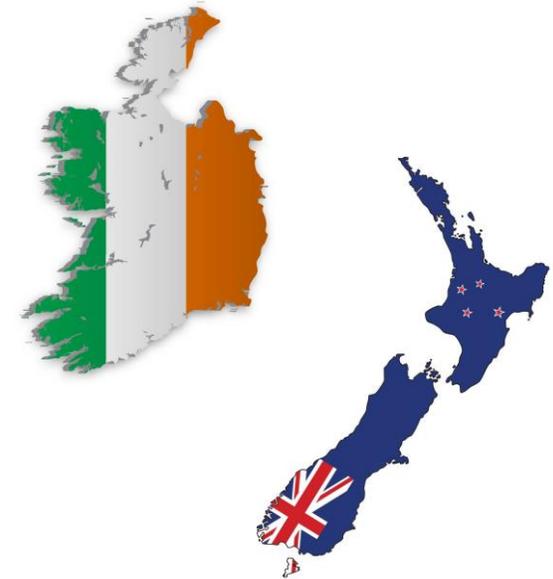
Consequence for Agriculture?

- **Politicians/policy makers** have pursued further “**low hanging fruit**” in terms of **GHG emissions elsewhere** in the economy
- Outcome: Serious consideration of agricultural emission reductions has been **deferred in many countries**
- But now that **position is changing rapidly**
- As emissions fall in other sectors, **spotlight with increasingly fall on agriculture**

