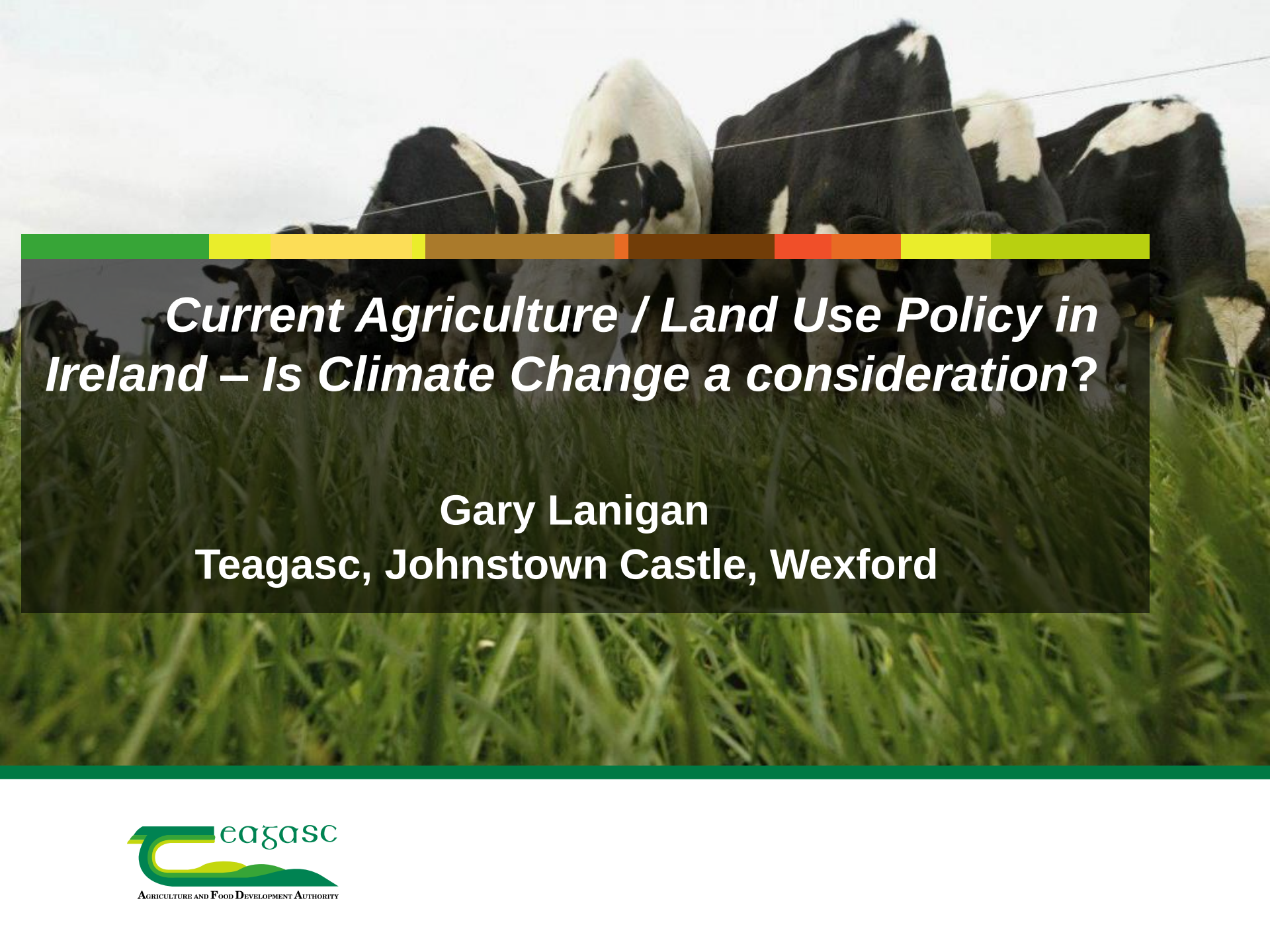




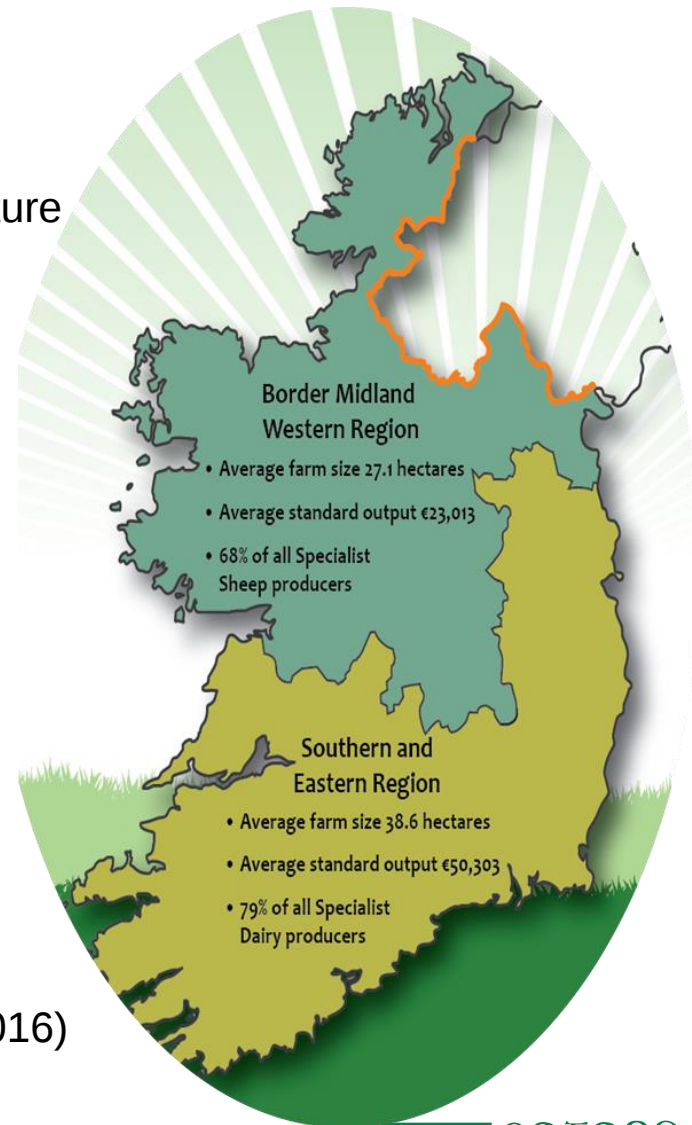
# ***Current Agriculture / Land Use Policy in Ireland – Is Climate Change a consideration?***

**Gary Lanigan  
Teagasc, Johnstown Castle, Wexford**

# Irish Agriculture and Land-use

(2016 data unless specified)

- Agricultural Land – 4.5m ha
  - Grassland: 3.563m ha (91%) – mainly permanent pasture
  - Crops: 0.352m ha (9%)
- Forest – 0.74m ha
- Livestock
  - 7.2m Cattle
  - 5.2m sheep
  - 1.6m pigs
  - 10.1m chickens
- Agri-food in the economy
  - 7.6% GVA (2016)
  - 8.6% employment (including 140,000 family farms) (2016)
  - 10.3% of exports (2016)





