



Soil Fertility Management

Good for your pocket and long term crop productivity

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Planning fertiliser decisions for the year ahead

Soil fertility on tillage farms

9,385 soil samples analysed during 2018-2020

Current Fertiliser prices

Ground Limestone
€22-24/tonne



Phosphorus
€3.69/kg P



Potassium
€1.33/kg K

Soil Analysis Results



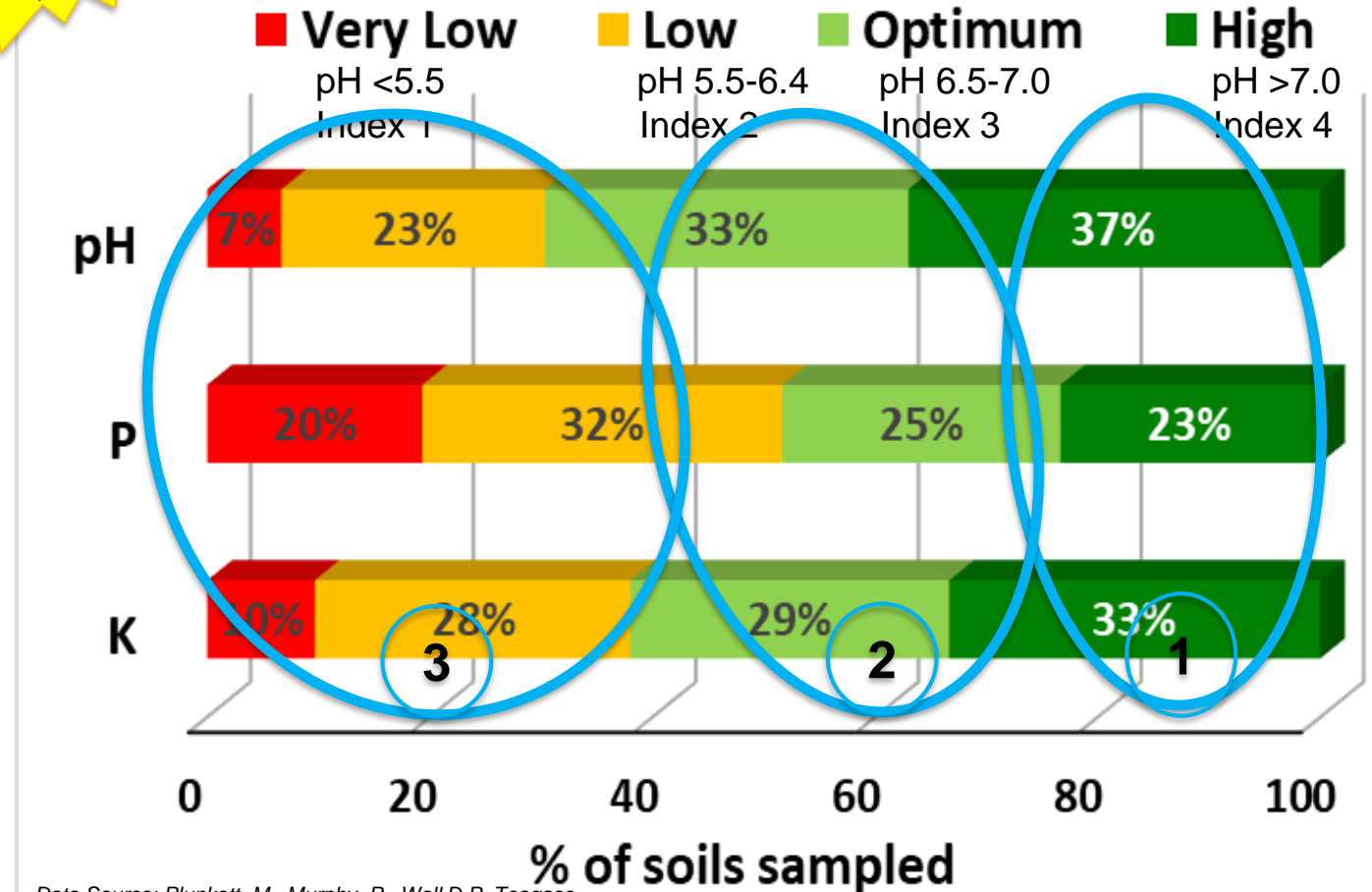
CAN(27%N)
€675/tonne
€2.50/kg N



UREA(46%N)
€950/tonne
