

Sustaining the future.



WE'RE ABOUT SOLUTIONS

Solutions to meet the growing demand for multi nutrients in Europe

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SIRIUS MINERALS CHANGING THE EUROPEAN FERTILIZER MARKET

COMPANY HIGHLIGHTS

- World's largest and highest grade source of polyhalite
- POLY4's agronomic validation demonstrates value globally
- Proven and growing market demand
- Commercial success with 8.2 Mtpa of offtake agreements
- Stage 1 financing secured (US\$1.2 billion)
- Stage 2 financing well advanced – financial close planned for Q1 2019

2011 – 2015

Resource definition,
minerals rights and
approvals

Nov 2016

Stage 1 financing
complete

2017 – 2021

Construction and
development

2021

First polyhalite

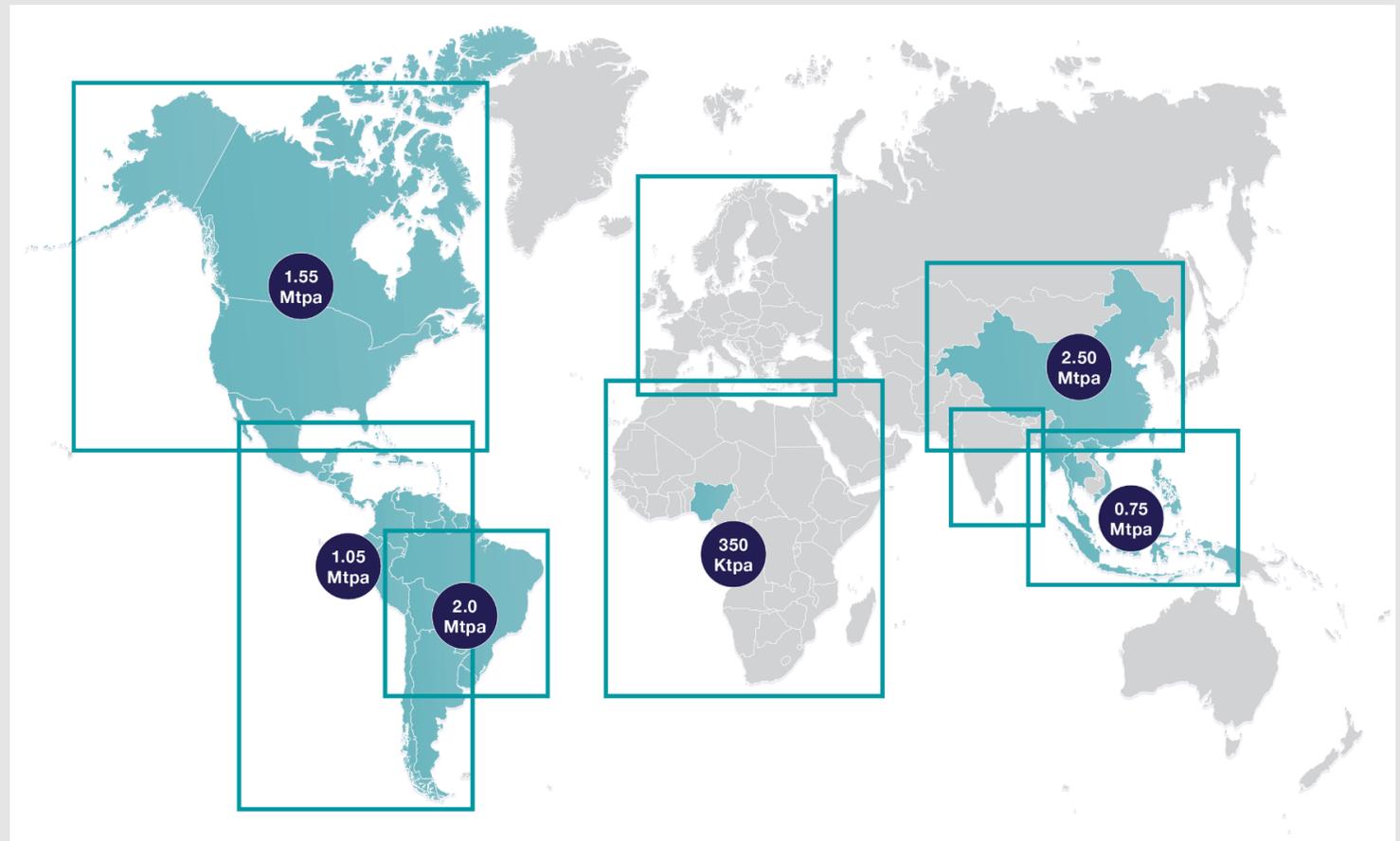
2024

10 Mtpa ramp-up

POLY4 COMMERCIAL DEVELOPMENT

Existing agreements total 8.2 Mtpa of POLY4 sales both into the fertilizer and animal feed markets.

In addition, options within existing offtake agreements of 1.15 Mtpa bring the total to 9.4 Mtpa.



