

# Major and Micro Nutrient Advice “Green Book” New Developments

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# Early Soil Fertility Advice

– An Foras Talúntais

1963: Technical Bulletin

1986: Soil Analysis &  
Fertiliser Recommendations

Table 1. Source and number of soil and plant samples analysed at Johnstown Castle in 1986

Table 6. Recommended (Conway, 1986) fertilizer application rates assuming soil P and K values at Index 1 (1-3 and 1-50 ppm respectively).

Nutrient	Pasture	Suggested Fertilizer Rates (kg/ha)		
		Winter Wheat*	Potatoes	Sugar Beet
N	See table 5	185	220	160
P	40	35	150	80
K	75	75	290	315

\*Grown 3-6 years after good pasture, straw removed

... samples taken at present would

# Next generation of Soil Fertility Advice

## –Teagasc Johnstown Castle

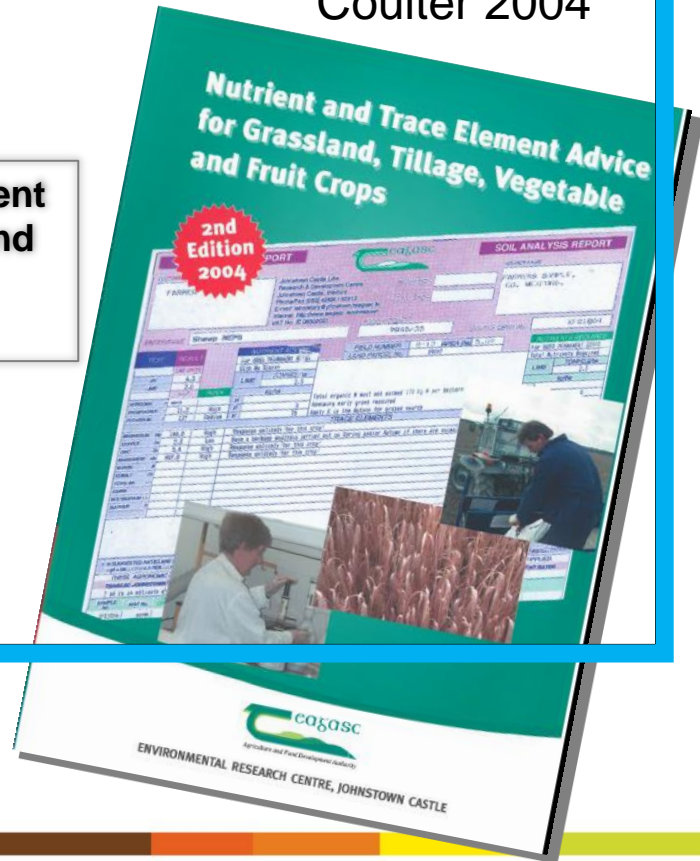
Gately, 1994

**Soil Analysis and Fertilizer,  
Lime, Animal Manure  
Recommendations  
1994-2000**  
Gately, 1994

Coulter, 2001

**Nutrient and trace Element  
Advice for Grassland and  
Tillage Crops**  
Coulter, 2001

Coulter 2004





# Arrival of Environmental Legislation

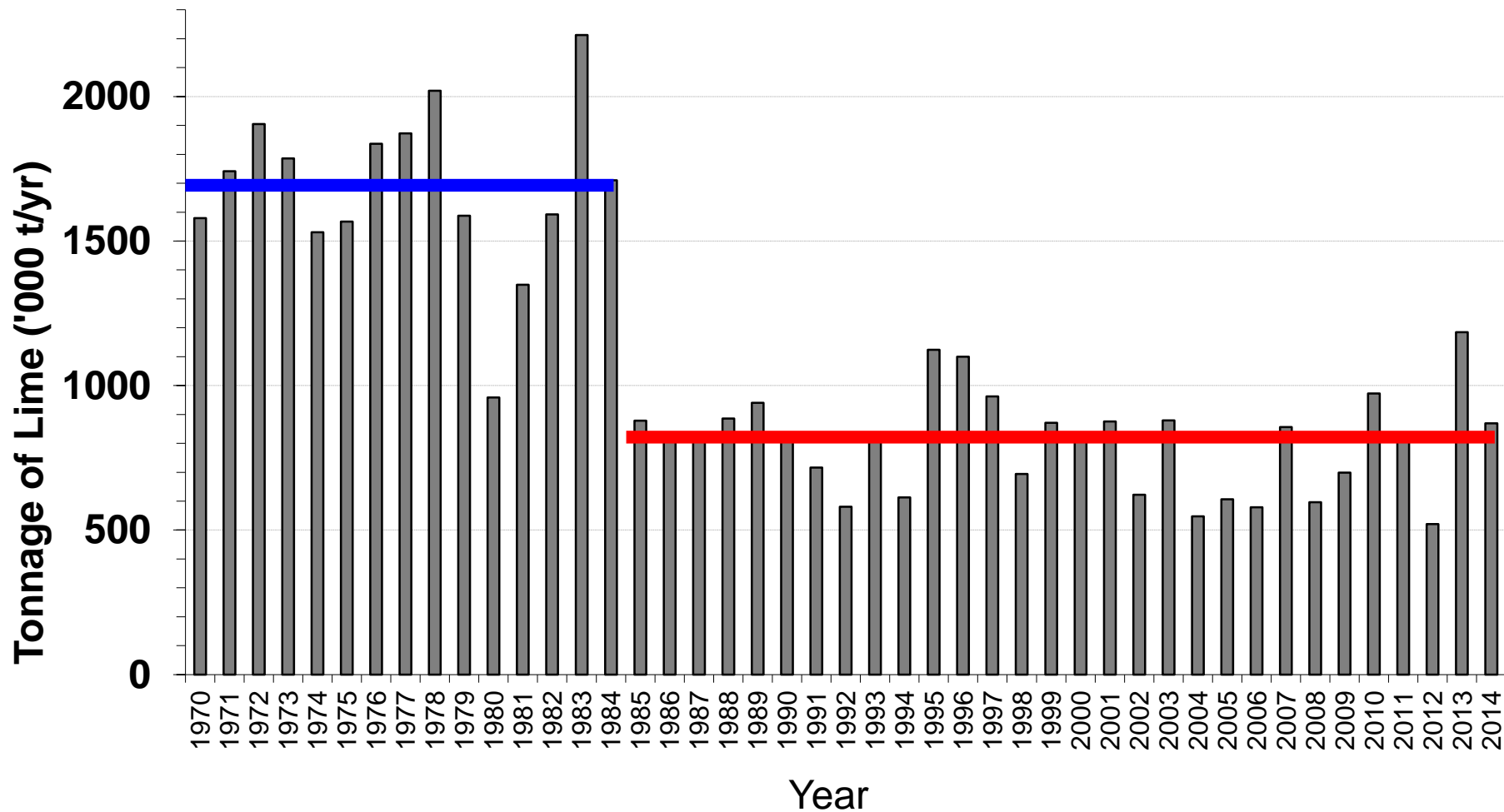
## Soil Fertility Advice under EU Nitrates Directive