€2.06/kg N



Protected Urea(46%N)
€1000/tonne
€2.17/kg N



Data Source: Plunkett, M., Murphy, P., Wall D.P. Teagasc

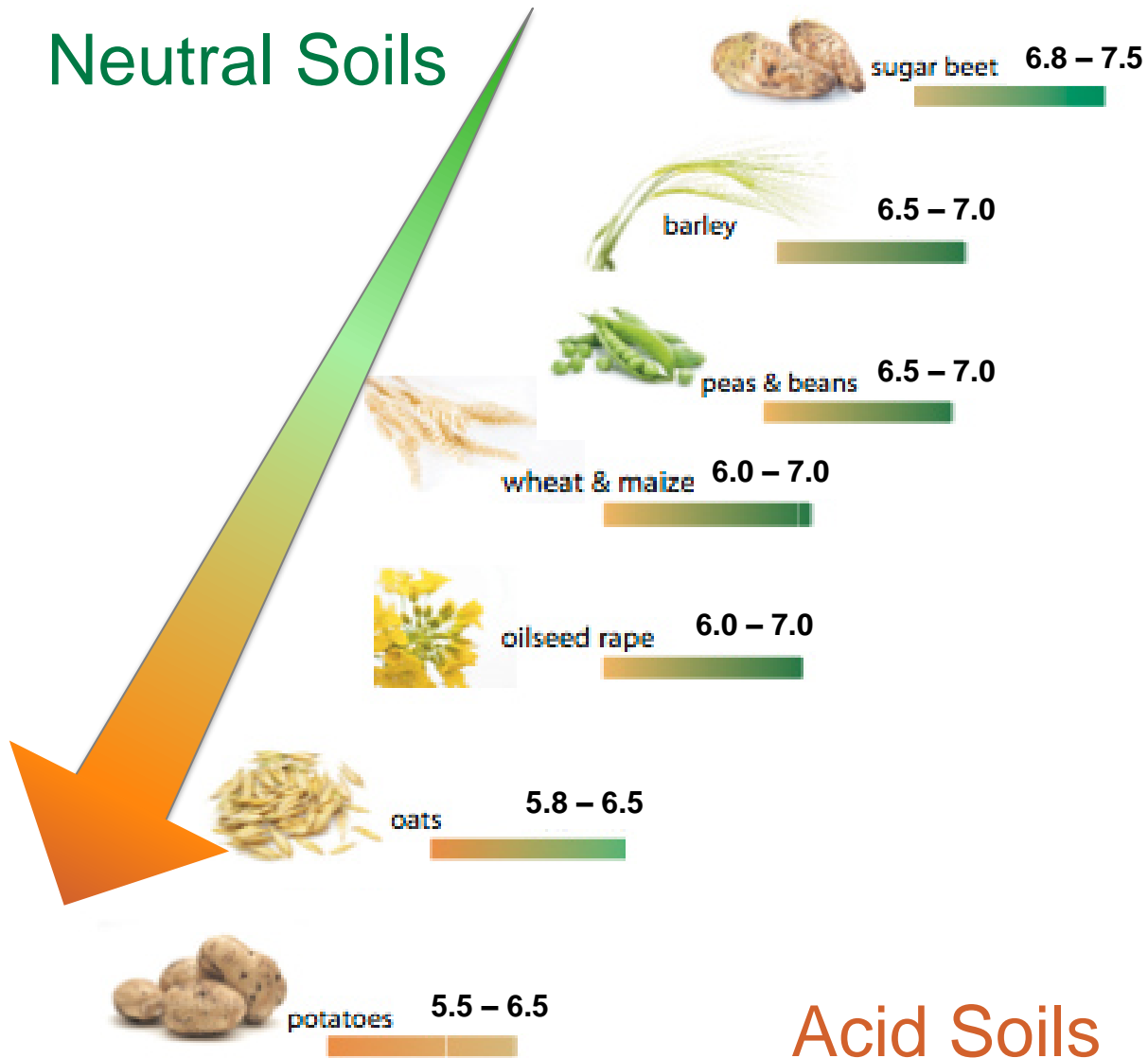
Maintaining soil yield potential



Importance of soil pH

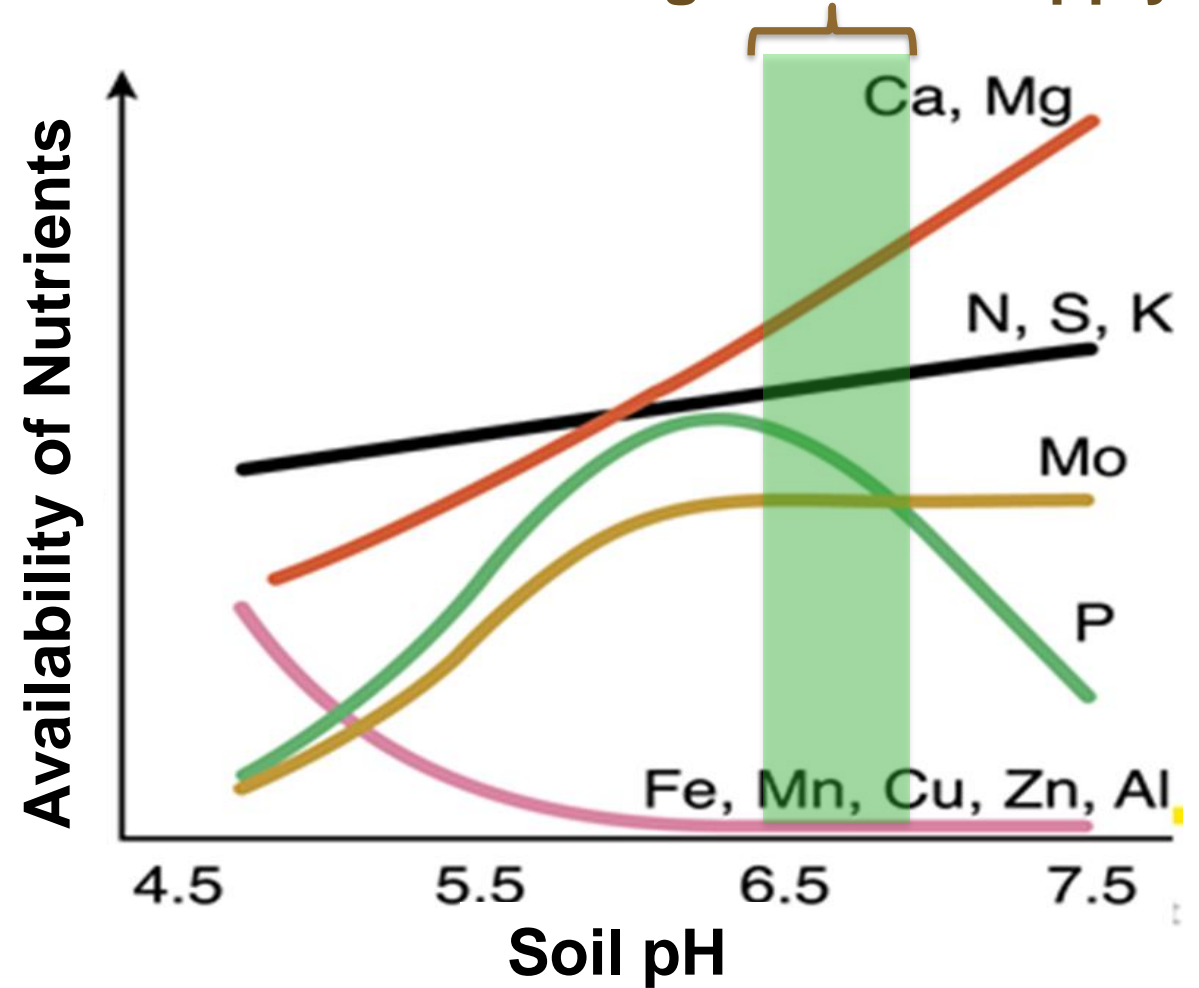
