



Manure and it's Management – focus on cattle slurry

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Manure management is ultimately about growing a crop with the nutrients

Meeting the challenge of getting the correct nutrient rate on each field for each crop



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Land is expensive – if we don't get nutrient rate correct every time it is costing money

Questions

1. What's the target crop?

- Determines the nutrient maintenance rate

2. What's the soil status?

- Determines the nutrient build-up rate

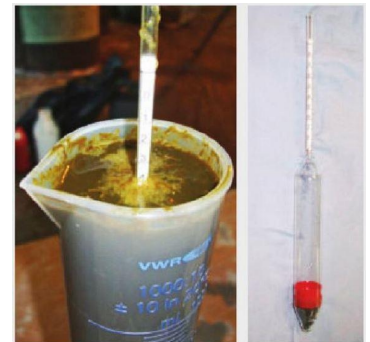
3. What's the slurry nutrient content?

- Determines application rate/volume
- Determines purchased mineral fertiliser rate

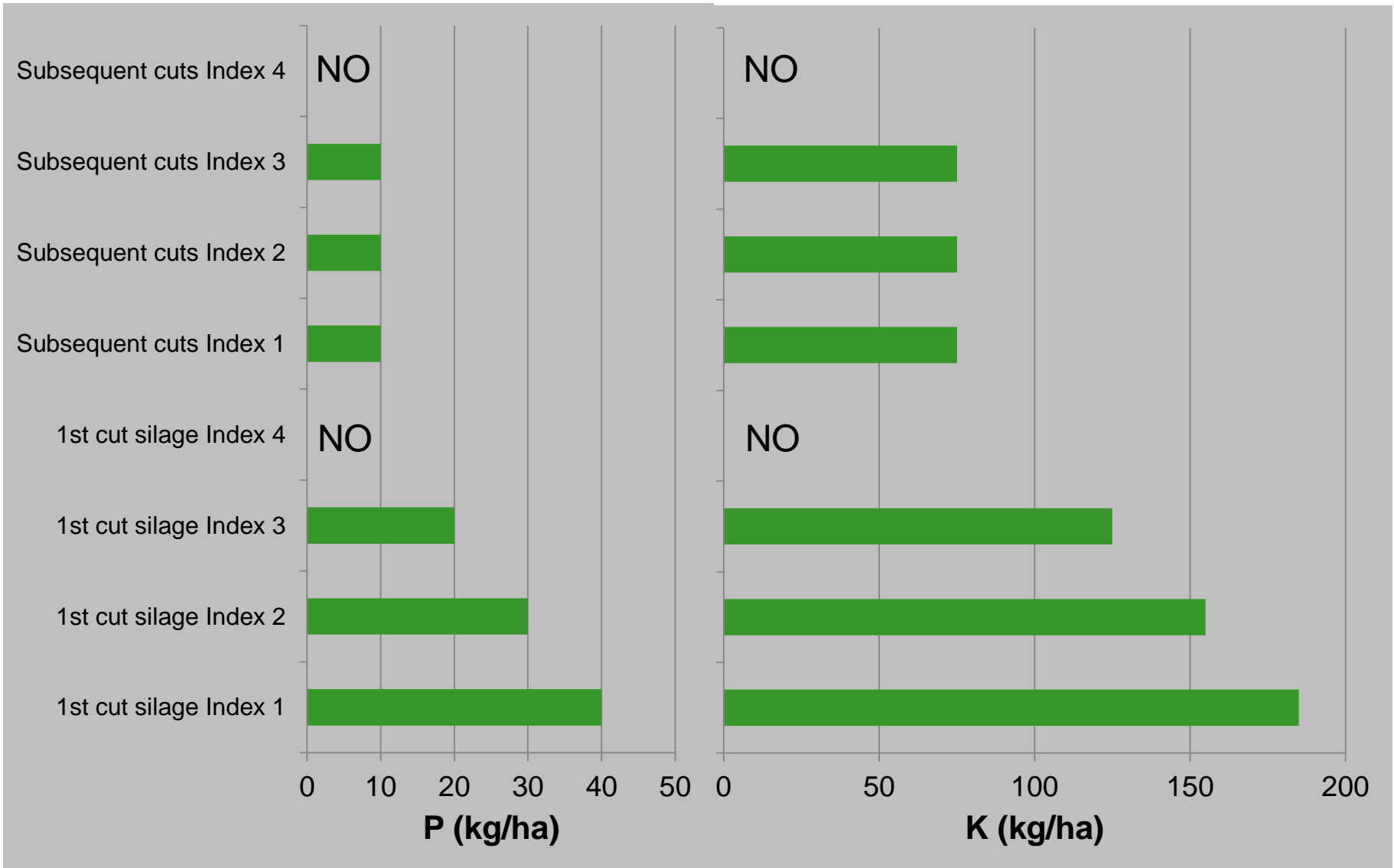
4. What's the application method?

