Dairying Post Brexit: Environmental Challenges – Threat or Opportunity?

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AFBI Outlook Conference

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Background

- The UK voted to leave the EU on 23 June 2016 - uncertainty across a wide range of issues, especially trade
- A key principle behind the EU Single Market is free movement of goods, people, services and capital
  - goods can move freely within the EU without being subject to tariffs, quotas, duties or custom delays
- The impact of Brexit on the UK's ability to trade within the EU is unknown
- The EU also has free trade agreements with many countries – the impact of Brexit on the UK's ability to trade with these countries is also unknown

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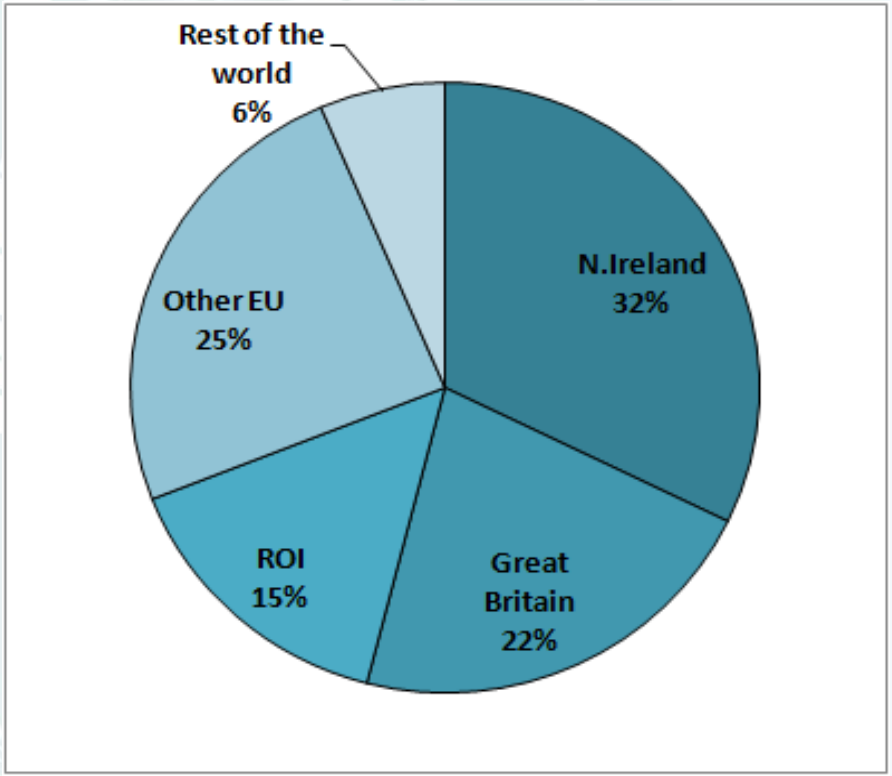
Northern Ireland Food and Drink processing sales (£) Milk and milk products (2014, DAERA)



- Total sector has value of £994 million
- 46% of sales of milk and milk product from NI are outside of the UK
- Primarily to the EU - 40%
- Rest of the world – 6%
- ?
- Exports will remain critical to the success of our dairy sector
- Government must seek to achieve highly favourable trade agreements with EU and non-EU countries

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What standards will we have to meet to export dairy product!

- GB ?
- EU ? – ‘we will not compromise our standards on the altar of trade – P. Hogan’
- Rest of world ?

- To maintain and expand export markets, Northern Ireland must seek to produce milk which meets the highest standards in relation to animal health, welfare, and the environment

- ‘Protection’ from third country imports

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Challenges to our environmental credentials