Since 2006 constrained  
nutrient use on farms

Coulter & Lalor 2008

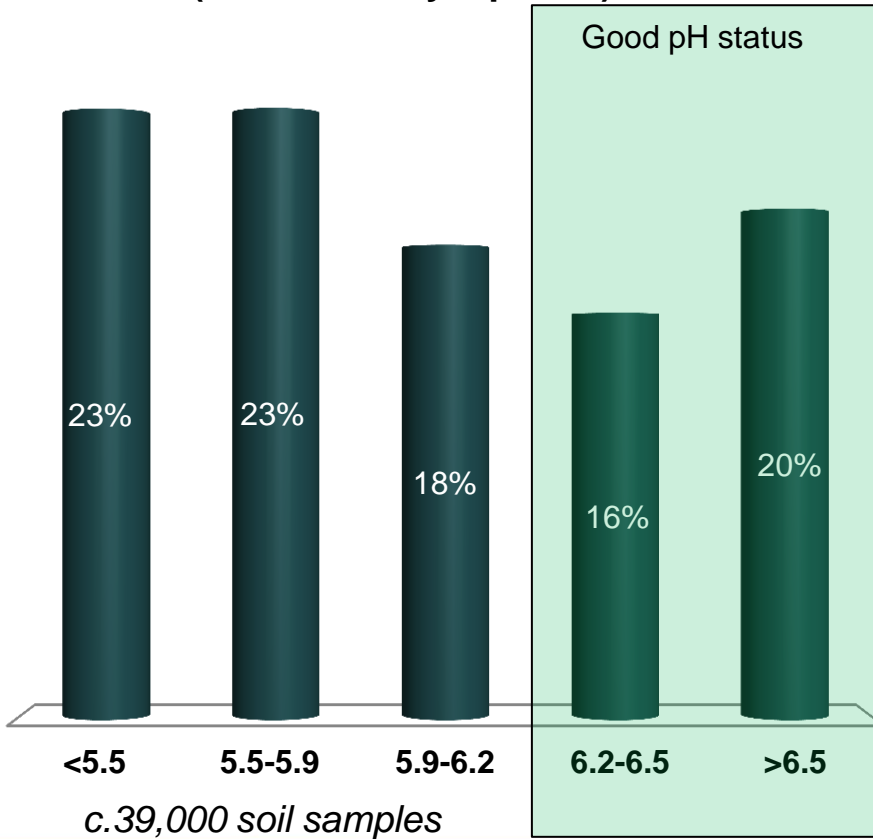


# Lime use 1970 - 2014

