Where is farming & research at when it comes to environment and where does it need to go?

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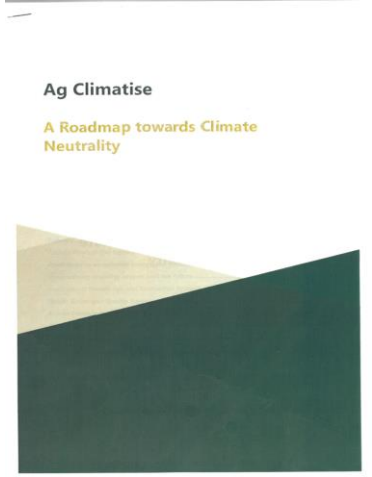
Teagasc
Agriculture and Food Development Authority

Irish Government Policy Perspective

- Climate Action Plan 2019- targeted a 10 to 15% reduction in Greenhouse Gas Emissions by 2030.
- New Programme for Government Agreed in 2020
  - 51% reduction in GHG by 2030 & Climate Neutral Economy by 2050
- Climate Action Bill Currently Going Through Oireachtas.
- By December 2021- Climate Action Council Develops Carbon Budgets; Government Agreement on Carbon Budgets; Sectoral Ceilings Assigned- 2021 to 2025 & 2026 to 2030.

Ag Climatise- A Roadmap Towards Climate Neutrality (stabilising methane and reducing nitrous emissions)



- Vision: a climate neutral food system by 2050
  - Reduce GHG emissions from the sector.
  - Increase carbon sequestration and carbon storage of Irelands land use sector.
  - Reduce nutrient loss to the environment and contribute to improved water quality and biodiversity.
  - Meet our Ammonia emissions targets.
  - Build sustainable, resilient food production and land use systems.
  - Transparently communicate our progress.

Reduce chemical N fertilisation from a peak of 408,000 tonnes in 2018 to 350,000 tonnes by 2025 and 325,000 tonnes by 2030.

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Teagasc Dairy Roadmap to 2027

	Current	2027	Current Research Performance
Milk Solids (kg fat plus protein/cow)	417	465	480
Herd EBI (€)	90	140	150
Six-weeks Calving Rate (%)	62	78	90
Av Number of Lactations/Cow	3.4	>4.0	>4.5
Stocking Rate (cows/ha)	2.10	2.20	2.70
Herbage Utilized (tonnes/ha)	7.8	8.9	12.9
Concentrate Fed/Cow (kg)	1,176	750	500
Fertilizer N Usage (kg/ha)	184	170	150
GHG Emissions (kg CO_2e/kg FPCM)	0.99	0.85	0.76
Biodiversity (habitat area as %)	7	10	10
Nitrogen Use Efficiency (%)	25	26	35

The Teagasc Signpost Programme

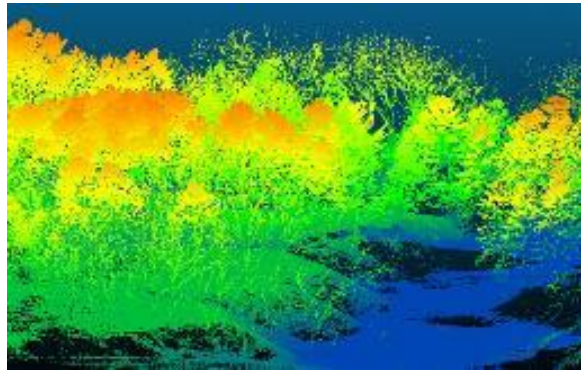
- A national campaign to reducing GHG emissions
- Three main elements:
  1. Network of 100 Signpost demo farms
  2. Signpost Advisory campaign
  3. National Agricultural Soil Carbon Observatory (NASCO)
- Two guiding principles
  - whole of industry alignment
  - build on existing initiatives, while avoiding duplication

KPI of the Dairy Signpost Farms

- Reduce GHG emissions to 0.7 kg CO_2eq per kg of FPCM.
- Increase pasture utilisation by 2 t DM/ha over 5-years.
- Reduce the use of chemical N by 10% over 5-years.
- Use 50% of chemical N as protected urea & all slurry spread using LESS.
- Target 4.5 lactations herd average & increase EBI by €10/year.
- Reduce concentrate CP% to 14% (main grazing season)
- Target 10% of high value biodiverse area per farm.

