

Low Input Dairying Challenges and Opportunities Sinclair Mayne, AFBI

22 March, 2016

Brussels, Belgium

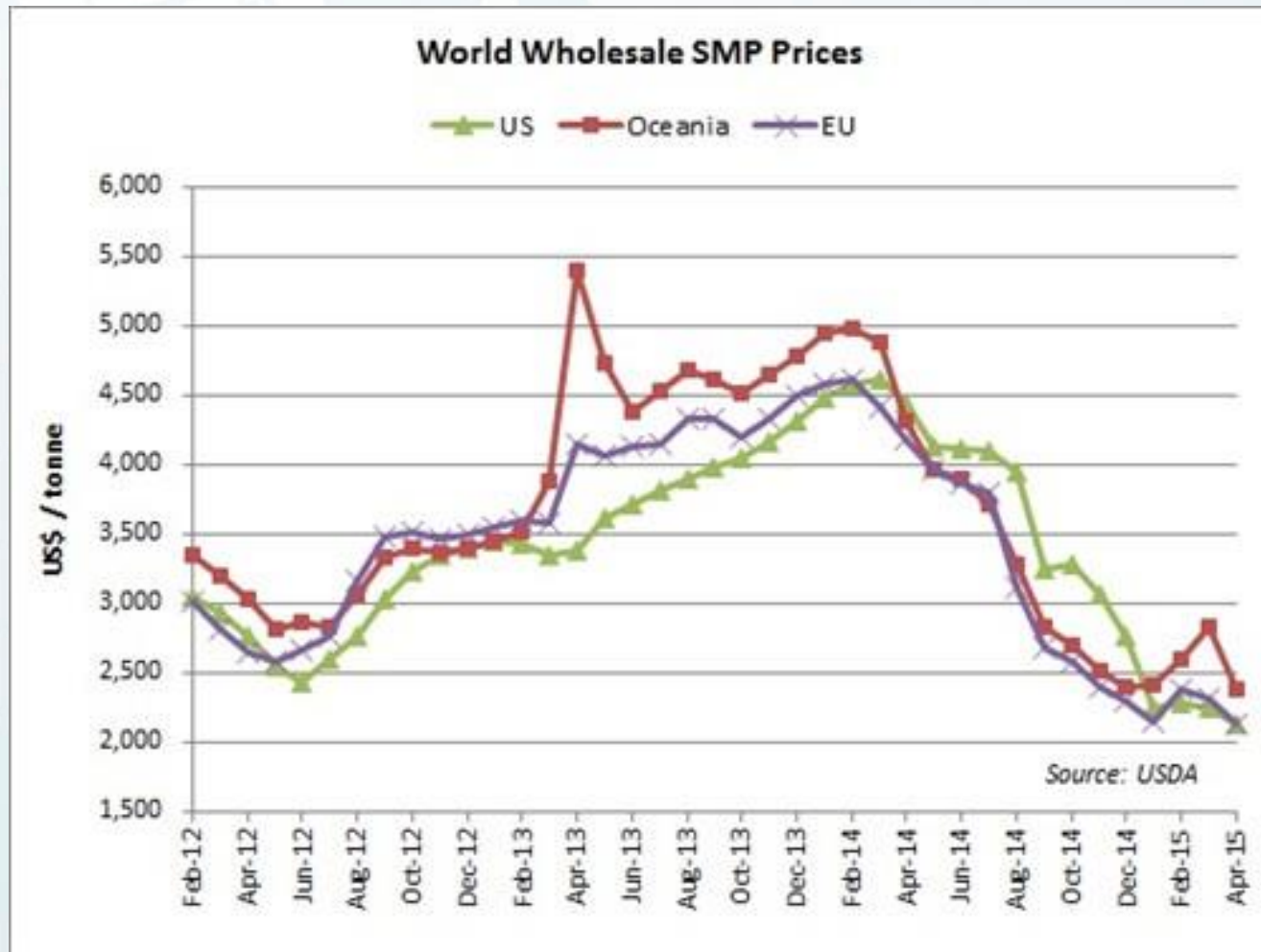


Overview

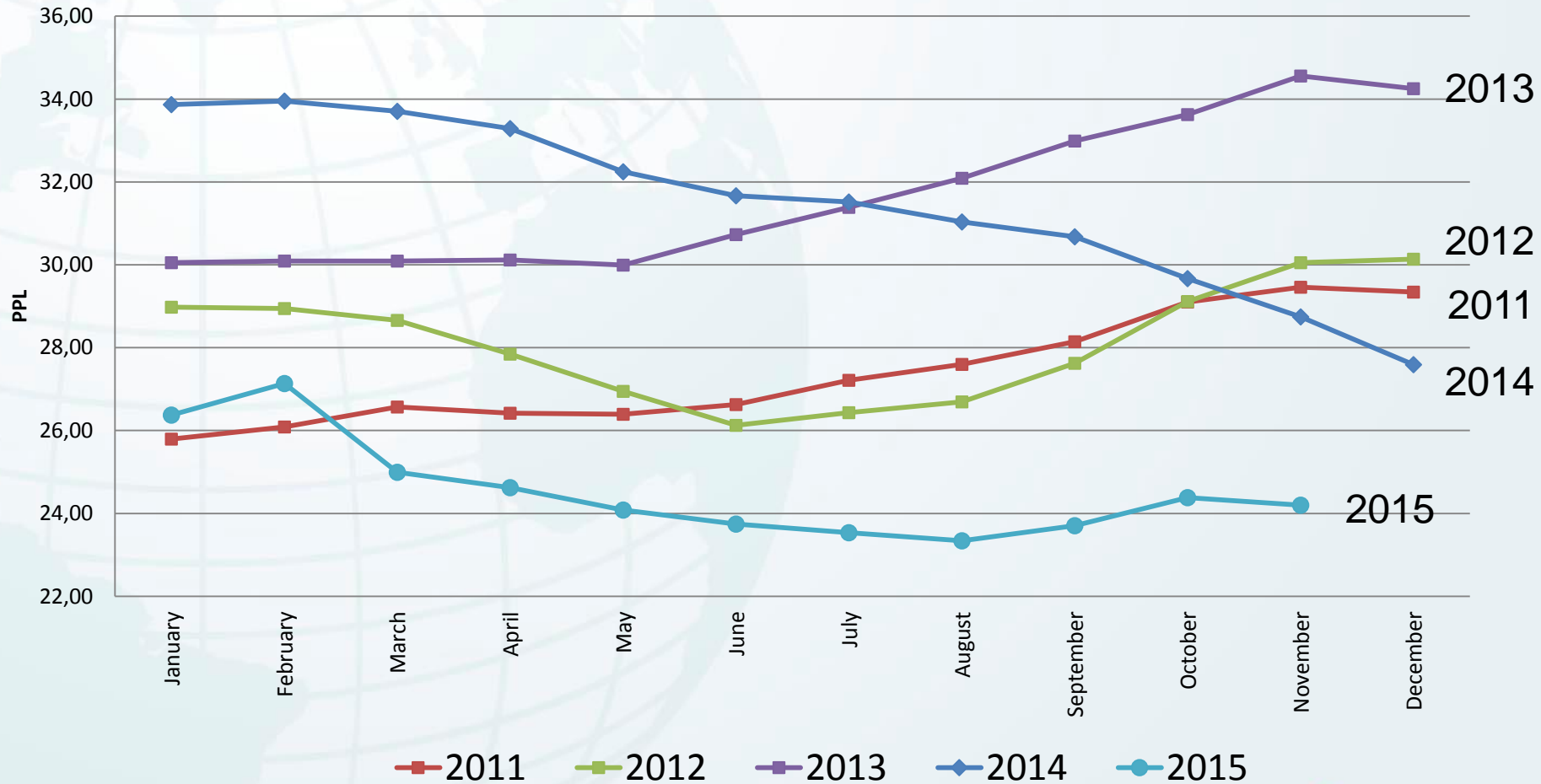
- Why Low Input?
- Role of Grass and Forage
 - Growing grass
 - Effective grassland management
 - Efficient conversion of grass to milk
- The Way Forward?