# Ireland's farming landscape



- Total number of farmers – 139,600
- Average farm size – 32.5 ha
- Total area farmed (000ha) – 4,536

- Grass based production system
- Long growing season
- Long grazing season

Figure 1.7 Utilisation of land, 2010

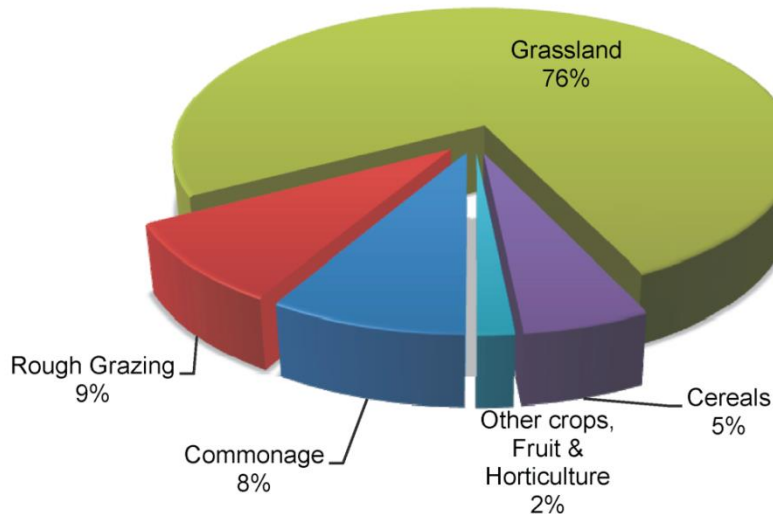
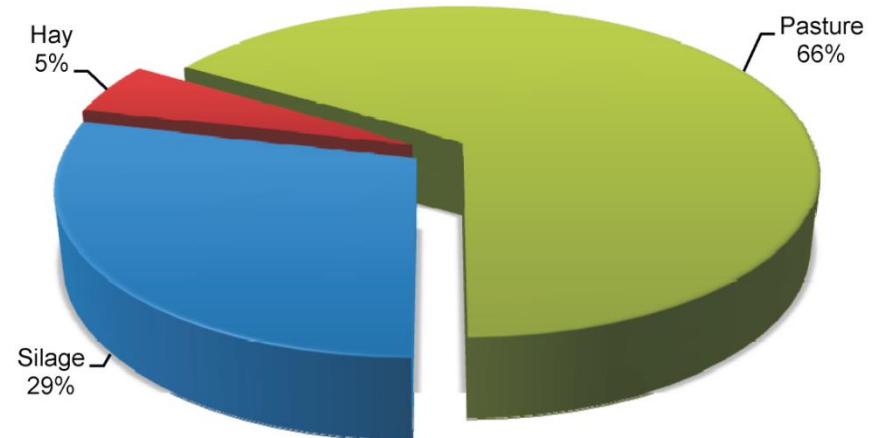
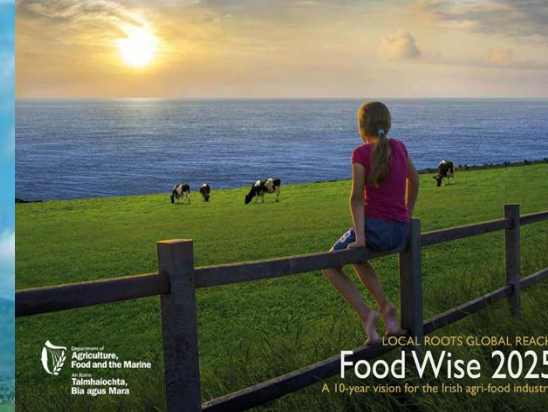


Figure 1.12 Grassland, 2010



# #FoodWise2025 Strategy



**Increase the value of agri food exports by 85% to €19 billion**

**Increase value added to the sector by 70% to €13 billion**

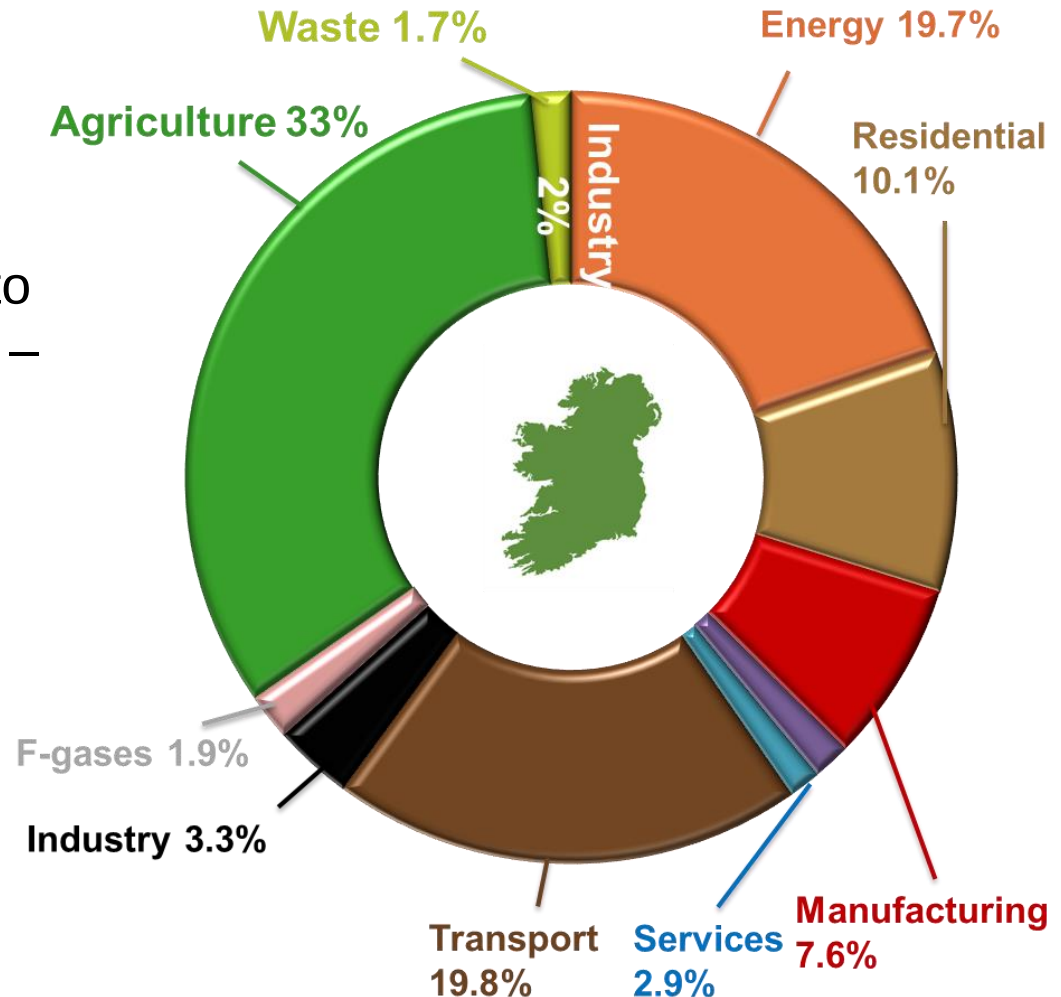
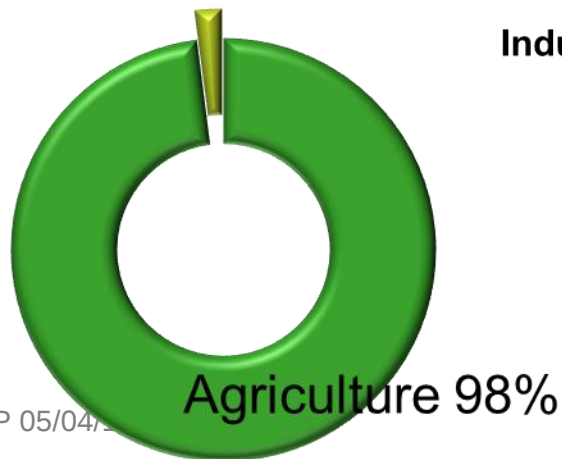
**Increase the value of primary production by 65% to €10 billion**