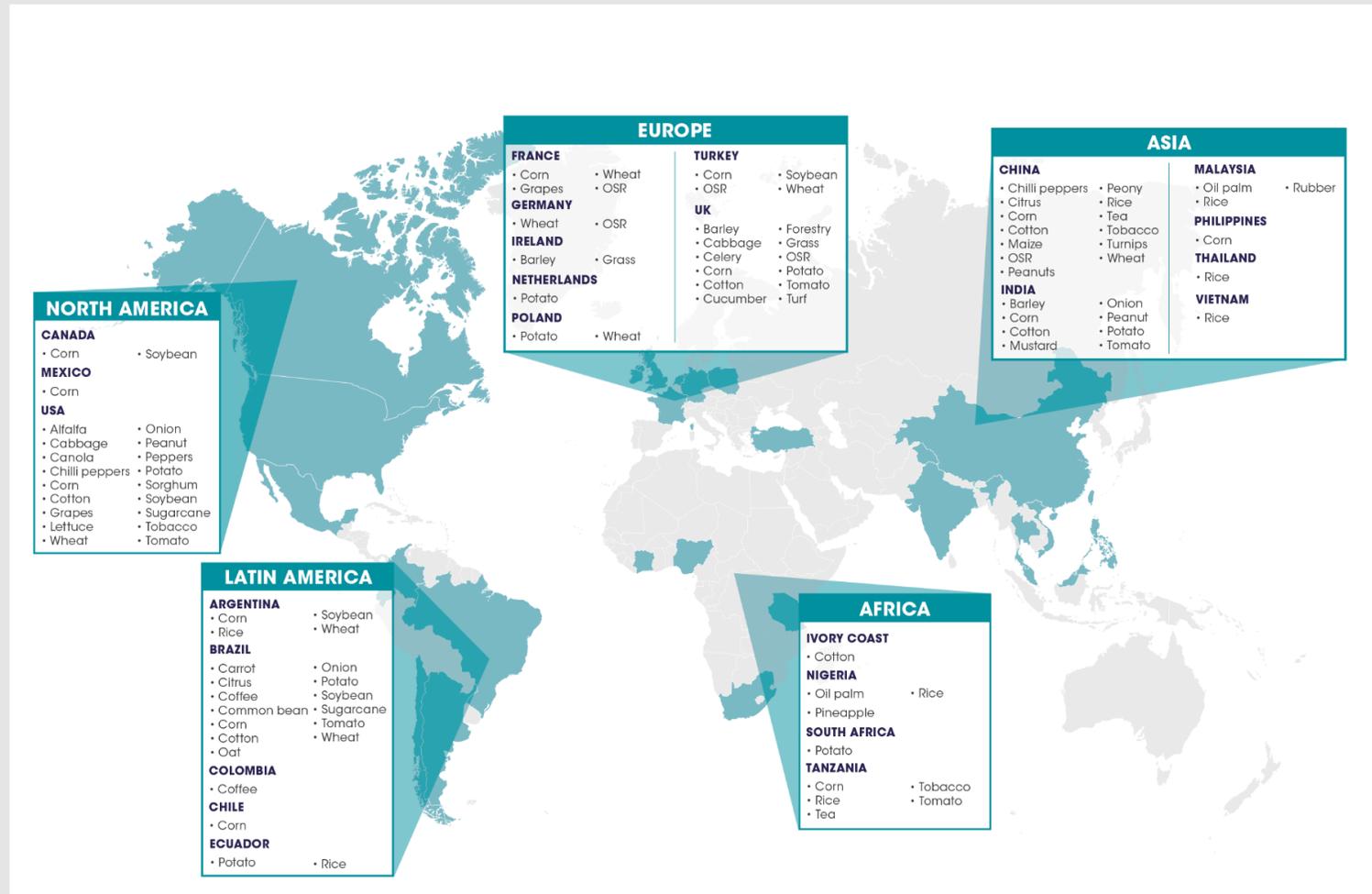
SIRIUS MINERALS R&D PROGRAMME

Trials
339

Crops
36

Countries
25

Collaborators
119



Notes: Trials as of September 2018

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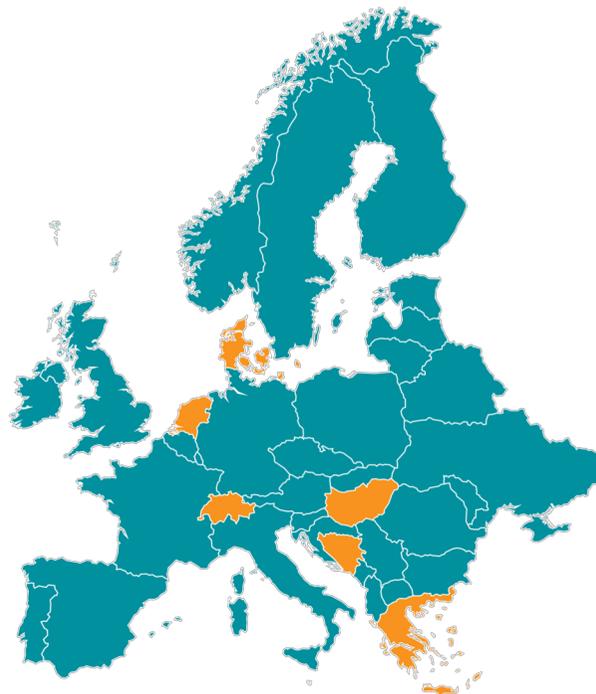
EUROPEAN MARKET

EUROPEAN NUTRIENT DEFICIENCIES

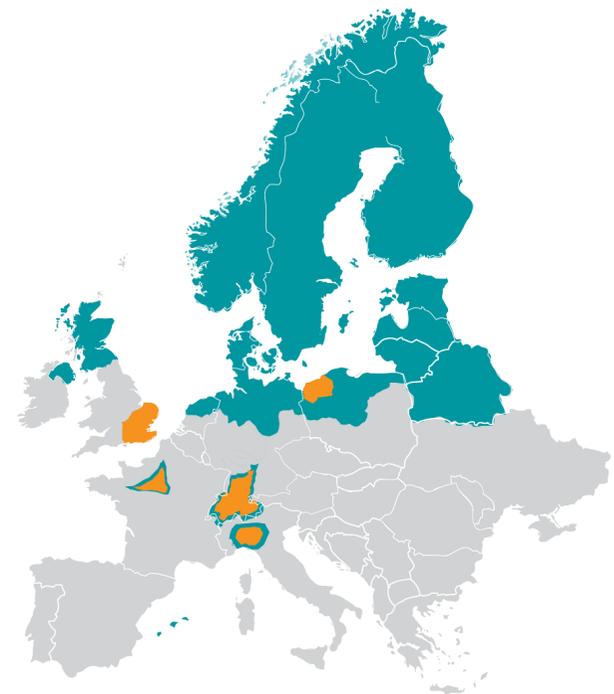
Potassium deficiency



Sulphur deficiency



Magnesium deficiency



 Significant deficiency
 Low/moderate deficiency

Source: CRU, European Commission Joint Research Centre, Roland Berger, Sirius Minerals

EUROPEAN DRIVE FOR SUSTAINABILITY



Source: Sirius Minerals



SOIL HEALTH

Prevention and mitigation of soil degradation process.