Global Dairy Markets in Decline



UK Milk Price 2011-2015



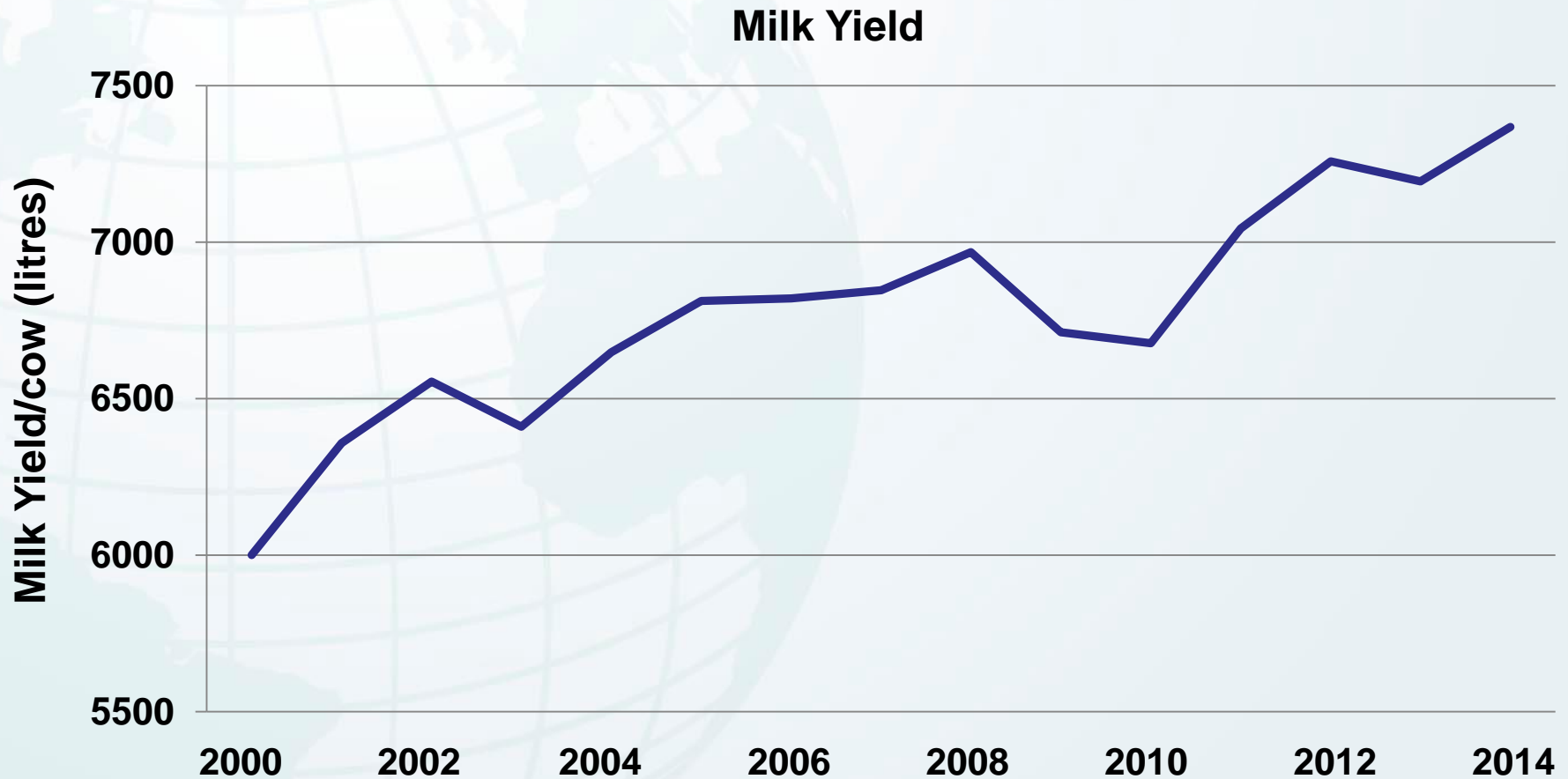
Source: AHDB Dairy

Costs of Milk Production 2015 (ppl)

	Top 25%	Bottom 25%
Total Variable costs	12.3	13.8
Replacement cost	2.1	3.4
Cash only fixed costs	9.1	12.5
Total cash costs	23.5	29.7
Other fixed costs	12.1	18.2
Total FEC	26.5	35.5