1. ***Improving water quality***

2. ***Reducing atmospheric N deposition***

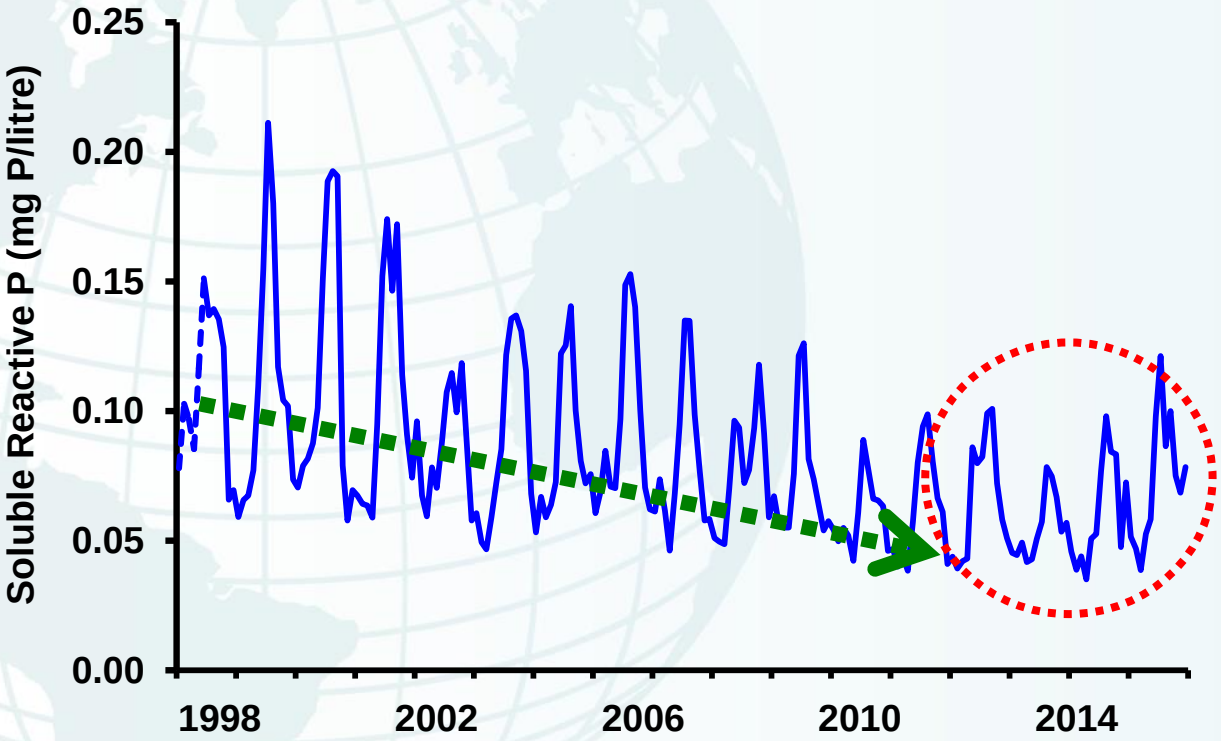
3. ***Reducing GHG emissions***

Challenges to our environmental credentials

1. *Improving water quality*

2. *Reducing gaseous N emissions*

Soluble Reactive Phosphorus (127 NI rivers, NIEA)



- Until recently, P concentrations in NI rivers had been declining
- 'Easier' to justify no further 'tightening' of our Nitrates Action Programme
- In the past 3 years, however, P levels appear to have been rising again, which is a **MAJOR CONCERN!!**

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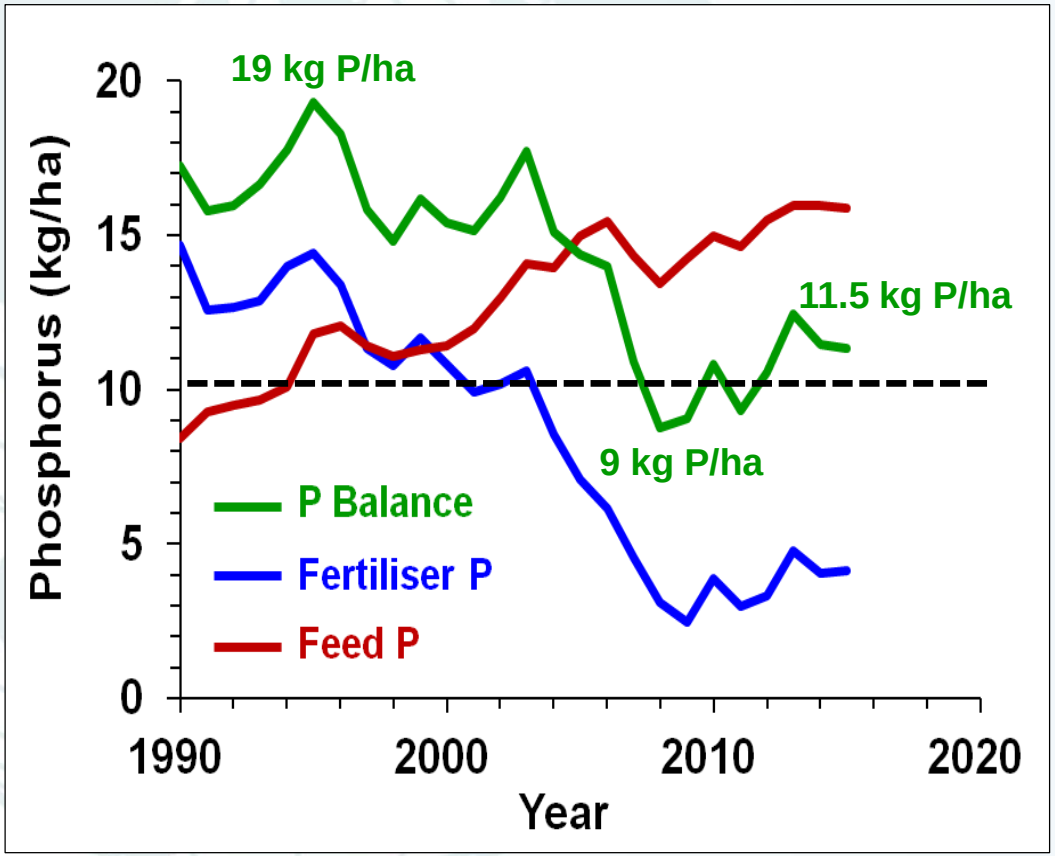
Northern Ireland Agricultural P budget (1990 – 2015)