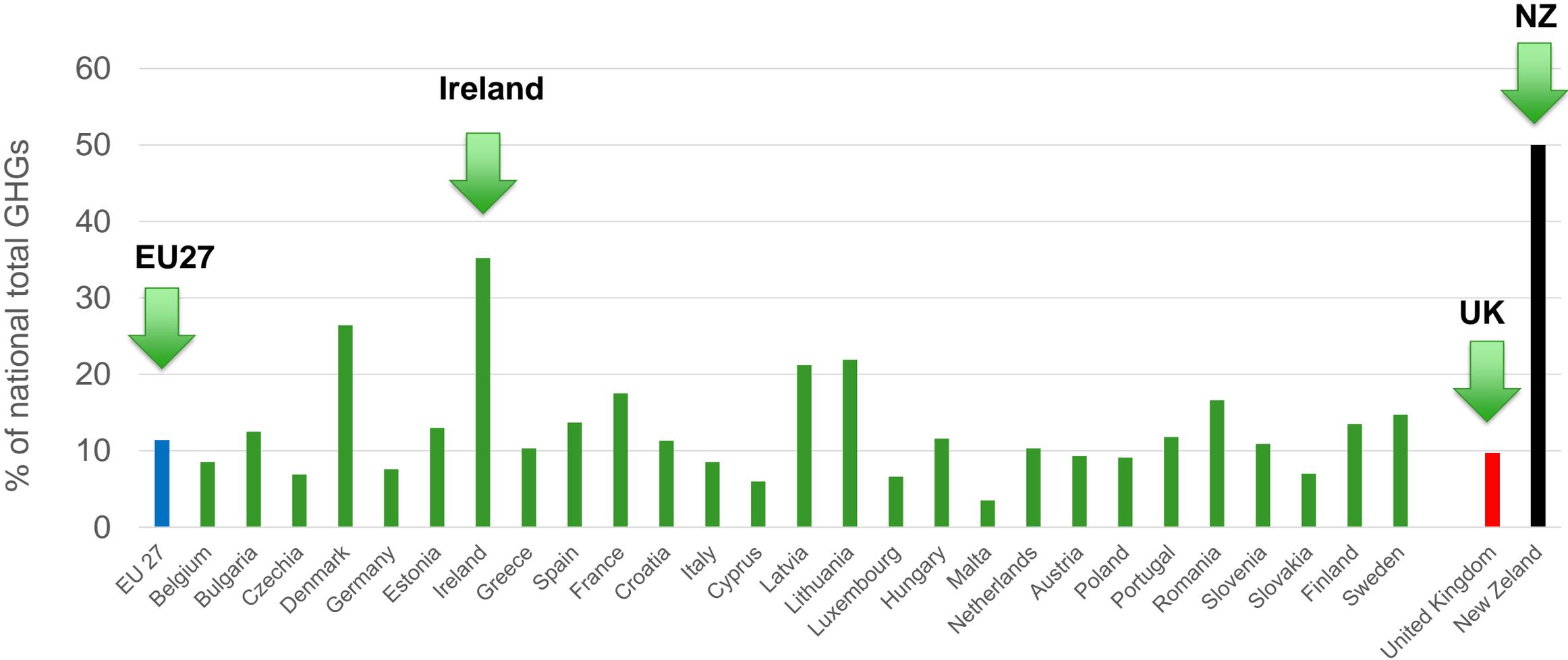


Ireland and New Zealand are outliers

- **Significant % of GHG emissions** generated in Ag Sector in some countries
 - e.g. **New Zealand (50%)** and **Ireland (35%)**
 - **Animal based** agriculture (particularly bovines) dominate
 - » Large export capacity in milk and meat
 - **Small human populations**
 - » which limit transport, power and heat emissions
 - **Service sector focus** elsewhere in the economy
 - » which limits emissions from heavy industrial processes
- As a result, both countries must now deal with Agriculture



