Agri-Food and Biosciences Institute

Producing & Utilizing Good Quality Grass & Forage

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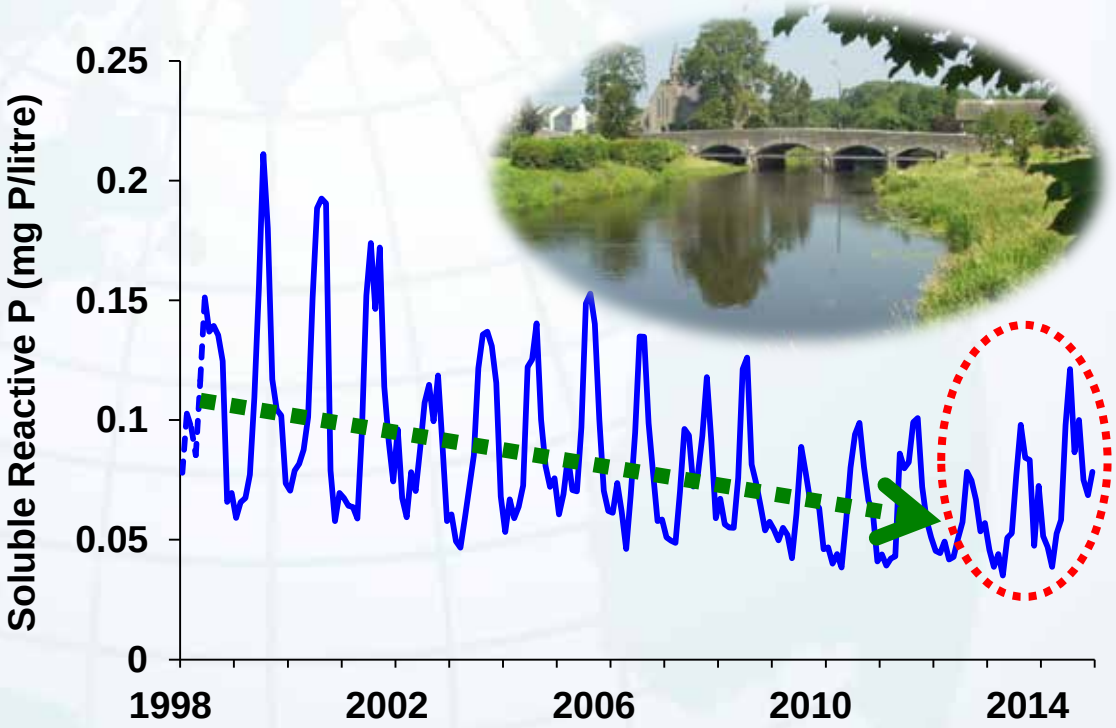
Presentation Outline

1. Setting the Scene
2. Factors hampering grass production and utilization
3. Factors impairing grass quality and inflating production costs
4. Using quality grass & forage to sustainably improve dairy farm profitability
5. Summary

1. Setting the Scene

Soluble Reactive Phosphorus in 127 Rivers (NIEA)