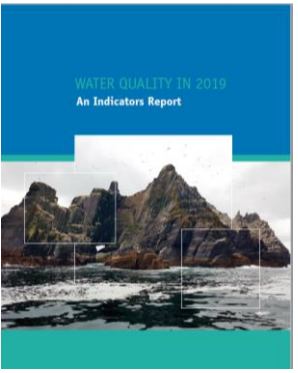
National Agricultural Soil Carbon Observatory

- All Signpost farms will be part of the NASCO
- Deep soil sampling (1m) – soil C
- LiDAR analysis – above ground C stocks
- Model soil C sequestration across all sites
  - will include farm specific data plus data from C Flux towers
- Objective:
  - Establish soil carbon stock across all farms
  - Quantify change over time related to:
    - » Soil type
    - » Land use
    - » Management practices- soil fertility/grazing management/fertilizer practices



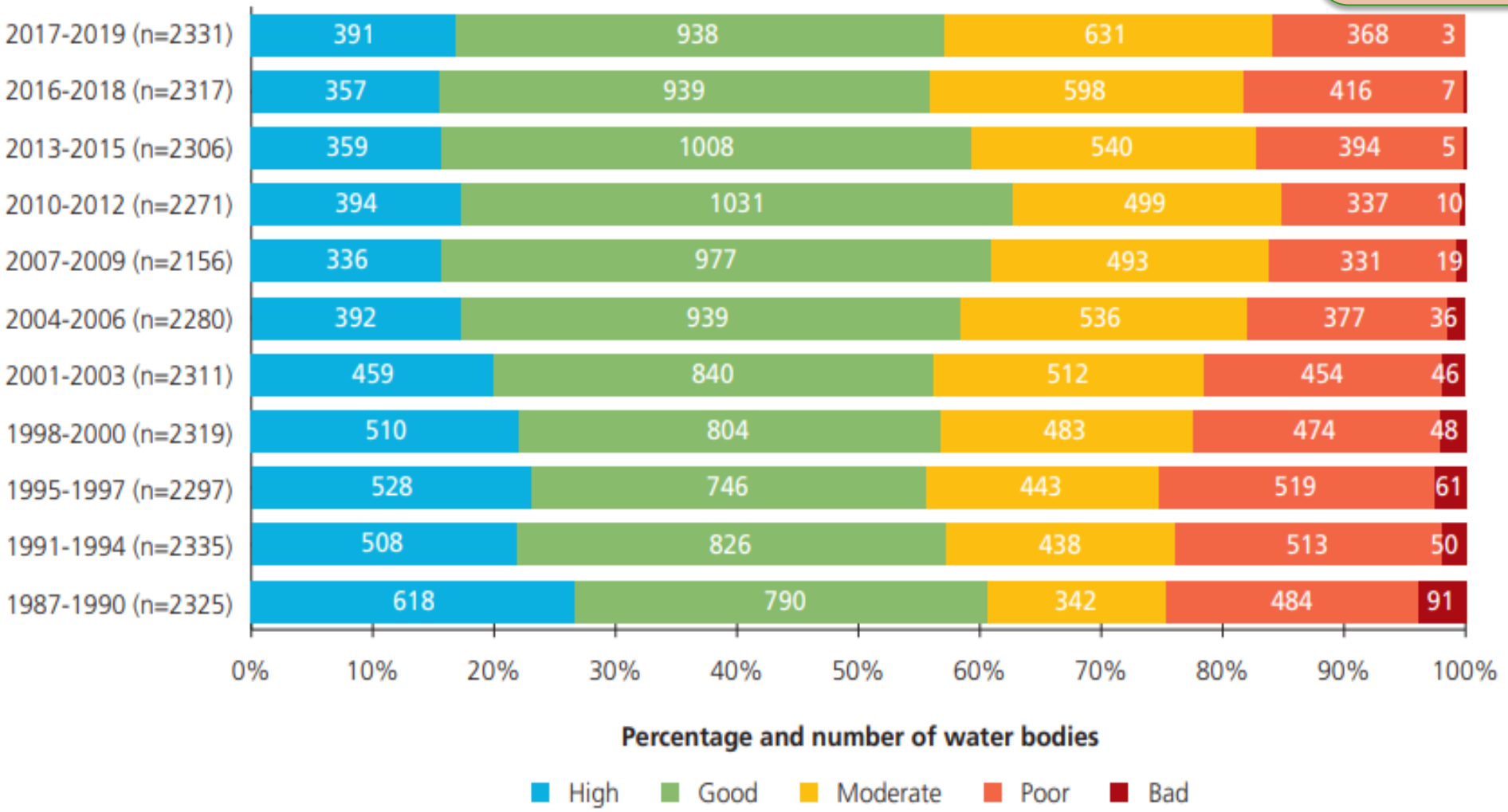
Current Research on GHG Emissions

- Methane
  - Baseline and profile- from pasture based systems
  - Additives- feed additives, dietary oils, seaweeds
  - Genetics- animal lifetime efficiency
- Soil carbon sequestration- baseline and management
- Fertiliser- soil pH, fertiliser type, white clover
- Modelling- inventory
  - Life Cycle Assessment
  - Sequestration and interaction with grass growth and management
- Land use change- rewetting peat soils;