**Deliver a further 23,000 jobs in the agri food sector by 2025**

# GHG & Ammonia Emissions

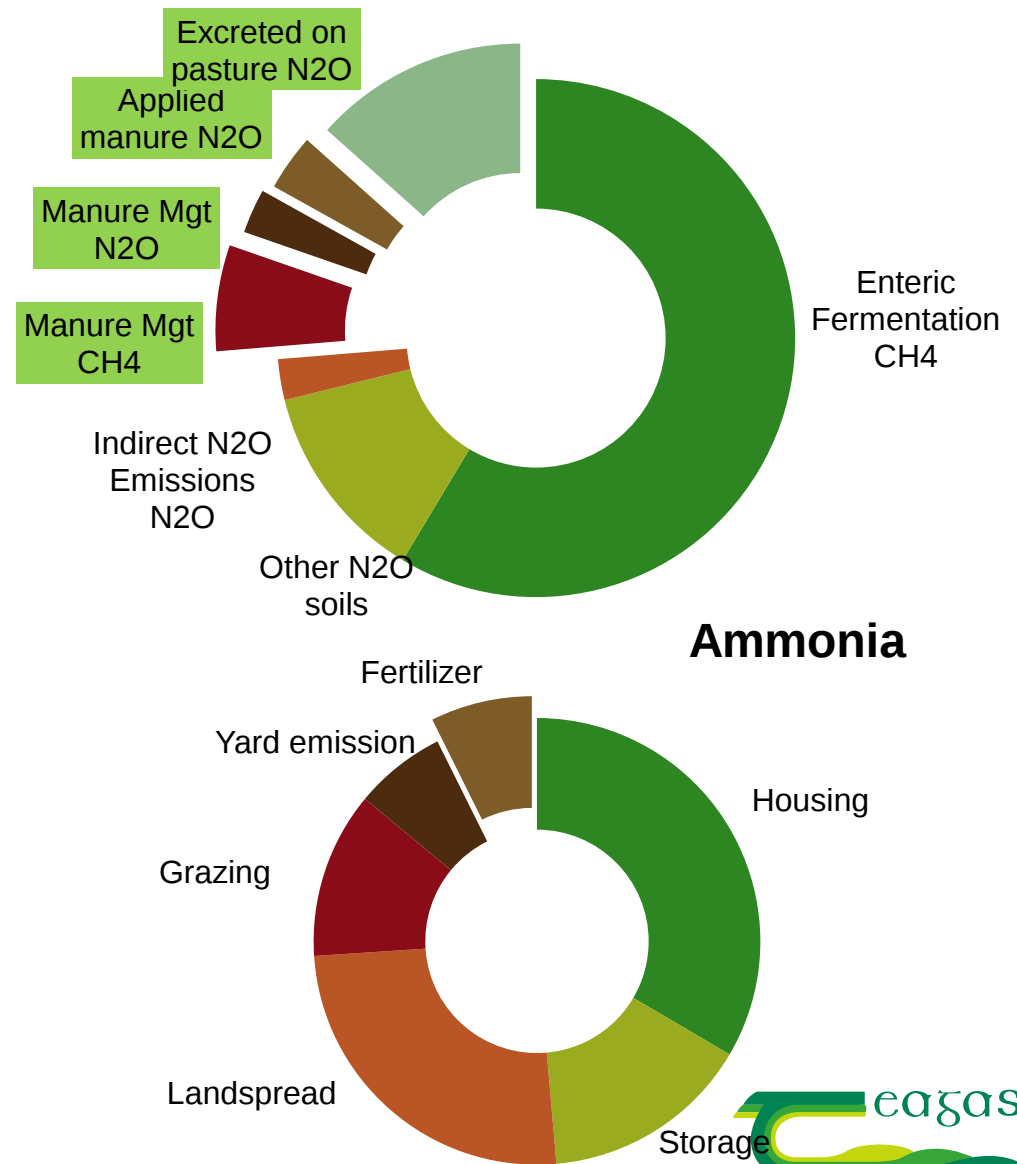
- Irish Agriculture accounts for 33% of Irish national emissions (EU = 9%)
- Due to small industrial base to 'dilute' agricultural emissions – allied to proportionally large livestock sector
- 80% of ammonia from dairy and beef
- Remainder from pig and poultry

## Ammonia



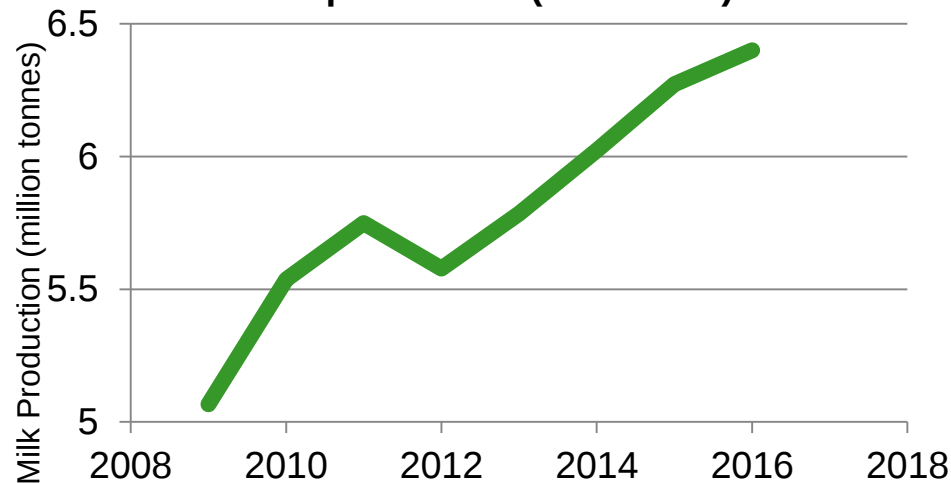
# Irish Emissions Profile

- GHG dominated by methane from enteric fermentation
- Nitrous oxide associated with 32% of emissions
- CO<sub>2</sub> only comprises 1.5% emissions