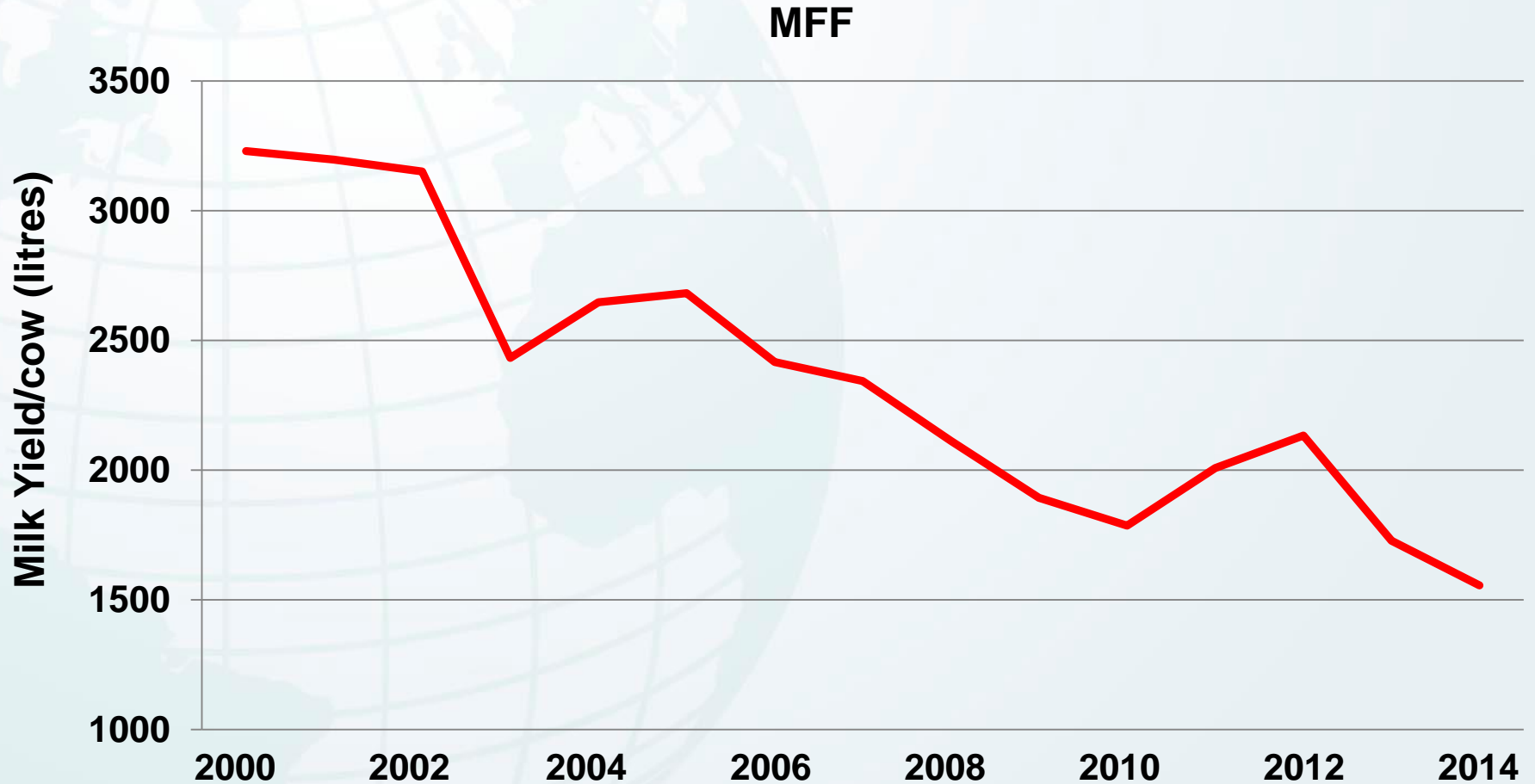
Source: AHDB Dairy

Trends in Milk Yield Per Cow



CAFRE Benchmarking Data

Production From Forage Per Cow



CAFRE Benchmarking Data

Why is Reduced Production From Forage a Concern?

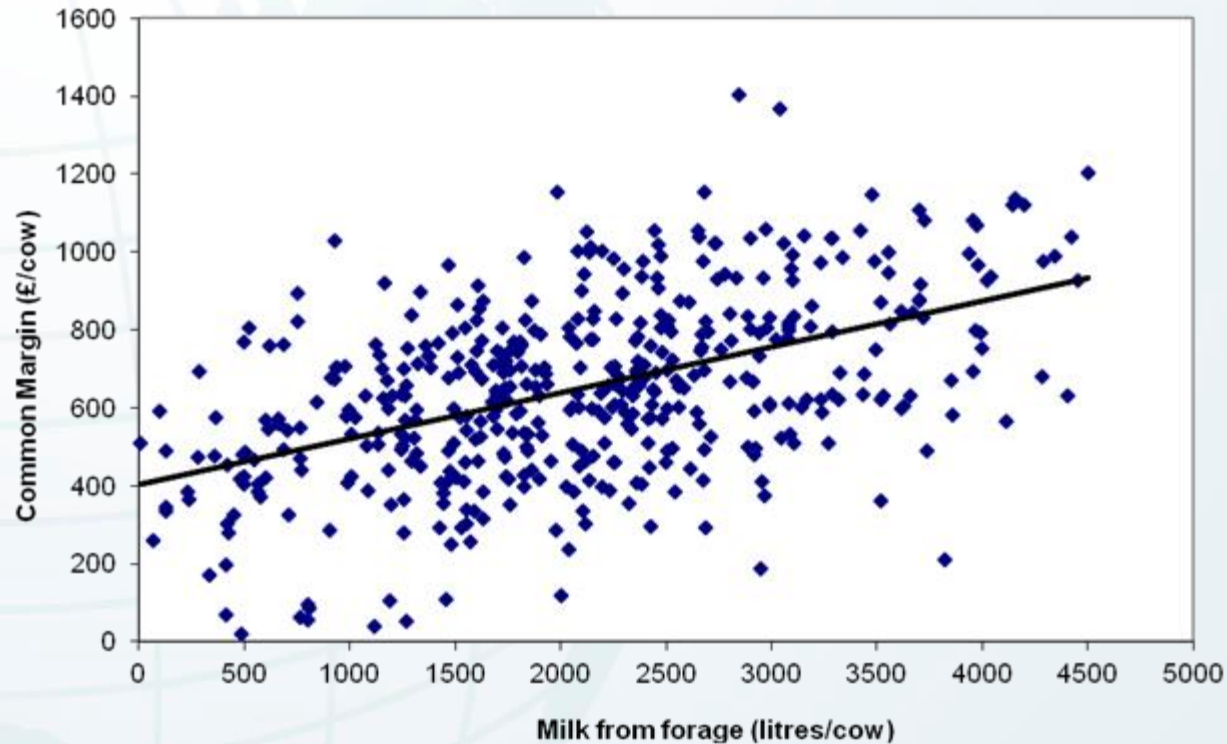
West of UK - competitive advantage is grass.

- Potential Yields of up to 14 tDM/ha
- Long/reliable growing season

Increase in demand for concentrate feed ingredients:

- Increasing global food demand
- Volatile global market
- Transport costs
- Global shortage of protein feeds

Relationship Between Milk From Forage and Common Margin Per Cow from CAFRE Benchmarking



Each 1000 litre increase in milk from forage is worth £120 per cow in increased profit.