- NI P surplus halved between 1995 and 2009.
- 80% reduction in fertiliser P inputs.
- P surplus has again risen above 10 kg P/ha/year during last 6 years
- Due to increase in fertiliser P usage and continuous increase in concentrate feed P usage.
- 37% of this surplus from the dairy sector - average NI dairy farm has a P surplus of 16 kg/ha/year

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Possible implications of declining water quality

- **The European Commission could insist on new measures to tackle this problem – such as:**
- Extending the 'Closed-Period' for slurry application
  - Challenged on this in the past
- Banning slurry application to high P soils (Lux, Fl, Ger, NL)
  - On average, 70% of fields on intensive dairy farms have index of ≥3
- Imposing P balance limits on all farms (Lux, Brit, NC)
  - Difficult to defend 'why not'
- Refuse renewal of Derogation from the Nitrates Directive in 2018 (NL, Dk)
  - 308 derogation applications in NI in 2017 – numbers increasing
- Any of the above will have major implications for the NI dairy sector – but if water quality does not improve – legislation will force change
- How can we tackle the problem?.....

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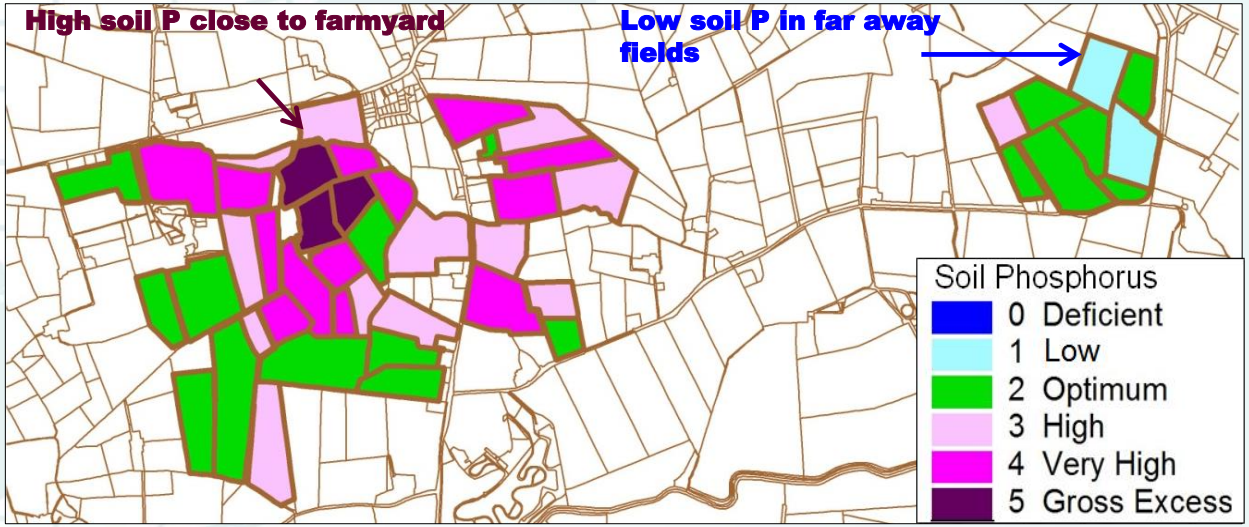
Reduce P inputs – Inorganic fertiliser P

- Few NI dairy farms require inorganic fertiliser P for grassland
  - Exception - low input (spring calving) systems
- Fields with a low P status often reflect poor distribution/recycling of manures (*but some may be unsuitable for manure - wet or steeply sloping*)
- Compounded by lack of soil testing



Reduce P inputs – low P concentrates?

- AFBI research has demonstrated that it is possible to reduce P levels in dairy cow concentrates – but how low can we go?