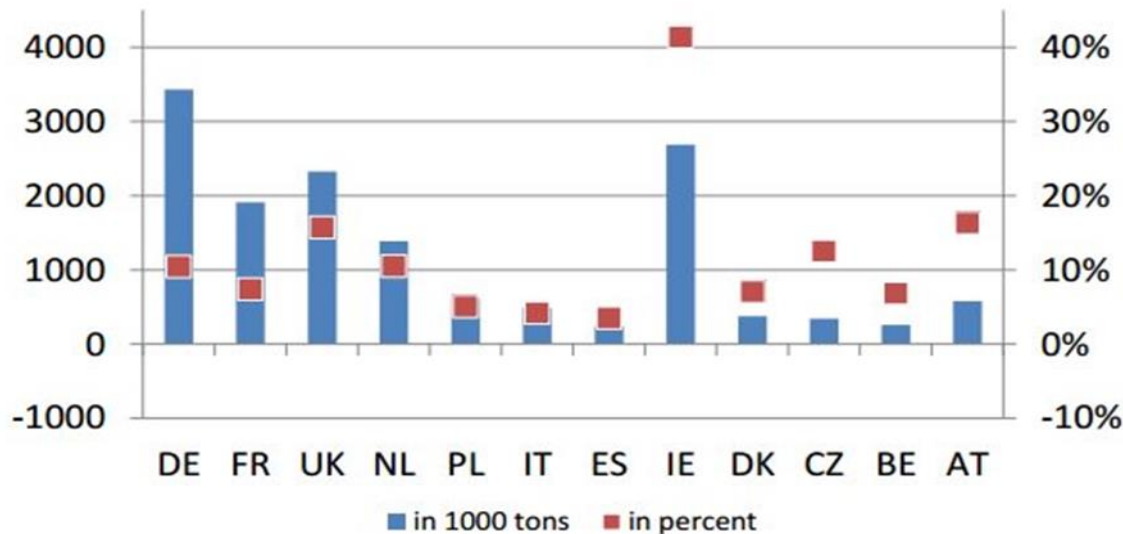
# Improvements in Production capacity

Milk production (2009-2016)



- Agri-food exports increased 56% since 2009
- Dairy production increased 26% since 2009
- EU forecasts 41% increase in Irish dairy output up to 2026

Milk - Change in Production, 2026 vs 2016 (1000t and %)



Source: AGMEMOD simulation

# The Challenges

## GHG targets:

- 20% emissions reduction by 2020
- 30% non-ETS reduction by 2030 (2030 Effort Sharing)

Both GHG and ammonia emissions projected to increase by 2030

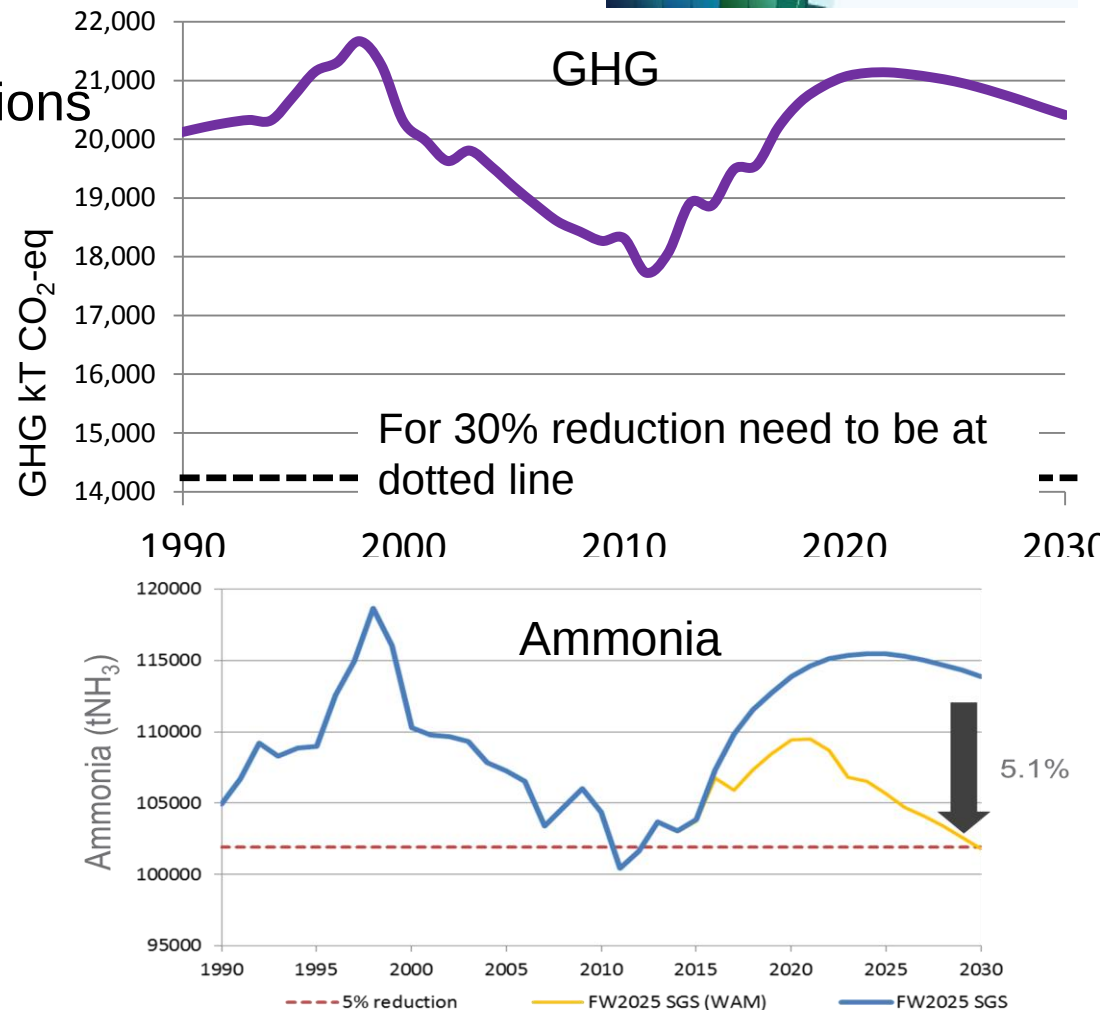
## Ammonia targets:

- 1% reduction to 2030
- 5% from 2030 onwards
- ammonia mitigation can be synergistic

