Developments in monitoring and improving agricultural sustainability

John Lynch, Teagasc REDP, Athenry
john.lynch@teagasc.ie

Stimulus Research Fund 14/889

Agriculture and Food Development Authority

Agricultural sustainability

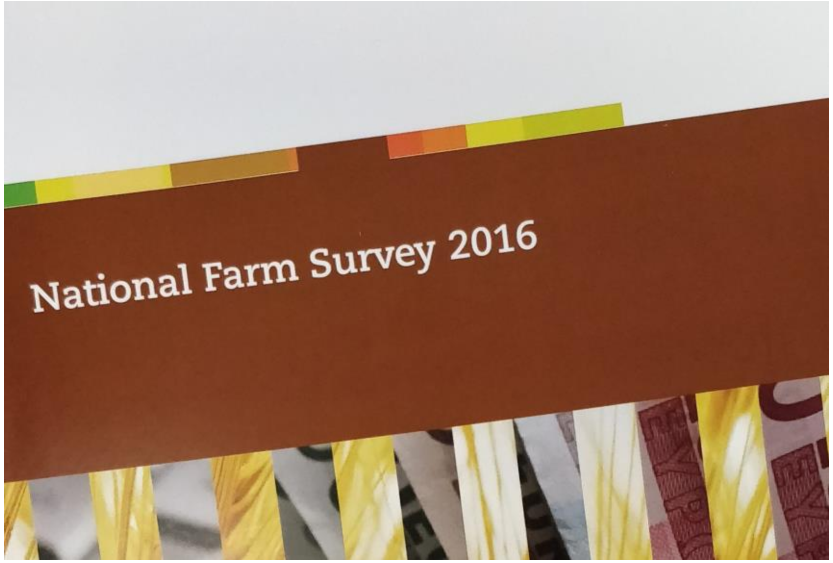
- Sustainability
  - Farm without compromising future
- Multiple dimensions to sustainability
  - Economic, environmental, social
- Why is it important?
  - Food exports and international comparisons
  - Consumer and societal faith in agriculture
  - Benefit farmers
  - Ensure their efforts are recognised

Teagasc

Agriculture and Food Development Authority

Economic sustainability

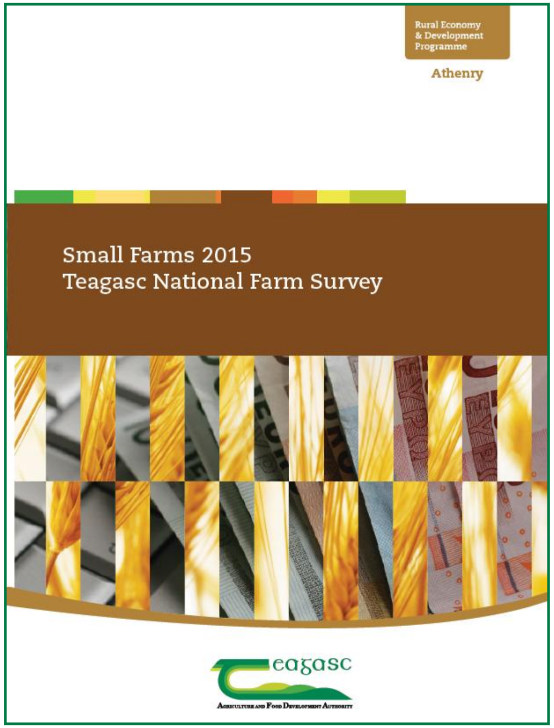
- Can the farm remain in business?
- What is the return on farmer investments?



Teagasc
Agriculture and Food Development Authority

Social sustainability

- Sustainable demographic profile of farms?
- Are farmers happy with rural quality of life?