Crop tolerance to soil acidity

Neutral Soils



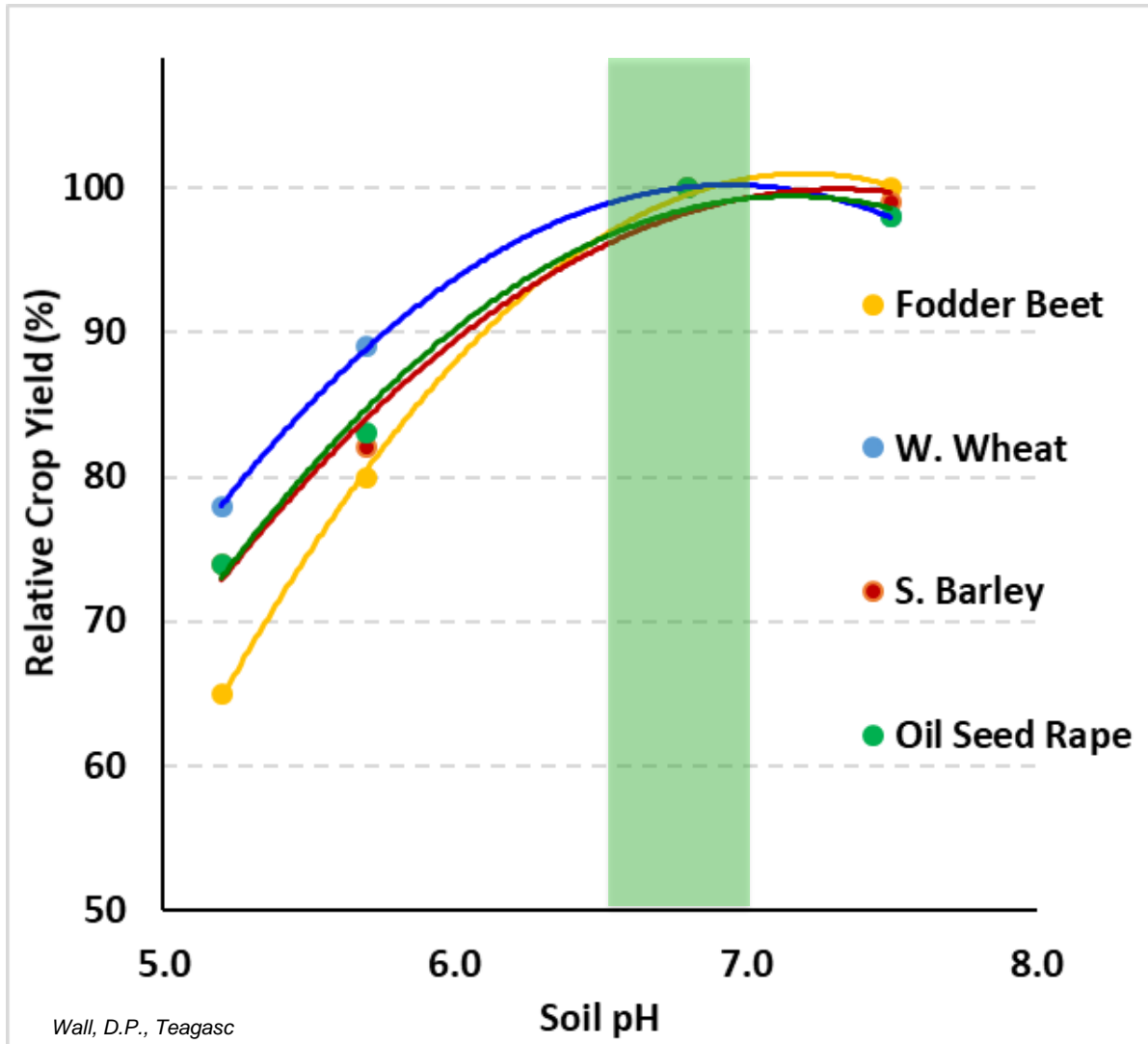
Acid Soils

Ideal soil pH range for maximising nutrient supply

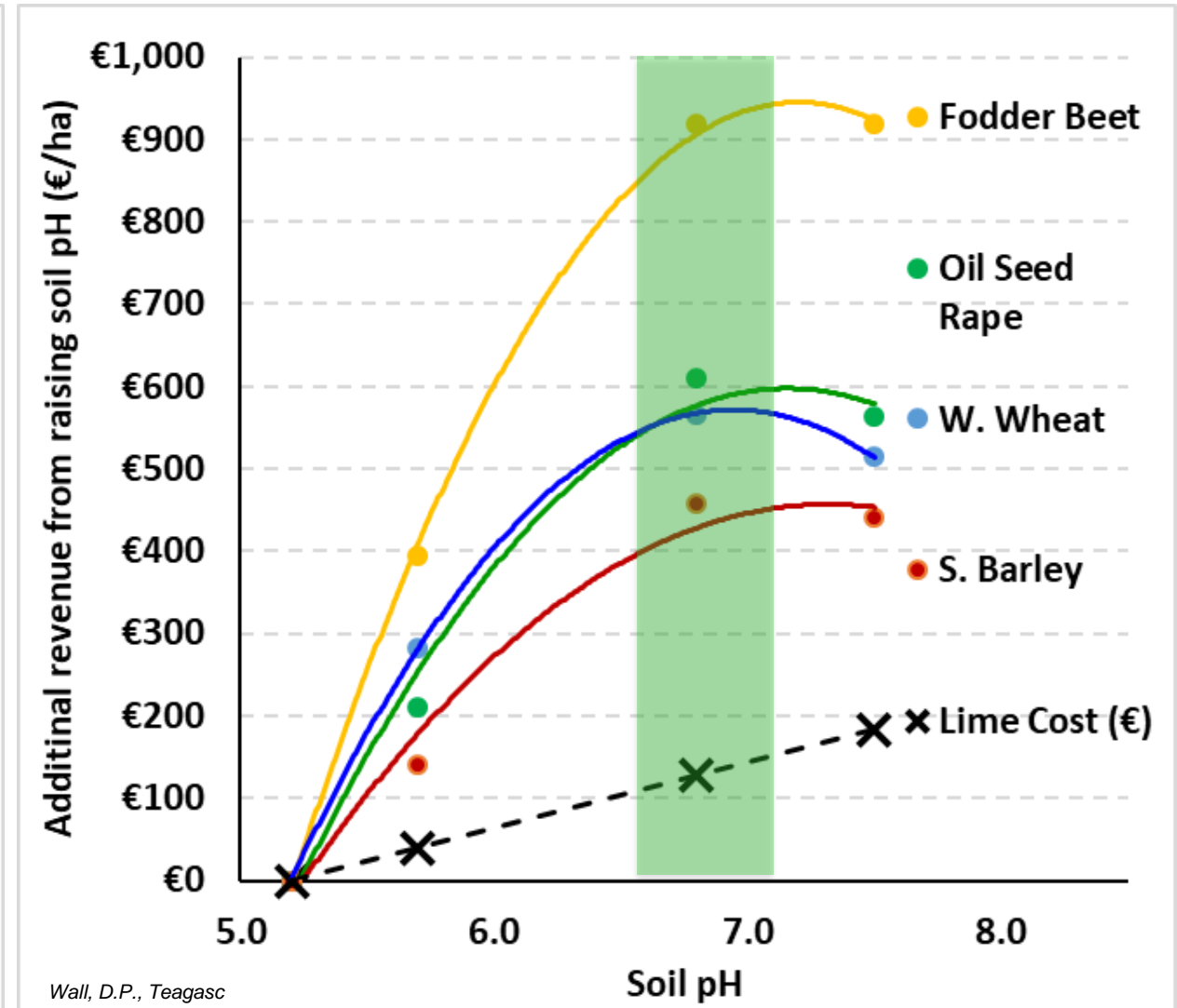


Source: Agricultural Lime Association