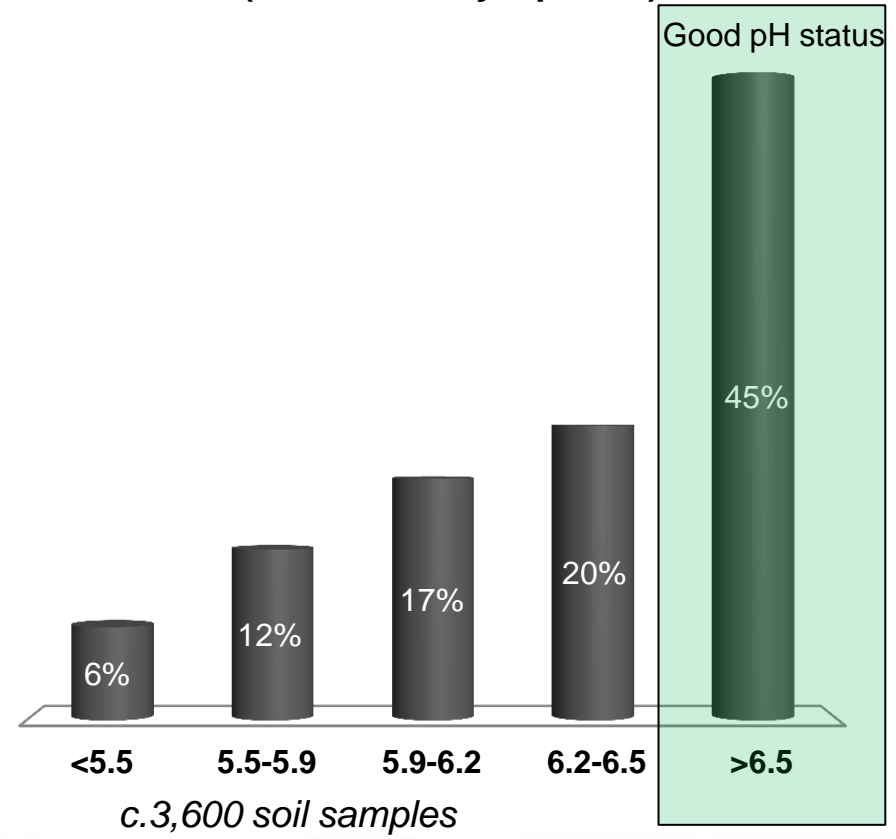


# Soil pH status in 2015

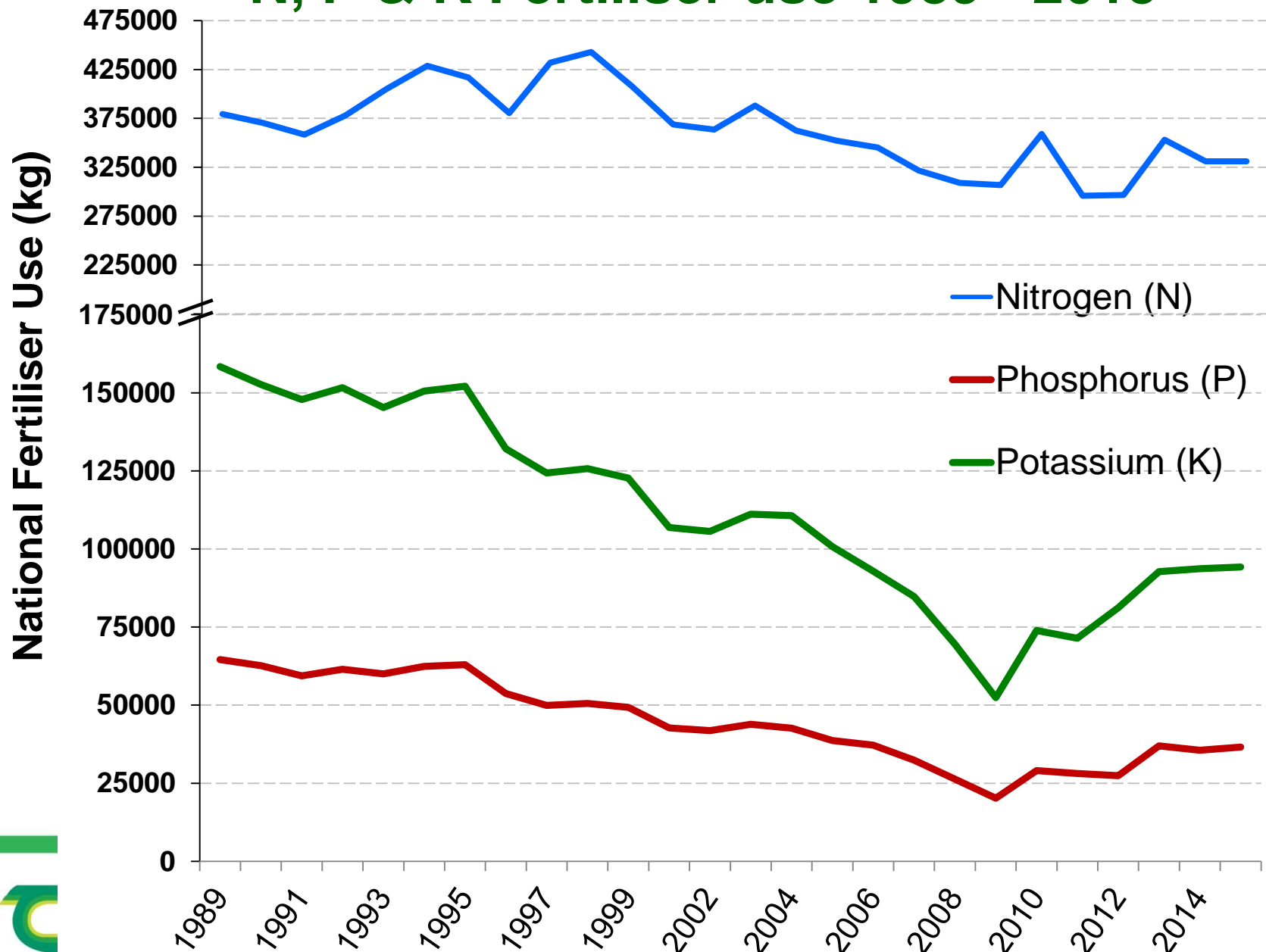
## Soil pH Grassland (Good Fertility > pH 6.2)