- Affects the retained N

5. How can I get the rate right? Example

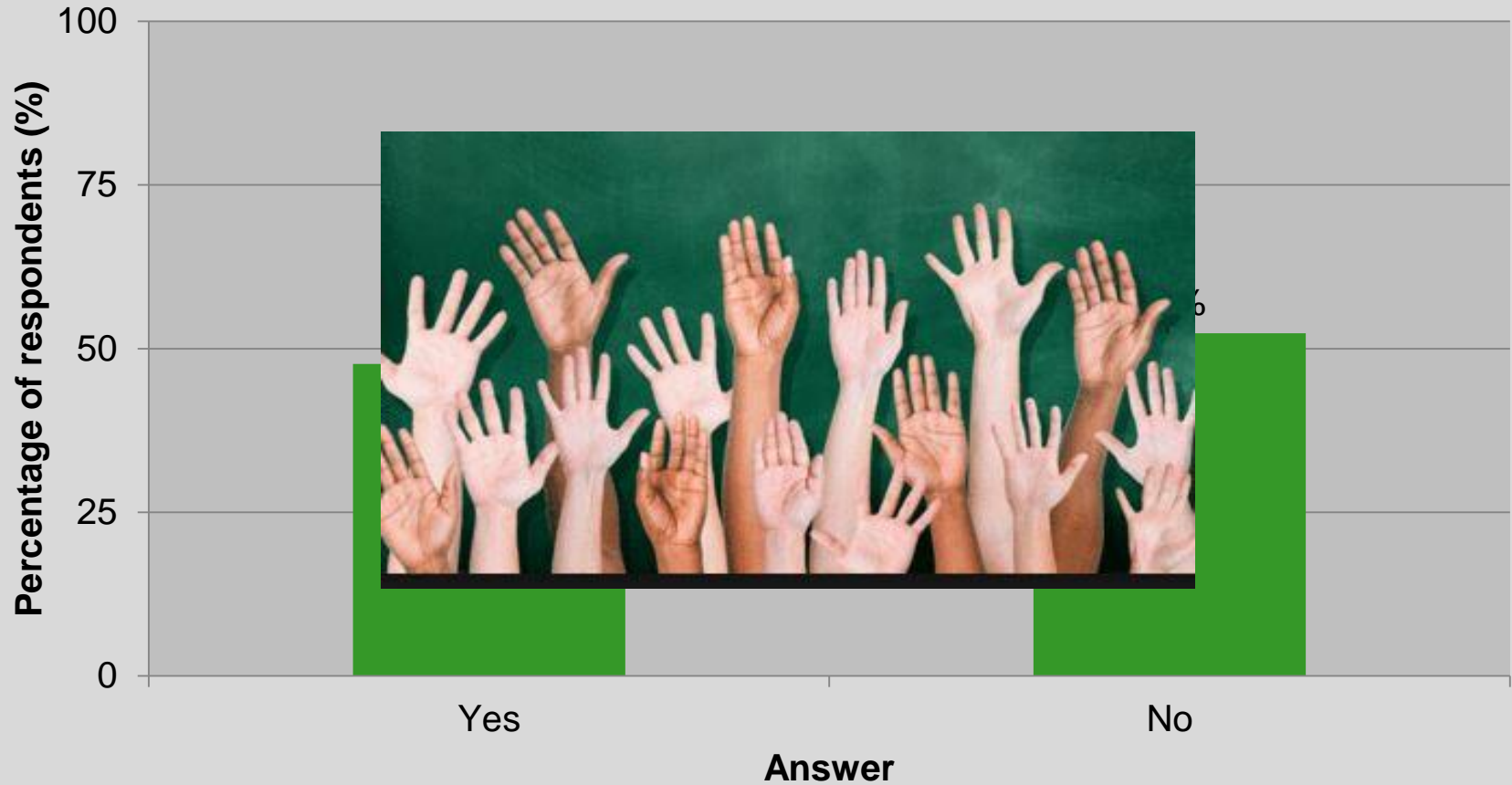


Effect of target crop & soil status on P & K requirement



Soil Status

Do you use soil tests to decide where to spread slurry?
(n=149) P. Berry (2013)



Where?

Return to silage ground
guided by soil test

But why?



Index	Status	P (mg/l)	K (mg/l)	P & K fertiliser plan
1	Very low	<3.0	<50	Build up + Maintenance
2	Low	3.1-5.0	51-100	Build up + Maintenance
3	Adequate	5.1-8.0	101-150	Maintenance
4	High	>8.0	>150	No P/K fertiliser

Nutrient variability

Do you vary rate according to differences between slurries?

(n=125) (P. Berry, 2013)



Nutrient variability?

Large variability between farms

Between high and low:

NH₄: 17 fold difference

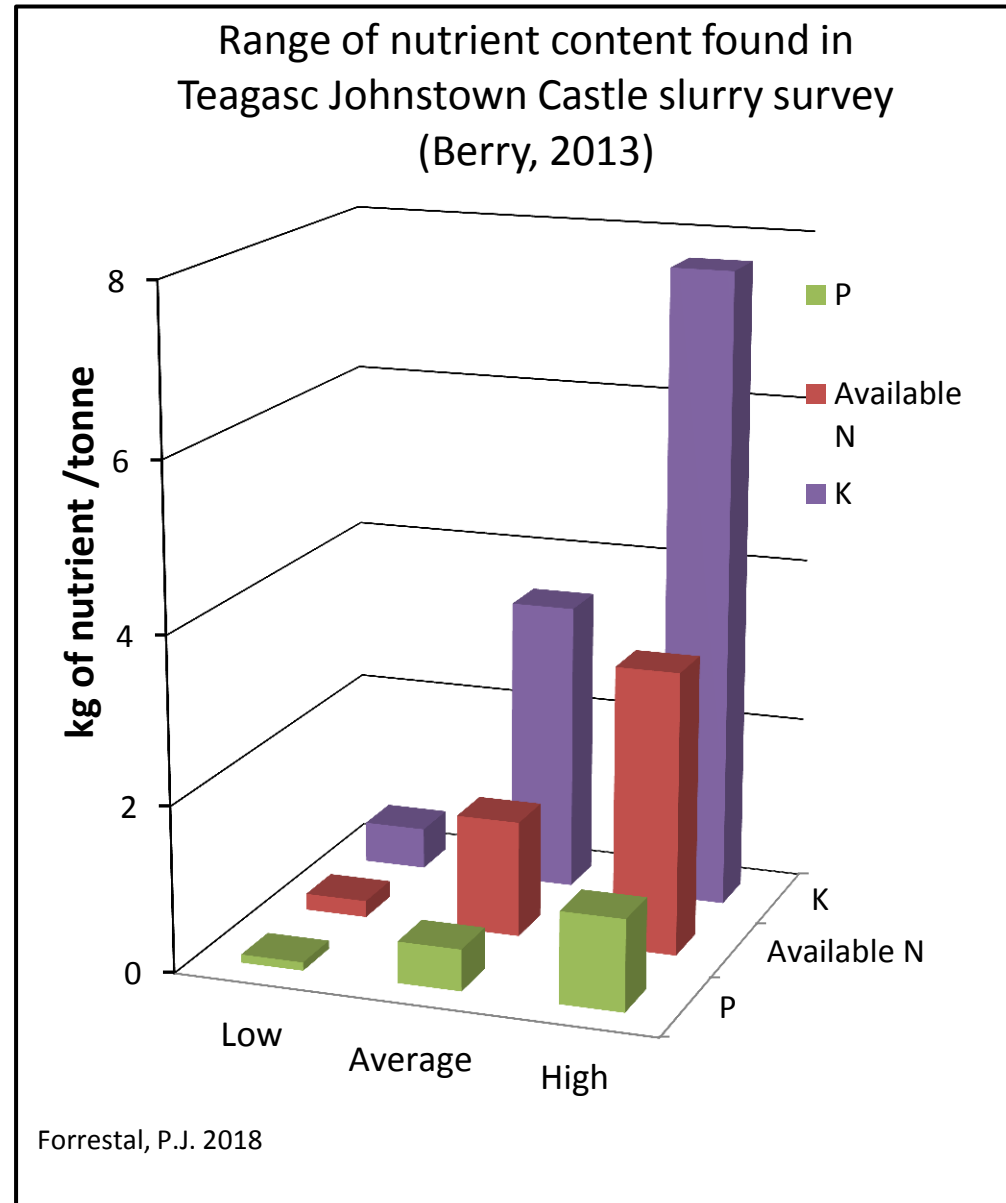
P: 11 fold difference

K: 15 fold difference

For comparison imagine going to the supplier a to buy a tonne of fertiliser – let's say
10:10:20

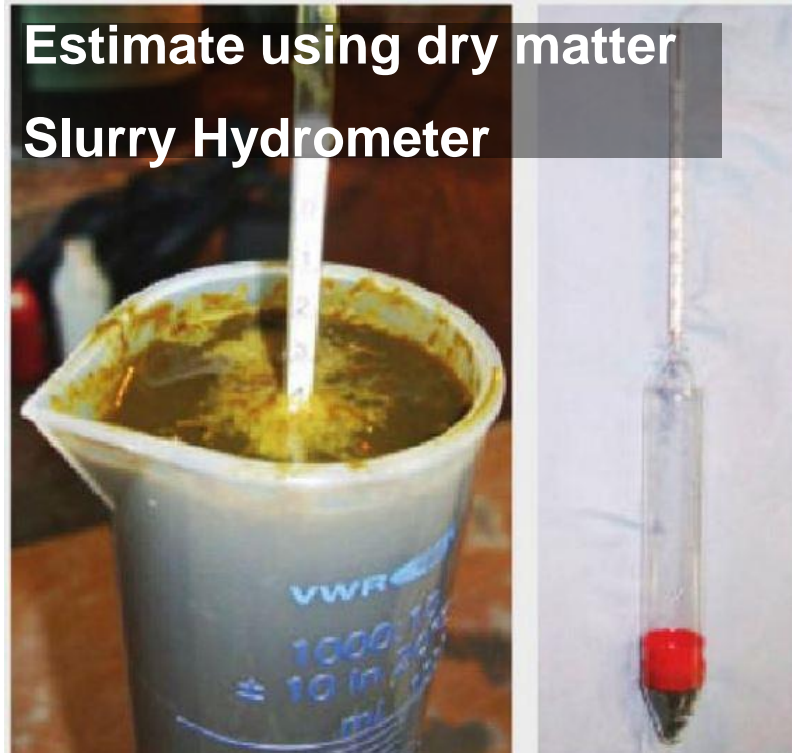
BUT: no label and the information is, well its somewhere between:

1:2:3
14:12:24

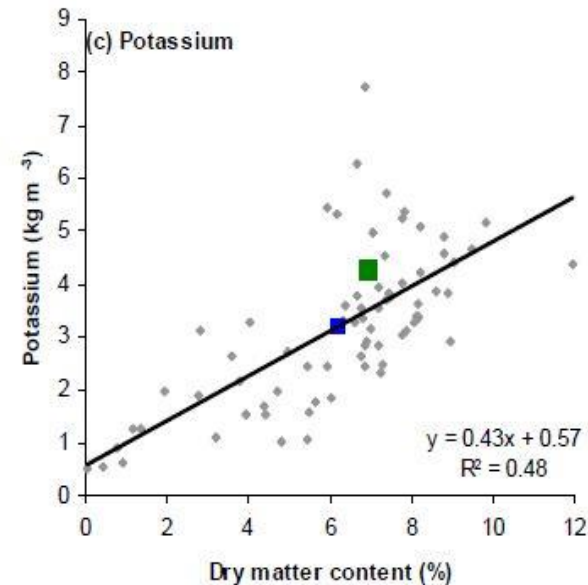
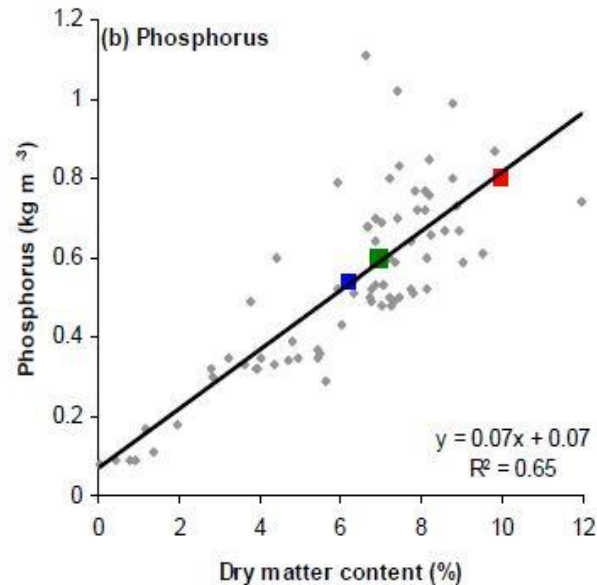
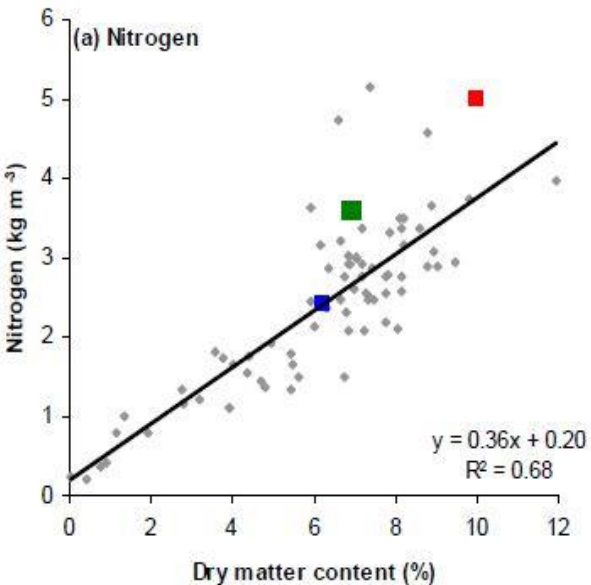


How can I know the “label” for my slurry?

1. Collect sample after tank agitation, safest from the spreader
2. Place in tall container
3. Place hydrometer in and allow time to find level/dilute



Estimate using dry matter
Slurry Hydrometer



Take your DM value and read off table below
Print yours! Google Teagasc Green Book
it's on page 46!

Table 9-8: Typical available N, P, and K applied (kg/ha)^{1, 2, 3, 4} depending on cattle slurry dry matter content and application rate⁴

Slurry Application Rate	4% DM Slurry			6 % DM Slurry			8% DM Slurry			10% DM Slurry		
	-----kg/ha-----											
	N ²	P ³	K ³	N ²	P ³	K ³	N ²	P ³	K ³	N ²	P ³	K ³
11 t/ha	5	4	23	8	5	32	10	7	40	12	8	49
22 t/ha	11	7	47	15	10	64	20	13	80	24	16	97
33 t/ha	16	11	70	23	15	95	30	20	121	37	25	146
44 t/ha	21	15	93	31	21	127	40	27	161	49	33	195
55 t/ha	27	18	116	38	26	159	50	33	201	61	41	244