Crop response to increasing soil pH



Data adapted from ADAS and Teagasc research



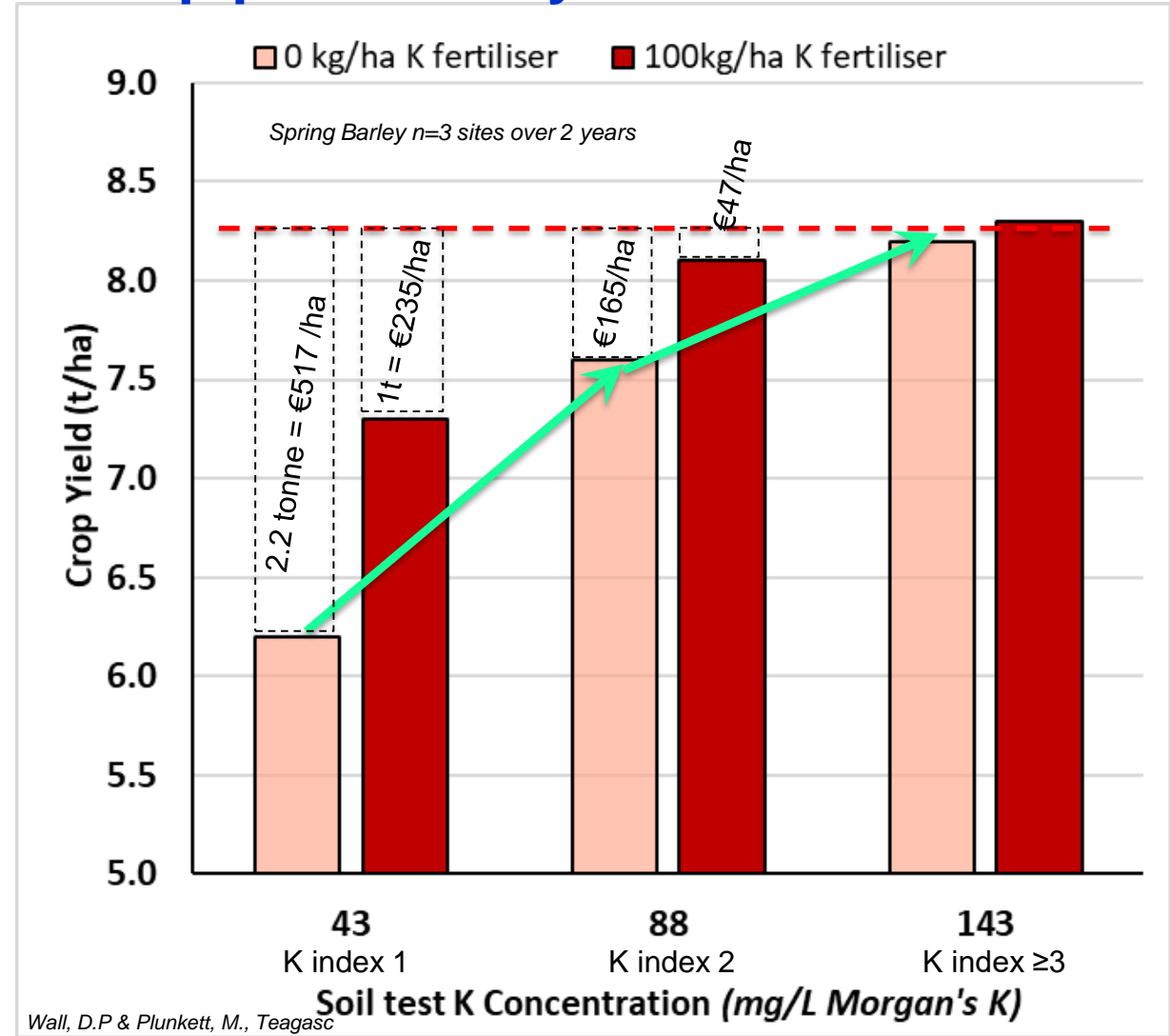
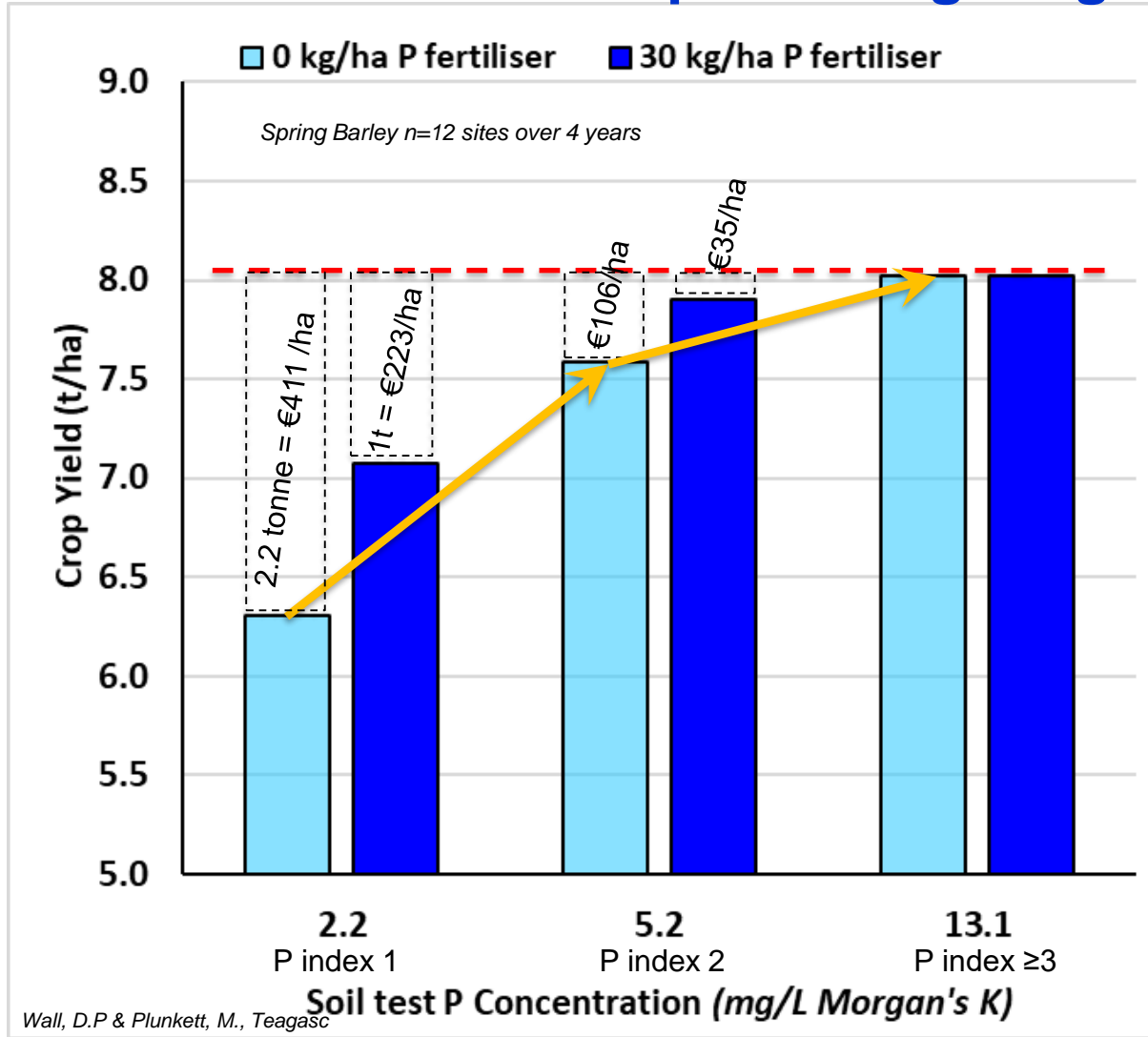
Based on €35/t Fodder Beet, €470/t OSR, €245/t W. Wheat, €235/t S. Barley



