

Soil Fertility Progress - Heavy Soils Programme Farms 2014-2016

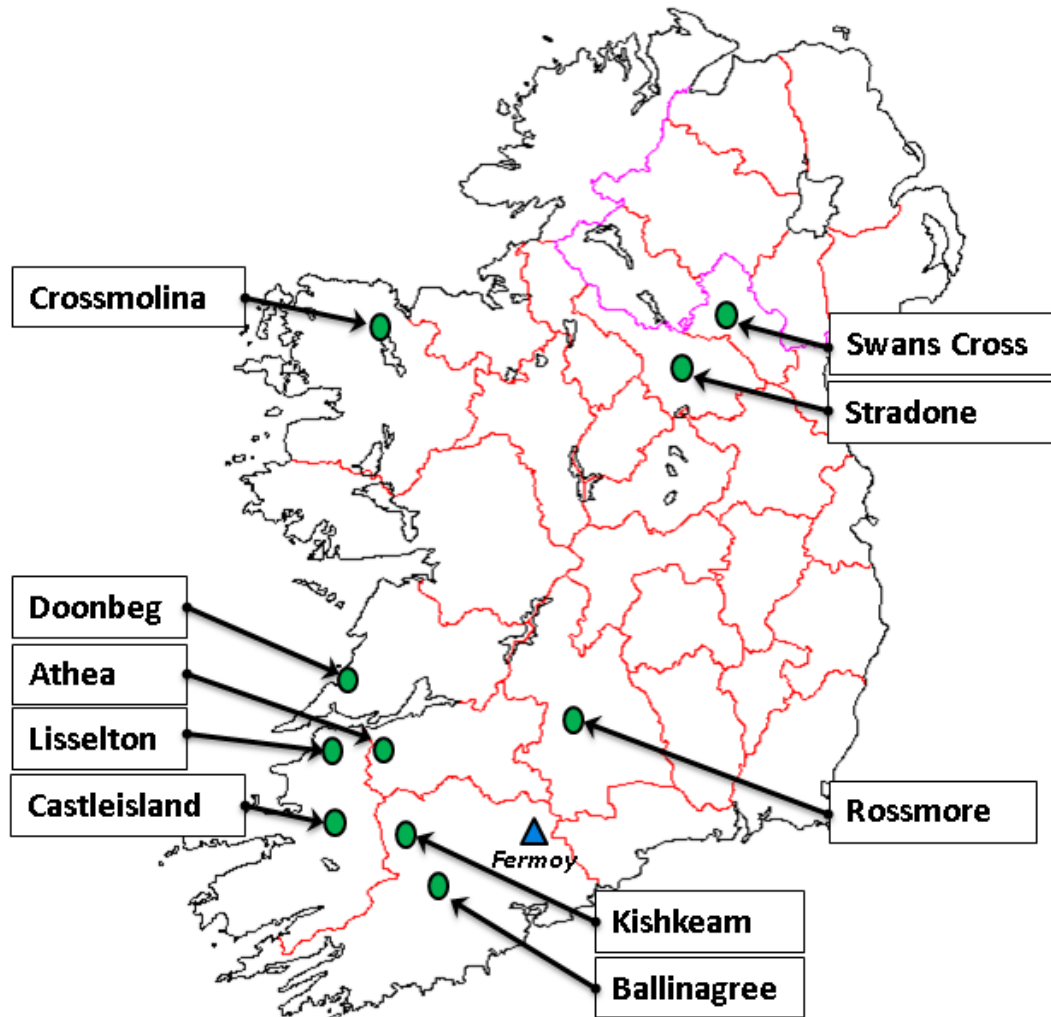


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Teagasc Heavy Soils Programme

Outline

- Background Heavy Soils Farms
- Lime/PH Progress & Impact
- Phosphorus & Pottasium progress
- Grass Growth
- Issues around building Soil P
- Farm Focus on increasing % of farm at optimum soil fertility
- Conclusion

Heavy Soils Programme Farms



Key Physical Performance 2016

<u>2016</u>	Cow Numbers	Milking Block SR Lu/Ha	MS/ha (Milking block)	Kg MS/cow	6 week calving %
Spring calving Kerry grp Suppliers n=182	95	2.53 [2.1 Lu/ha whole farm]	1053	415	67
Heavy Soils Farms (n=7)	101	2.58 [1.85 Lu/Ha Whole farm]	1132	439	79

Heavy Soils Farms increased Milk Solids Production by 20% since 2014 (Avg 90 cows)

Financial Performance 2016

	Feed	Fertiliser	Total Variable	Machinery	Total Fixed	*Total Costs c/l	*Total Costs €/kg MS
Spring calving Kerry grp Suppliers n=182	3.96	2.65	11.85	1.13	7.81	19.66	2.49
Heavy Soils N=7	3.39	2.85	11.3	1.13	7.68	18.94	2.36