## Soil pH Tillage (Good Fertility ≥ pH 6.5)

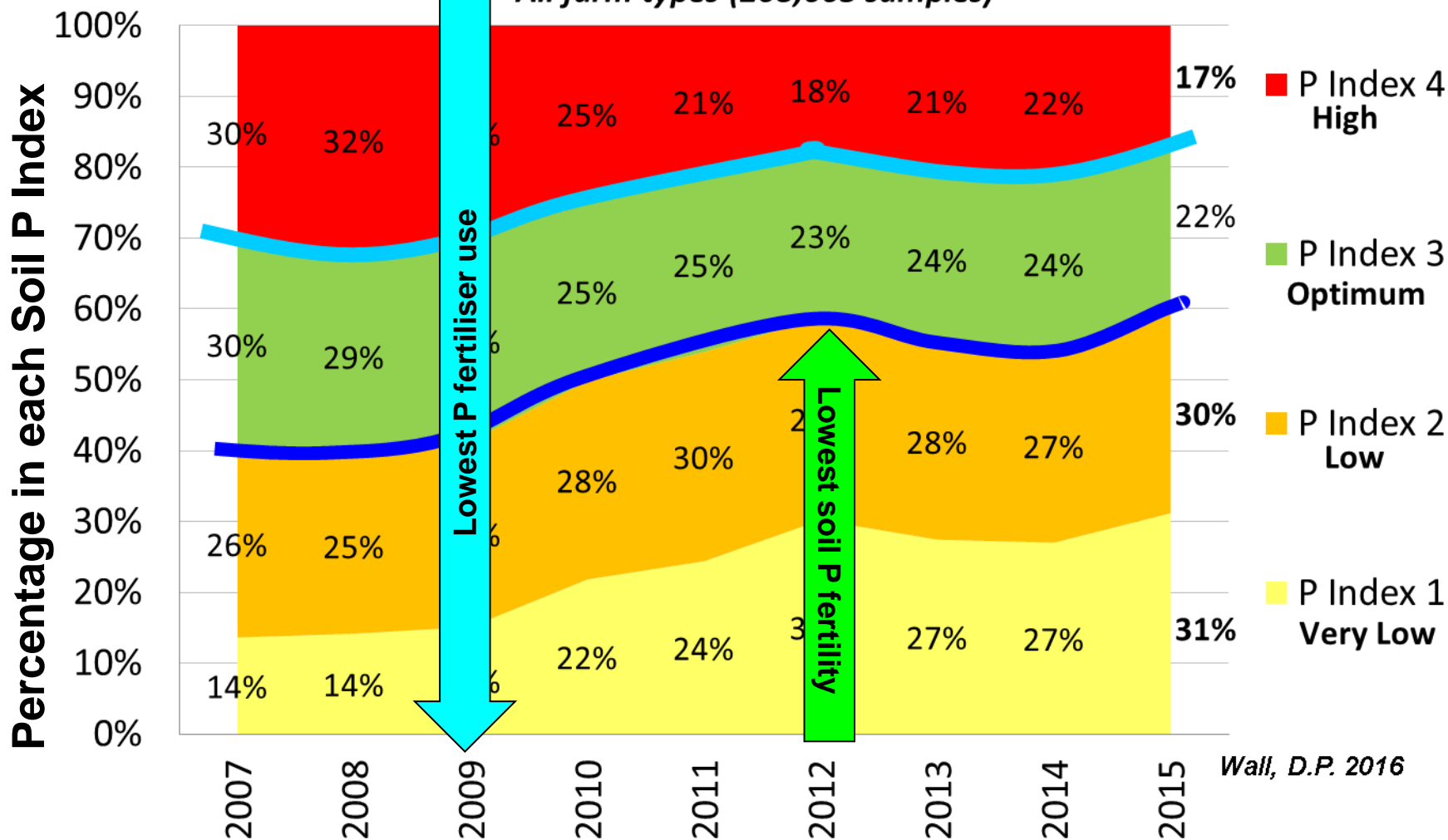


# N, P & K Fertiliser use 1989 - 2015



# National Soil Test P Trends

All farm types (268,663 samples)