Soil P and K supply for the developing crop

Maintain soil P & K fertility

– protecting long-term crop productivity

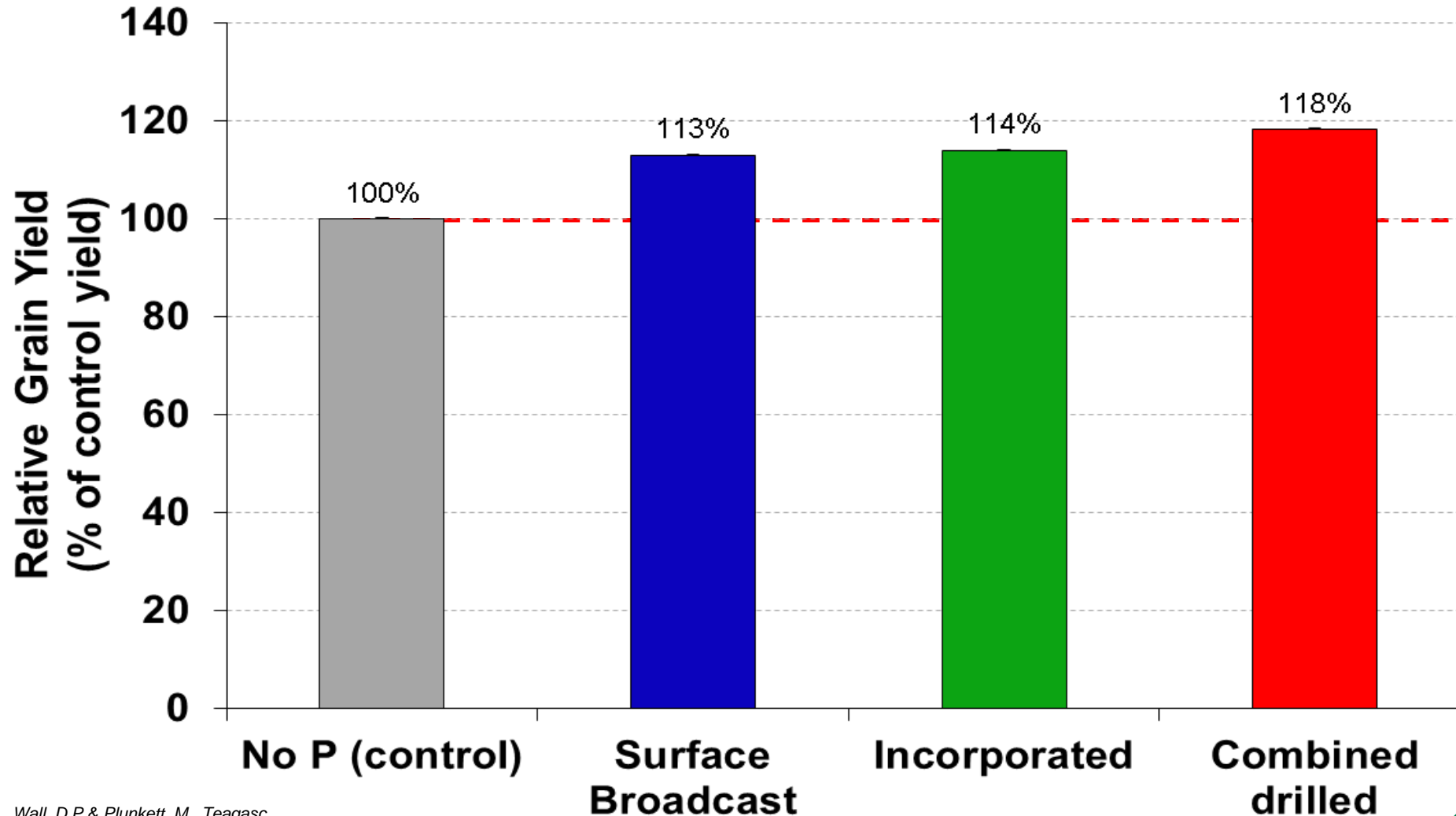


@ Spring Barley Grain price €235 /tonne

Grain yield response to P application method - Spring Barley

Relative grain yield response to P application method

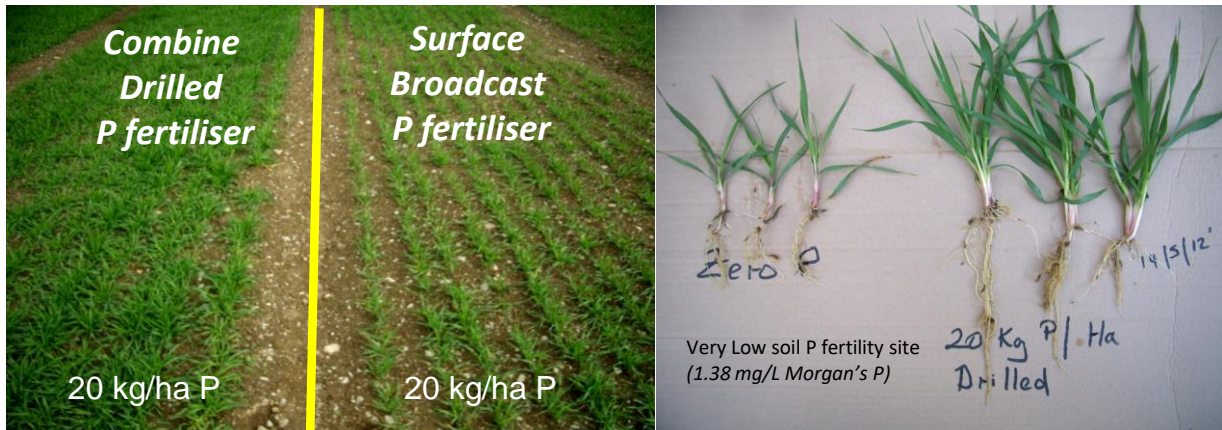
Average response across 7 sites over 3 years