NUE

Regulation/policy stimulate leaching reduction.



EMISSION CONTROL

Due to emission controls, EU soils are deficient in sulphur.



ORGANICS

Demand for environmentally-friendly fertilizers.

EUROPE: THE REGIONAL CHALLENGES

Supporting organic growth



Addressing the nutrient requirement



Unmet chloride-free demand

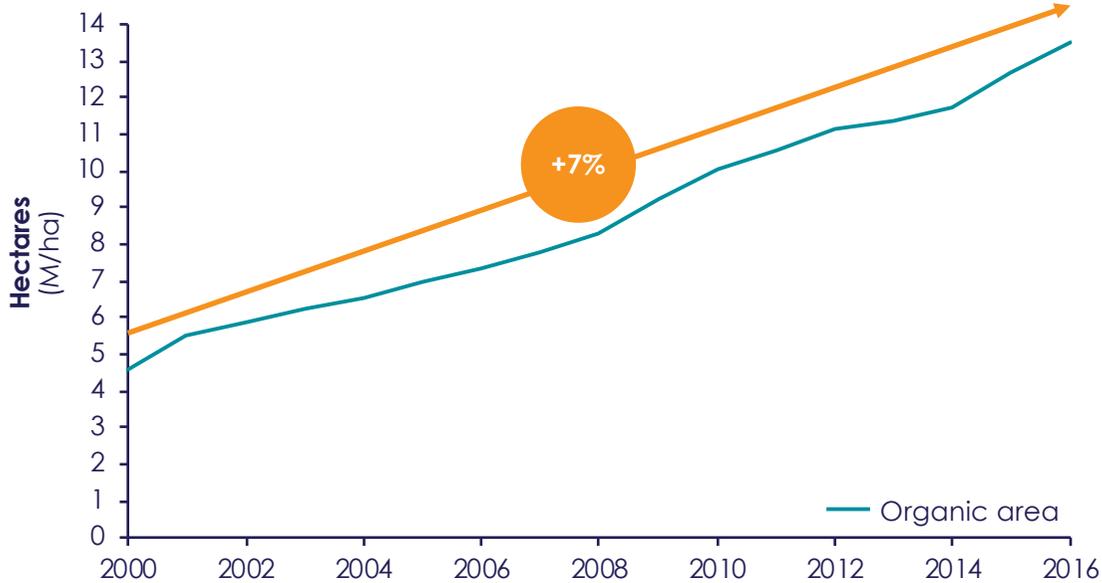


GROWTH IN EUROPEAN ORGANIC MARKET



Growth in organic market

- Organic land in Europe has been growing at a CAGR of 7% since 2000



13.5 million hectares of organic land in Europe in 2016 – 21% increase since 2012.



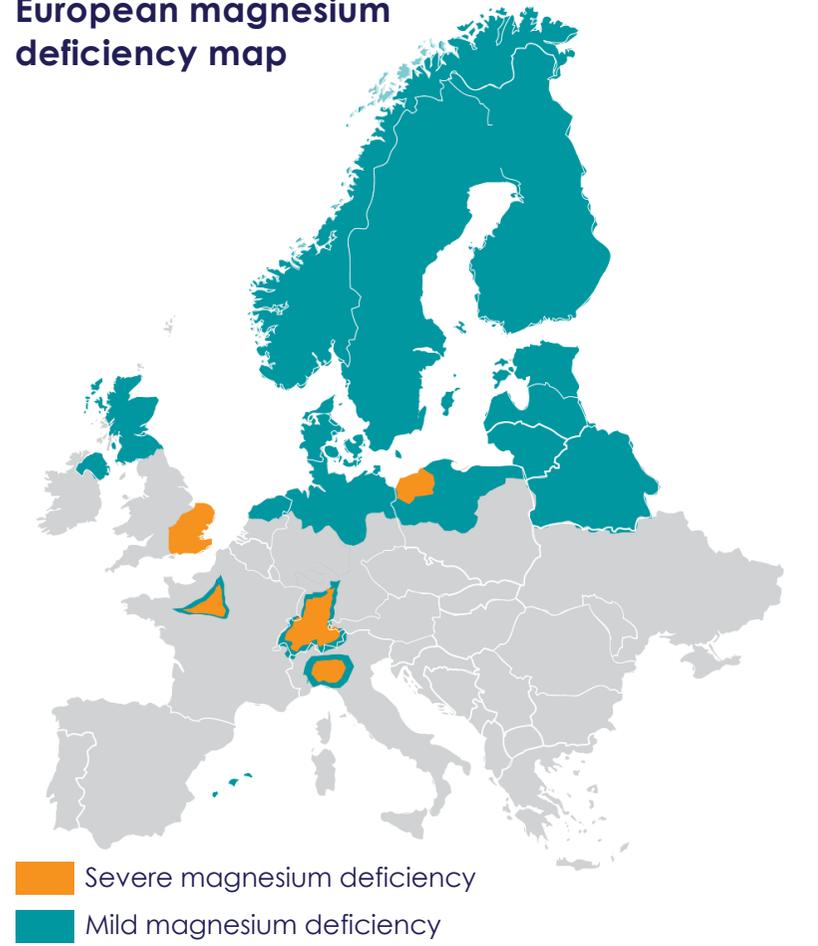
KEY TAKEAWAY:

POLY4 IS A CERTIFIED ORGANIC PRODUCT WHICH CAN BE USED TO SUPPLY A HIGH GROWTH MARKET IN BULK

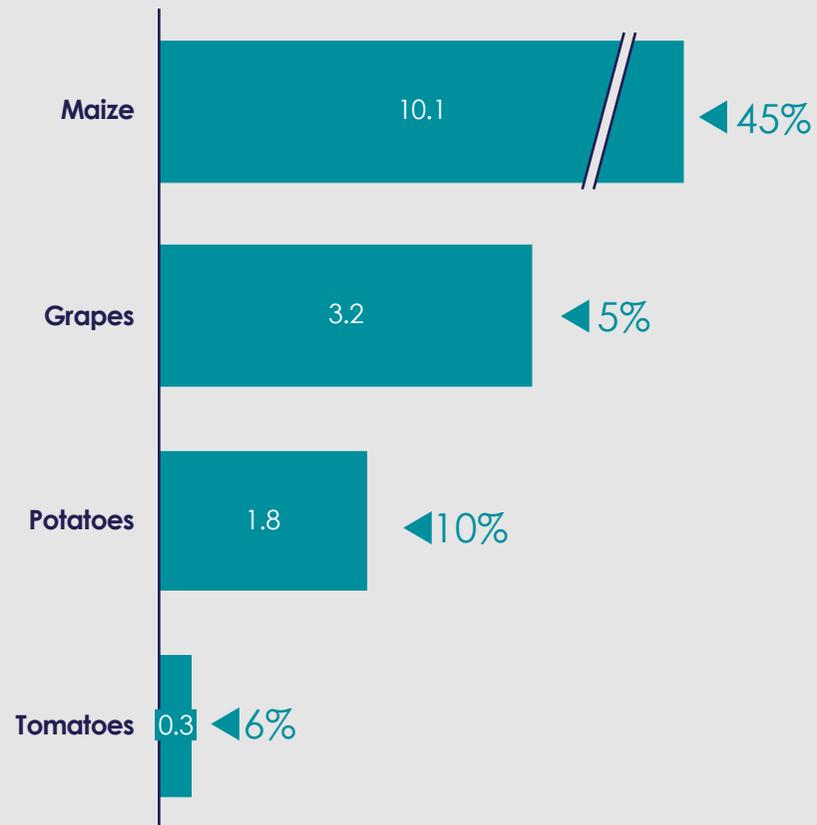
Sources: IFOAM EU Group, 2016

EUROPEAN MAGNESIUM DEFICIENCY

European magnesium deficiency map



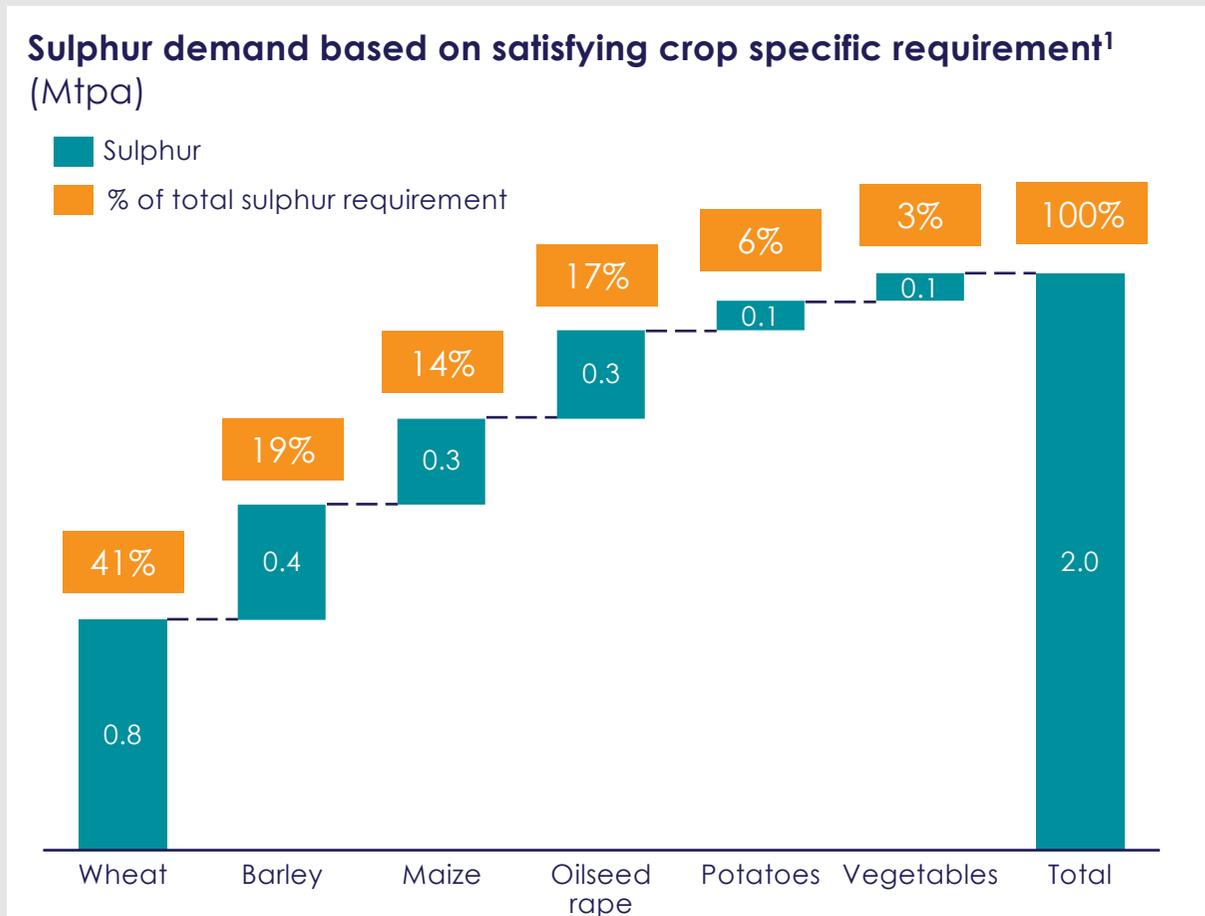
Magnesium responsive crops, European hectares harvested and % of world total¹