Production From Forage - Research

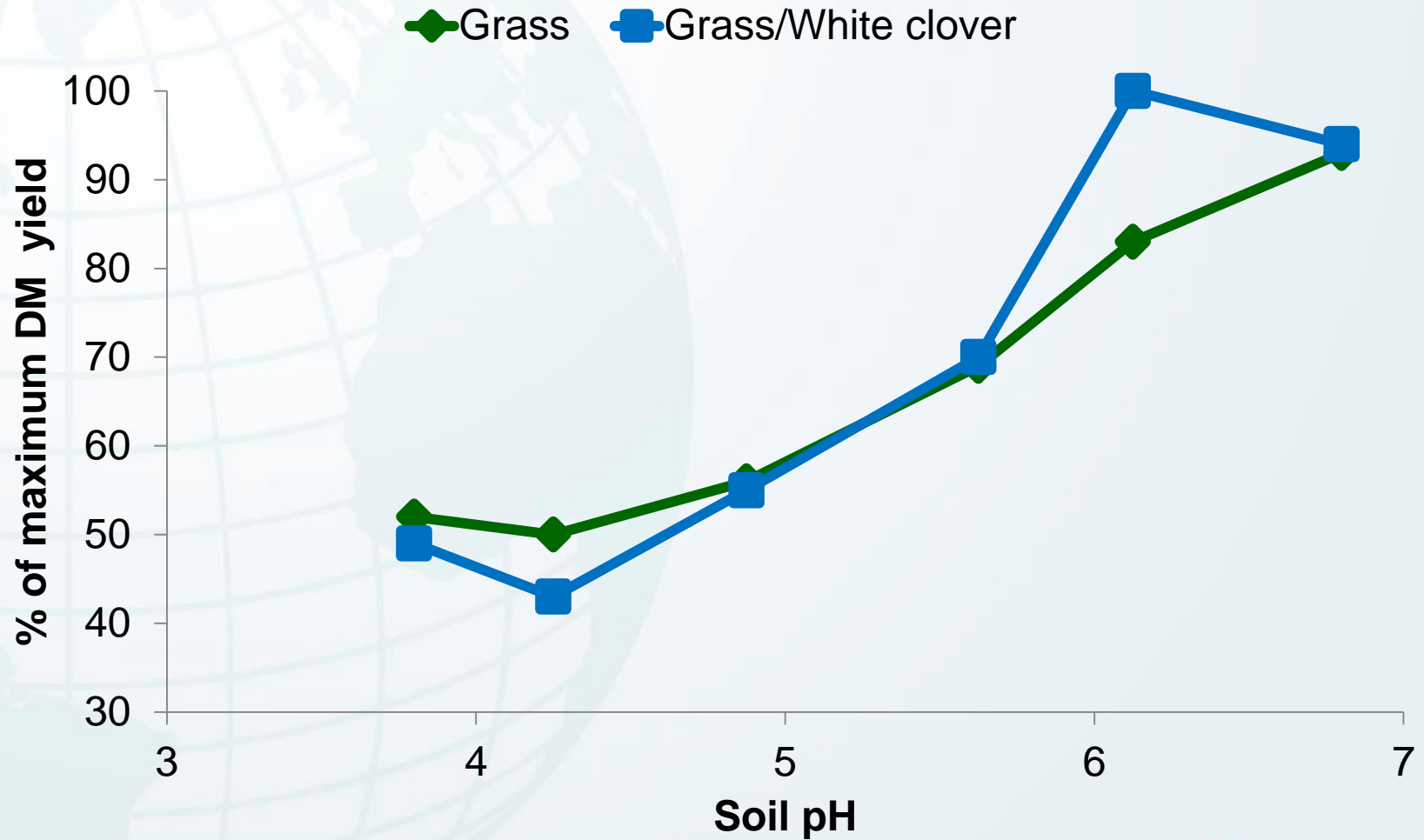
Milk from all forage

1. **4680 litres** - Rae et al. (1986), England. 3-year study, all-grass diet, winter calving.
2. **5500 litres** - Lincoln University, New Zealand, 2011/12. All-grass diet, spring calving, rotational grazing, irrigation.
3. **5841 litres** – (Ferris et al, 2013 Northern Ireland).
3-year study, high genetic merit cows, autumn calving, high quality silage +6 kg concs, early turnout, rotational grazing, no concs. Total yield: 8230 litres. Milk from forage = **70%** of total.