2001	Survey of 50 farms	6.2 g /kg fresh (7.1 g/kg DM)
2005	NI Industry target	5.7 g/kg fresh (6.6 g/kg DM)
2015	Where the NI industry is at present	5.0 g/kg fresh (5.7 g/kg DM)
2002 - 2007	Hillsborough study	3.8 g/kg fresh (4.4 g/kg DM)

- Concentrate P levels can be reduced to below 5.0 g/kg fresh
- But at a cost!
- Need to consider P content of silages (variable)
- Further reductions will be necessary on some farms

- P balance of 6.0 kg P/ha possible on a highly stocked derogated farm producing 9500 litres milk from 3.5 t concentrate with low P concentrates

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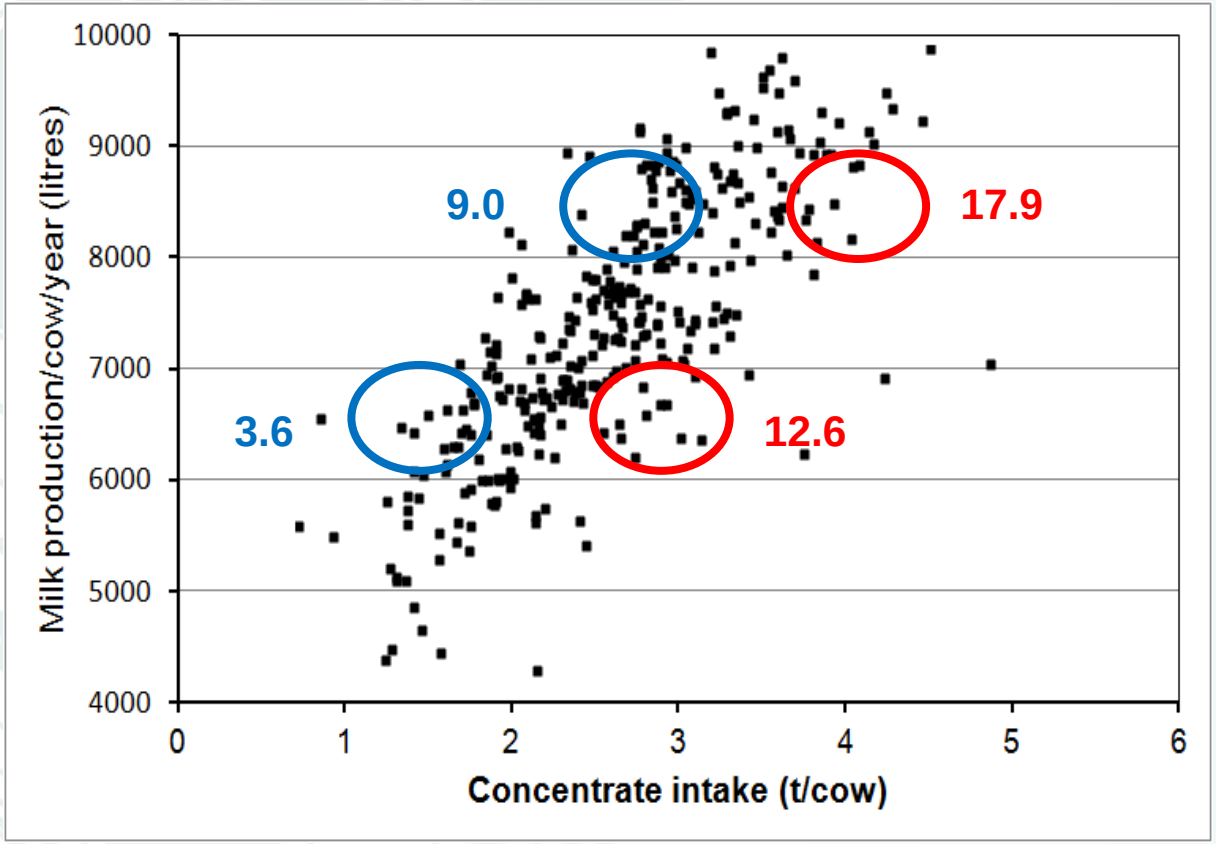
Reduce P inputs - more efficient use of concentrates



CAFRE Benchmarking

- Significant economic and environmental gains are possible by improving concentrate use efficiency
  - Making better use of quality forage