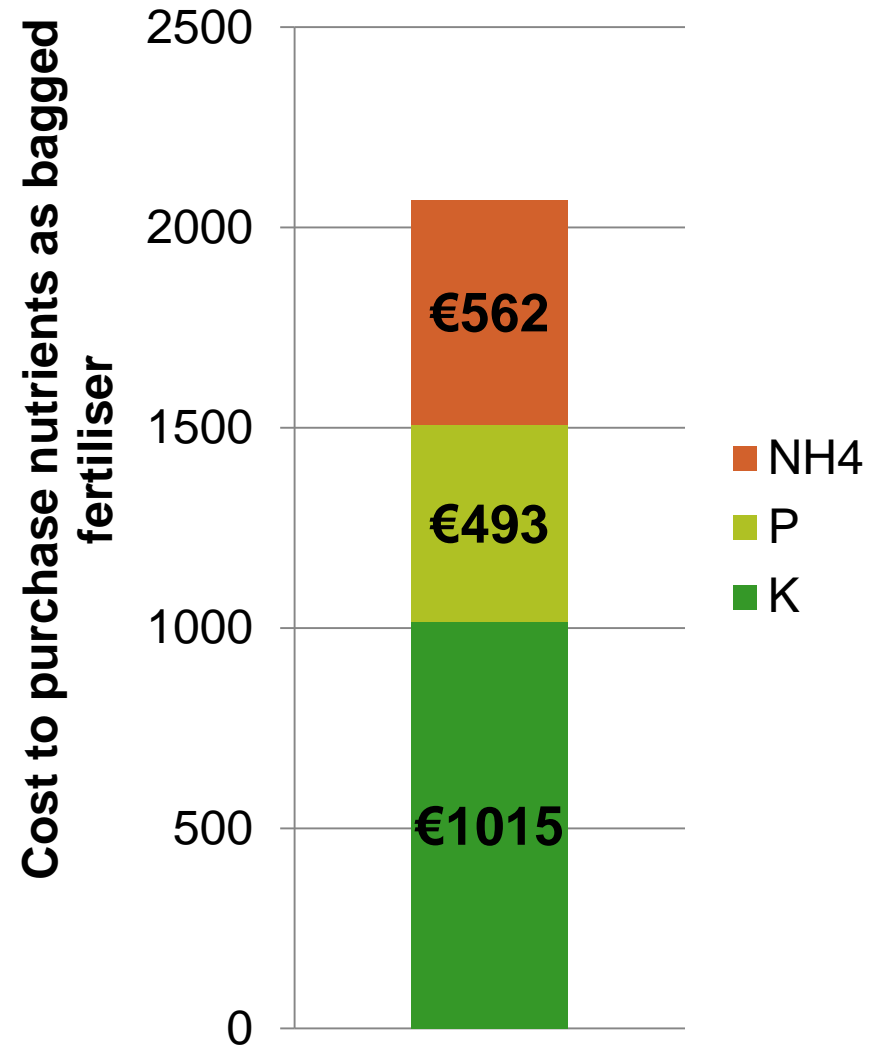
How can I know the “label” for my slurry?

Use hydrometer/estimate and cross check with lab

BUT is it expensive?

- About €60 per sample
- 16 weeks storage for 90 dairy cows is 475 t of slurry
- If you were buying €2000 of fertiliser would you accept no nutrient label?

Value of 90 dairy cow 16 weeks stored slurry



Survey

Have you ever had the nutrient content of your slurry analysed in a lab? (n=155)



Potential measure for improving
Farm nutrient use efficiency

Discussion Group? Industry Sustainability initiative?

Slurry N, P, K – Things to know

	N	P	K
Gaseous loss phase?	Yes	<u>No</u>	<u>No</u>
Atmospheric conditions?	Yes	<u>No</u>	<u>No</u>
Application method?	Yes	<u>No</u>	<u>No</u>
Spread pattern?	Yes	Yes	Yes