Wall, D.P. 2016



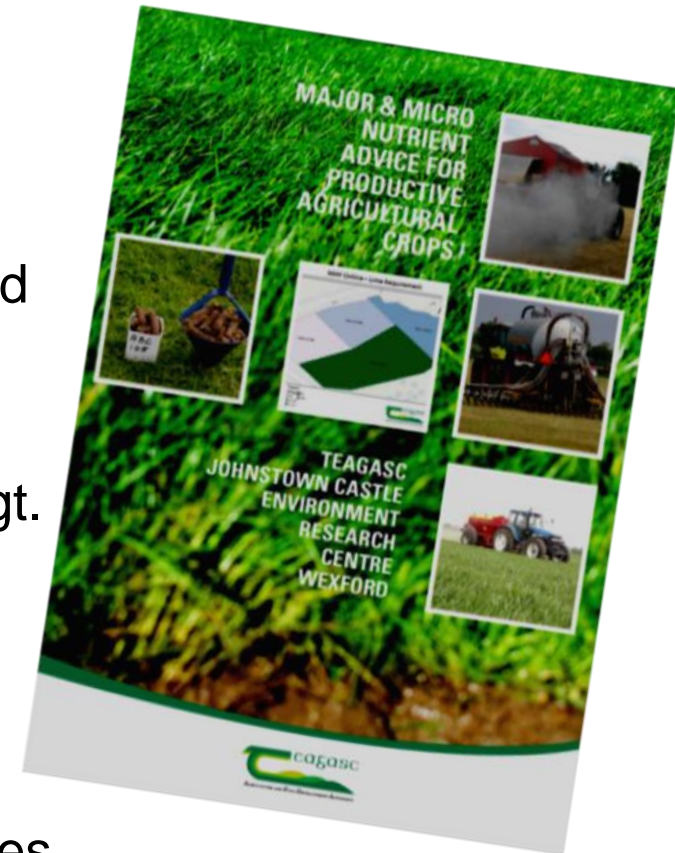
# Nutrient Management Advice – New Developments

“Green Book 2016”

*Large team of people involved!*

## Approach to developing new Nutrient Advice

- Review the latest soil and fertiliser research
  - New fertiliser types
  - Soil type influence on nutrient cycling
  - Modern grassland and crop nutrient demand
  - Nutrient requirements for livestock systems
- Review of on-farm sustainability research
  - Most sustainable approaches to nutrient mgt.
  - Low emission nutrient application methods
  - Soil type specific nutrient advice
  - Agronomic and environmentally optimum nutrient advice
- Review of environmental legislation and practices



# Nutrient Management Advice – New Developments

“Green Book 2016”

Green Book, 4<sup>th</sup> Edition Summary of Changes

## New Sections

Soil Types and Nutrient Cycling: Information on the major soil types in Ireland and their influence on nutrient cycling and management, including links to further information of Irish soils

Fertiliser Ingredients: Definitions and information on the main fertiliser ingredients available in Ireland

Adaptive Nutrient Management Planning; NMP On-line: Information on the new nutrient management system “NMP On-line” and how it can be used to facilitate better nutrient management planning and sustainable outcomes for farmers into the future

Nutrients for Energy Crops: New information and nutrient recommendations for energy crop production



# Nutrient Management Advice – New Developments

## “Green Book 2016”

### Green Book, 4<sup>th</sup> Edition Summary of Changes

#### Revised/updated Sections

Soil Acidity and Liming: Improved information on soil pH and new information on lime and lime products has been included

Nutrients in Organic Manures: Updated fertiliser replacement values for slurries and new information on organic manure and biosolid types.

Information on tools to measure slurry variability and how to maximise slurry efficiency

Grassland: New N advice for beef and sheep systems and suggested application timings for fertilisers.

Information on soil test P response to fertiliser P inputs as influenced by varying soil parameters



# NMP On-line

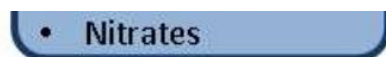
## 1.3.1 Fertiliser plans / Nutrient management plans

The system provides a number of NMP report types.

**Farm Fertiliser Plans:** All farmers require a nutrient management plan to help match nutrient applications to soil requirements as per soil test results, crop type and/or stocking rate etc. NMP On-line offers two main types of farm fertiliser plans; (1) Short fertiliser plan - this plan provides a report which focuses on the core nutrient management component of the plan, (2) Long fertiliser plan - This plan provides a comprehensive output from the system including nutrient management, manure production and storage.