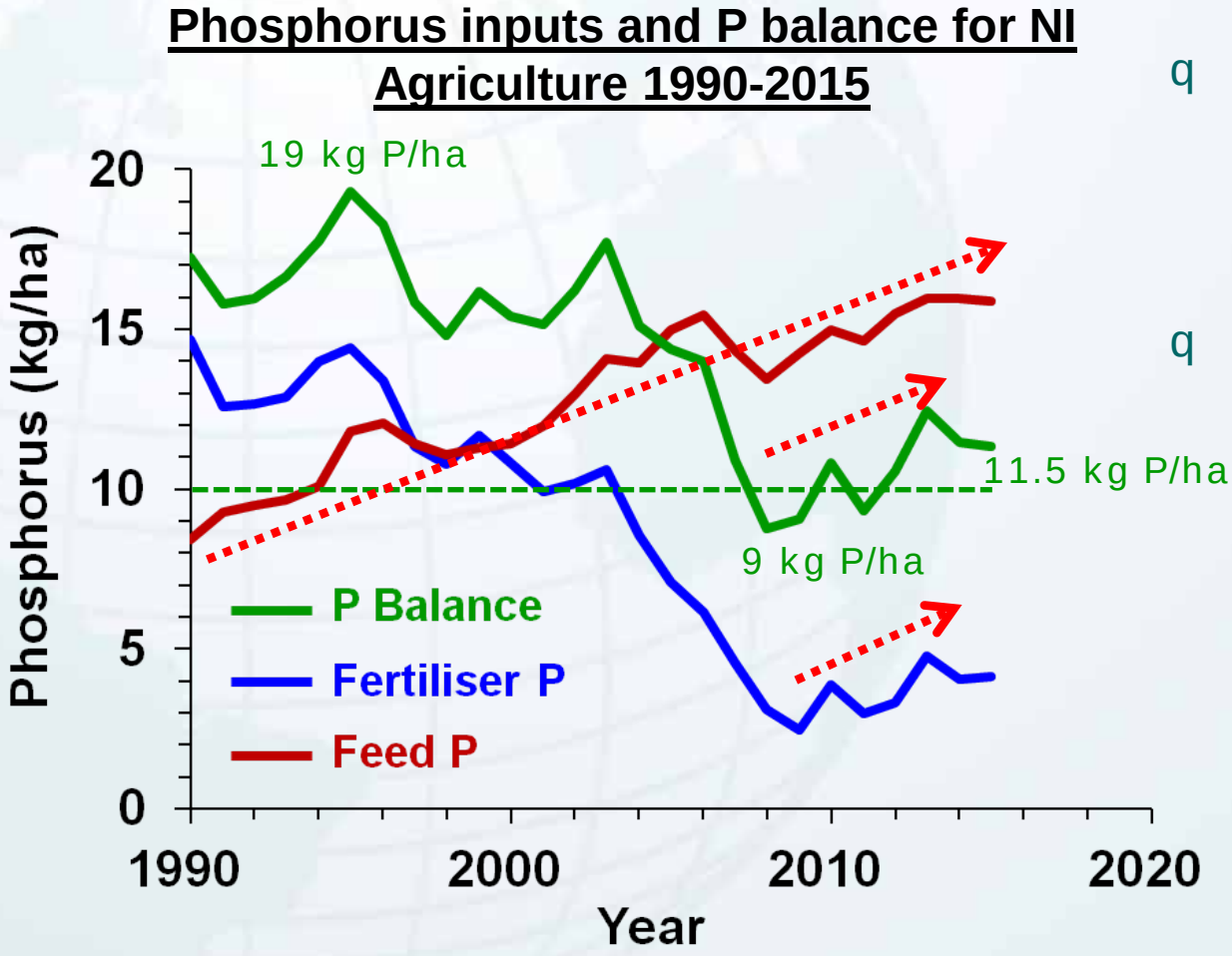


- Until the last 3 years, phosphorus (P) concentrations in NI rivers had been declining - making it easier to justify no further 'tightening' of our Nitrates Action Programme
- In the past 3 years, however, P levels appear to have been rising again, which is a MAJOR CONCERN!!

- The European Commission could insist on new measures to tackle this problem – such as:
  - Extending the 'Closed-Period' for slurry application
  - Banning slurry application to high P soils *(Lu, Fl, Ge, Ne)*
  - Imposing a Zero P balance on all farms *(Lu, Bt, NC)*