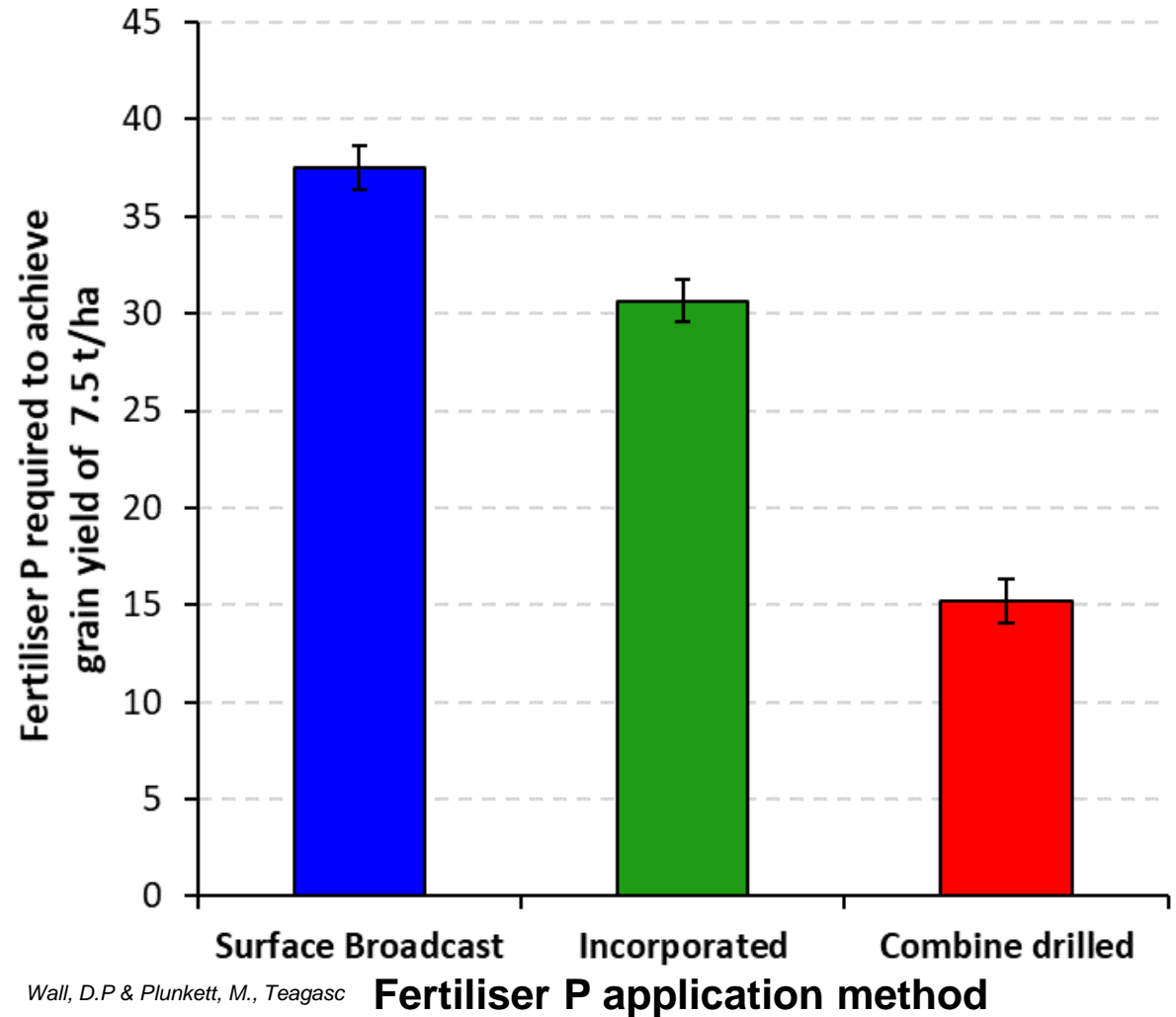
Wall, D.P & Plunkett, M., Teagasc

Grain yield response to P application method - Spring Barley

- Low soil P fertility
 - effects crop rooting & establishment
 - Leads to lower crop yield potential
 - Reduced N use efficiency
- Opportunity to reduce P fertiliser inputs through changing P application method without compromising grain yield.
- Considerable cost savings can be achieved in 2022 due to high fertiliser prices ($P = \text{€ } 3.69/\text{kg}$)



Fertiliser P to achieve similar Sp. Barley yield

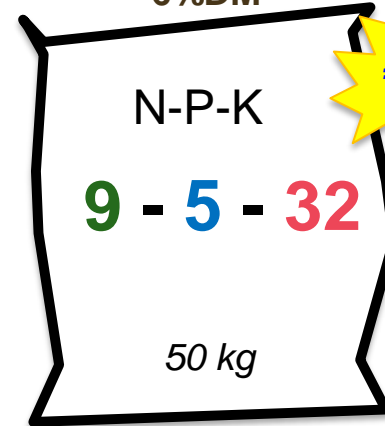


Opportunities to offset fertiliser purchases with organic manure

Fertiliser replacement value of 4.5 m³ (1,000 gallons) Slurry

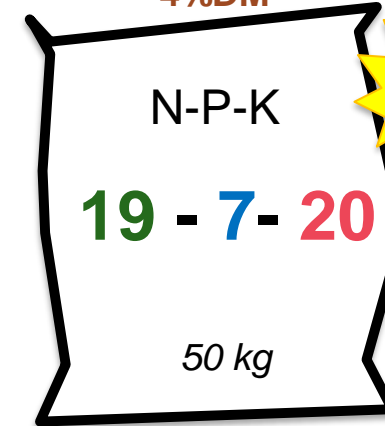
Cattle Slurry

6%DM



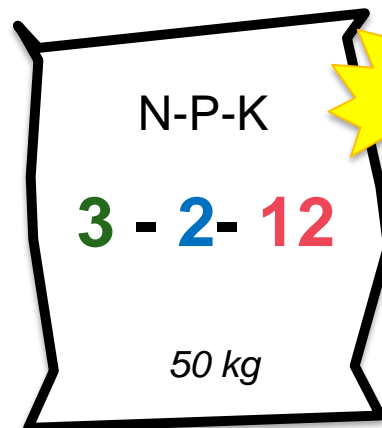
Pig Slurry

4%DM

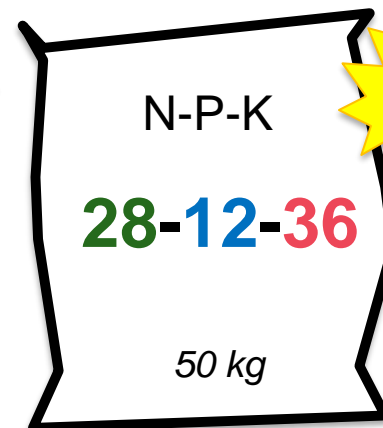


Fertiliser replacement value of 1 tonne manure

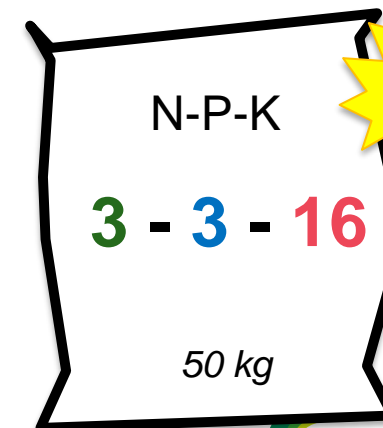
F.Y.M.



Broiler Litter



S.M.C.