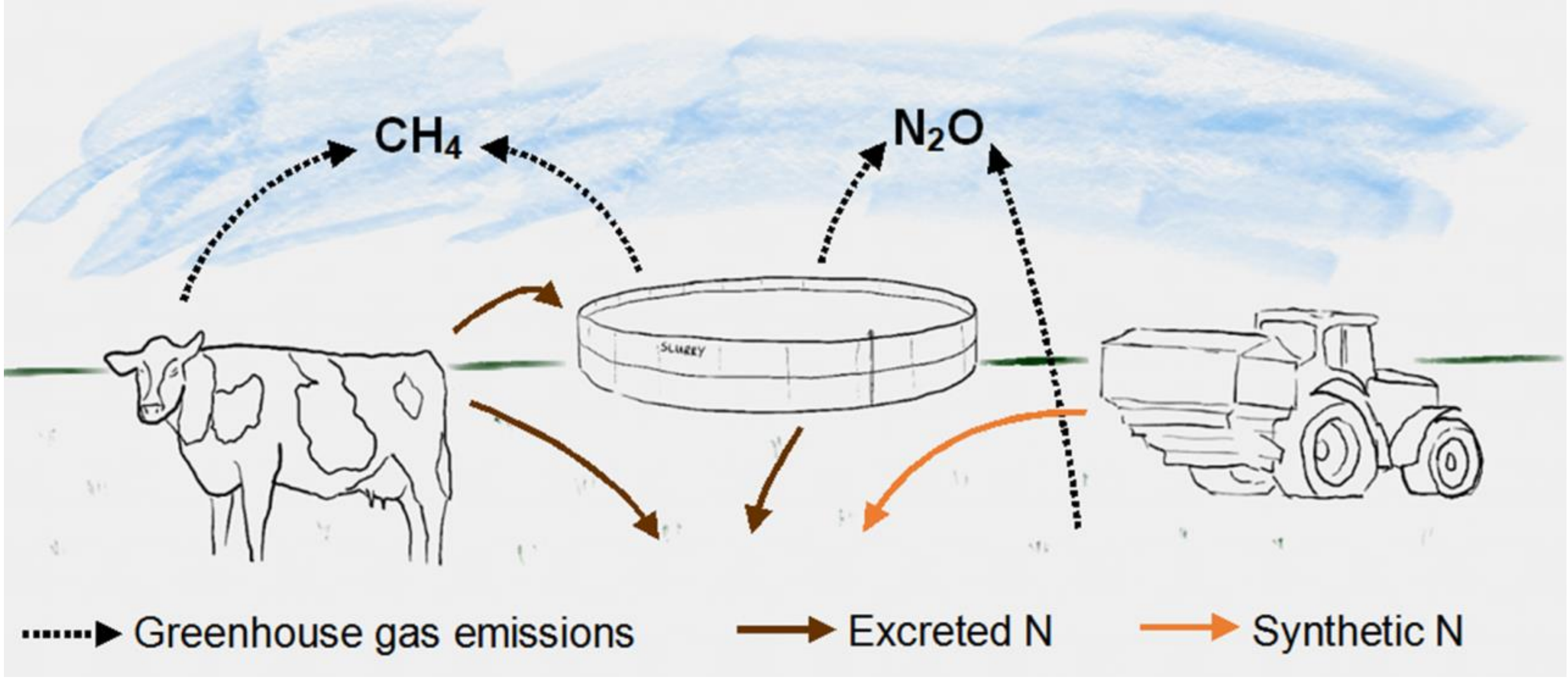


Teagasc
Agriculture and Food Development Authority

Environmental sustainability

- Greenhouse gas emissions
  - Continuing monitoring and strive for efficiencies
- Losses to water
  - How to ensure optimum nutrient use
- Biodiversity
  - Recognise important agricultural habitats

Agricultural GHG emissions



- + CO_2 from urea and lime applications

Teagasc
Agriculture and Food Development Authority

Research developments in GHGs

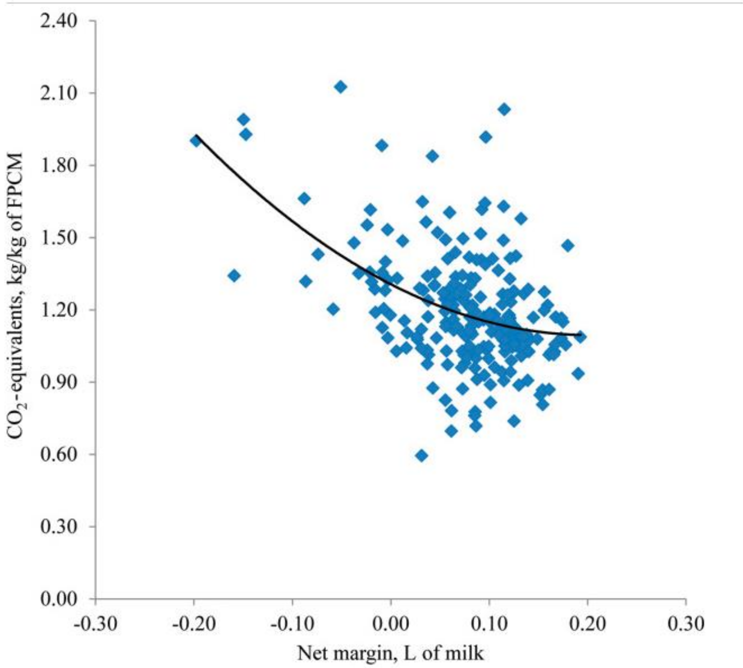
- Scientific research → on-farm impacts
- Improve efficiency and reduce emissions