Grass Production



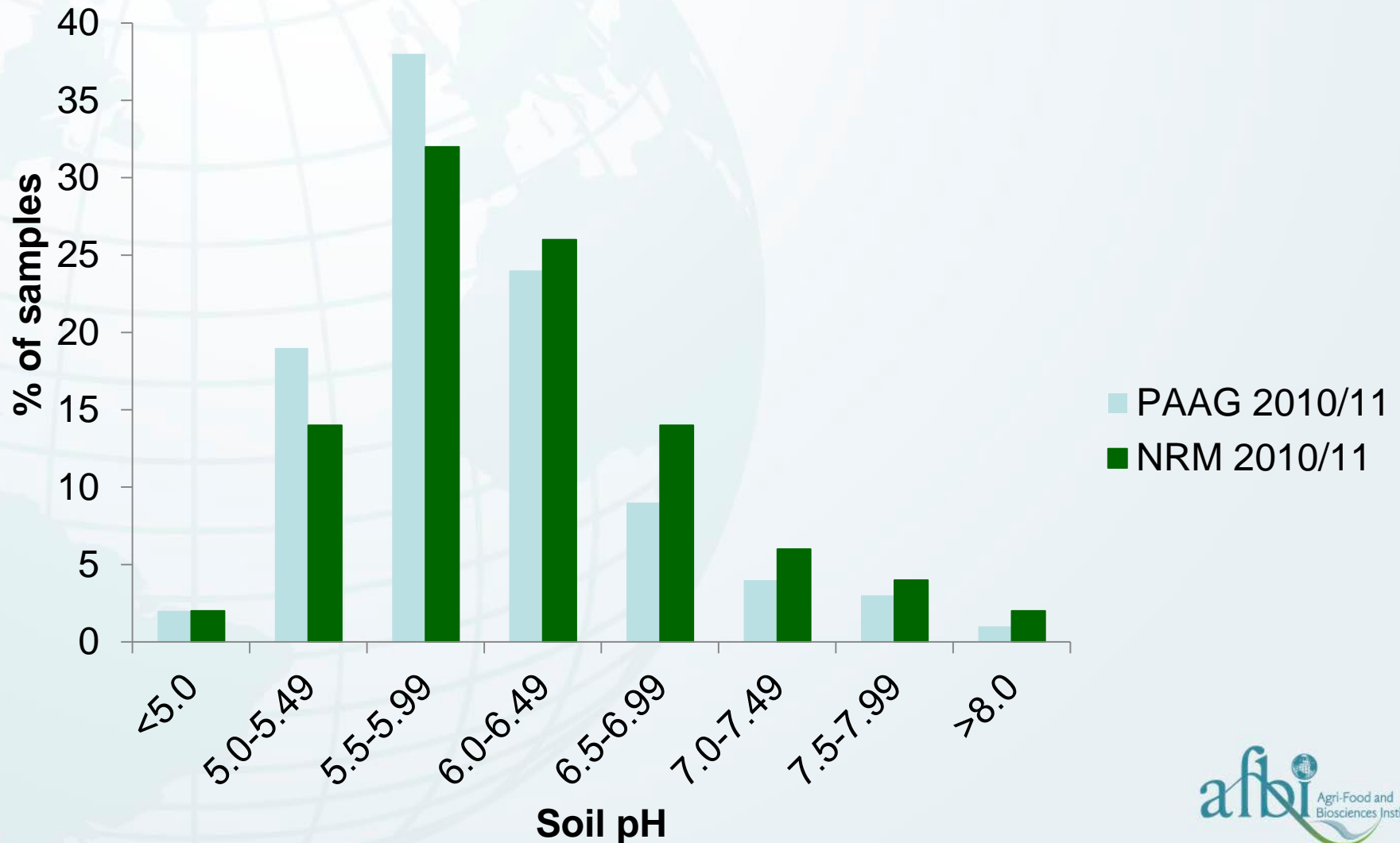
Soil pH and Grass/Clover Growth



From Hopkins *et al.* (1990) Grass and Forage Science

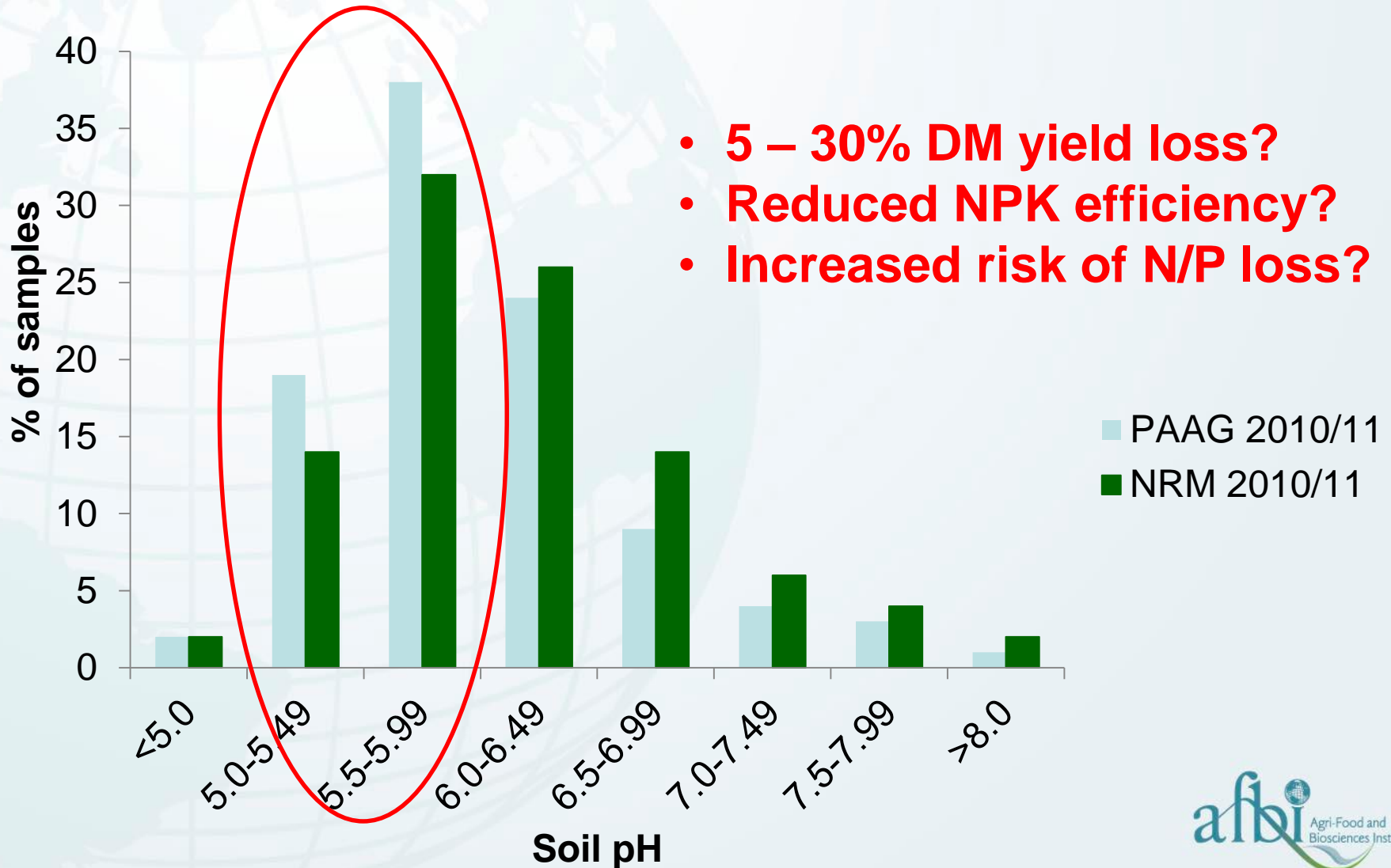
Soil pH - UK Grassland Soils

Source: Fisher, 2013



Soil pH - UK Grassland Soils

Source: Fisher, 2013



Phosphate and Potash Status - no better!

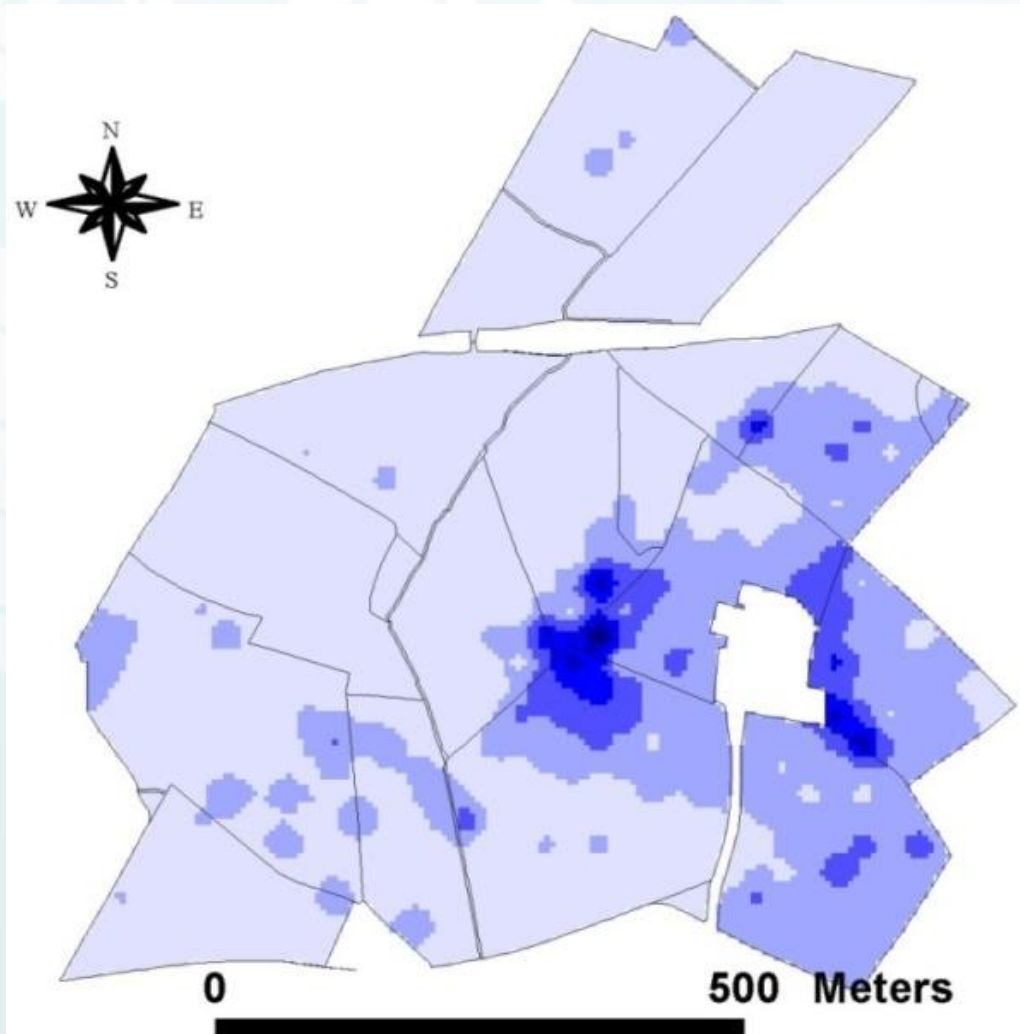
Source: Fisher, 2013

Percentage of grass samples in P and K indices

	P INDEX		
K INDEX	< target	target	> target
< target	20	12	10
target	10	8	8
> target	7	9	15

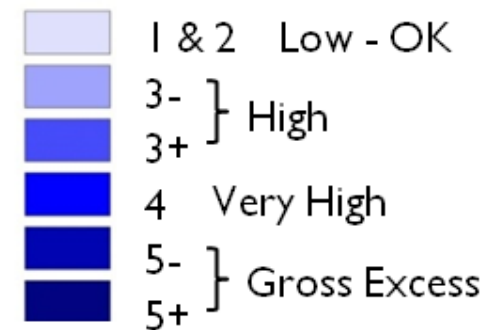
(PAAG, 2012 – 38,266 samples)