or antagonistic with GHG mitigation

## Nitrates/WFD targets:

- Need to improve water quality/reduce nutrient inputs



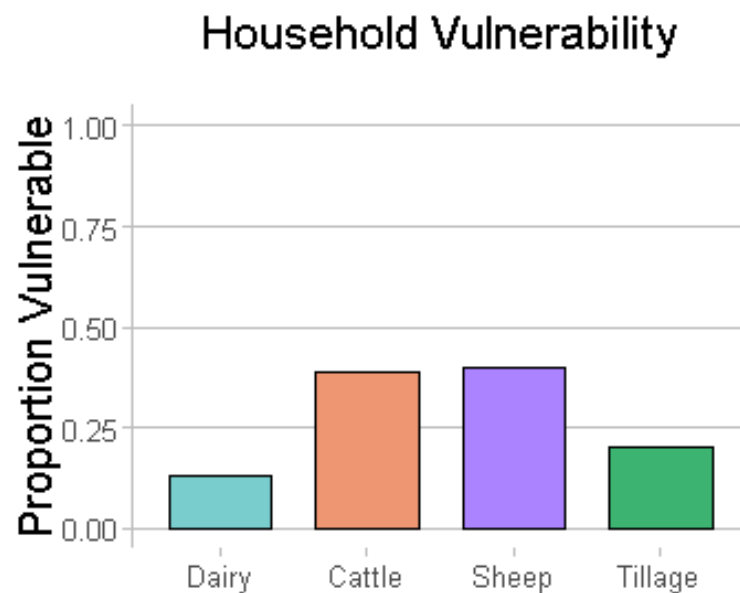
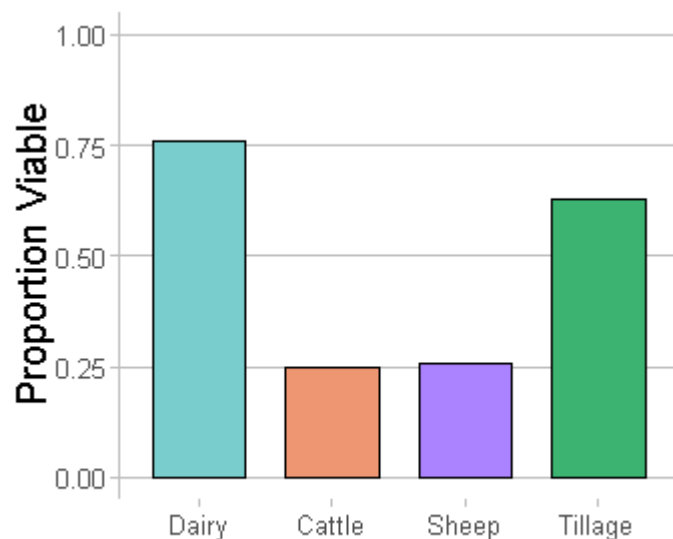
# Sustainability

- Sustainable growth has become a central issue
  - Regulatory requirement and marketing opportunity
- Means different things to different people
  - Environment
  - Economic
  - Social
- Need pragmatic balance between economic growth and environmental concerns
  - Concern for environmental targets
  - But also concern for life quality in rural Ireland



# Economic and Social Sustainability

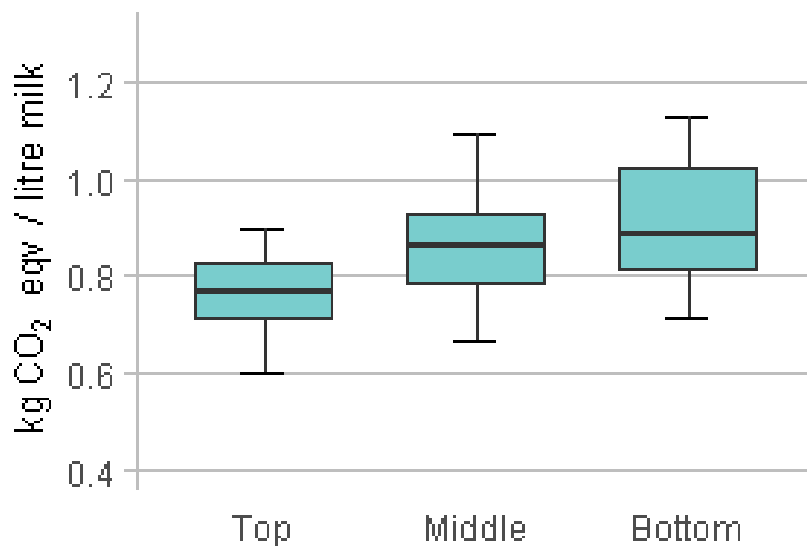
- Gross Output and Margin (per ha.)
- Family Farm Income (per labour unit)
- Market Orientation (% of output from market)
- Economic Viability
  - Ability to earn minimum wage, and 5+% return
- High Age Profile
- Isolation Risk
- Hours Worked on Farm
- Household vulnerability
  - Lack of economic viability + no off-farm employment



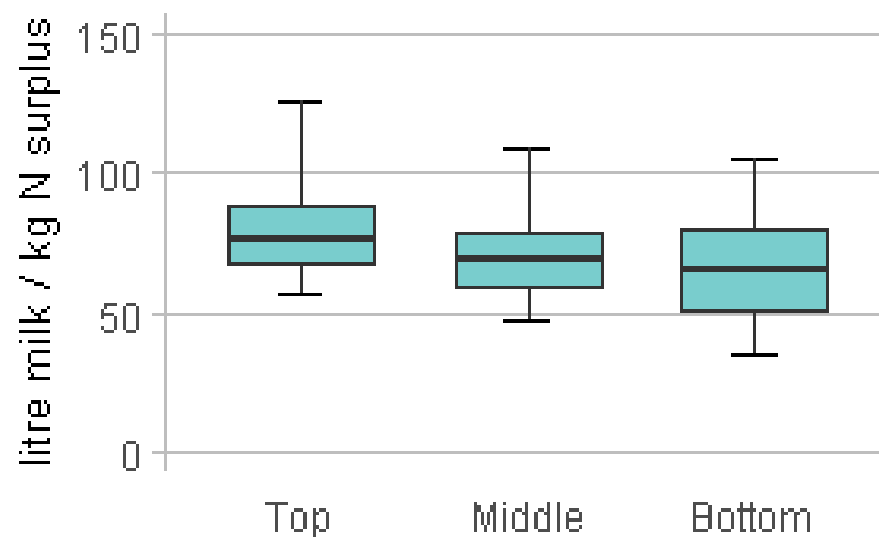
# GHG & Nitrogen Intensity

- Emissions efficiency of production important to highlight
- N balance critical for GHG, ammonia and water quality

Emissions Intensity (Dairy)