Notes: 1). Based on crops produced in 2016
Sources: CRU, FAOSTAT

SATISFYING EUROPEAN CROP NUTRIENT DEMAND: SULPHUR

- Sulphur demanding crops such as cereals, oilseed rape, potatoes and vegetables account for **66%** of the total hectares planted in Europe

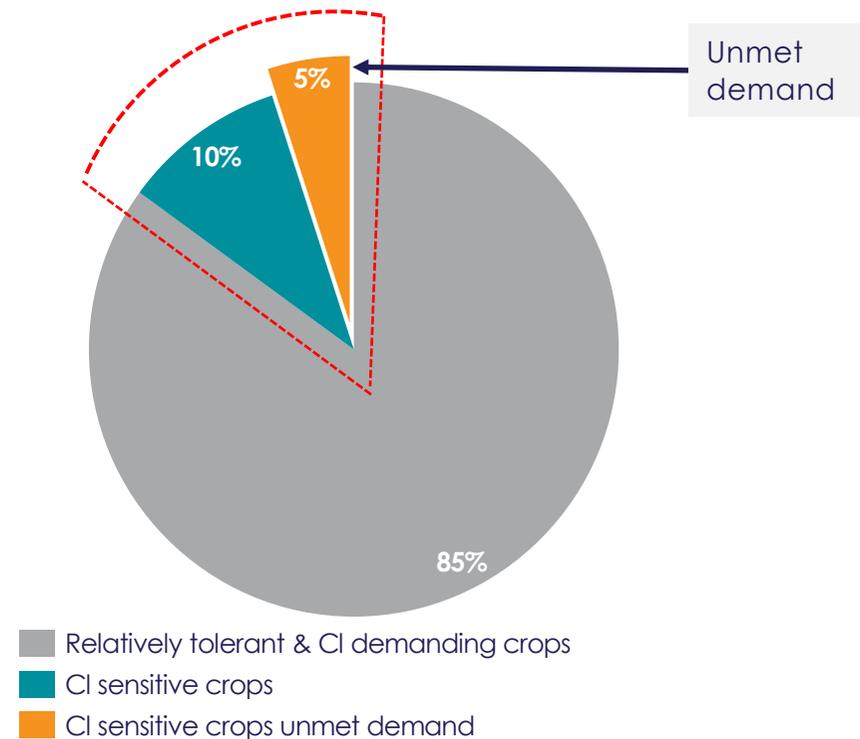


Notes: 1) Sulphur requirement based on crop specific sulphur requirement: wheat 30 kg S ha⁻¹; barley 30 kg S ha⁻¹; maize 30 kg S ha⁻¹; oilseed rape 50 kg S ha⁻¹; potato 70 kg S ha⁻¹; vegetables 30kg s ha⁻¹. Based on total hectares planted 2016.
Sources: Sirius Minerals, FAOSTAT

EUROPEAN UNMET CHLORIDE-FREE DEMAND

- Consumption of chloride-free products accounts for 10% of total K_2O consumption
- 15% of the total K_2O consumption is used on chloride-sensitive crops, which identifies an unmet demand of 5%
- This unmet demand in Europe equates to 0.43 Mtpa of SOP or 1.53 Mtpa in POLY4 equivalent

European K_2O demand based on crop requirement



KEY TAKEAWAY:

EUROPEAN UNMET CHLORIDE-FREE DEMAND CAN BE FULLILLED BY POLY4

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THE NATURAL SOLUTION



THE POLY4 CORNERSTONES

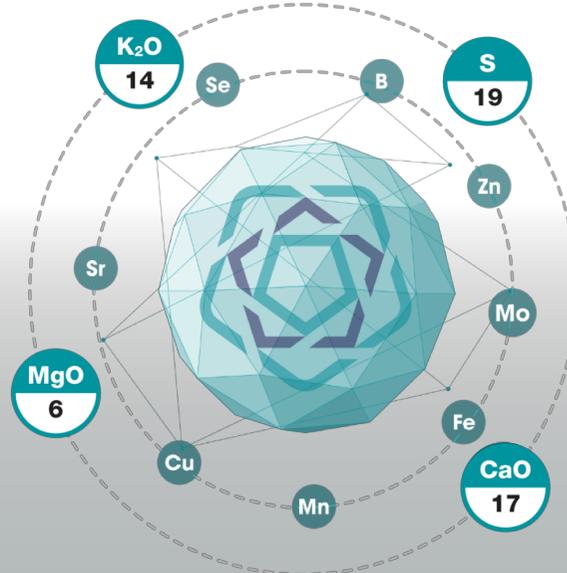
THE POLY4 CORNERSTONES

EFFICIENCY

EFFECTIVENESS

FLEXIBILITY

SUSTAINABILITY



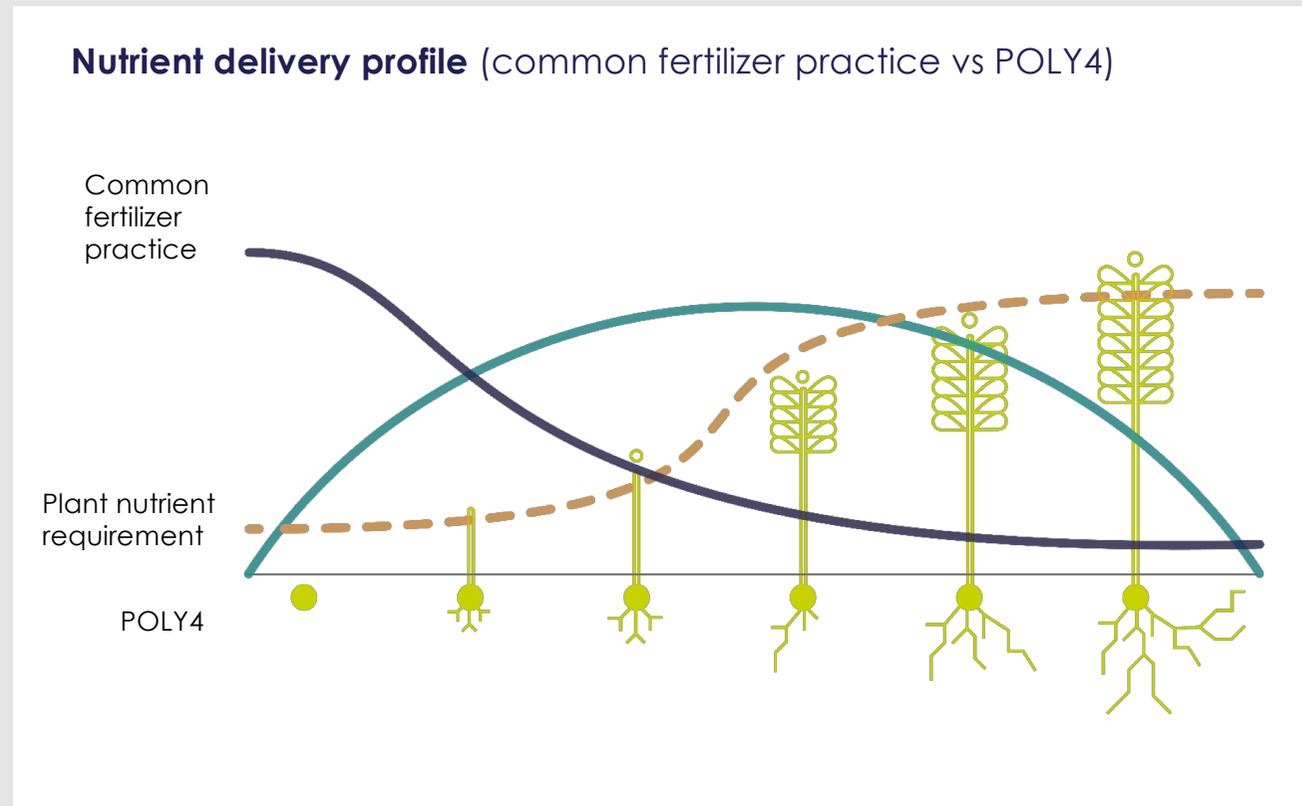
POLY4 CHARACTERISTICS

- Effective nutrient release**
- Balanced**
- Compatibility**
- Critical relative humidity** 70%
- Low chloride** Cl
- Low CO₂**
- Crush strength** 6.5 kgf
- Soil enhancer**
- Organic**
- Effective spreading** 36m
- Improves FUE**
- Improves yield**
- Diversification**
- Profitability**
- pH neutral**

Notes: 1) Based on 90% polyhalite grade. Macro nutrients based on w/w % and micro nutrients based on mg/kg; micro nutrients' content: B 169, Zn 1.9, Mn 3.1, Mo 0.3, Se>0.5, FE>0.5, Cu 1.1, Sr 1414. 2) POLY4 is the trademark name for polyhalite products from the Sirius Minerals polyhalite project in North Yorkshire, *48% SO₃. B – boron, Cu – copper, Se – selenium, Zn – zinc, Fe – iron, Sr – strontium, Mo – molybdenum, Mn – manganese.

EFFECTIVE NUTRIENT RELEASE PROFILE

- A plant's nutrient requirement changes through its life cycle
- Common fertilizer practice – nutrients are lost through leaching, run-off and erosion etc
- POLY4's nutrient release profile more closely aligns with a plant's nutrient requirements