Soil P Distribution on a Grassland Farm



Soil P distribution across 50 ha grassland farm (Bailey et al, 2013)

Soil P Index



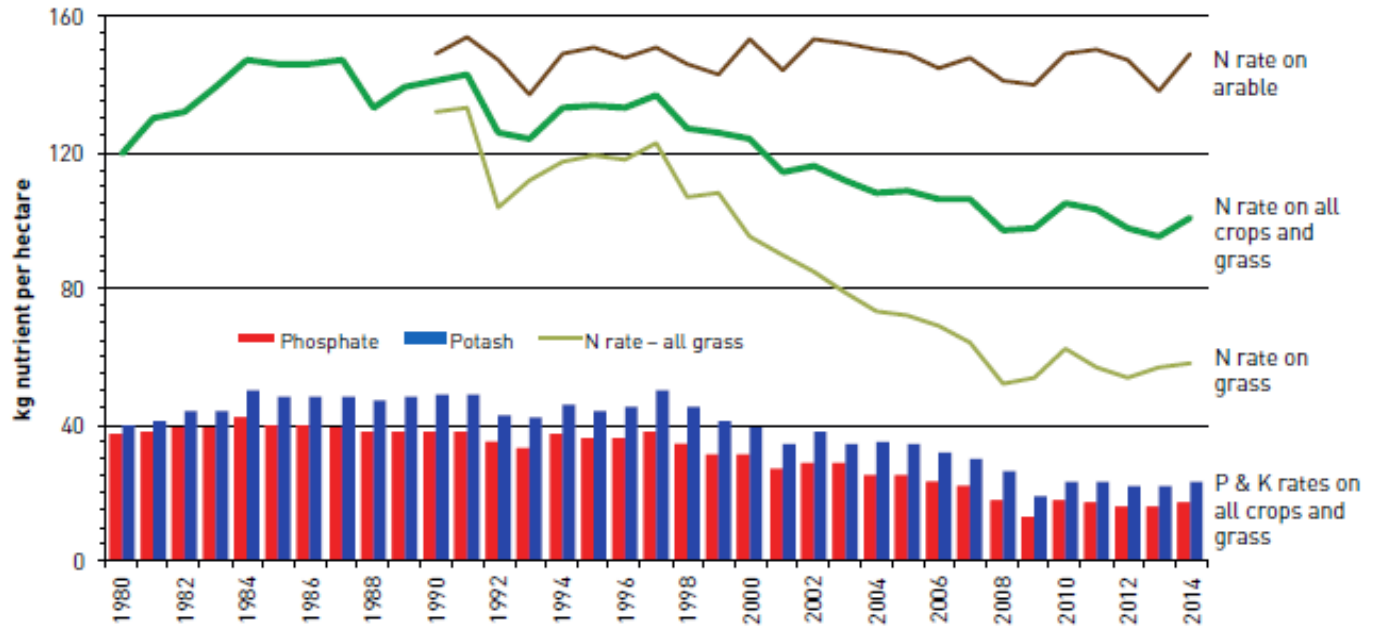
Variation in Grass Production



Source: Bailey, 2015

Nitrogen Fertiliser Levels for Grassland

Figure 1
Changes in overall fertiliser nutrient application rates, England and Wales

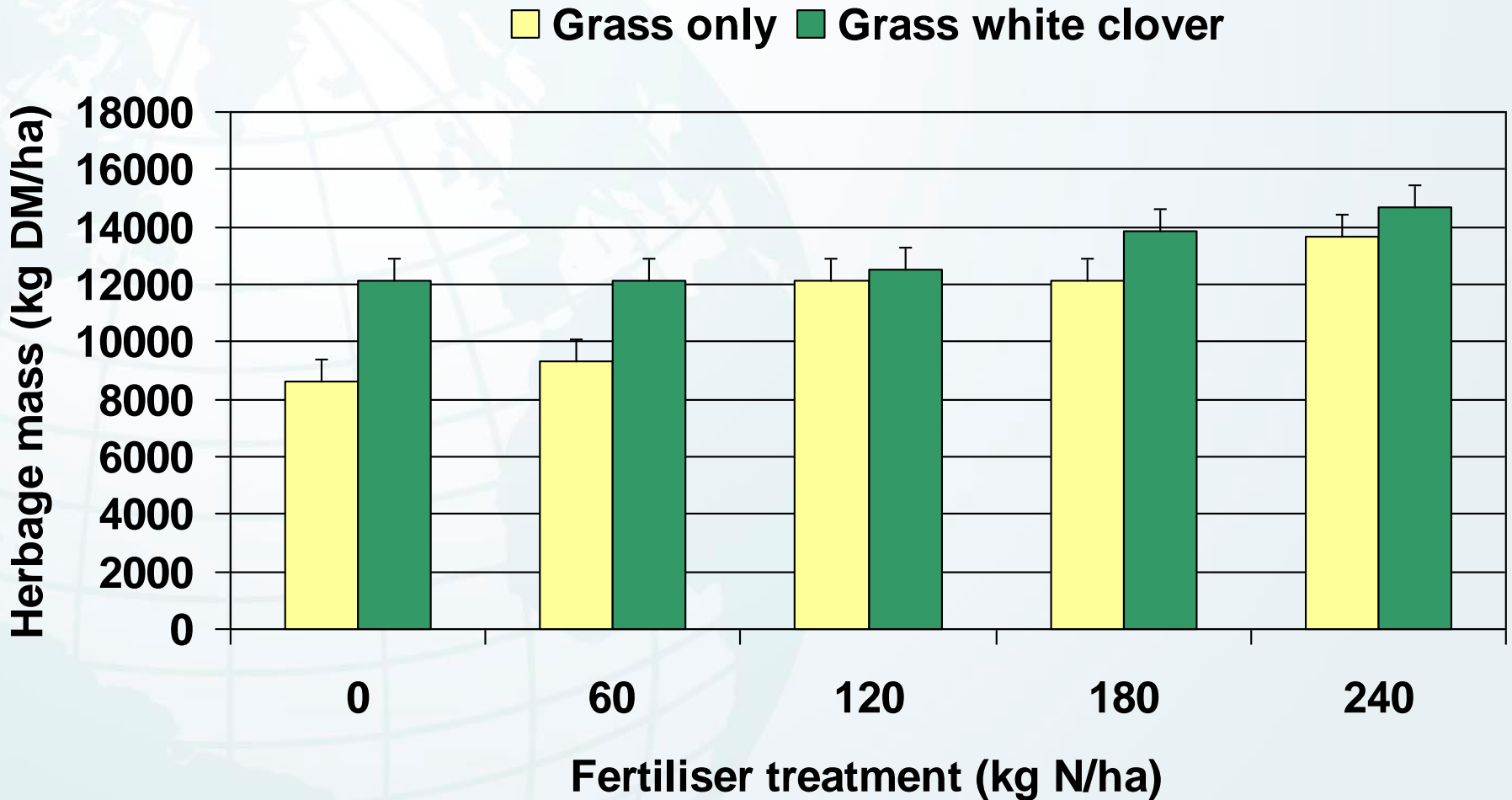


Source: British Survey of Fertiliser Practice

N level on grassland now 60 kg N/ha compared to 130kg N/ha in 1990

Source: AIC Fertiliser Statistics 2015

Three Years Herbage Production (2010-12)