1. Setting the Scene

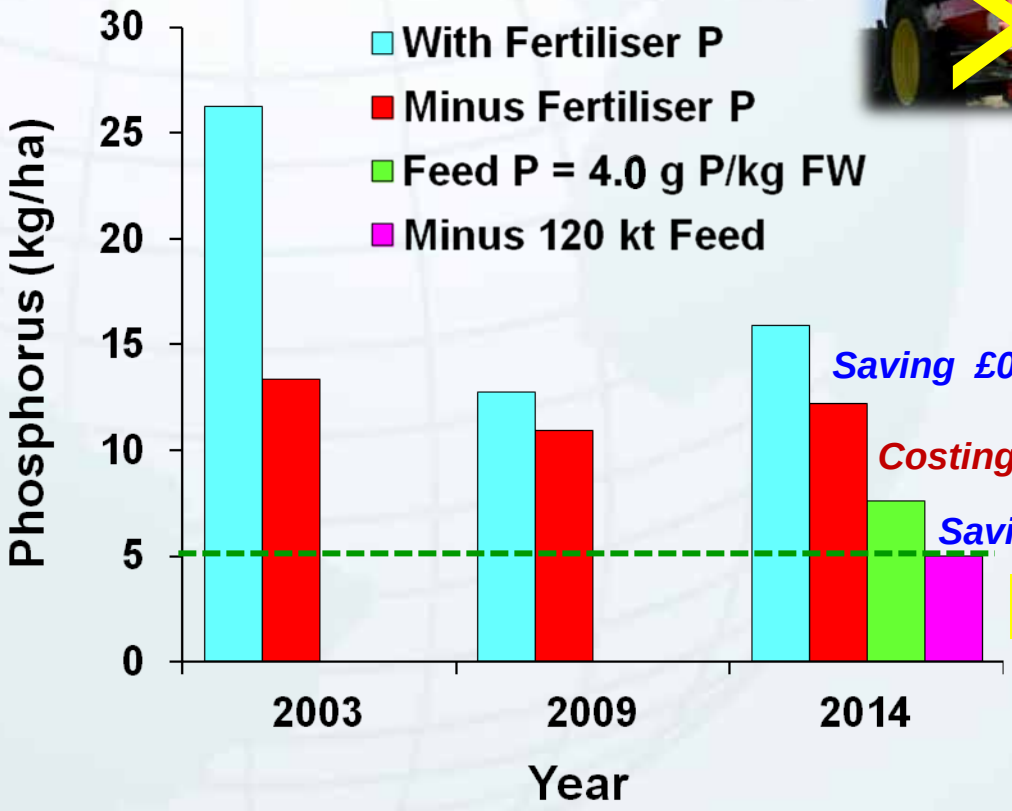
- Between 1990 and 2009, there was an 80% reduction in fertiliser P inputs to NI Agriculture - halving the NI P Balance over this period, i.e. from 19 kg P/ha in 1992, to just 9 kg P/ha in 2009



- In the last 6 years, however, fertiliser P usage has begun to increase again
- This increase, together with the continuous increase in concentrate feed P usage over the past 25 years, has caused the NI P Balance to rise again above 10 kg P/ha/yr

1. Setting the Scene

- Of the land-based farming sectors, the dairy sector has the highest P balance or surplus
- While it declined appreciably between 2003 and 2009, it remains 3 times higher than the optimum of 5 kg P/ha/yr



- Elimination of fertiliser P would reduce the P balance and save the industry £0.5 m/yr
- If the P content of feeds was reduced to 4.0 g P/kg FW, this would further reduce the P balance, *but at a cost of £7.5 m/yr*
- If 120 kt of feed was also removed the P balance could be optimised with a net saving of £18 m/yr

Net Saving £18.0 m

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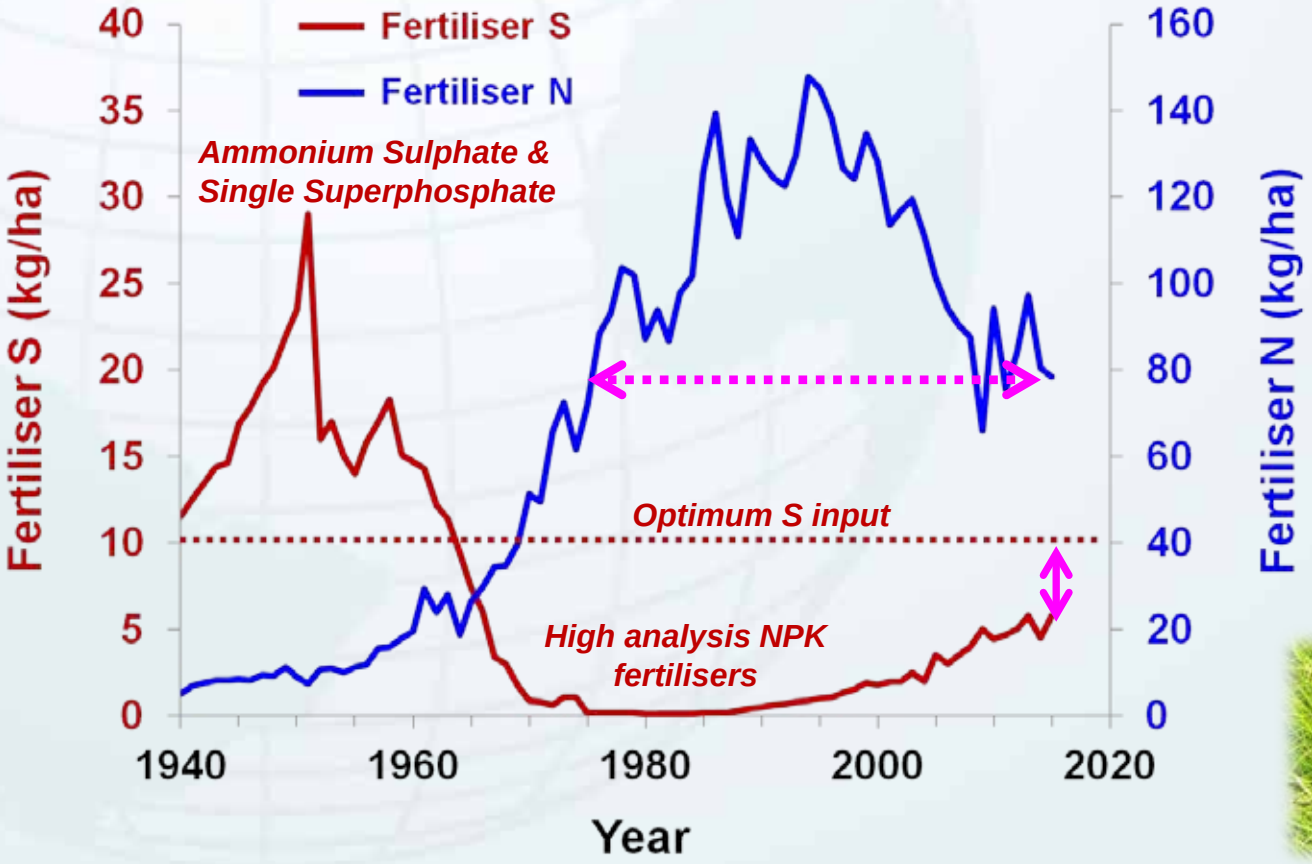
1. Setting the Scene