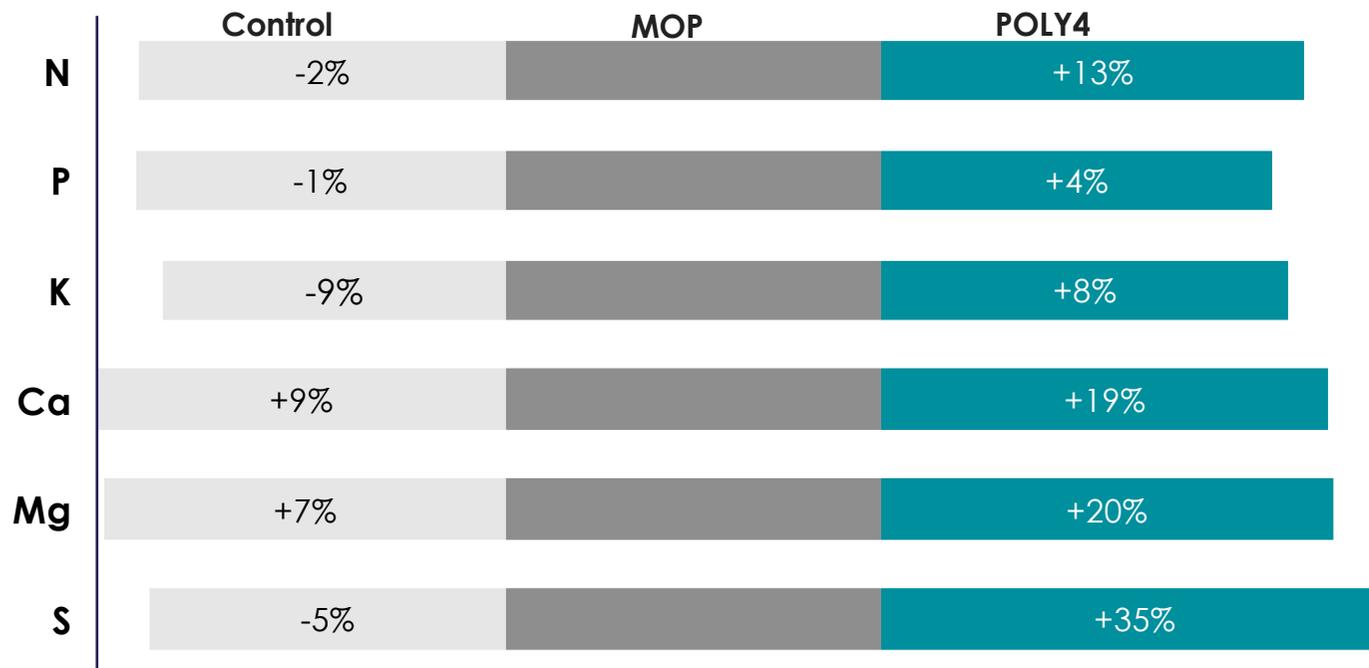
EU: SUSTAINED MACRO-NUTRIENT DELIVERY

Macro-nutrient uptake results from EU trials¹

Initial soil analysis¹

Soil measurement	Value
P (mg kg ⁻¹)	56
K (mg kg ⁻¹)	113
Mg (mg kg ⁻¹)	98
Ca (mg kg ⁻¹)	2047
S (mg kg ⁻¹)	5
OM (g kg ⁻¹)	19

Improvements in macro-nutrient uptake compared to MOP



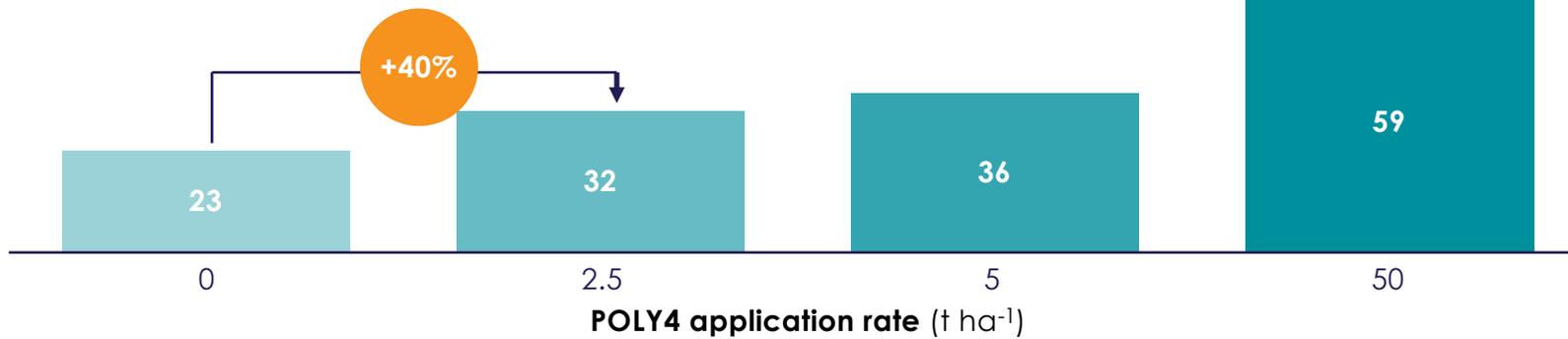
KEY TAKEAWAY:

POLY4 OUTPERFORMED MOP IN MACRO-NUTRIENT UPTAKE

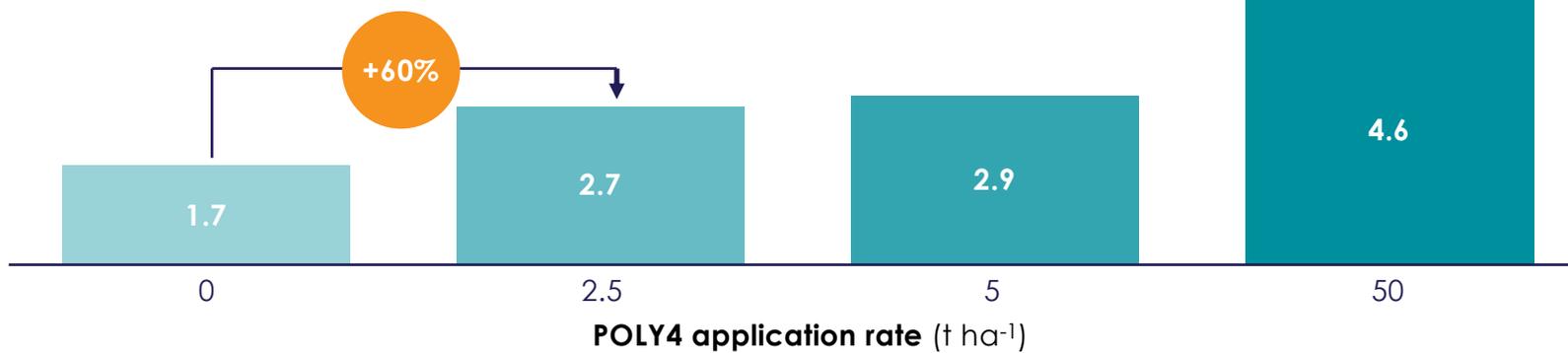
Notes: 1) The results are based on 11 EU trials covering both high-value and broad-acre crops such as potato, wheat, barley, oilseed rape, silage corn, corn and celery. Source : Sirius Minerals.

SOIL STABILISATION

Soil tensile strength (kPa)