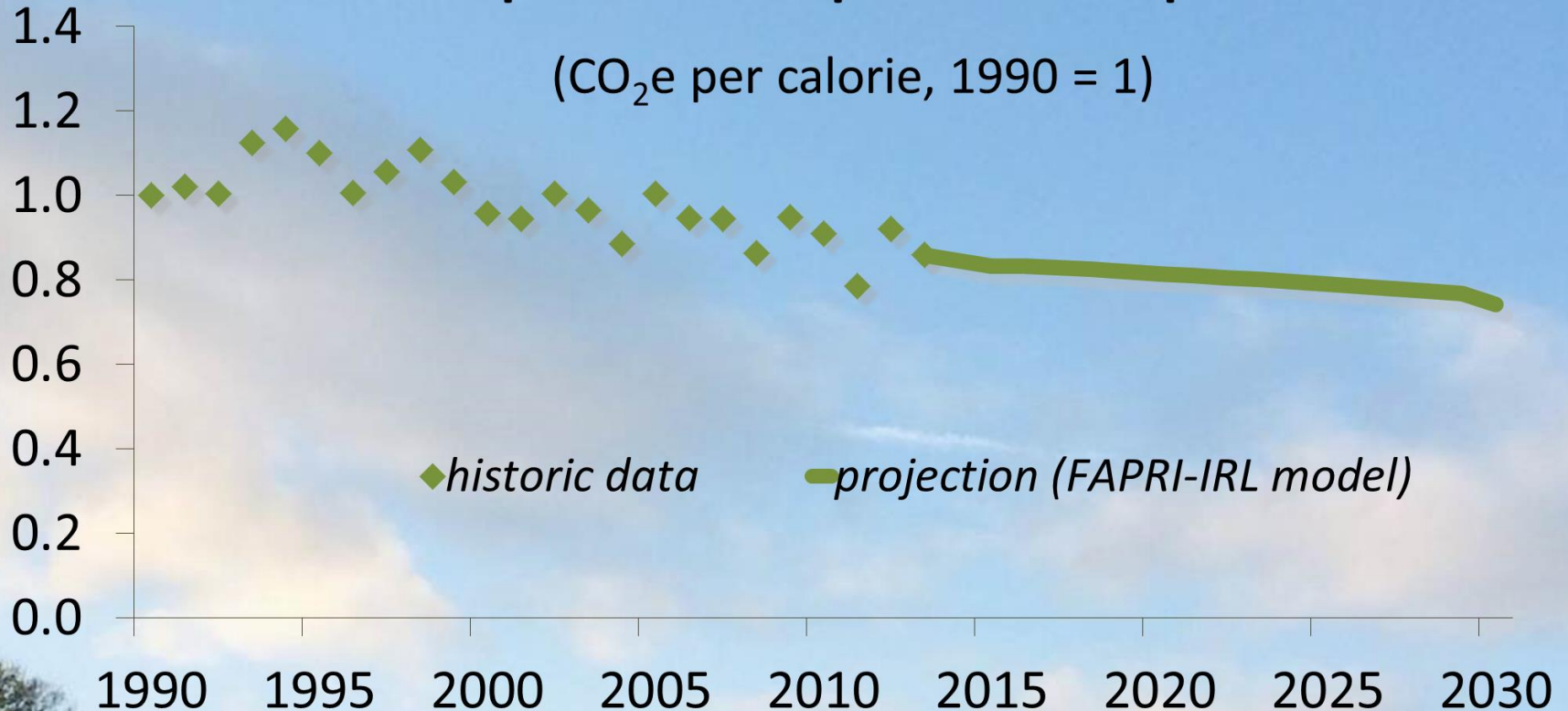


Production per unit N surplus (Dairy)



# Carbon Footprint of Irish produce compared to 1990

(CO<sub>2</sub>e per calorie, 1990 = 1)



# Environmental Sustainability

- **Biodiversity:** Produced as part of a Teagasc-funded project on habitat surveys of Irish farmland in collaboration with Bord Bia.

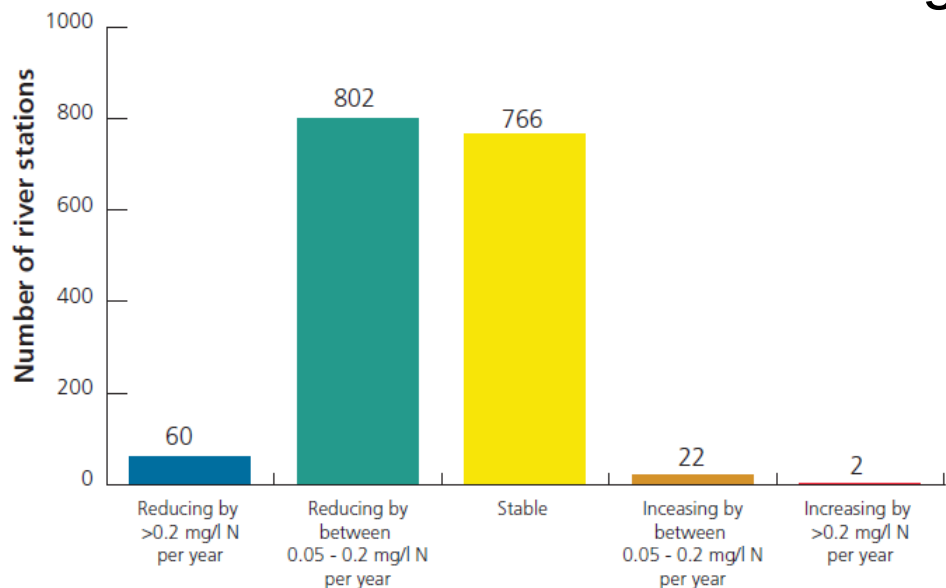


**Water Quality:** Improve resource-use efficiency  
– ACP validating water quality impacts  
Heavy soils programme – will reduce P runoff on vulnerable soils

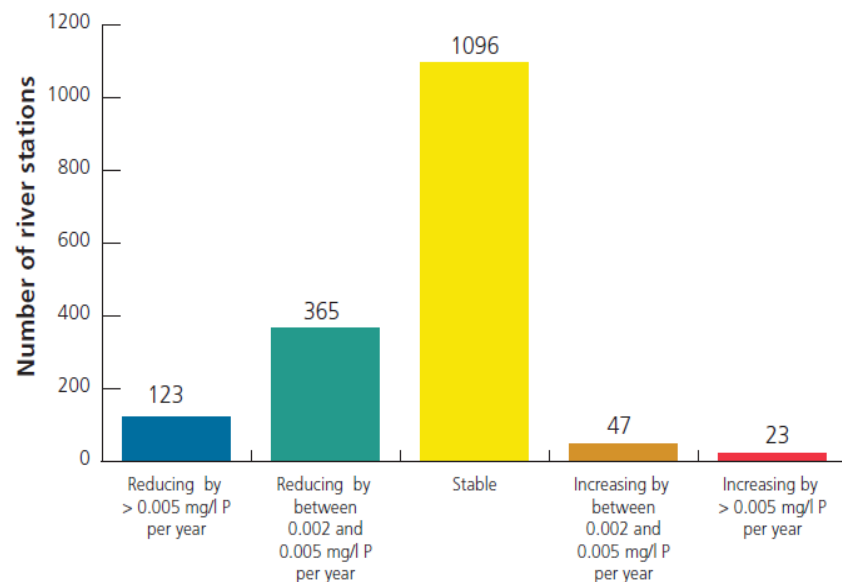


# Water Quality

## Nitrates in water declining

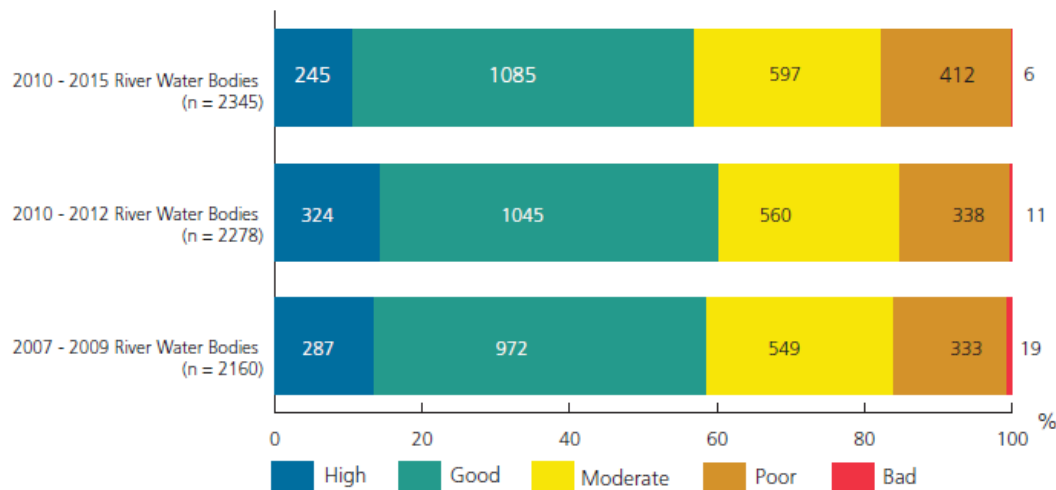


## Phosphorous in water declining



...But in terms of ecological status - 418 river water bodies exhibited an improvement 499 river water bodies declined in status