* Excludes own labour, tax, capital repayments, heifer rearing

- Heavy Soils farms are very efficient relative to peer group in same Region

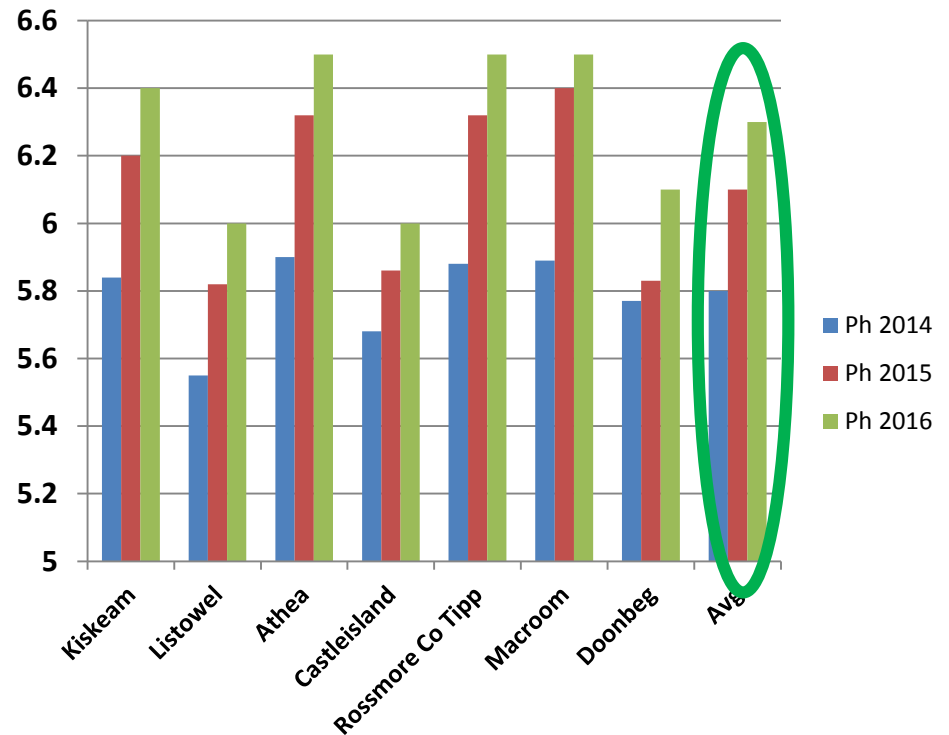
Lime Requirement

2013 NMP	Cost of Lime	Annual cost for 3 Years
Lime requirement tonnes (n=7 farms)		
	€	€
278	5836	2075

**Average annual farm application
92 tonnes Lime 2014-2016**

PH Progress 2014 -2016 (N=7)

	PH		
	2014	2015	2016
Kiskeam	5.84	6.2	6.4
Listowel	5.55	5.82	6
Athea	5.9	6.32	6.5
Castleisland	5.68	5.86	6
Rossmore Co Tipp	5.88	6.32	6.5
Macroom	5.89	6.4	6.5
Doonbeg	5.77	5.83	6.1
Avg	5.8	6.1	6.3

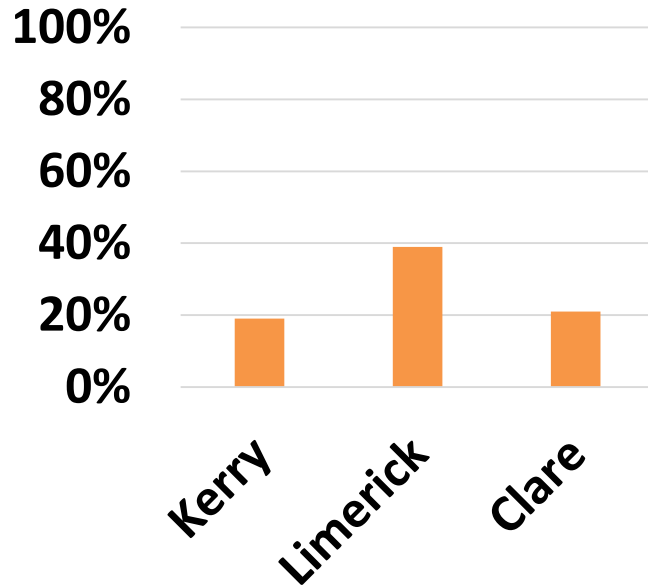


Impact of Lime Application observed on HSP Farms.

- Paddocks that were at Ph 5.5 on HSP farms in 2013 and are now at Ph 6.3 are growing an additional 2 tonnes DM/ha in 2016.
- Farms that are now at target pH notice a much faster response to applied fertilisers. When soil temperatures are good paddocks are easily achieving the 21 day pregrazing target of 1500kgs/ha .This has led to more surplus silage of high quality being harvested during the main growing season, an invaluable resource on a Heavy soil farm.
- In 2016 the Athea farm achieved an average Ph of 6.5. As well as supporting a Dairy herd stocking rate of 2.5 cows/Ha the farm also produced an additional 70 tonnes DM in the form of 390 surplus bales of silage equivalent to 10 bales/ha (almost 4 bales per cow).The farm grew 11.4t/ha and utilised 9t/ha.
- Paddocks are better grazed out by the herd and palatability of grass has improved.
- Grass has a better root structure, better tillering and less open swards.
- Farmers aware of softening effect of excessive lime use, split application (max 2 tonnes per single application) has worked well in building pH without negatively affecting soil structure.

Soil Fertility Campaign 2016

PH >6.2 in 2015




Get your pH right now

Soil pH & Lime Req. Test Offer

From now until 15th Oct 2016

For €35 (€7 per sample) get a snapshot of the lime needed for your farm

Pick up a Soil Corer & Boxes at your KERRY AGRIBUSINESS STORE

TAKE 5 REPRESENTATIVE SAMPLES

Paddocks

- With similar soil type
- Previous lime applied at a similar time
- Paddock with similar management – eg. silage paddocks

Full soil analysis should continue in the Autumn to meet complete Nutrient Management Planning requirements




Using the new Lime Brochure to discuss myths on applying lime.