Soil resilience to compaction (Young's Modulus MPa)^{1,2}



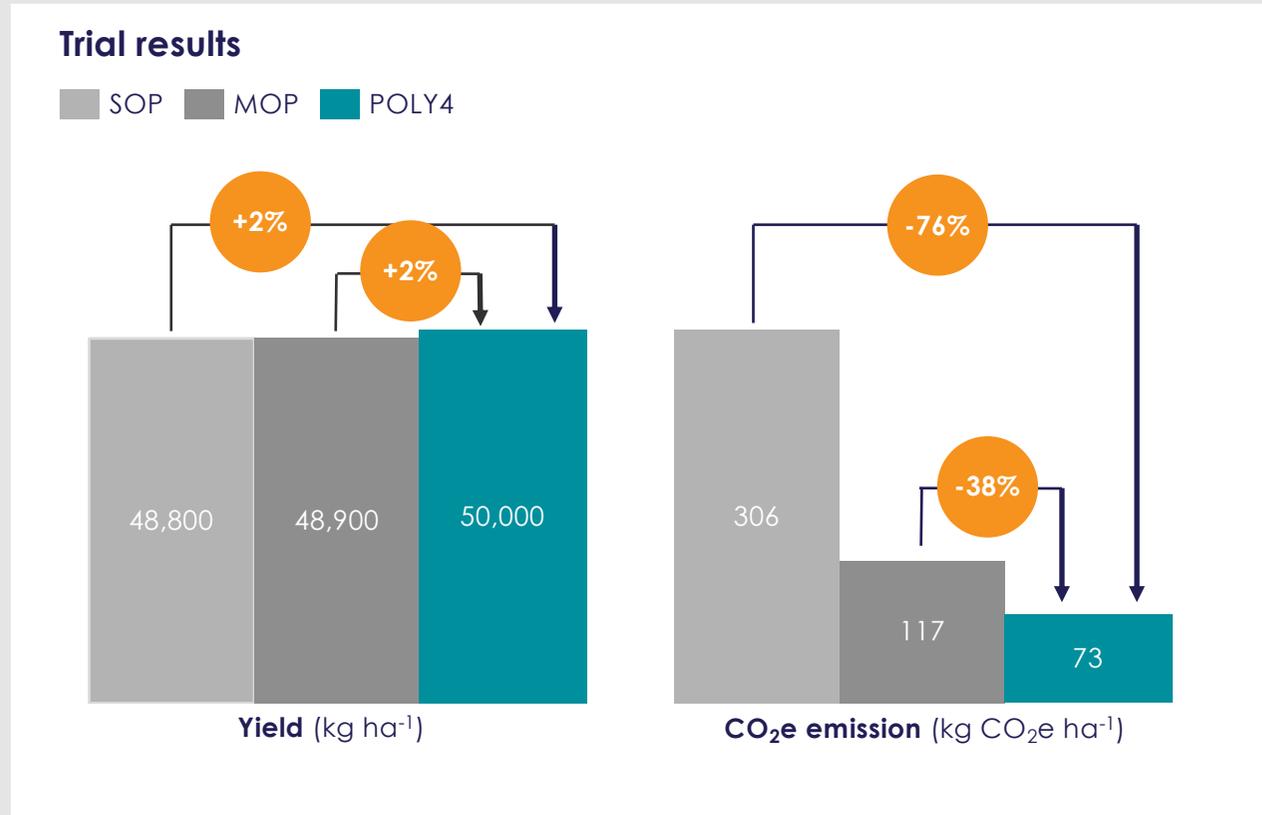
KEY TAKEAWAY:

POLY4 HELPS TO REBALANCE AND RECONSTRUCT THE SOIL STRUCTURE SUPPORTING SUSTAINABLE LAND MANAGEMENT

Notes: 1) Genstat means; 2) Young's Modulus is a measurement of the elasticity of solid materials. Source: University of Aberdeen 2015.

FERTILIZER PLAN CO₂E REDUCTION EXAMPLE: POTATO TRIAL

- The increase in yield reflects the potential of POLY4 to increase economic returns of farms
- The results show that with POLY4, farmers can achieve both economic and environmental sustainability



KEY TAKEAWAY:

POLY4 CAN DELIVER HIGH CROP YIELD AND REDUCE CO₂e EMISSION

Notes: UK potato trial – 22000-MAC-22010-15; Based on yield results at recommended K₂O application of 200kg ha⁻¹; All plots received 220 kg N ha⁻¹ from AN, 100 kg P₂O₅ ha⁻¹ from TSP and 300 kg K₂O ha⁻¹ from MOP, SOP or POLY4. Initial soil analysis: P 28 mg kg⁻¹, K 106 mg kg⁻¹, Mg 46 mg kg⁻¹. Source: Commercial partner (22000-MAC-22010-15), Sirius Minerals

FERTILIZER PLANS OF THE FUTURE

Value-in-use by a European farmer

MOP + POLY4 net income (US\$ ha⁻¹)



Trial results and economic analysis: Wheat trial in Poland

Economic Indicator	MOP + AS	MOP + POLY4	Diff.	Change (%)
Equivalent mass required (kg ha ⁻¹)	672	726	54	8%
Wheat yield (t ha ⁻¹)	8.09	8.38	0.3	4%
Wheat price (US\$/t)	158	158	-	-
Gross income (US\$/ha)	1,278	1,324	46	4%
Total cost (US\$/ha)	171	185	14	8%
Net income (US\$/ha)	1,107	1,139	32	3%

Trial results and economic analysis: Wheat trial in France

Economic Indicator	MOP + AS	MOP + POLY4	Diff.	Change (%)
Equivalent mass required (kg ha ⁻¹)	672	726	54	8%
Wheat yield (t ha ⁻¹)	7.34	7.55	0.2	3%
Wheat price (US\$/t)	160	160	-	-
Gross income (US\$/ha)	1,174	1,208	34	3%
Total cost (US\$/ha)	171	185	14	8%
Net income (US\$/ha)	1,003	1,023	20	2%

Notes: 1) Wheat results presented are based on data from Genstat regression analysis at K₂O rate of 75 kg ha⁻¹. MOP+AS treatment plan – 100% K₂O supplied by MOP. MOP+POLY4 treatment plan – K₂O supplied at a rate of 70% MOP and 30% POLY4. Economic analysis based on European quoted prices 2016: urea granular FOB US\$205/t, ammonium sulphate granular FOB US\$163/t, DAP FOB US\$343/t, MOP granular US\$284/t, POLY4 US\$200/t; 2) POLY4 value at a breakeven margin scenario versus MOP+AS. Sources: 49000-PUL-49010-16, 17000-ASA-17011-16, CRU, ArgusFMB, FAOSTAT, Sirius Minerals.

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THANK YOU

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