Source: Teagasc: (*Enríquez-Hidalgo et al., 2013*)

Efficient Grassland Management





At Paddock Level

Producing grass that is easy to graze

- Recommendations based on age of regrowth (15- 35 days) or pregrazing height (PreGH)
- To maximize intake **per cow** and **per ha**, PostGH needs to be around 45% of PreGH
- Target:
 - Enter paddock between 10 to 14 cm PreGH
 - Exit paddock at 4 to 5 cm PostGH

Source: Delaby et al, 2013

Keep Grass Covers Low



At System Level

Managing the grass budget

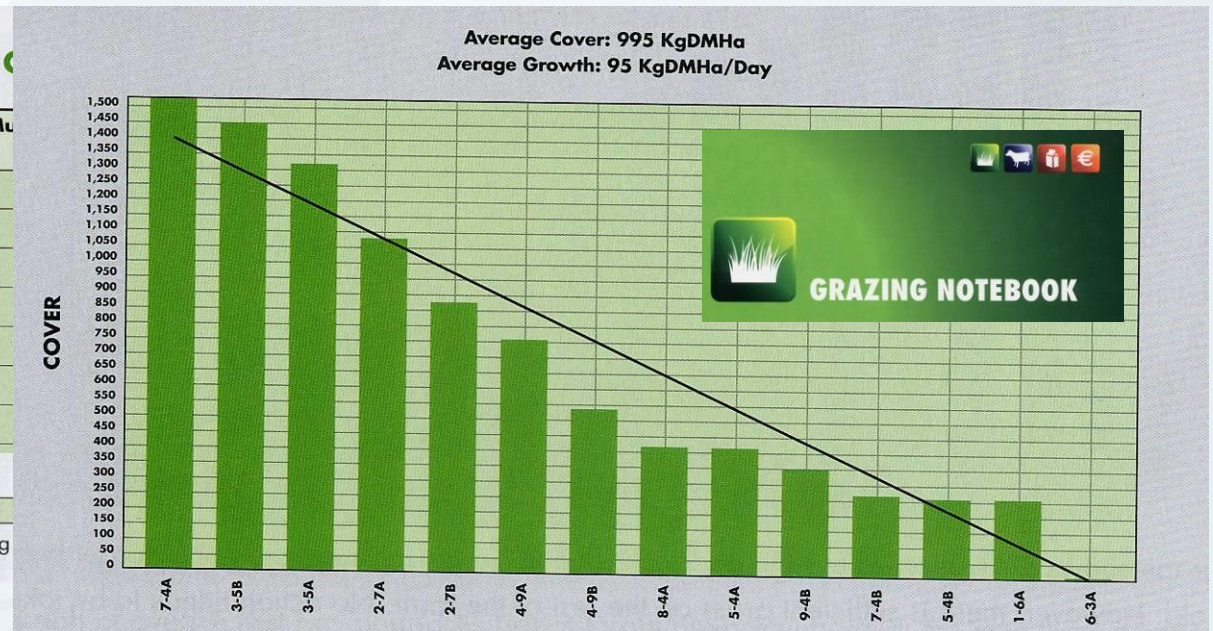
- Major developments in grass budgeting methods and tools:
Grass Wedge (NZ, Ireland,...) and Herb'aVenir (France)

Example: Calculating a Farm Cover

Paddock No. / Name	Paddock DM yield (kg DM/ha)	Mu
1	900	
2	100	
3	200	
4	1000	
5	1200	
6	600	
7	200	

To calculate the quantity of grass per cow

$$\text{Farm cover } 591 \div \text{Stocking } 4$$





Efficient Conversion to Milk

Production From Forage - Cow Genetics

Selection of animals for grass-based systems is essential for profitable pasture-based systems

Key Characteristics:

- Propensity for high grass DM intake
- Efficient conversion of grass to milk solids
- High fertility and longevity
- Easy care and docile
- Robust to fluctuations in grass quality and quantity

Crossbreeding?

- ◆ Why crossbreeding? Introduction of desirable traits from another breed

	<i>Holstein</i>	<i>Jersey crossbred</i>
Milk Yield (litres/cow/lactation)	6070	5463
Fat (%)	4.20	4.78
Protein (%)	3.30	3.59
Fat + Protein yield (kg/cow/lactation)	467	471
Average live weight (kg)	510	470

- ◆ Crossbred cows grazed for an extra 50 minutes each day - well suited to grass based systems
- ◆ Functional traits:
 - Reduced incidence of still births, mastitis and lameness
 - Improved fertility,
 - Increased longevity (4.8 vs 3.6 lactations)
 - Increased profitability (£27/cow/year)



Source: Ferris et al, 2015

Summary

The basics of profitable livestock production from grass remain the same:

- Growing high yields of quality grass:
 - managing soil and swards
 - soil ph and fertility
 - N fertiliser or grass/cover or mixed swards
- Using grass efficiently for grazing and silage:
 - lower grass covers pre and post grazing
 - the right cow for the system
 - flexibility to cope with adverse weather

• Major Research/Advisory/Industry initiative needed to drive :

Focus on Forage

Faith in Grass

“Making full use of grass relies on having faith in its ability to fulfil a more demanding role in dairy herd nutrition.

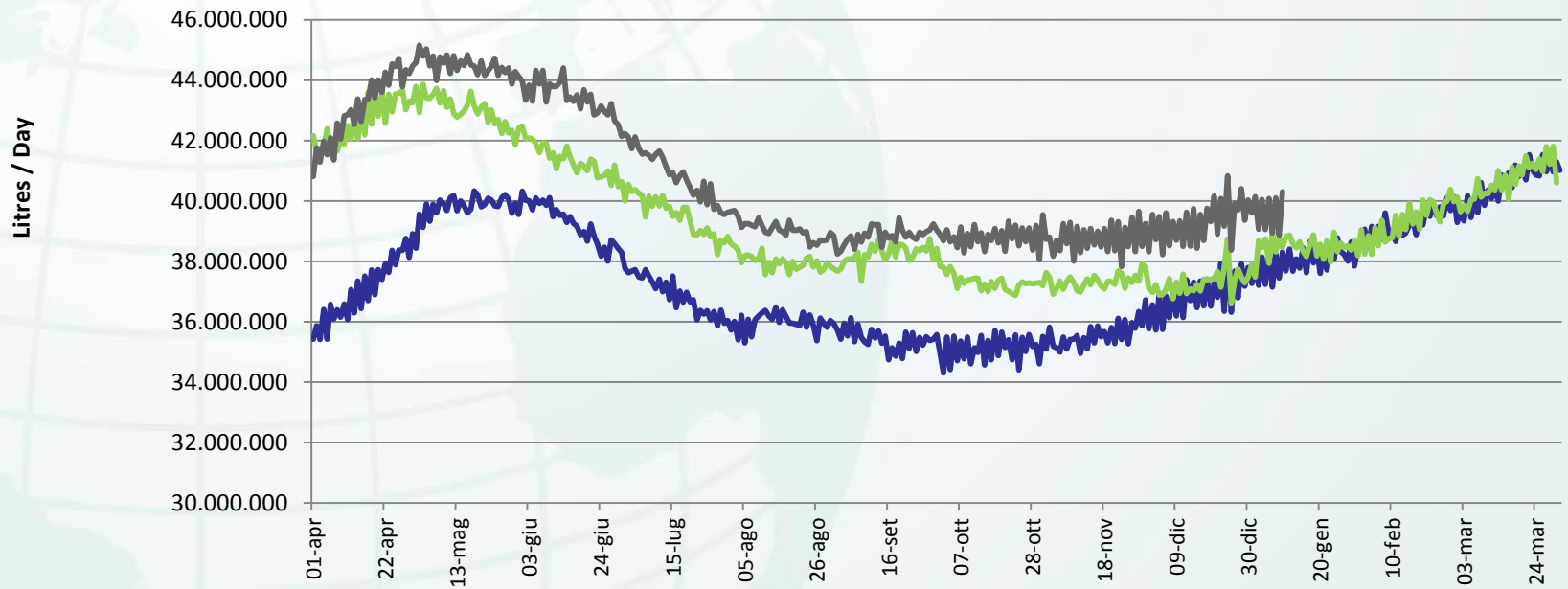
Such faith can only stem from growing grass in sufficient quantity and presenting it to the cow at a satisfactory stage of growth and quality.”