EU, UK, NZ Ag GHG Emissions as % of nat. total



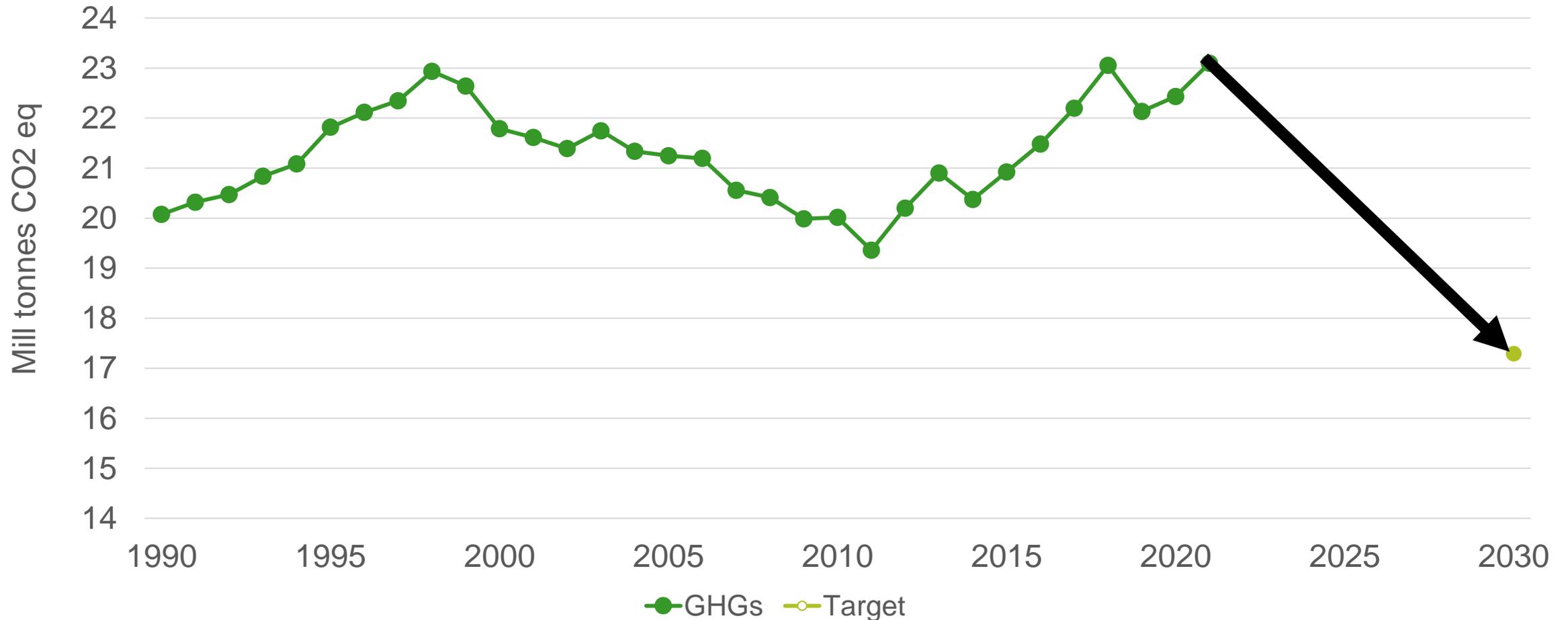
Ireland's GHG mitigation target



- EU context (Fit for 55 Proposal)
- Ireland's EU GHG reduction target
 - **42%** emission reduction to be achieved by **2030** (relative to 2005)
- But Gov. of Ireland has higher nat. policy ambition
 - **51%** emission reduction to be achieved by **2030** (relative to 2018)
 - Sectoral reduction targets have been specified
 - **Agriculture** given a **reduction target of 25%**



GHG Emissions and Projections 1990 to 2021 and reduction required to achieved 2030 target



Some GHG mitigation actions for agriculture

■ Fertiliser

- lower usage (use clover to fix nitrogen in the soil)
- switch to lower emission fertilisers

■ Animal waste

- low emission slurry application

■ Better animal genetics

- lower emissions per cow
- better cow fertility

■ Dietary changes

- better feed digestibility

■ Feed Additives

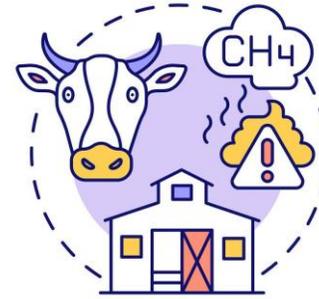
- to reduce methane output

■ + several other mitigation measures



Some GHG mitigation actions for agriculture

- But these actions fall short
 - could deliver ~ **3mt** CO₂eq for the BAU scenario
 - equivalent to GHG reduction of about **17%**
- Larger (25%) GHG cuts would require
 1. additional **new mitigation technologies** very quickly (unrealistic?) or
 2. **animal population reductions**



Challenges around Technical Ag GHG Mitigation

- Some **technical Ag GHG mitigation** measures are low in cost
- Developed originally to **promote efficiency**
 - **improved productivity** with a view to **enhanced profitability**
 - may coincidentally include an **environmental dividend** as a side benefit
- Example: **Lime application** to optimise soil pH
 - correct soil pH improves crop nutrient uptake
 - allowing for lower synthetic fertiliser use (for a given level of output)
- But equally this could result in the **same level of fertiliser use**
 - and a **higher level of output**
- So **efficiency measures** may **promote productivity** and **increase output**



Economic Solutions

- The Economist's contribution to mitigation
 1. Emission Quotas or
 2. Emissions CAP and Trade Schemes
- **Mixed interest** in economic solutions on the part of **policy makers**
- Happier to run with “**scientific**” (aka technical) **mitigation** measures



Regulatory Solutions: Emission Quotas



- **Historical experience** with implementation
 - milk and sugar quotas
 - on paper an approach which could be made to work
- But **their simplicity is their weakness**
 - **blunt** in their **implementation**
 - **limit** the production of **all producers** (including the most efficient)
 - **problematic** in the context of farms with **growth oriented business plans**
- Implementation in connection with GHGs could be challenging
 - **Measuring** farm level **GHGs accurately** is **data intensive**
 - GHG indicators may require **numerous pieces of data**
- Could simplified **proxy measures** be used?

Substantial data needs for GHG estimation

- **Proxy measures** can sometimes be useful
 - but are proxy measures good enough in this case?
 - can they **capture small incremental annual changes made by farmers?**
 - a poor proxy cannot identify small annual changes
- In the end, a **high level of data accuracy** will be required
- Can **simplified approaches** capture changes in emissions resulting from technical mitigation actions?
 - If they can't then they are a lot less useful



Activity Data collected for GHG estimation

■ Animal inventories

- Number / type of animals on farm over the year

■ Manure management

- Winter housing dates
- Slurry / farm yard manure (FYM) storage facilities (covered/uncovered)
- Slurry / FYM quantities applied by season
- Slurry application method (Trailing shoe/hose, injection, splashplate)
- Application to crop (grassland vs arable)