LIME

- Add life to your land and money to your pocket
- Grow another 80 tonnes of feed every year from 40 ha

- Lime is a soil conditioner that is essential in the soil to obtain the desired pH for the growing crop. Low pH is reflected in poor crop yields and poor use of applied fertilisers
- In the Kerry Agribusiness catchment area 8 out of every 10 paddocks sampled in the past year were deficient in lime
- Farmers who spread lime are reporting very positive results on their paddocks

John Leahy Kilca, Co. Limerick

- Farms heavy clay & peat soils
- Increased clay soil pH from 5.5 to 6.2 between 2013 to 2015 across the whole farm
- Used 1,200 t/ha per year on 40ha costing €2,600/ha. This was 10% of the total fertiliser and lime spend in 2015

"We taken an aggressive approach to liming over the last 3 years, making it a priority area of spending"

"Grass growth has turned around on the farm, grass has a healthier appearance and responds more quickly to N fertiliser. This year I've noticed improved drainage on the heavier soils on the farm, not increased soling of the soil as some people suggest"

Dan Daly Milltown, Co. Kerry

- Farms lime draining soils
- Increased soil pH from 5.4 in 2012 to 6.0 in 2015

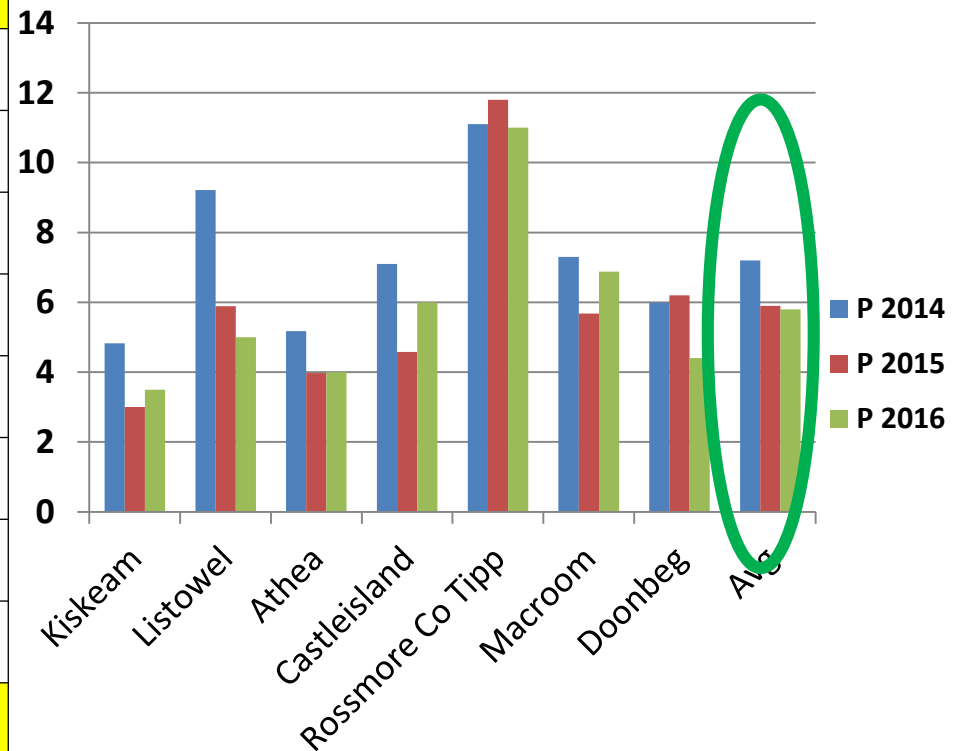
"Soil levels taken 4 years ago showed my farm needed a lot of lime. It wasn't a priority for me then but I was seeing a lot of paddocks with poor grass growth. Last year I took the plunge and applied 100t to my 40ha milking block, this worked out at one tonne per cow in my hand. I've seen dramatic improvement in the grass, less dead material in the base, looks healthier and grows faster, especially after nitrogen. Cows are grazing paddocks a lot better this year"

"I've been able to keep some grass in the cows diet every day since March 10th in this tough spring"