Teagasc
Agriculture and Food Development Authority

Research developments in GHGs

- Link emissions efficiency with economic benefit

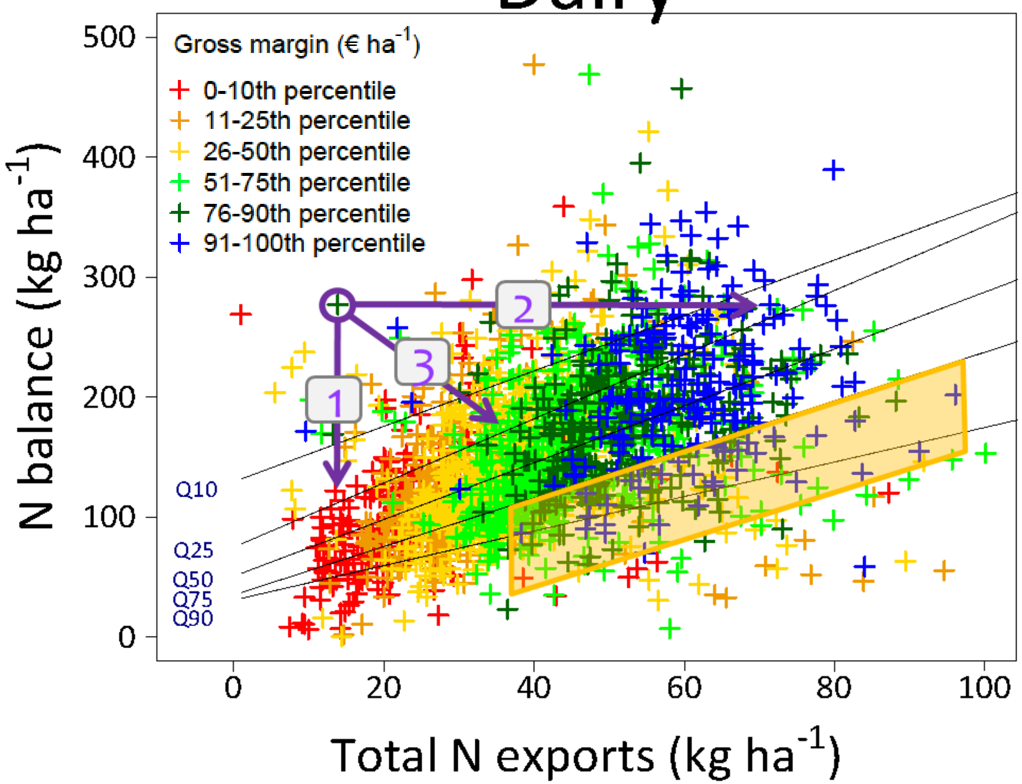


O'Brien *et al* (2015)
Journal of Dairy Science 98

Developments in water quality impacts

- Real farm nutrient balances to set targets

Dairy



Optimal benchmark zone

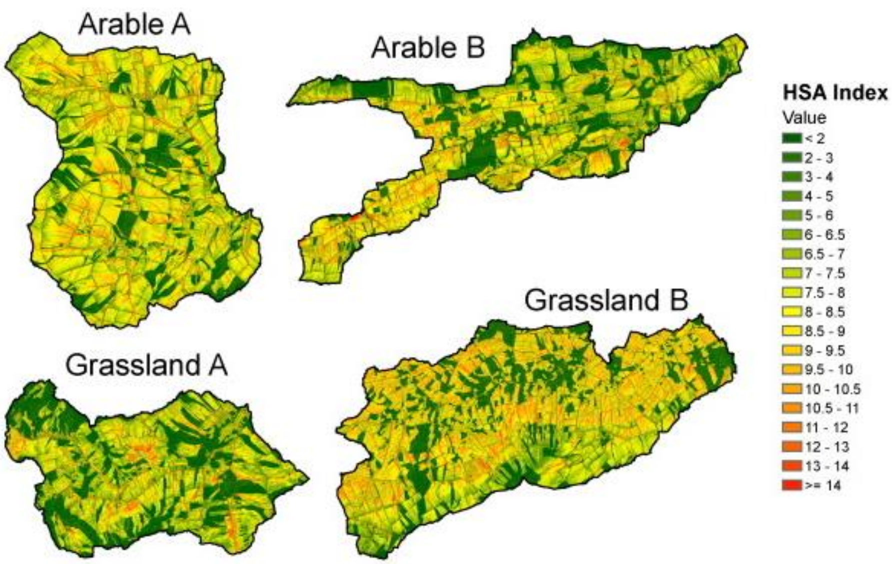
To reach benchmark targets:
1. Reduce surpluses
2. Increase exports
3. Do both