Application method – affects N loss/ N retention

Splash plate



Loss of 34 to 83% of available N

Average loss: 54%

Average retained: 46%

Trailing shoe



Loss of 11 to 68% of available N

Average loss: 35%

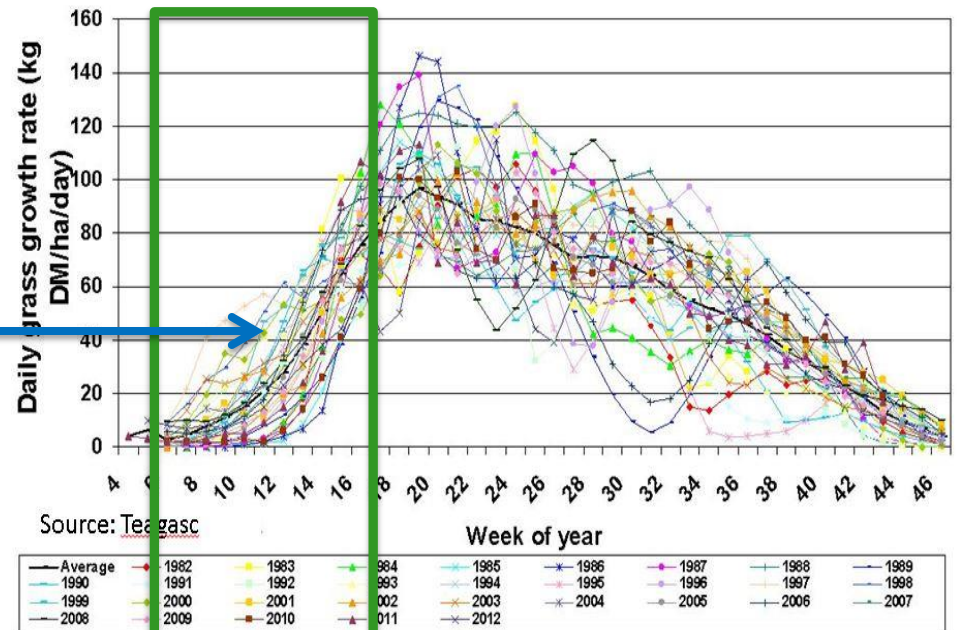
Average retained: 65%

N: Application timing

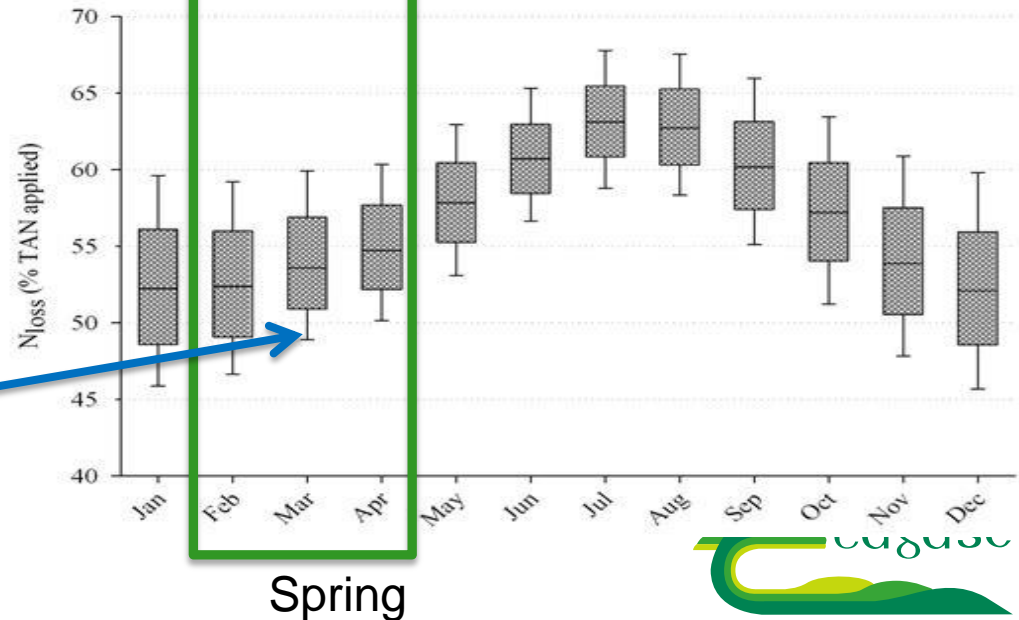
Growth rates increasing
strong nutrient uptake

Bridge gap to spring growth
with storage – Nervous about
spreading bought fertiliser?
Think about slurry nutrients the
same way