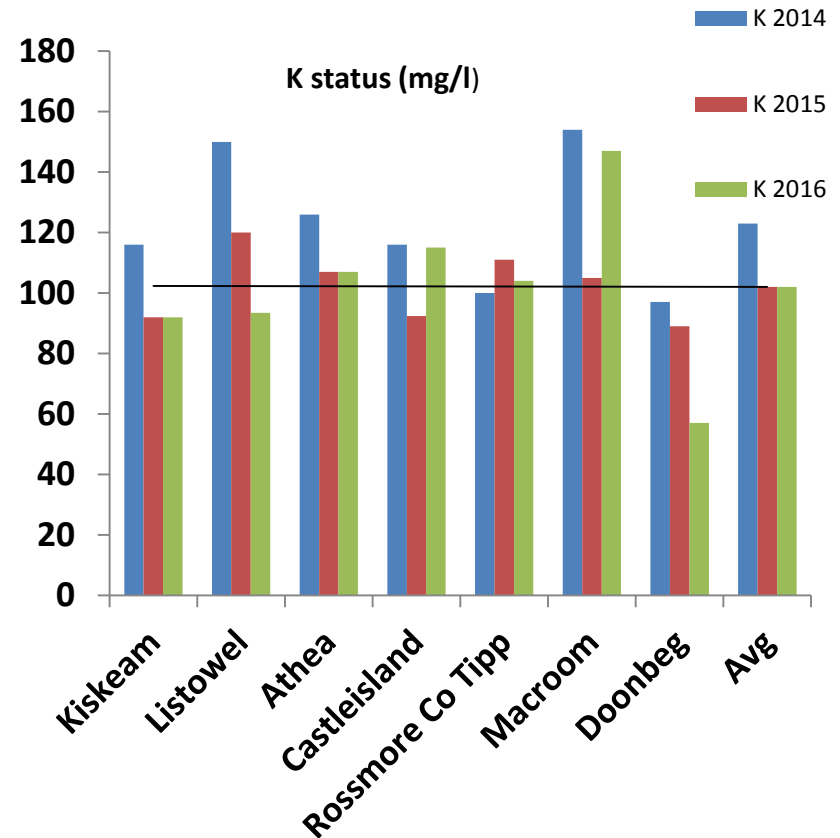
Phosphorus (mg/l) 2014-2016

	P (mg/l)		
	2014	2015	2016
Kiskeam	4.83	3	3.5
Listowel	9.22	5.89	5
Athea	5.17	3.97	4
Castleisland	7.1	4.58	6
Rossmore Co Tipp	11.1	11.8	11
Macroon	7.3	5.68	6.88
Doonbeg	5.99	6.2	4.4
Avg	7.2	5.9	5.8



Pottasium (mg/l) 2014-2016

	K mg/l		
	2014	2015	2016
Kiskeam	116	92	92
Listowel	150	120	93.5
Athea	126	107	107
Castleisland	116	92.4	115
Rossmore Co Tipp	100	111	104
Macroon	154	105	147
Doonbeg	97	89	57
Avg	123	102	102