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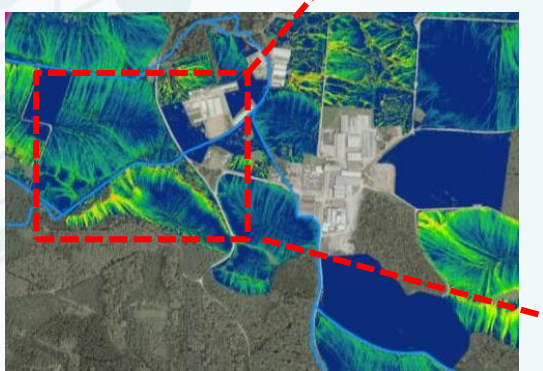
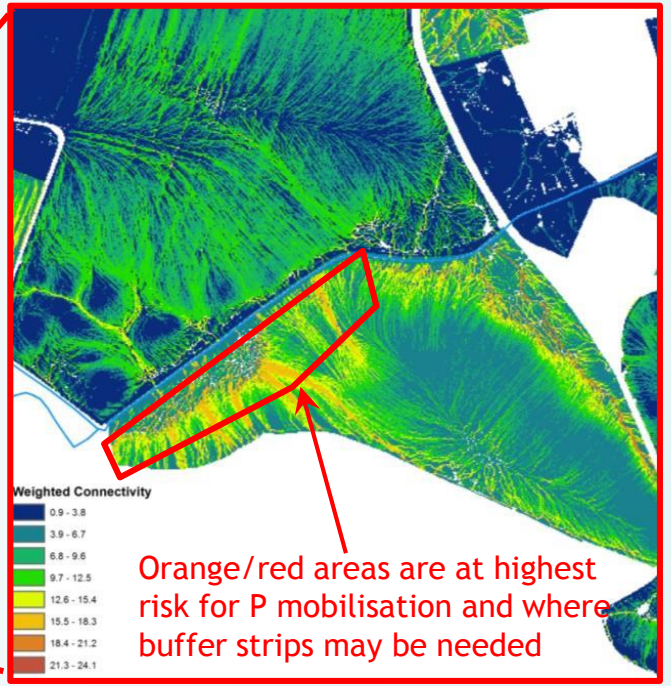
Management practices to reduce P runoff

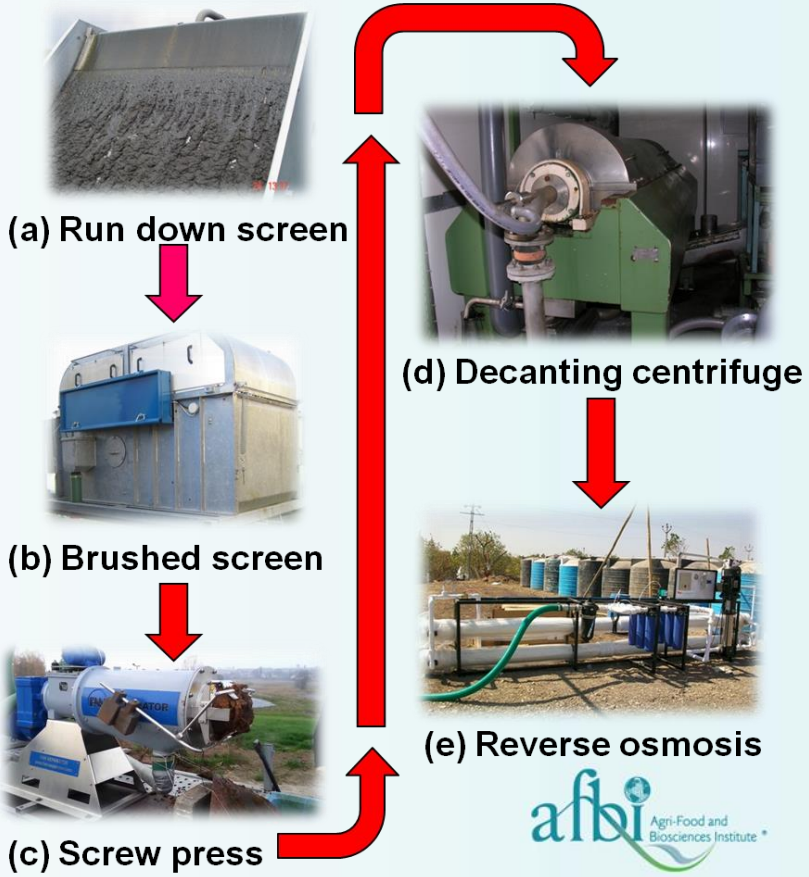
- P utilisation efficiency by dairy cows will never be 100%
- Must minimise P losses to waterways from applied manures
- NAP action programme
- Other approaches
  - Use of LIDAR to map overland flow pathways
  - Combines land elevation, hydrology and soil information to indicate where risk of P runoff loss is greatest





Exporting P off farms

- Phosphorus can be exported from farms as raw slurry
  - Local opportunities - limited scope for ‘mass redistribution’ around NI
  - Animal health risks and risk to water quality in other regions
- Technologies exist to process manures, remove P, process this and ‘export’
- Variable levels of efficiency
- Cost
- Exports markets?
- May have a role in some situations – but not a NI wide solution