- **The key to improving profitability and minimising P usage, is to produce and feed more high quality grass and forage to animals and thus minimise costly concentrate usage**
- **Farmers therefore need to tackle the factors that are currently hampering grass and forage production and utilisation**

2. Factors hampering grass production and utilization

- The No 1 factor hampering grass production in NI is under-use of **fertiliser** N - and the No 2 factor is underuse of **fertiliser sulphur (**S)
- **Fertiliser N** usage is currently at a 40 year low, and inputs of **fertiliser S** are only about ½ what is needed to optimise grass yield and true protein content



- More than 50% of silages analysed each year are **N deficient** with sub-optimal crude protein contents
- 30 - 40% of first cut silage swards and early grazed swards are also **S deficient**

2. Factors hampering grass production and utilization

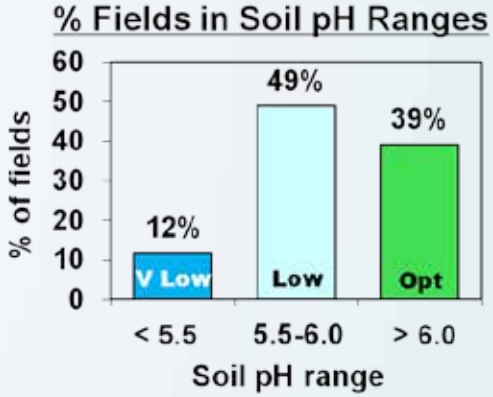
New phosphate recommendations for grassland at soil P index 2-

Crop	Soil Olsen-P Index				
	0	1	2-	2+	3
	(kg P2O5/ha)				
Grass estab'	120	80	65	50	30
1st Silage	100	70	55	40	20
Hay	80	55	43	30	0
Grazing	80	50	35	20	0

- The No 3 factor hampering grass production is potassium (K) deficiency – largely because of inadequate recycling of manure K to fields remote to farmyards - affecting up to 15% of 2nd and 3rd cut crops
- The No 4 (*and less important*) factor affecting grass production is P deficiency – again largely due to inadequate recycling of manure P
- AFBI research demonstrated that RB209 P recommendations are inadequate when soil P is at the lower end of Index 2 (16-20 mg P/l)
- Accordingly, the soil P index 2 range has been split into 2- (16-20 mg P/l) and 2+ (21-25 mg P/l) with higher P recommendations at index 2-