Nutrient Input 2016

Total nutrient input (whole farm) HSP farms 2016

N	P	K
Kgs/Ha		
248	37	139

Chemical Fertiliser applied 2016 HSP farms

N	P	K
Kgs/Ha		
234	25	47

Slurry nutrient contribution 2016 HSP farms

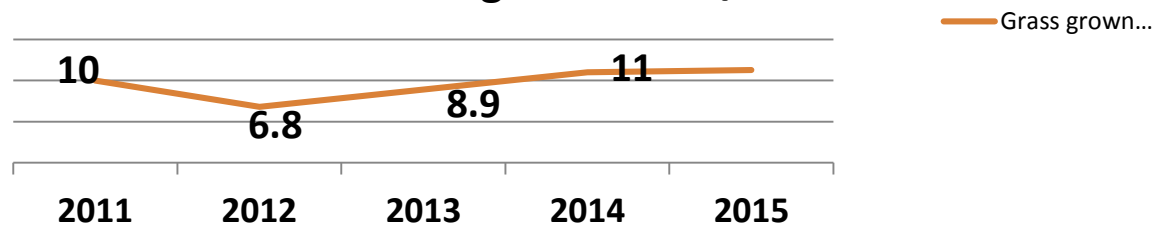
N	P	K
Kgs/Ha		
14	12	92

Grass Growth (T Dm/Ha) 2016

HSP Grass Measurement Data 2016

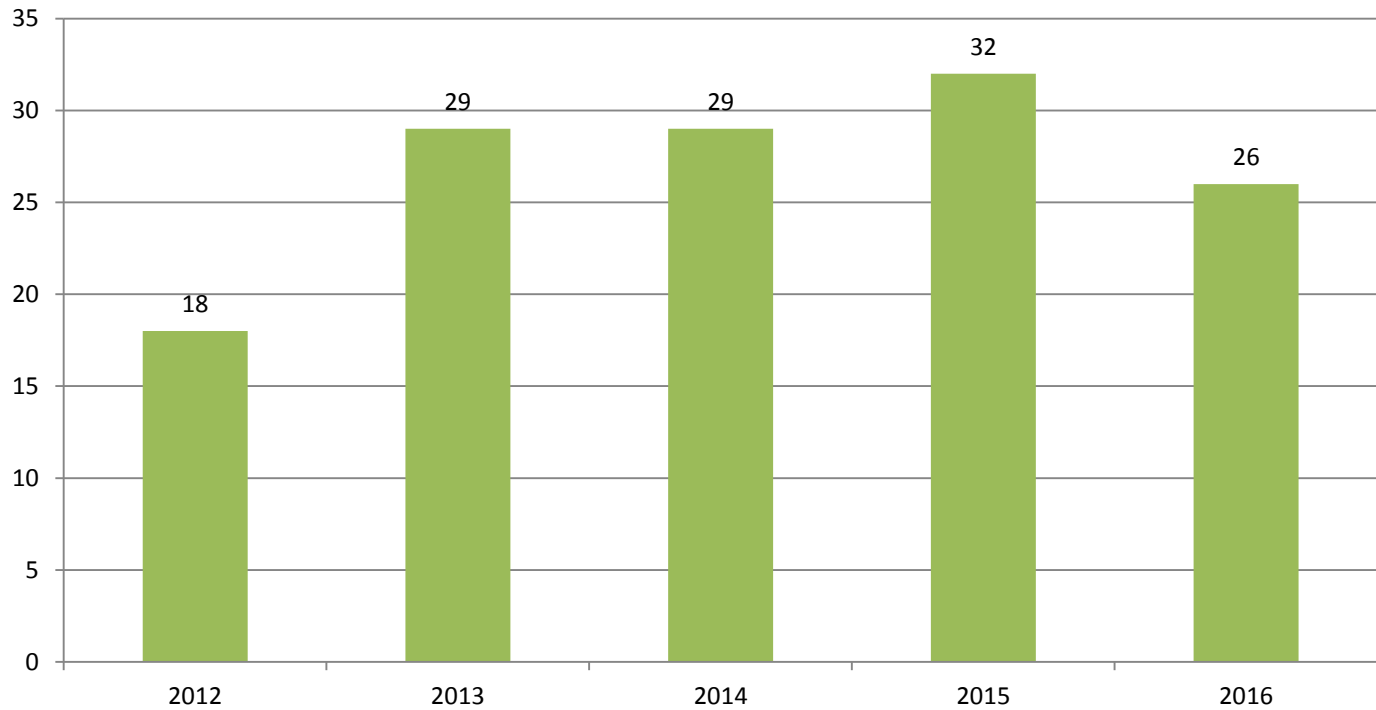
	Milking block	start date	Number	T DM/Ha	Spring	Summer	Autumn
	Hectares	measurement	measures	>15 measures			
Heavy Soils Farms							
Doonbeg	36.8	13/01/16	36	12.1	0.2	8.3	3.6
Athea	39.3	03/02/16	42	11.4	0.6	7.3	3.5
Kiskeam	42.1	14/02/16	23	9.2	0.2	6.0	3.1
Castleisland	41.7	12/03/16	28	11.6	0.2	7.4	4.0
Listowel	31.3	29/01/16	22	11.1	0.4	7.5	3.1
Macroon	55.82	11/02/2016	25	11.8	0.35	7.66	3.8
Rossmore Co Tipp	31.31	01/01/2016	28	12.7	0.42	7.69	4.62
Average	39.8	02/02/2016	29	11.4	0.3	7.4	3.7