**GLAS NMP Report:** For farmers who are participating in the GLAS Agri-environmental scheme there is a report format which can be produced by the system. This report can be printed by the system for the farmer but is uploaded NMP Online directly into DAFM systems. This saves the requirement of interfacing with a GLAS system upload system.

**Derogation NMP Report:** For farmers who are applying for derogation to farm more intensively (i.e. up to a stocking rate of 250 kg/ha organic N) under the EU Nitrates Directive National Action Plan there is a requirement to develop a detailed nutrient management plan which includes a comprehensive computation of organic manure storage.



authority

Figure 3-1. Overview of data inputs, plan preparation and outputs using NMP On-line

# Organic manures section – New Developments

## “Green Book 2016”

### 8-3-Nutrient availability in organic fertilizers according to SI 31 of 2014

Organic Fertilizer Type	Fertilizer replacement value % <sup>1</sup>		
	Nitrogen	Phosphorus	
		Soil test P Index 1 & 2	Soil test P Index ≥3
Pig and poultry manure	50	50	100
Farmyard manure	30	50	100
Spent mushroom compost	20	50	100
Cattle and other livestock manure (including that produced on the holding)	40	50	100

1. Fertilizer replacement value % refers to the percentage of the total nutrient content that will potentially replace chemical fertilizer application to the crop following application



# Grassland section – New Developments

## “Green Book 2016”

### Nitrogen advice for Beef and Sheep Systems

- Suckler calf to weaning
- Suckler calf to beef
- Calf to beef
- Sheep and lamb

Table 11-3: Suggested timing of available N applications for grazed swards used for suckler calf to beef production systems at various stocking rates

		-----N rates <sup>1</sup> (kg/ha) for approximate application dates-----								
Stocking Rate LU/ha <sup>2</sup>	Stocking Rate <sup>2</sup> (kg/ha N)	Jan <sup>3,4</sup> / Feb	March	April	May	June	July	Aug	Sept <sup>3,4</sup>	Total N Rate <sup>1</sup> (kg/ha)
<1.0	≤ 80		23						12	35
1.25	99		23	15					15	53
1.5	118		25	23		10			17	75
1.75	138		34	25	10		15		19	103
2.0	158		42	30	20		20		20	132
2.25	178	13	45	32	20		26		26	162
2.5	198	15	49	36	25	22		24	22	193
2.75	218	15	53	42	25	26		28	26	215
3.0	238	20	57	46	30	28		32	28	241

1. Rates shown above refer to recommended application of available fertilizer. Chemical fertilizer rates should be calculated by deducting the available N contained in organic fertilizer applications from

# Nutrient Management Advice – New Developments

## “Green Book 2016”

### Green Book, 4<sup>th</sup> Edition Summary of Changes

#### Revised/updated Sections - Crops

Cereals: New advice on N application timings for cereal crops. Advice on fertiliser application methods at different soil P and K indices.

Potatoes: New N advice for potatoes, which considers variety group, and haulm longevity and production system type

Oilseed Rape: New advice on N timing based on density of the crop and leaf area index

Vegetable Crops: Updated of N, P and K advice for vegetable crops based on best available information has been included



# Cereal section – New Developments

## “Green Book 2016”

Table 12-8: Available phosphorus advice for cereals based on crop yield (kg/ha)

Soil P Index <sup>1</sup>	6.5	7.5 <sup>2</sup>	8.5 <sup>2</sup>	9.5 <sup>2</sup>	10.5 <sup>2</sup>	11.5 <sup>2</sup>
1	45	49	52	56	60	64
2	35	39	42	46	50	54
3	25	29	32	36	40	44
4	0	0	0	0	0	0

1. The table above shows the levels of P for cereal crops based on soil P index and crop yield.
2. Additional P can be applied on the basis of proof of higher grain achieved yields in anyone of the previous 3 years at 20% MC. An additional 3.8 kg P/ha for each extra one tonne above the base yield of 6.5t/ha.
3. Where soil pH > 7.0 an additional 20 kg/ha P can be applied on P Index 4 soils.