Challenges to our environmental credentials

1. Improving water quality

2. Reducing atmospheric N deposition

Atmospheric N deposition

- ‘Reactive N’ emitted to the atmosphere and deposited on land or water bodies, either as dry deposition (gaseous form) or wet deposition
- ‘Reactive N’ – in a form usable by ‘plants’
- UK
  - Nitrogen oxides (NOx) - mainly from fossil fuel
  - Ammonia (85% from agricultural sources)
- Why are we concerned?
  - Acidification and eutrophication of sensitive habitats – loss of biodiversity of plants, fungi, mosses, lichens
  - Contribute to poor air quality and public health issues
- Legislation
  - Gothenburg Protocol
  - EU National Emissions Ceiling Directive

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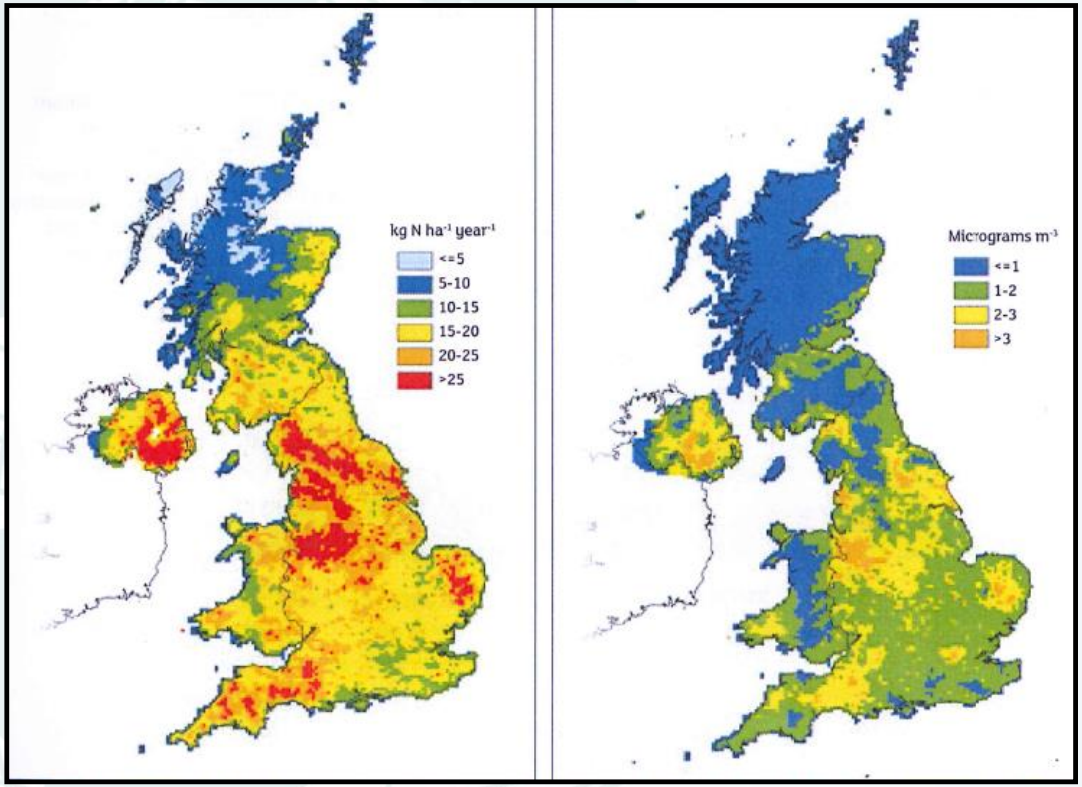
Nitrogen deposition and ammonia concentrations



Nitrogen deposition map (2011 – 2013)

Ammonia concentrations (2010 – 2012)

Centre for Ecology and Hydrology

- In Northern Ireland 90% of sensitive habitats exceeded the critical load for N deposition in 2011 – 2012