Grass grown T Dm/Ha

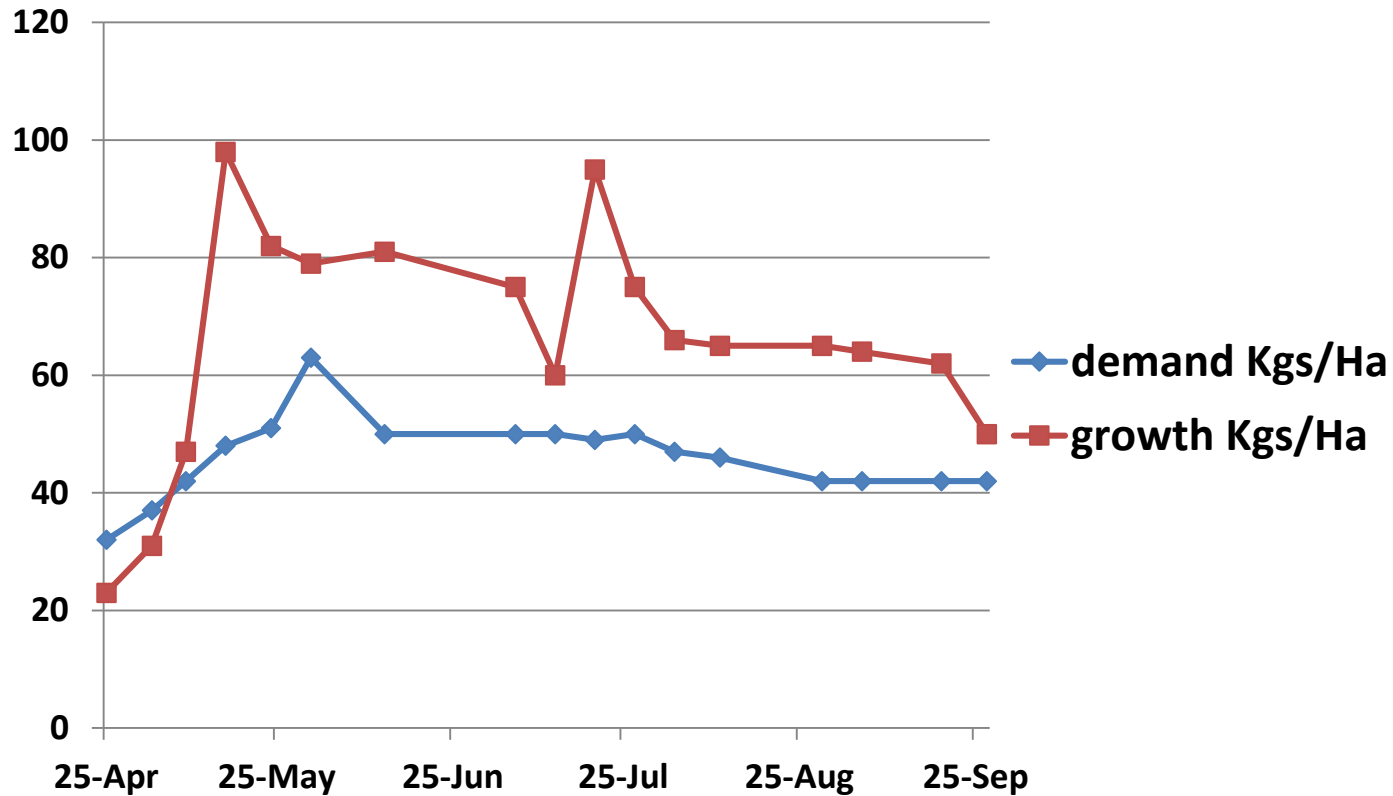


% Ryegrass HSP farms

2012 - 2016 %Ryegrass HSP

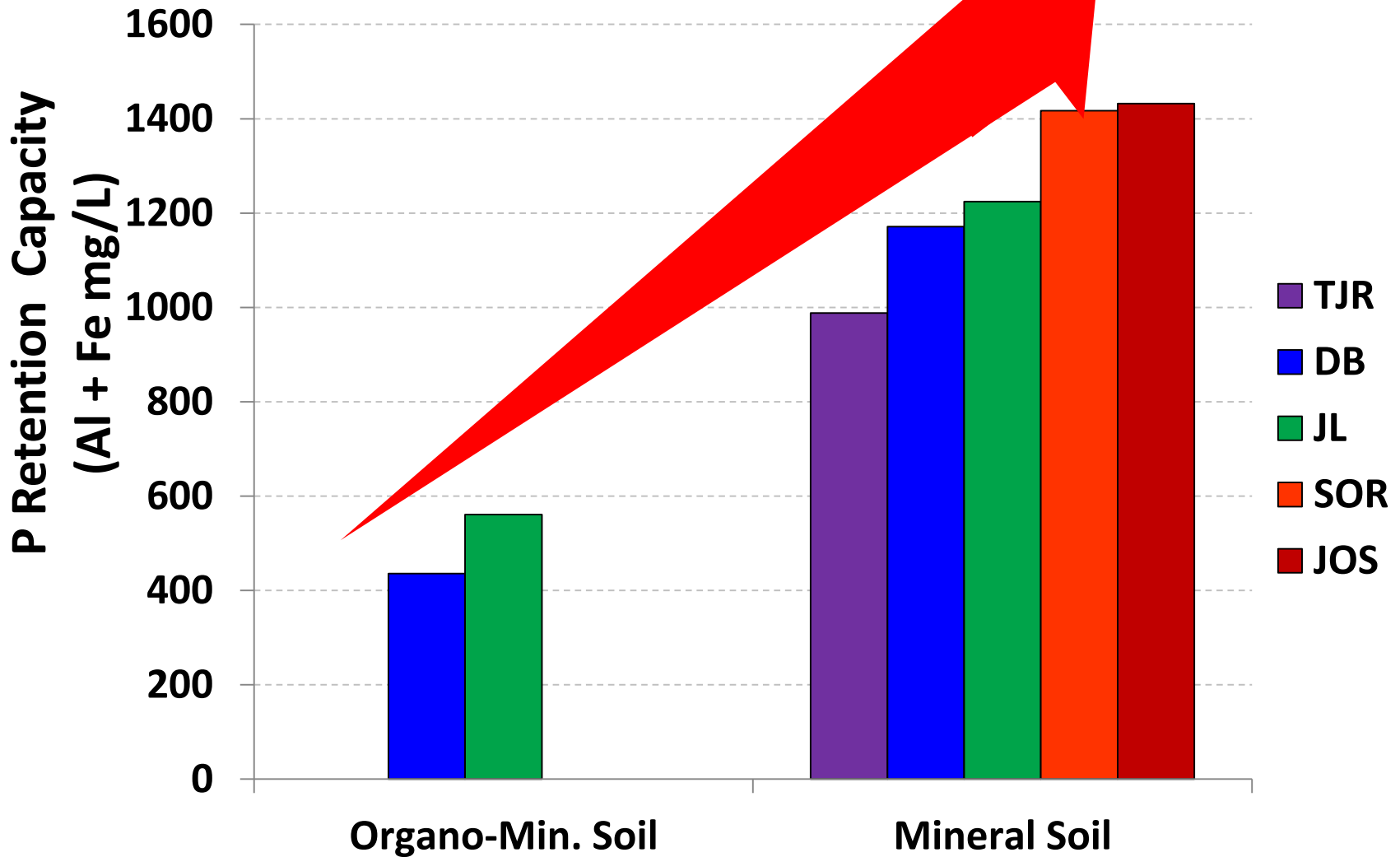


Mid-Season Grass Growth v Herd Demand Kg/Ha/day



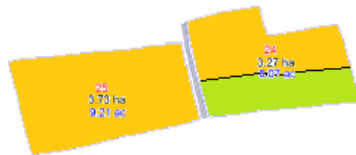
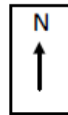
Relative Soil P Retention Capacity

(permanently fixed P)