*EPA (2017) Water quality status in Ireland Report*

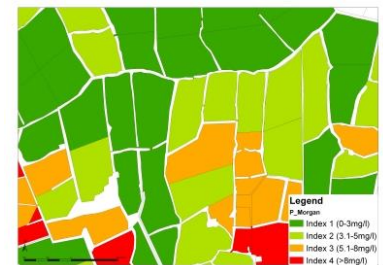
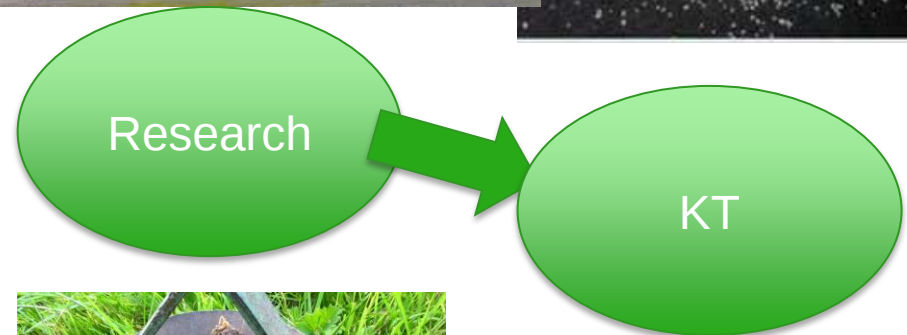


% number of river water bodies

# The Solutions

- Fertilisers and nutrient use – Protected urea can reduce  $N_2O$  substantially, while BY improving liming, N & P-use fertiliser inputs can be reduced
- Manure additives can reduce ammonia and methane by over 90%
- Animal genetics, extended grazing and diet reduce methane

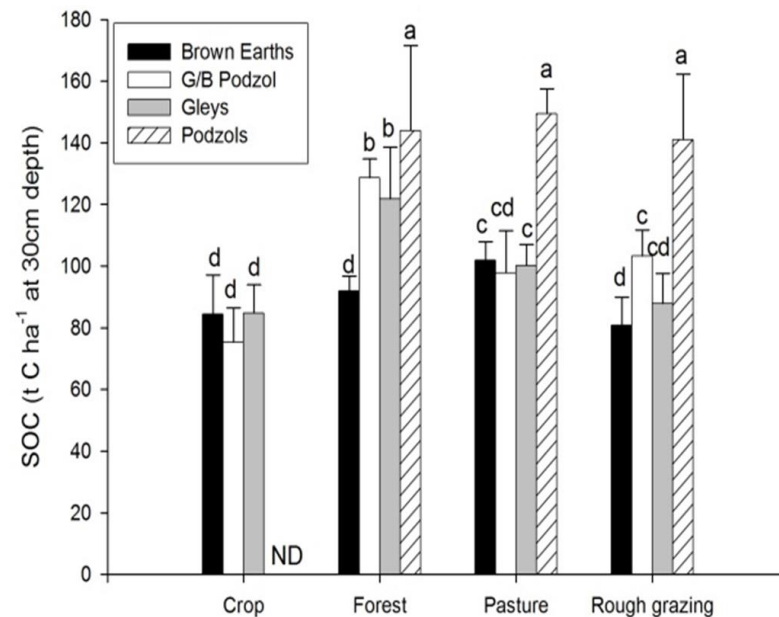
But need effective knowledge transfer - and these reductions won't be enough.....