■ Chemical Fertiliser types applied

- Type of chemical N fertiliser applied (e.g. Straight urea versus stabilised urea)



Market Based Solutions: Cap and Trade

- Allocate emission rights to producers
 1. Allow those **emissions rights** to be **tradeable**
 2. **Reduce the total amount of emission rights** available over time
 3. Leading to a reduction in emissions
- Leads to a **reallocation of emissions** to the **more efficient producers**
 - those with lower emissions per unit of product?
- **Create an asset for exiting producers** that could be sold
- Create an **incentive for producers** to explore the **adoption of mitigation technologies**
 - if mitigation technologies are cheaper than emissions rights



Market Based Solutions: Cap and Trade

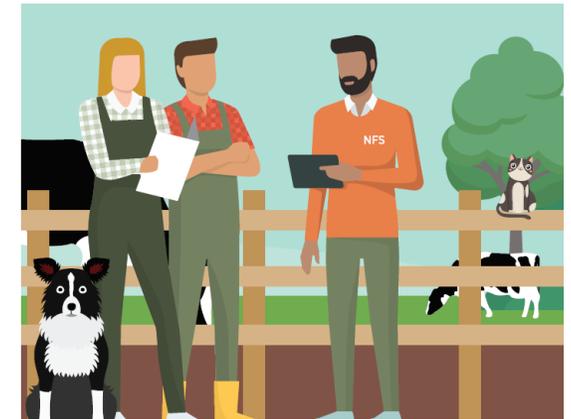


- Issue of **accuracy of GHG measurement**
- Comprehensive emissions measurement will be **data intensive**
- Simplified **proxy measures** may **not** be **sufficiently accurate**
- **Need to recognise and credit technical mitigation actions** when adopted
- Otherwise the **incentive to mitigate emissions** through the adoption of technical mitigation actions **is lost**
 - risk of **reducing emissions** merely by **reducing production**
 - rather than **rewarding the adoption of more environmentally efficient practices**

Question

How feasible is it to

1. Create a **robust GHG mitigation measurement tool** for farms at scale?
 - To cover a significant portion of the farm population
 - e.g 50%, 60%, 70% of the emissions produced in agriculture
2. **Link** such a **GHG system** to the **economic performance** of farms
3. Do this through expansion of the **EU FADN approach**
 - Reflects some of the thinking behind the transition to **FSDN**

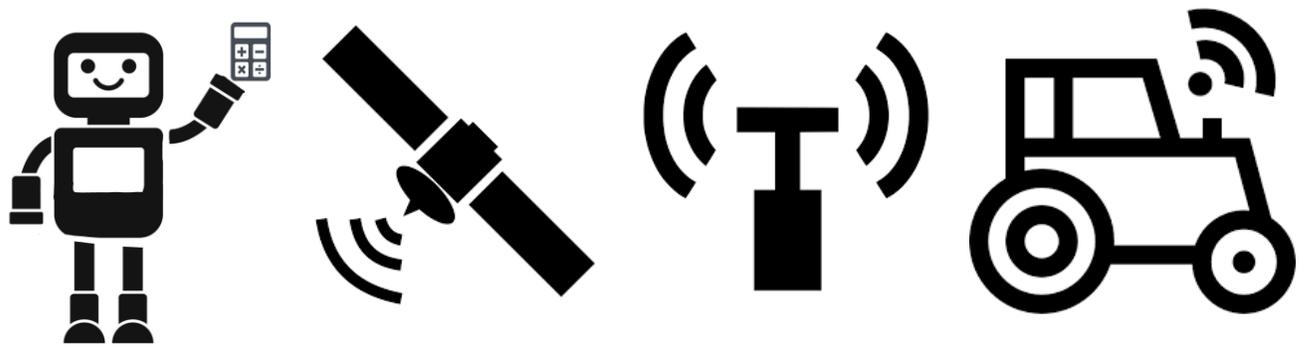


How can new technologies contribute to data collection?