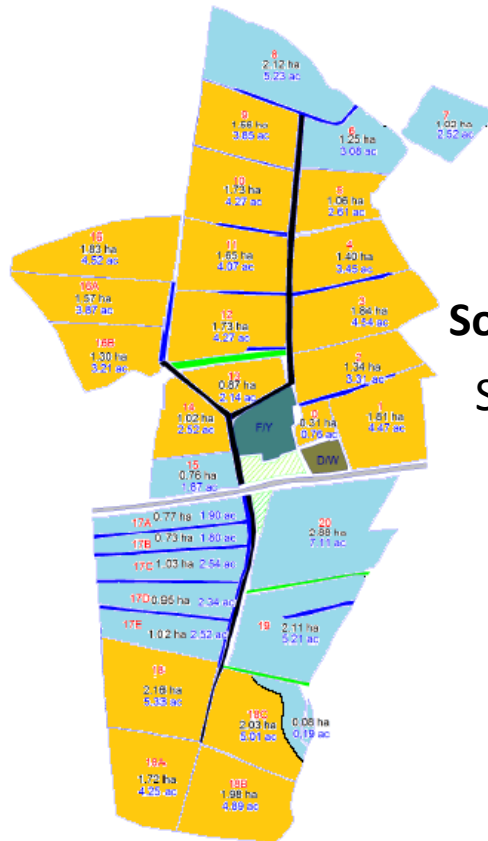


Athea Soil Map

- Stagnic Brown Earth
- Humic Surface-water Gley
- Stagnic Brown Podzolic
- Typical Brown Alluvial Soils
- Typical Groundwater Gley



0 100



Soil Type A

Stocking Rate = 2.5 Lu/Ha

Legend	
Public Road	
Farm Road	
Watercourse	
Hedgerow	
Dwelling House	
Farmyard	
Forestry	

Slurry

15 October to 15 January

Grassland

161 kg/Ha

FYM

1 November to 15 January

Soil Fertility Summary

Athea Farm 2017 NMP

Overall Fertility Status

pH > 6.2, P & K index 3 or 4

Lime

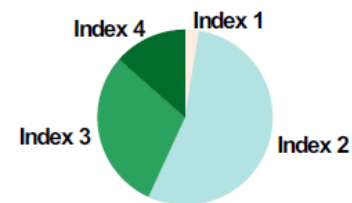
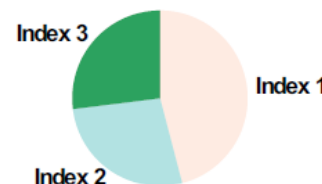
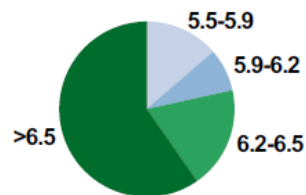
Soil pH > 6.2

Phosphorus

P Index

Potassium

K Index



	Ha's	%
Yes	9.76	16%
No	50.98	84%

pH	Ha's	%
<5.5	0.00	0%
5.5-5.9	8.31	14%
5.9-6.2	4.78	8%
6.2-6.5	11.39	19%
>6.5	36.26	60%

Index	Ha's	%
1	27.9	46%
2	16.46	27%
3	16.38	27%
4	0.00	0%

Index	Ha's	%
1	1.54	3%
2	32.98	54%
3	17.96	30%
4	8.23	14%

% reduction in farm capacity to perform based on current fertility levels compared to optimal fertility

pH, P and K
100

pH
100

P
100

K
100

Soil pH & Lime

Lime Planned

2017 82 Tonnes

Target pH

Mineral Soil

Organic Soil

Grass

6.3

5.5

Tillage

6.5

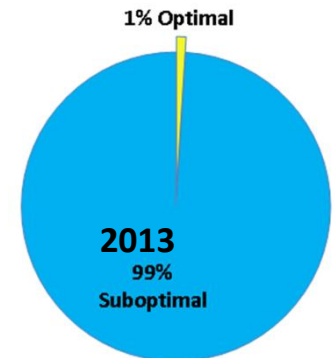
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Comparison of Better Soil Type paddocks v Whole Milking Block 2016 Athea Farm

Area	Ha	K 2015	K 2016	P2015	P2016	PH 2015	PH 2016
Milking Block	39.5	104	111	3.7	4.1	6.2	6.6
Soil Type A	21.6	116	127	4.9	5.2	6.5	6.8

Area	Ha	Grass grown/ha	Nutrient input 2016	
			P Kgs/Ha	K Kgs/Ha
Milking Block	39.5	11.4	45.6	193
Soil Type A	21.6	12.5	42.1	118