3C

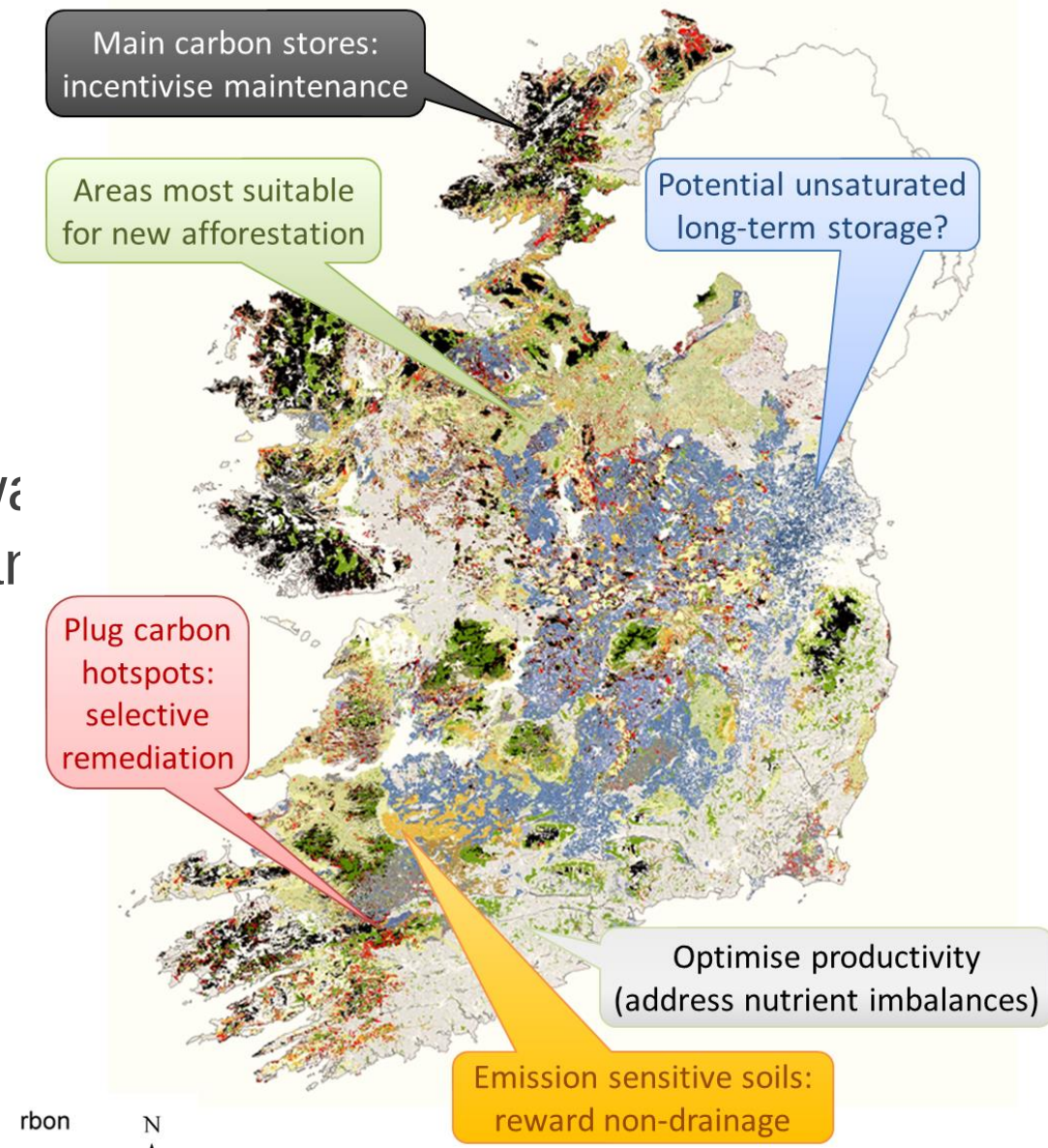
# Carbon sequestration

- Offsets emissions as plants remove CO<sub>2</sub> from atmosphere
- Large amounts held in woody biomass (forests) for 40-100 years
- Soil carbon can remain *in situ* for 100's years – depending on soil type!
- Ploughing for tillage production releases large amounts of C to the atmosphere. CO<sub>2</sub> release can range from 5-35 tonnes CO<sub>2</sub> per annum over a 30 year period depending on soil type
- Can use these 'sinks to offset 5.6% of all national emissions ....but forestry planting rates need to be increased



# Smart Land Use and Land management optimisation is required

- Enhance grassland and cropland sinks through optimal management
- Maintain forestry sinks
- Plug carbon hotspots – water table manipulation on mineral organic soils
- Enhance biodiversity



# Current schemes/measures

- Green, Low Carbon Agri-Environmental Scheme (GLAS):
  - Preserve traditional hay meadows and low-input pastures.
  - habitat preservation and practices such as minimum tillage;
  - apply agricultural production methods compatible with the protection of the environment, water quality, the landscape.
- Targeted Agricultural Modernisation Scheme (TAMS 2):
  - Low Emission Slurry Spreading Equipment Scheme
  - Organic Capital Investment: Rainwater harvesters and equipment to encourage uptake of organic farming
  - Water meters, solar panels, etc. for pig/poultry
  - Upgrade housing facilities
- Good Agricultural Environmental Conditions (GAEC):
  - Maintain soil carbon and ground cover
  - Establishment of buffer strips along watercourses
  - Protection of ground water against pollution

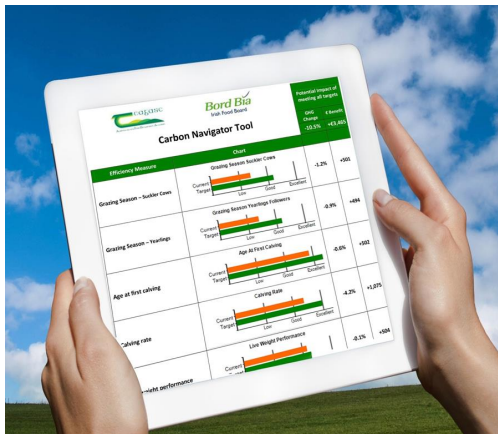
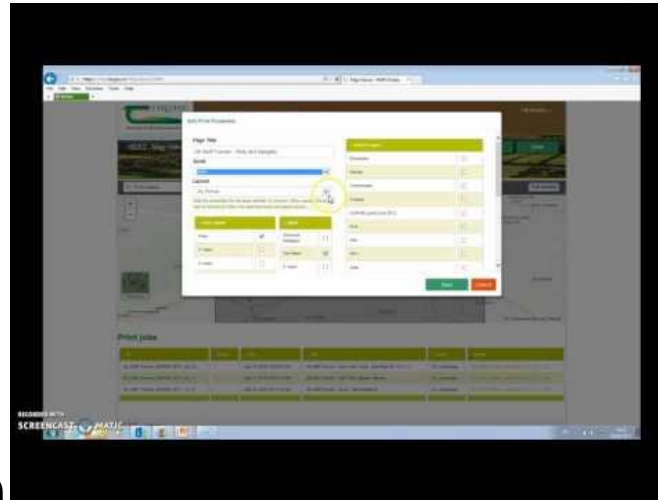
# Irish GHG Research

- One of the few countries that have accurate reporting of agriculture emissions
- Large amount of research in agricultural GHG – recognised as world leaders in GHG research
- Integral member of Global Research Alliance on Agricultural GHG, are leading a large European GHG/forestry research initiative (ERA-GAS) and IPCC report on climate and land-use

# Knowledge transfer



- Better farms
- NMP online
- PastureBase – improve grass growth & utilisation
- Carbon navigator

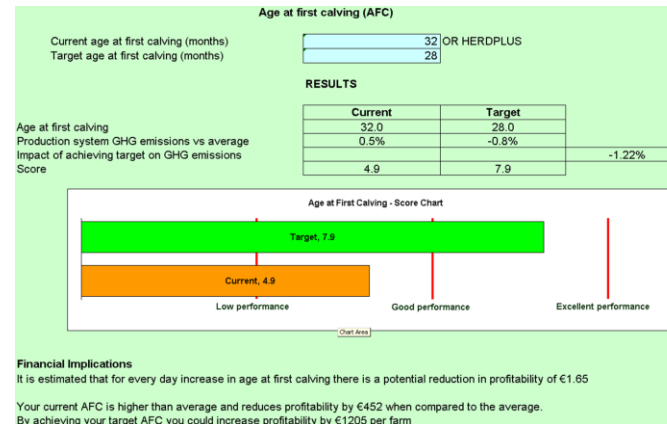
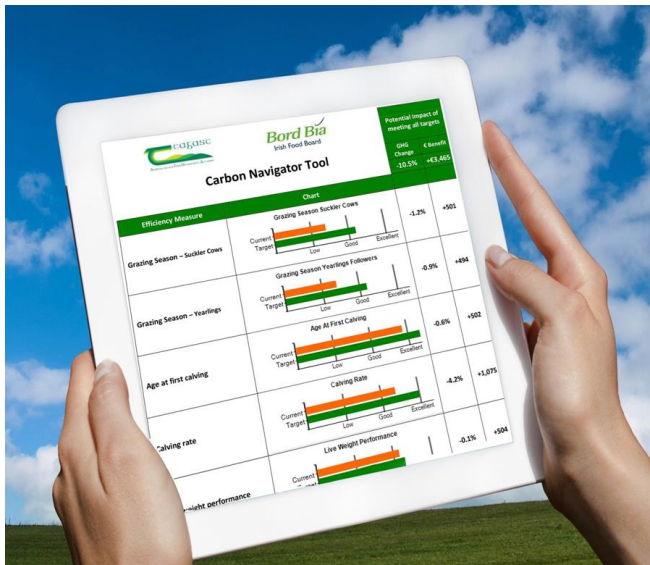


The Irish Agriculture and Food Development Authority



# Mainstreaming Sustainability to farmers: The Carbon Navigator

- Partnership approach: Teagasc & Bord Bia
- Online software to assist farmers:
  - To understand how their farms produce GHG emissions
  - To identify mitigation capacity
  - To set targets and a pathway to reduce emissions



**Bord Bia**  
Irish Food Board