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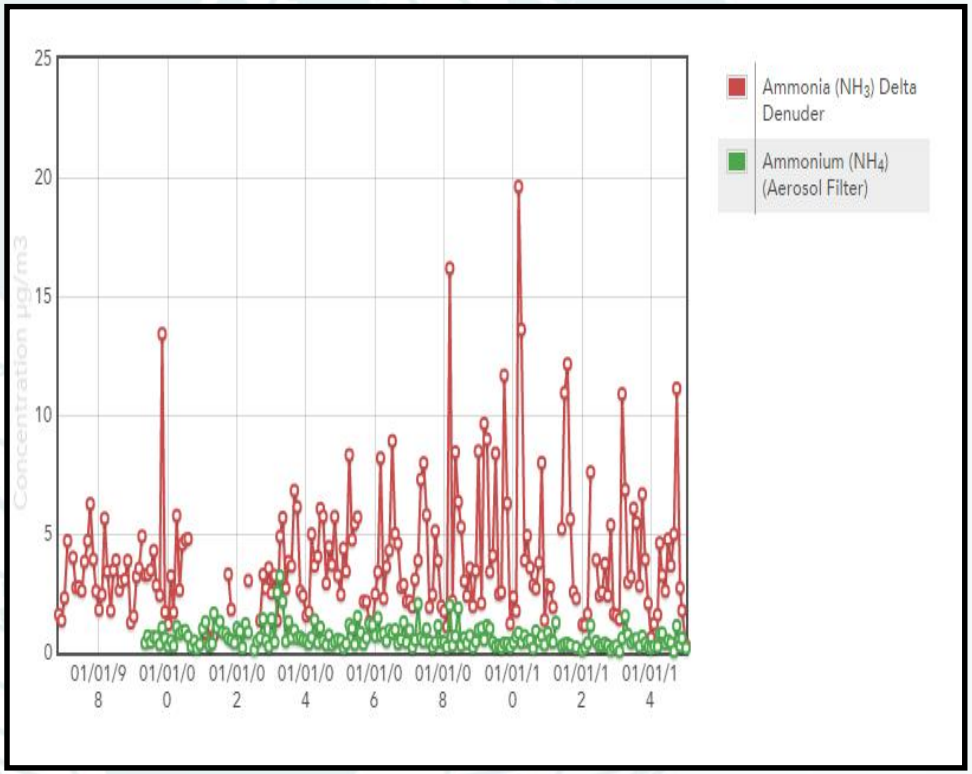
Ammonia emissions from livestock systems



Ammonia concentrations at AFBI (Centre for Ecology and Hydrology)

- 80-90% of agricultural NH_3 emissions are from manures
- Emissions take place during all stages of manure management
  - Housing
  - Storage
  - Spreading
- Abatement actions to prevent NH_3 loss at one stage may simply increase losses at the next stage

- **One of the most effective strategies to reduce NH3 emissions is to manipulate the diets to produce lower emitting manures**

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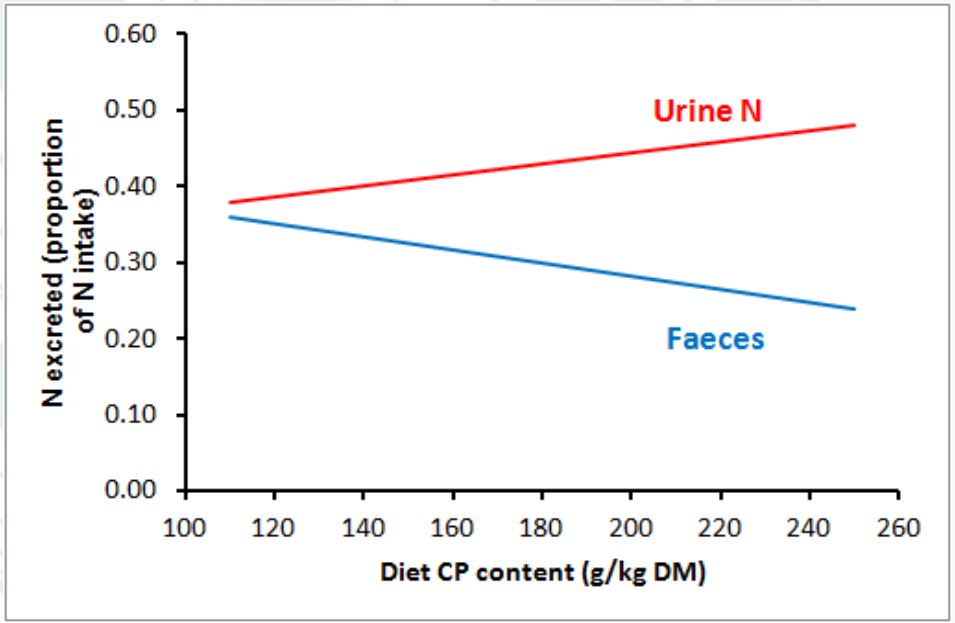
Diet manipulation to reduce ammonia emissions from manures

- In ruminants, ammonia mostly derived from the urine component of manures, rather than the faeces



T. Yan, AFBI Chamber data

	Diet CP (% DM)	
	17%	13%
Milk (kg/day)	35.1	32.3
Ammonia released from fresh manure (ppm)	8.33	3.76