Percentage of soils with optimum soil pH, P & K status



Increased to 16% optimal in 2016

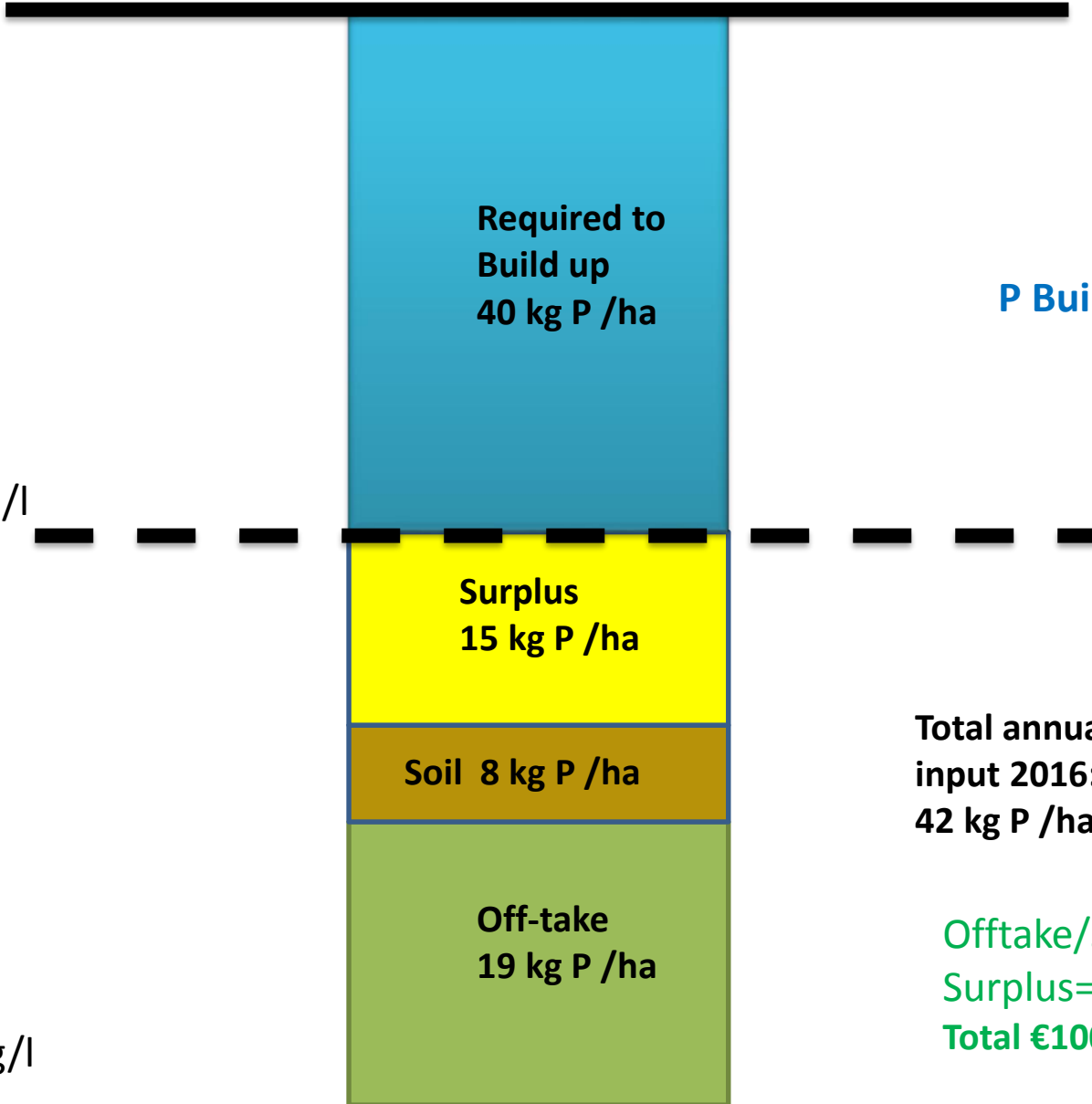
Athea Farm Soil Type A Phosphorus inputs (slurry & chemical) required to meet crop & soil requirements and Build P status

P = 6 mg/l

Soil index 3

2016 P = 5.2 mg/l

2015 P = 4.9 mg/l



P Build up c €100/ha

Total annual
input 2016:
42 kg P /ha.

Offtake/Soil=€64/ha
Surplus= €36/ha (slurry)
Total €100/ha

Implementing NMP 2017

Paddock focus on 60 Ha Athea farm

(10.3 Ha) Ph =6.9 P=4.2 K=104

Jan-March

- Pdks get Slurry (2500gals/ac or High P/K Compound late Mar (eg 2 bags 18 6 12/ac))
- Urea top up N

April-Sept

Slurry or High P/K compound
(Eg 6 bags 18 6 12/acre)

Urea Top up N

Chemical P applied =34kgs/ha

Slurry P applied=16kgs/ha

K Applied 163kgs/ha

50 ha

- Slurry (100,000 gals) Index 1 & 2 soils
- High P/K cpd (eg 3.3 bags 18 6 12/ac)
- Urea Top up N
- Potash 50%K Top up K

Chemical P applied 25 kgs /ha

Slurry P applied = 5 kgs/ha

K applied 137 kgs/ha

Target the farm chemical P allowance of 1600 kgs

10.3 ha x 34kgs/ha =350kgs + 50 ha x 25kgs/ha = 1250kgs

Messages from Heavy Soils Programme experience

- Do a comprehensive soil test of all paddocks at least every two years
- Correct lime deficiency based on lime requirement. On heavy soils limit lime application to 2 tonnes/acre in any single application
- Be opportunistic in spreading lime throughout year
- Use your soil results to set up a fertiliser plan and know the total amount of P fertiliser you are allowed spread. New Nutrient Management plans will have colour coded maps indicating the paddocks with low Indices for P& K or high lime requirement.
- Use of the low ground pressure umbilical & trailing shoe systems of slurry spreading have revolutionised the ability of HSP farms to get more slurry spread in the spring time, however great care must be exercised to avoid runoff losses from close to saturated heavy soil types.
- Split your P allowance applying 50% in spring and remainder in July/Aug.-apply on a little and often basis
- Ensure that Phosphorus content of compound fertiliser used is high enough to meet requirements
- Prioritise lime/fertiliser spending above other lower return costs

Conclusion

- Correct Soil PH....Get lime on first.
- Needs a definite lime application plan
- Treat lime the same as any other fertiliser.
- Consider PH maintenance-it will be higher in high rainfall areas
- Consider your soil type and its P “Lock-up” capacity
- High P and K compounds...a little and often
- Use your NMP Plan to increase the number of Paddocks with optimum soil fertility.
- Steady progress can be achieved in lifting Soil Fertility over time with the correct focus.