Irish Water Quality

Some Dis-improvement 2016-2019



EPA, Water Quality in 2019

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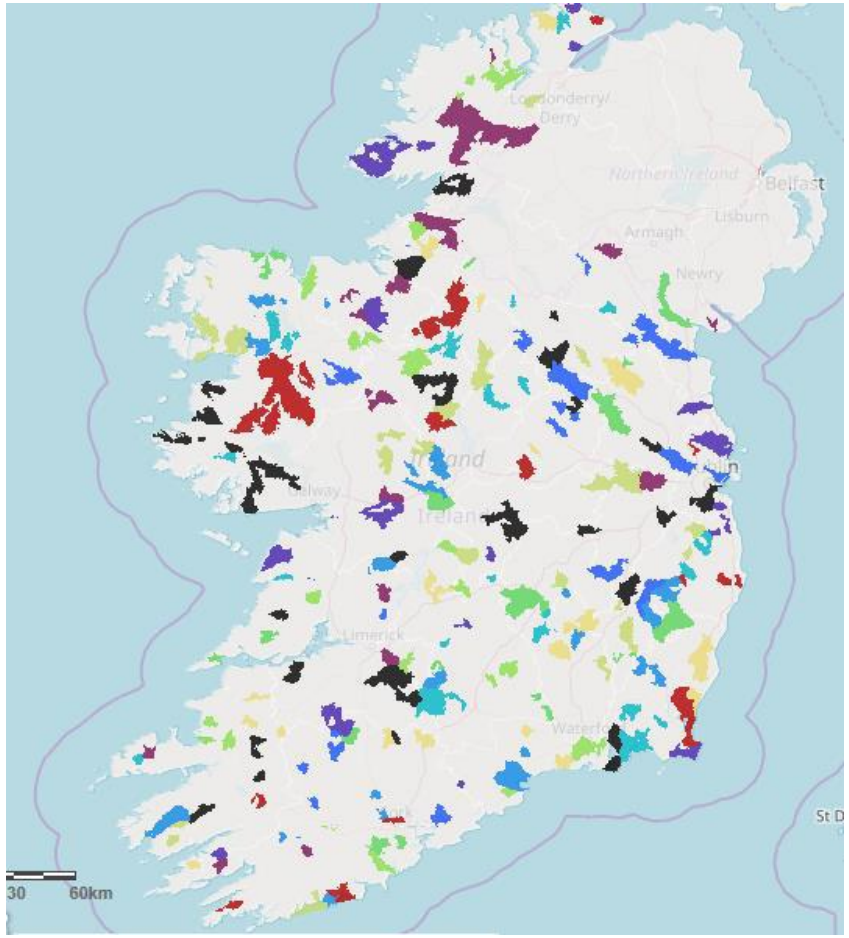
Use Agricultural Sustainability Support and Advisory Programme (ASSAP) To Improve Water Quality

190 Catchments "Areas for Actions" 2018 to 2021



Why we need ASSAP

- Water quality has remained static
- Agriculture is the most prevalent pressure
- Support needed as well as regulation.

Teagasc

- Team of 20 ASSAP advisors
- Across the country Teagasc offices
- To help farmers address water quality in "Areas for Action" (see map)
- Free Advisory service
- Available to clients and non-clients in conjunction with private consultants

Dairy Co-Ops

- Team of 10 additional staff to address sustainability issues with Co-Op Members

What will ASSAP do

- Work with Farmers to reduce impact of farming in 'Areas for action'
  - ➢ Improving nutrient management
  - ➢ Controlling losses from farmyards
  - ➢ Managing land to avoid losses
- Support all farmers to improve water quality
  - ➢ Know the water quality in your area
  - ➢ Farm to protect "your water"

Supported By

Climate Action Options

1. Adopting existing technologies and best practices- MACC
2. Target interventions and prospective technologies- white clover, feed additives, low carbon/nitrogen feeds, selecting low emitting animals.
3. Promoting a circular bio economy- utilising wastes efficiently; greater integration between dairy and beef industries.
4. Carbon removal- carbon sequestration pasture management, hedges, woodland, land use change.
5. Renewable energy- generating renewable energy on farms- solar, wind, biogas.
6. In the Irish context there is a requirement to differentiate biogenic methane from other greenhouse gases like New Zealand.

Conclusions

- Dairy production systems in New Zealand & Ireland are mainly grass-based, which confers environmental advantages in terms of manure cycling, soil OM content, feed self-sufficiency (including protein), amount of human edible food in diet, GHG emissions per kg of product, landscape diversity and superior product quality;
- Environmental policy and targets relating to GHG, water quality and biodiversity will require widespread adoption of new technologies and changes in emphasis of production systems;
- Research is needed to identify new mitigation technologies and changes in farming practices that can allow environmental targets to be reached without compromising food production.