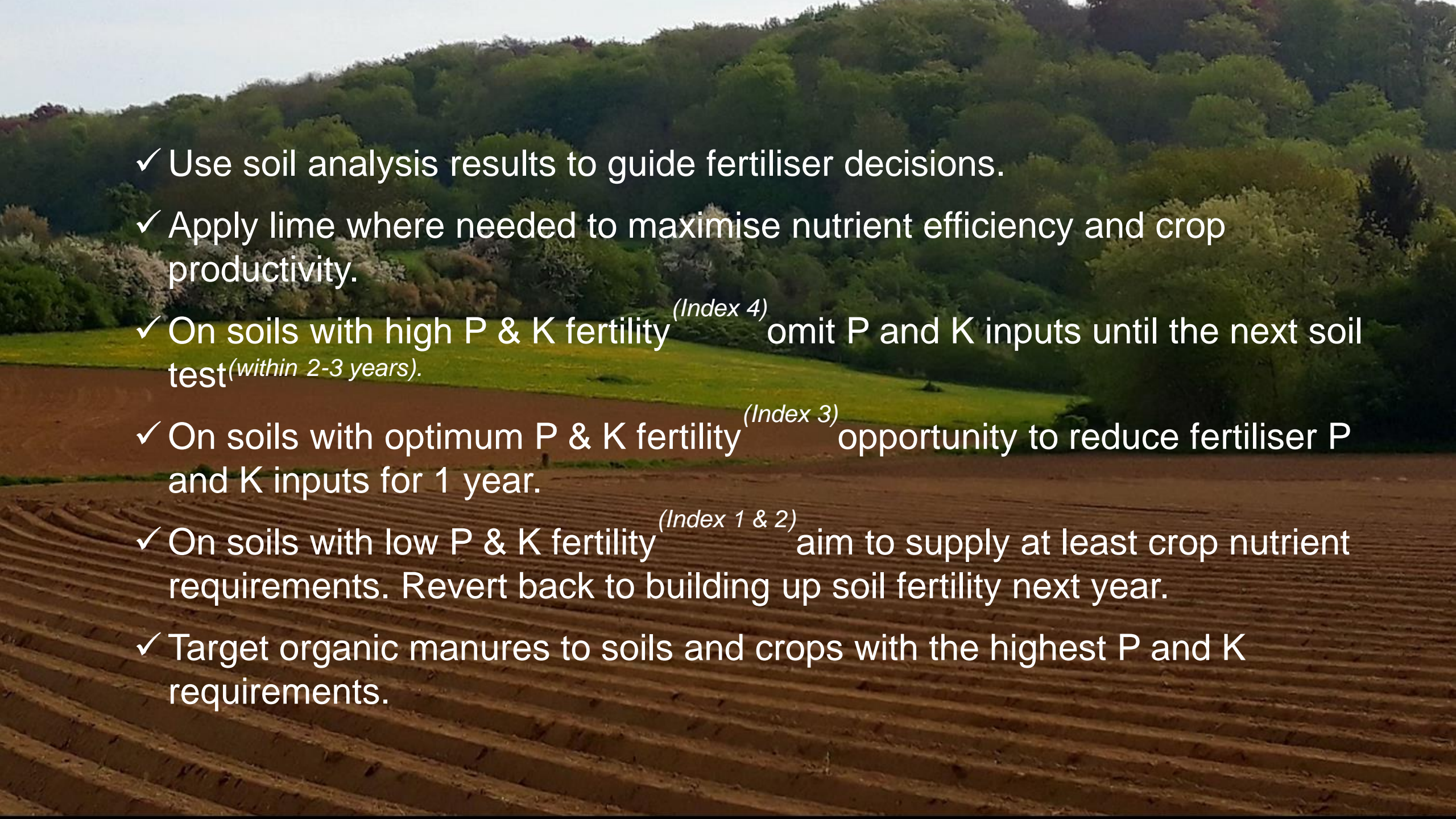
Data Source: Wall, D.P & Plunkett, M., Teagasc Green Book

Organic Manure nutrient values (€) based on fertilizer nutrient prices January 2022

Organic manure offsetting fertiliser purchases

Scenario: Aim to supply a least 50% of the P and K nutrient requirement for a spring barley crop using organic manure

Crop	Yield (t/ha)	N (kg/ha)	P (kg/ha)	K (kg/ha)	Cost
S. Barley	7.5	155	29	86	= Nutrients Required
<i>Comp. fertiliser 13-6-20</i> @ 241 kg/ha		31 <i>(20% of total)</i>	14.5 <i>(50% of total)</i>	48 <i>(56% of total)</i>	€182
Manure	Appl. rate	N	P	K	Fert.Value/ha
Cattle Slurry _(6%DM)	25 m ³ /ha <i>(~2,250 gal's/ac)</i>	25 <i>(16% of total)</i>	14.5 <i>(50% of total)</i>	88 <i>(102% of total)</i>	€217
Pig Slurry _(4%DM)	19 m ³ /ha <i>(~1,750 gal's/ac)</i>	40 <i>(26% of total)</i>	14.5 <i>(50% of total)</i>	42 <i>(49% of total)</i>	€229
Broiler Litter	2.5 t/ha	35 <i>(23% of total)</i>	14.5 <i>(50% of total)</i>	45 <i>(52% of total)</i>	€190
S.M.C	10 t/ha	16 <i>(10% of total)</i>	14.5 <i>(50% of total)</i>	80 <i>(93% of total)</i>	€199

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- ✓ Use soil analysis results to guide fertiliser decisions.
 - ✓ Apply lime where needed to maximise nutrient efficiency and crop productivity.
 - ✓ On soils with high P & K fertility ^(Index 4) omit P and K inputs until the next soil test ^(within 2-3 years).
 - ✓ On soils with optimum P & K fertility ^(Index 3) opportunity to reduce fertiliser P and K inputs for 1 year.
 - ✓ On soils with low P & K fertility ^(Index 1 & 2) aim to supply at least crop nutrient requirements. Revert back to building up soil fertility next year.
 - ✓ Target organic manures to soils and crops with the highest P and K requirements.

Thank you for your attention

Acknowledgments

- *DAFM for funding through research stimulus fund*
- *All field & lab staff at Teagasc Oak Park & Johnstown Castle*
- *Farmers for access to the field sites*