# OSR – New Developments

## “Green Book 2016”

### Nitrogen management for winter oilseed rape

1. For backward crops or crops grazed extensively by pigeons a light dressing (30kg N/ha) should be applied at the onset of spring growth (late Feb to early March), a third of the remainder should be applied 10 days later and the final dressing in early April.
2. On moderate crops, one third of the N should be applied in mid -March with the rest applied in early April.
3. On large crops with lots of leaf area post winter, early N will encourage excessive vegetative growth and applications should be delayed with the first third of the total applied in late March/early April and the remainder applied as late as possible whilst still allowing a uniform spread pattern between the tramlines (before the crop gets too tall).

This approach can be further refined by assessing the extent of green or leaf area development post winter using image analysis (mobile phone apps). A green area index (GAI) of 0.5 or less can be considered ‘backward’ or grazed. 0.5 to 1.5 would be normal, while anything in excess of 1.5 at the end of February would be considered large.

# Potatoes – New Developments

## “Green Book 2016”

Table 16-2. Available N advice for potatoes (kg/ha)

Length of Growing season	Variety determinacy group	Soil N Index <sup>1</sup>			
		Index 1	Index 2	Index 3	Index 4
< 60 days	1	100 -140	80 -120	60 -100	40 -60
	2	80 -120	60 -100	40 -70	0 - 40
	3	60 -100	50 - 80	30 - 60	0 - 30
	4	N/A	N/A	N/A	N/A
60-90 days Earlies	1	160 - 210	140 – 170	120 - 150	90 - 120
	2	100 – 160	70 – 130	50 - 110	40 - 80
	3	60 – 140	50 – 110	30 – 90	0 – 60
	4	40 – 80	30 – 50	10 – 40	0- 40
90-120 days Maincrop/Seed	1	220 - 270	200 – 230	180 – 210	150 – 180
	2	150 – 220	120 – 170	100 – 150	80 – 120
	3	110 – 180	90 – 110	70 – 90	40 – 60
	4	80 – 140	50 – 70	40 -50	0 - 40
>120 days Maincrop	1	N/A	N/A	N/A	N/A
	2	190 – 250	160 – 190	140 – 170	120- 140
	3	150 – 210	130 – 150	110 – 130	80 – 100
	4	100 – 180	70 – 90	50 – 70	20 – 40



# Vegetable section – New Developments

## “Green Book 2016”

**Table 19: Available N, P and K advice for carrot crops (kg/ha)**

Soil Index	N	P	K
1	90	65	250
2	75	45	200
3	55	35	150
4	40	20	110

If soil P is greater than 15mg/l, no fertilizer P is necessary  
If soil K is greater than 250 mg/l, no fertilizer K is necessary

### **Nitrogen**

Depending on soil fertility, apply 40 – 90 kg/ha N as a base dressing. Top dressings are usually not required.

### **Potassium**

Sulphate of potash is the preferred form of K for carrots.

### **Boron**

The disorder known as ‘5 o’clock shadow’ is caused by a deficiency of B, so the use of a

# 4<sup>th</sup> Edition Major and Micro Nutrient Advice for Productive Agricultural Crops

- Provides farmers, advisors & industry with most up to date advice
- Latest information to manage soil fertility for efficient grass & crop production
- Supports profitable and sustainable nutrient management & farming
- Helps to protect the environment and aids farmers meet their obligations under environmental legislation (e.g. EU Nitrates Directive – NAP).
- Helps to support our Nitrates Derogation!
- This new Green Book information in tandem with NMP On-line has the potential to help farmers to restore good soil fertility and reverse declining soil fertility trends nationally.

“Green book” available on-line at <https://www.teagasc.ie/crops/soil--soil-fertility/>



# 4<sup>th</sup> Edition Major and Micro Nutrient Advice for Productive Agricultural Crops

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The editors wish to acknowledge the considerable help given by many people, both within and outside Teagasc in the preparation of this edition of the nutrient advice manual. Many Teagasc staff gave time and encouragement to the work, and helped greatly by contributing new data, reviewing texts and suggesting ways of improving the information content and clarity of the text and tables. Stan Lalor of Fertilizer Association of Ireland provided much useful information on fertiliser ingredients and organic manures. This book also drew on the knowledge and experience of many former staff members of Teagasc and its forerunner, An Foras Taluntais. Their contribution is acknowledged.