Frank and Swensson (2002)

- Reducing dietary protein content offers potential to reduce ammonia losses
- Protein degradability also important
- Scope for research with grass silage based diets

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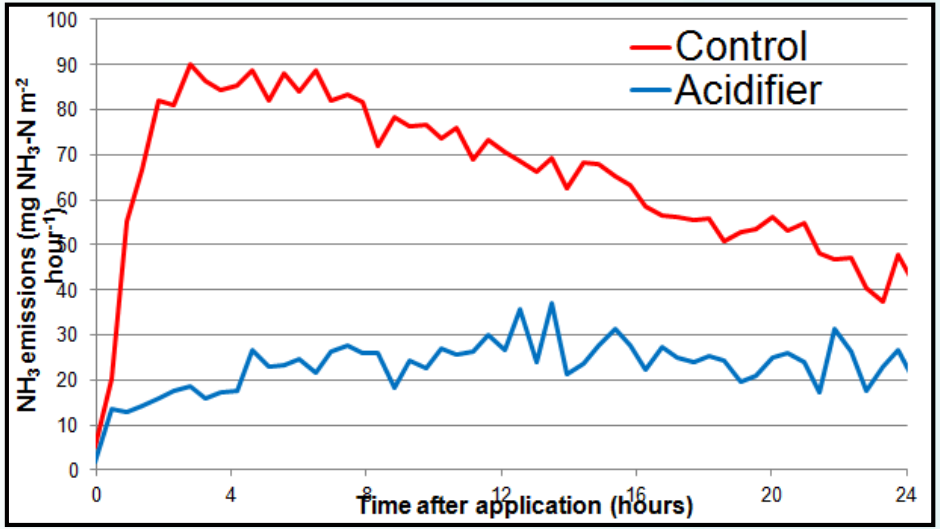
Mitigation of Ammonia Emissions from Floor Surfaces (DAFM LowAmmo Project)

- 10 potential additives tested
- Acidifiers appear to be efficient and cost effective



Carolan and McIlroy (2017)

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

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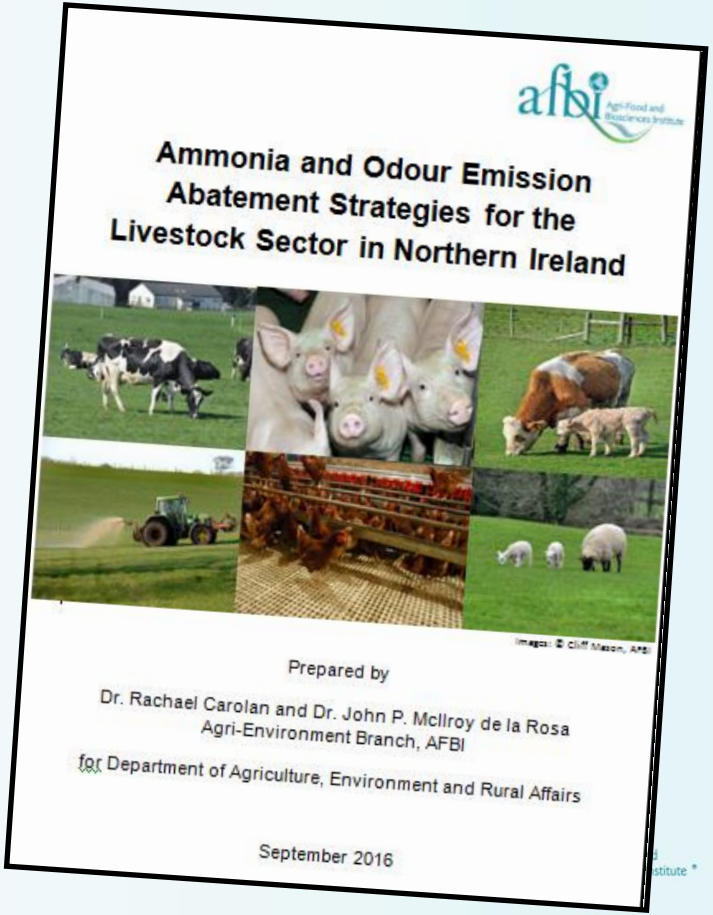
Reducing emissions from slurry stores and following spreading



Conclusions

- Brexit has created much uncertainty for the NI dairy sector – especially in relation to exports
- Exports will remain key to the long term survival of our sector – must seek to maintain current markets and develop new ones
- To do that we must produce a product that we can market as having been produced to the highest standards, including high environmental credentials
- Considerable challenges – water quality and gaseous emissions
- Must continue to focus on developing and adopting strategies to reduce the environmental footprint of our dairy sector