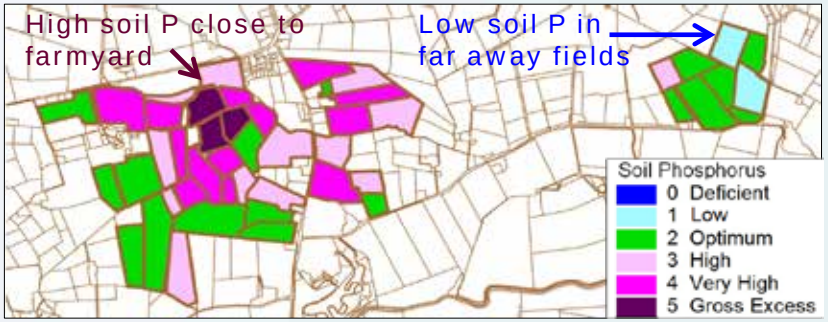
3. Factors impairing grass quality and inflating production costs

- **Inadequate liming** resulting in sward deterioration - with indigenous species of low digestibility invading pastures and replacing quality species such as perennial ryegrass and clover



- **Inadequate reseeding** with new high performing grass varieties to enhance forage quality and reduce the need for costly concentrate feeds

- **Unnecessary use of NPK fertilisers** owing to lack of soil testing and poor distribution/recycling of manures - adding up to £35/ha to production costs



- **Shorter cutting intervals required** to improve grass energy and protein contents – a more cost-effective strategy than allowing swards to 'bulk up' to minimise contractor costs per tonne

4. Using quality grass & forage to sustainably improve dairy farm profitability

Case Study: Current v Improved Quality Grass System

- **600 kg dairy cow producing 7,500 l milk/yr**
- **Stocking rate: 1.77 cows/ha**
- **Grazing 205 d; Confinement 160 d**

Focus on increasing forage Quality

System Variables

	Current System	0.5 t/ha extra Grass/ forage DM utilisation	
Grass or silage intake per head (t DM/yr)	**4.05**	**4.55**	
ME content of grass (MJ/kg DM)	11.2	12.0	
ME content of silage (MJ/kg DM)	10.7	11.5	
Concentrates required per head (t DM/yr)	2.09	1.28	
Milk yield per head (litres/yr)	7,700	7,500	**Reduced milk yield**
Milk yield (litres/ha/yr)	**13,600**	**12,600**	
Milk P export (kg P/ha/yr)	**12.9**	**12.0**	
Concentrate required (t DM/ha/yr)	**3.71**	**2.15**	
Concentrate P input (kg P/ha/yr)	18.9	11.0	
		With Fert P	**Minus Fert P**
Whole Farm P Balance (kg P/ha/yr)	15.3	8.3	5.3

4. Using quality grass & forage to sustainably improve dairy farm profitability

Cost-Benefit Analysis – Of Moving to the Improved System

	Savings / Losses
Milk yield reduced by 1,000 litres/ha/yr	**£180/ha/yr**
Concentrate use reduced by 1.56 t DM/ha/yr	**£312/ha/yr**
Additional costs for extra cut on ½ of silage area	**£34/ha/yr** ***(averaged over whole platform)***
Additional 25 kg fertiliser N/ha on ½ of silage area	**£8/ha/yr** ***(averaged over whole platform)***
Net saving by soil testing and manure distribution	**£10/ha/yr** ***(averaged over whole platform)***
NET SAVING	£100/ha/yr

- **This strategy has the potential to make dairy farms more profitable whilst simultaneously reducing their environmental impacts – i.e. making them more sustainable both economically and environmentally**

5. Summary

- Low milk prices and high overheads, including the cost of concentrate feeds, are currently threatening the viability of the NI dairy industry
- There is a real risk that recent increases in P losses to water bodies could bring about additional economic pressures should the European Commission impose more stringent environmental controls – e.g. an extension to the 'closed-period' for manure application
- To be sustainable the dairy industry must simultaneously become more profitable and less P intensive
- This dual goal can be achieved by increasing milk production from grass (***by increasing grass quality and grass utilisation***), reducing the amount of P-containing concentrates fed to dairy cows (***even if this does lower milk yield***) and eliminating the need for fertiliser-P, by soil testing and recycling manure-P to fields of low soil P status
- This strategy has the potential to lower farm P balances to the optimum of 5 kg P/ha/yr, whilst simultaneously increasing farm profits by £100/ha/yr - i.e., ***£10,000/yr on a 100 ha dairy farm***