AgriBenchmark project
Thomas *et al*, paper in preparation

Teagasc
Agriculture and Food Development Authority

Developments in water quality impacts

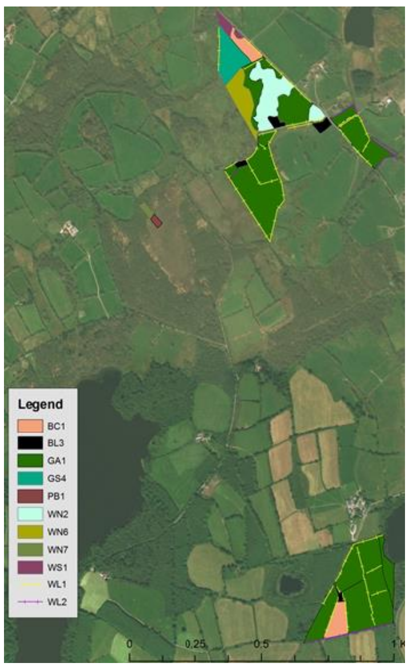
- Improved understanding of pressure-impact
- Cost effective interventions
- Support production where most appropriate



Thomas *et al* (2016)
Science of the Total Environment 556

Biodiversity – agricultural habitats

- Recognise important habitats
- Promote appropriate management



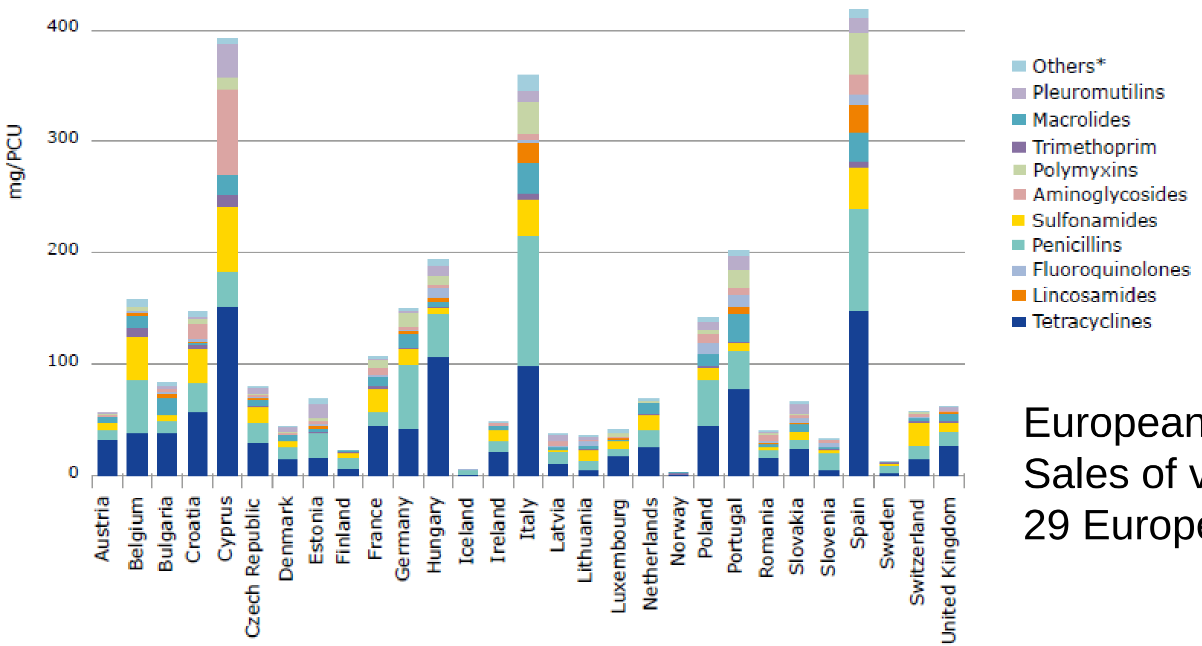
Code	Habitat	Area (ha)	Length (m)	Relative Wildlife Importance
BC1	Arable crops	1.38		Generally low, management dependent
BL3	Buildings / artificial surfaces	0.64		Potentially high (bats/birds)
GA1	Improved agricultural grassland	15.51		Low
GS4	Wet grassland	1.39		High
PB1	Raised bog	0.11		High
WN2	Oak-ash-hazel woodland	2.34		Very high
WN6	Wet willow-alder-ash woodland	1.24		Very high
WN7	Bog woodland	0.14		Very high
WS1	Scrub	0.33		Medium-high, management dependent
WL1	Hedgerow		4319	Very high

Finn *et al*
Teagasc and Bord Bia pilot project

Teagasc
Agriculture and Food Development Authority

Emerging topics in agricultural sustainability

- Antibiotic use
  - Overall use → individual management and risk?



European Medicines Agency (2016)
Sales of veterinary antimicrobial agents in 29 European countries in 2014

Emerging topics in agricultural sustainability

- Animal health and welfare
  - Devices and monitoring, productivity ‘win-win’
- Feed and food product traceability
  - Supply chain programmes and monitoring technologies
- Farm labour and rural quality of life
  - Farming lifestyle, farm as part of rural community
- Wider multi-functional outputs
  - Improved acknowledgement of biodiversity & beyond