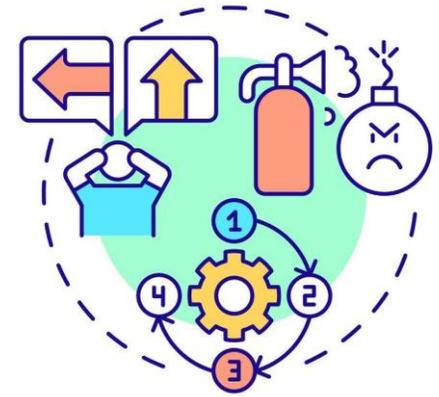
Policy needs

How can new technologies contribute to data collection



Technology developments

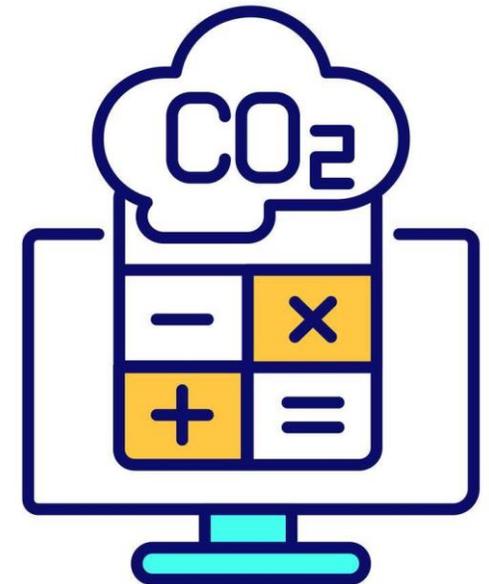
Caveat: Consistency in GHG measurement



- Achieving **consistency** between the **measurement of emission**
 1. at the aggregated **farm level (Bottom Up approach)**
 2. in the agricultural total for GHGs in **national GHG inventories (Top Down approach)**
- **Without consistency, the different approaches may undermine each other**
 - emissions appearing to rise based on one metric
 - emissions appearing to remain static or decline using another

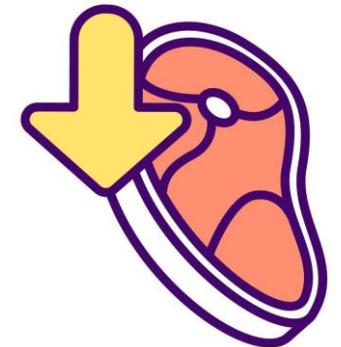
Caveat: Revision of GHG emission calculations

- Issue of **changes** in the emissions **calculation methodology**
- **Scientific uncertainties** exist with respect to our understanding of agricultural emissions
- Could lead to **revision of emissions**
- **Implications** right down to **farm level**
- Could have an **impact** on a **CAP and Trade system**
 - Could **change** the total number of **emission rights** in the system
 - **Driving changes** in the demand or supply of **emissions rights**
- **Undermine farmers' faith** in such a system



Caveat: Overly ambitious emission reduction targets

- **Sufficient technical mitigation** may not be available quickly
- GHG reduction targets then **achieved by reducing production?**
- This then **reduces scope of technical mitigation** measures
- Doom loop!
- In the extreme
 - most of the **GHG mitigation** could result from a **contraction in production** rather than the **adoption of GHG mitigation** actions



Caveat: The only good mitigation action is one that can be counted

- **Mitigation only counts** if recognised in the **National GHG Inventory**
- We know that **some mitigation actions work** (published science)
 - but it can be **difficult to provide data to prove** that in a **real world** context
 - **difficult to MRV** in the GHG inventory jargon
 - MRV = Monitoring, Reporting and Verification
- **Driving the adoption** of farm mitigation actions that we are **incapable of measuring** would be a very **poor outcome**



Conclusion

- Are **large measurable** Ag GHG emissions reductions achievable?
- We have a **range of mitigation solutions**
 - Scientific and Economic
- But their **practical implementation** may be **challenging**
- Part of the solution will involve the **development of richer datasets** that **link the various aspects of farm sustainability**
- Allow us to **better understand the overall implications** of emission **reduction targets** for agriculture
- By doing so we can better determine consequences for
 - emissions
 - farmers
 - production
 - productivity

End