Alf Walsh, Rex Paterson Memorial Study, 1982

Practical Targets

	Litres	% of total
Milk from grazing	2500	33
Milk from all forage	4500	60
Milk from concentrates	3000	40
Total	7500	

UK Daily Milk Deliveries



— UK Milk Deliveries 2013/14

— UK Milk Deliveries 2014/15

— UK Milk Deliveries 2015/16

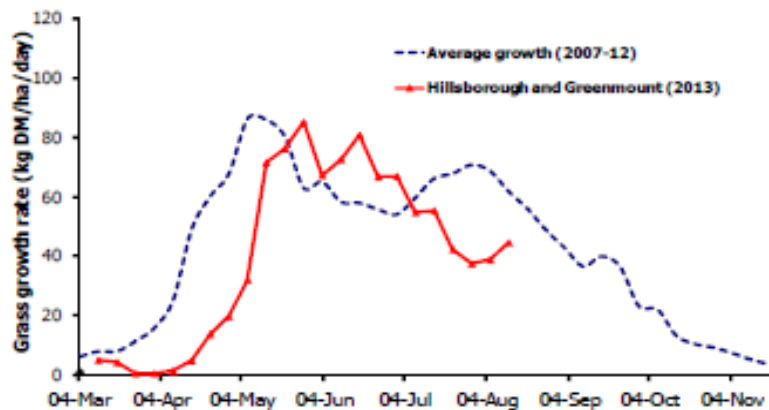
Grass Check - weekly information on grass growth

GrassCheck

Grass Growth and Quality

Week beginning 12 August 2013

Grazing Management Focus



3-week Grass Growth (kg DM/ha/day)*	
Greenmount	58
Hillsborough	31
Average	45

* 270 kg N/ha/year applied

Grass Quality	
Dry matter (%)	19
ME (MJ/kg DM)	12.0
Crude protein (%)	20
Sugars (% DM)	14

Pat Lavery manages 90 Holstein cows near Portadown. Pat's focus is to maximize milk yield per cow by utilising grass and grass silage. Rolling average performance figures are 7,600 litres from 1.8 tonnes of concentrate per cow with 3,600 litres of milk from forage per cow. There is no diet feeder on the farm and all concentrates are fed via a computerised "feed-to-yield" system in the milking parlour and out of parlour feeders.



Grass supply

Average farm cover	2,590 kg DM/ha
Pre-grazing cover	3,300 kg DM/ha
7-day grass growth	59 kg DM/ha/day (based on farm cover)
Herd grass demand	52 kg DM/ha/day

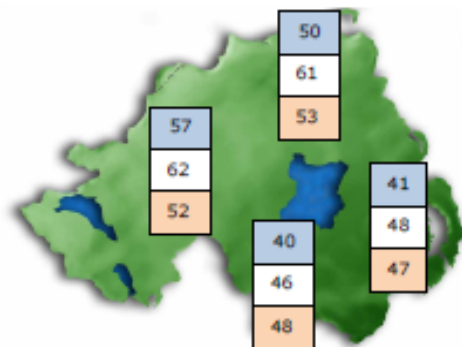
Cow performance

Milk yield and quality	26.3 litres/cow/day, 3.63% BF, 3.17% PR
Milk from forage	11.5 litres/cow/day
Concentrate feed level	6.7 kg/cow/day

Management issues

Growth rate on the farm has returned to the seasonal average following late July's rain. Paddocks too advanced for grazing were round baled in early August to control the grass wedge and provide additional silage for buffer feeding later in the season. Dry cows are following the milking herd to reduce residual covers to 2,000 kg DM/ha. If this does not occur, paddocks are topped. Target residual covers have increased over the season with more rejection around the dung pats. The M+ on the computerised feeding system was reduced to 12 litres for cows and heifers at the beginning of August. One paddock has been identified for reseeding and will be burnt off next week.

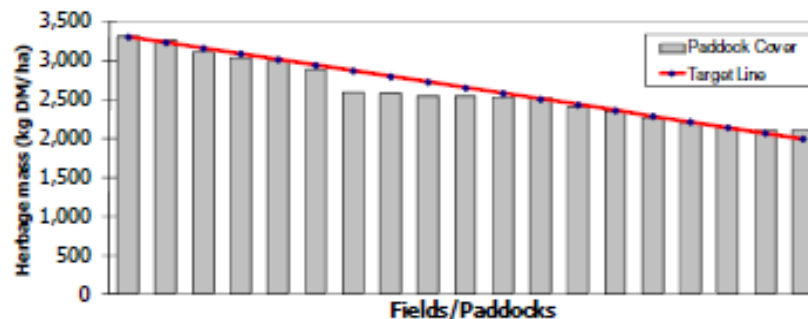
Grass growth predictions represent the average daily growth over a 21 day period.



Grass Growth Predictions (kg DM/ha/day)

Current
1 week ahead
2 weeks ahead

Comment: Growth continues to improve, although it is still well below the seasonal average, particularly on the dryer sites.



Target line in wedge reflects a pre-grazing target of 3,300 kg DM/ha and a post-grazing target 2,000 kg DM/ha. This is the quantity of grass required for a stocking rate of 3.5 cows/ha (86 cow equivalents grazing 24.7 ha) and a rotation length of 25 days, with cows eating 15 kg grass DM/day.

Production Systems - Trends

- Increasing milk yield and reliance on purchased feed.
- Reduced reliance on forage - also reflected in GB data.
Milk from forage 2534 l (Promar), 2486 l (Kingshay)

Refocus on milk from forage required



Increasing Output From Grass

How can I improve?

Grow it

- Drainage
- Soil fertility →
- Reseeding

Graze it

- Grazing skills
- ← • Grazing infrastructure
- Calving pattern



Variation in Nutrient Distribution - K

Source: Bailey, 2015