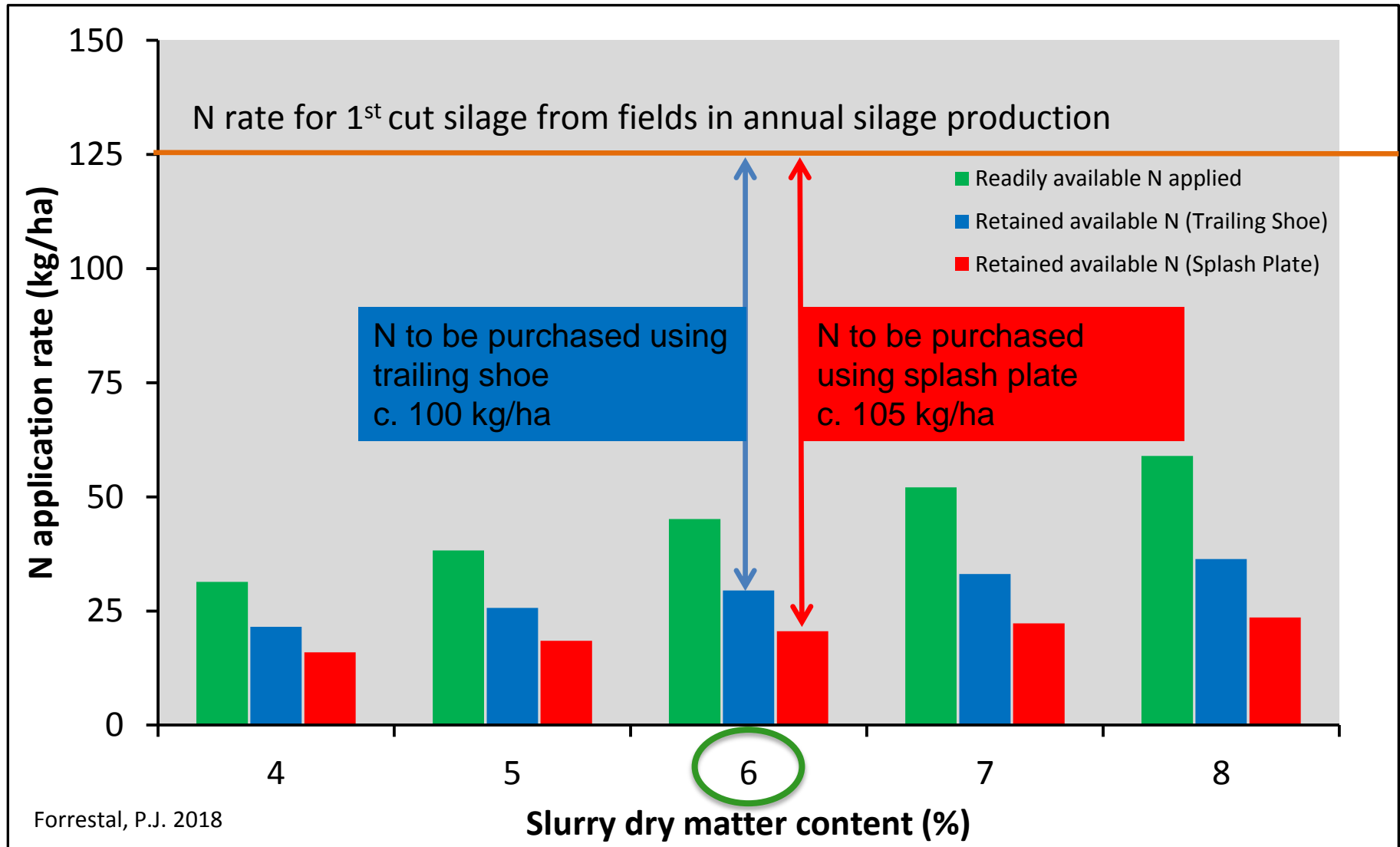
On average
lower
N loss as NH₃



Lalor and Lanigan (2010)
Søgaard et al. (2002)



Cattle slurry **Nitrogen (N)** application rate at **33t/ha (3000gal/ac)** as affected by slurry dry matter, method of application



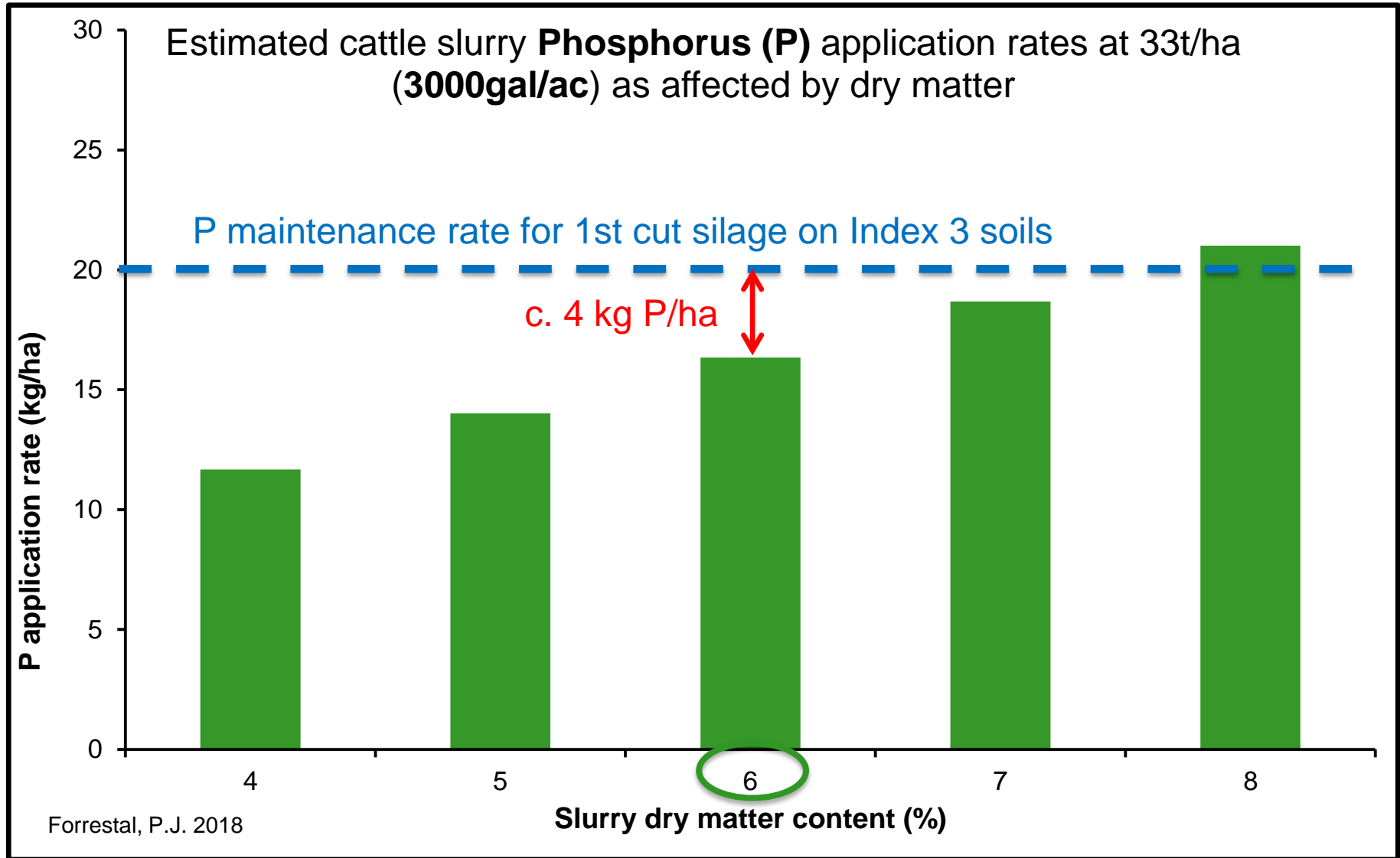
Targeting slurry P & K to Index 1 & 2 soils

Why?

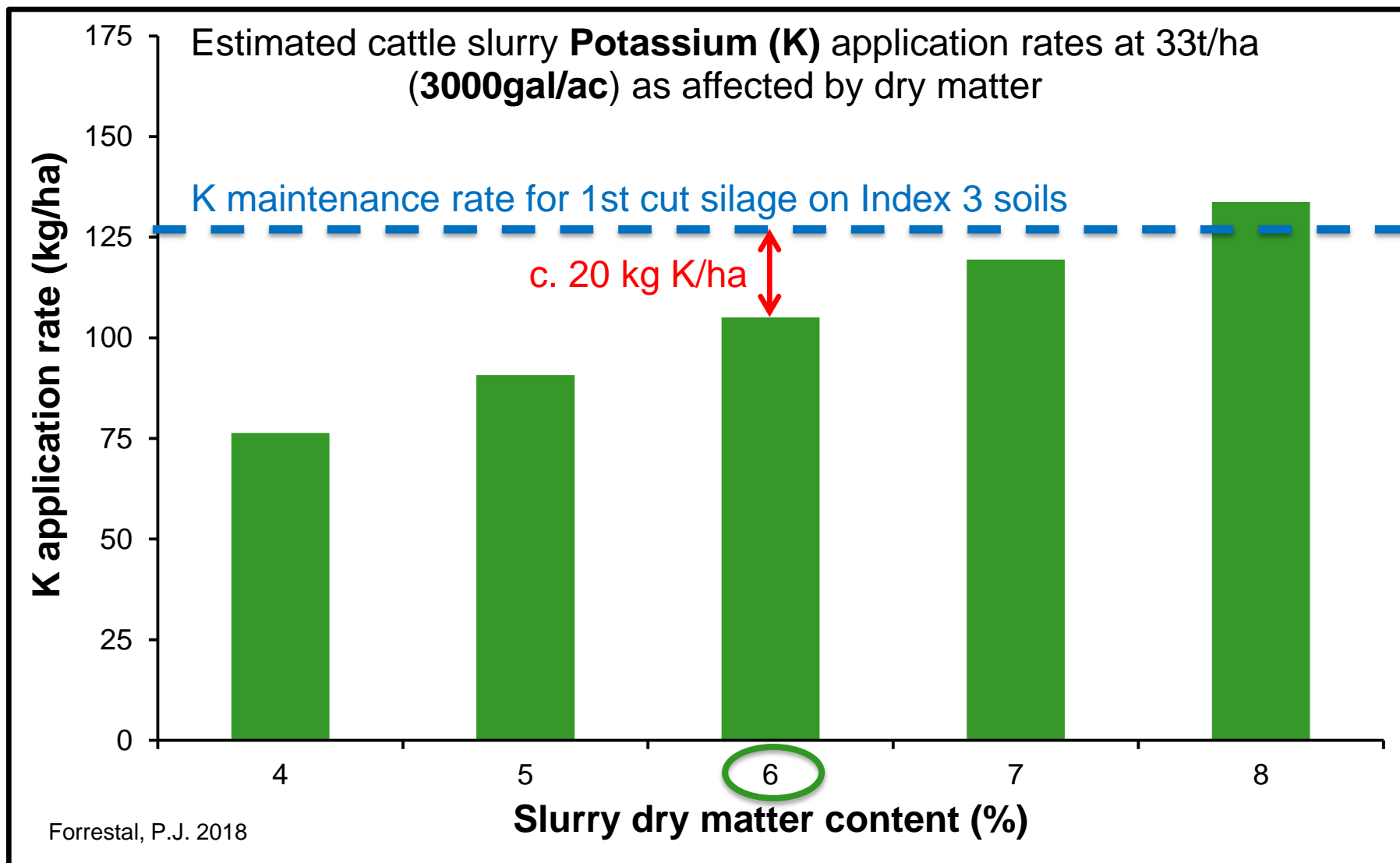
- The slurry P & K is already on the farm – target to where it will give the most benefit
- Only 50% of slurry P is counted at index 1 & 2 compared to 100% of the mineral P
- Target index 1 & 2 with slurry to increase farm mineral fertiliser P allowance



Getting Phosphorus (P) right



Getting Potassium (K) right



In this example 1st cut at Index 3

	N	P	K
Maintenance	125	20	125

*Typically no more than 90 kg K/ha applied at closing for silage

Key Messages

Need a field by field prescription for success

- a) Test soil**
- b) Test slurry**
- c) Use low emission spreader to retain N**
- d) Balance slurry with correct mineral fertiliser**



How are we spreading slurry at the Johnstown Castle Dairy and Beef farms, and Why?



Ammonia
 NH_3 (escaped N)



National Emissions Ceiling Directive
1% below 2005 to 2030
5% below 2005 from 2030 onwards

Low emission spreaders used

- More N retained to grow grass
- Reduced farm fertiliser N bill
- Less grass contamination option to spread grazing paddocks
- More even application of slurry N, P, K
- Less odour
- Helping to meet the national Ammonia emission reduction commitments