



POLY4

A SIRIUS MINERALS PRODUCT

REGIONAL SOIL CHALLENGES VIETNAM



The future of fertilizer.

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VIETNAMESE SOIL DEFICIENCIES

Severe soil deficiencies can be seen all over the world, particularly in South East Asia. In Vietnam, soil degradation is a widespread issue resulting from agricultural mismanagement including imbalanced fertilization and the overuse of acid fertilizers.¹

Magnesium deficiencies are significant in many parts of the country which, with 10 out of 12 major crops recognised as magnesium 'hungry', restricts Vietnamese farming potential.

Deficiencies can also be seen for other macro nutrients including potassium (seen in 80% of soils) and calcium (seen in 72% of soils).²



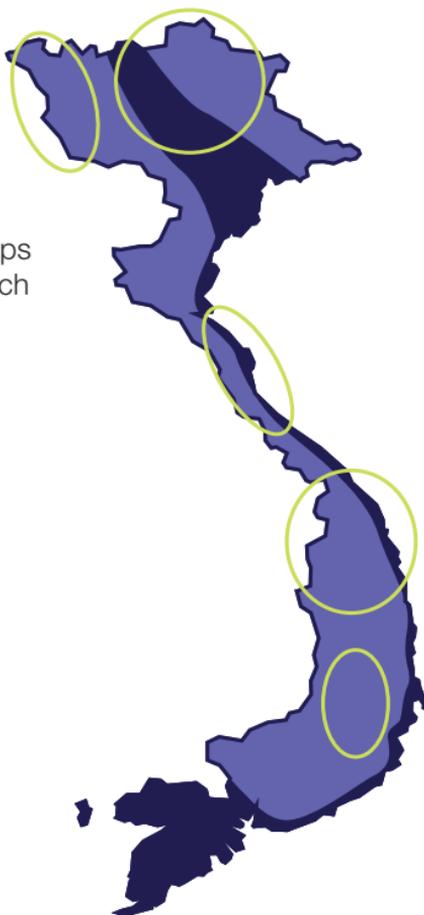
MAGNESIUM DEFICIENCIES¹

A wide range of crops are responsive to magnesium but, as the second largest exporter of rice in the world, rice is one of the most significant.

Other magnesium-sensitive crops include high value examples such as citrus, grapes and nuts. Broadacre crops, including sugarcane and corn, represent 9.4 million hectares.³

 Regions with magnesium deficiencies

 High value cropping areas



RICE FARMING CHALLENGES IN VIETNAM

Rice yields in Vietnam average at 5.75 tonnes per hectare. This demonstrates the need for improved fertilizer practices, compared to rice yields of 6.8 tonnes per hectare in China.³

This need is particularly apparent in regions such as the Mekong Delta. Soils show nutrient deficiencies, aluminium toxicity, low organic carbon and dangerous levels of both actual and potential acid sulphate.

Many provinces across this region have also been affected by 'rice blast' – a disease that can damage up to 30% of rice crops globally⁶. Neck and leaf blast, dirty panicle and sheath blight are all listed as the major causes of rice crop damage.

**VIETNAM
PRODUCES
45 MILLION
TONNES
OF PADDY RICE
PER ANNUM³**

**NUTRIENT DEFICIENCIES AND IMBALANCES, DISEASES AND
CHALLENGES FACING FARMERS ACROSS THE COUNTRY**

“Mg is next in line (after K, P and N) in limiting agricultural production in Vietnam... estimated rice yield response to added Mg was quadratic in nature.”²

Vietnam Soil Resources, Asian Soil Partnership Consultation Workshop on Sustainable Management and Protection of Soil Resources Tran Minh Tien, PhD

“The major strategies for better utilisation of soil could be the reclamation of acid sulphate and saline soils by leaching salts, acid and toxic elements and improving soil nutrient status such as NPK fertilizers.”¹

IPNI, An introduction to the major soil types in Vietnam

“Each tonne [of paddy] exploits from soil about 20 kg of K_2O . Nutrient depletion is indicated not only for major elements (N, P, K, S, Mg) but also for micro elements (Mo, Bo) as well.”¹

IPNI, An introduction to the major soil types in Vietnam

**AND TOXIC ELEMENTS IN SOILS ARE THREE OF THE KEY
COUNTRY. SEE HOW POLY4 CAN HELP OVER THE PAGE...**

UNLOCKING VIETNAMESE RICE FARMING POTENTIAL

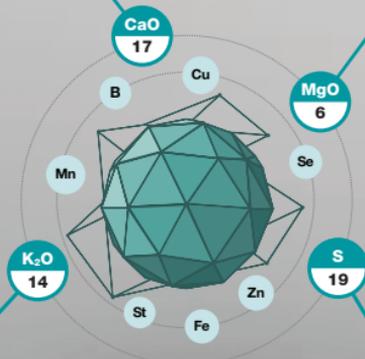
POLY4 is a naturally occurring, low chloride multi-nutrient fertilizer containing four of the six essential macro nutrients required for plant growth. These nutrients can help Vietnamese rice farmers to overcome the challenges outlined over the page.

CaO is known to remediate soil by making undesirable elements available for removal.

Mobilises nutrients.

Crucial for photosynthesis, resulting in more efficient energy absorption.

Helps with protein synthesis, the reduction of free radicals and enables activation of key enzymes.



Renowned for rice blast tolerance.⁴

Vital for plant cell wall strength.

Crucial for photosynthesis and thus efficient energy absorption.

An important component of proteins.

THE POLY4 CORNERSTONES

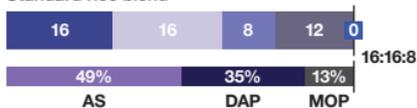
POLY4 has four key attributes that can benefit Vietnamese rice farmers by increasing their profits in a sustainable way through improved yields, reduced costs or both.

1 EFFICIENCY

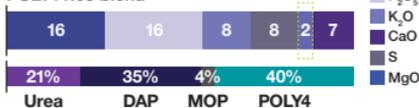
- Improves Fertilizer Use Efficiency by delivering greater nutrient uptake.
- Desirable nutrient release profile.
- High nutrient density, delivering four macro nutrients in one easy to use, cost effective granular delivery system.

POLY4 delivers nutrients over a time frame which more closely aligns with the needs of a plant, compared to conventional fertilizers which tend to be applied and deliver nutrients ahead of crop demand.

Standard rice blend



POLY4 rice blend



The blend example above shows POLY4's ability to deliver a wider range of nutrients including much needed magnesium, compared to a standard blend.⁵

3 FLEXIBILITY

- Granular product that handles, stores, blends and spreads effectively up to 36m.
- Can be used as a straight fertilizer and as a component of blend formulations.
- Allows a farmer to choose the timing of application.

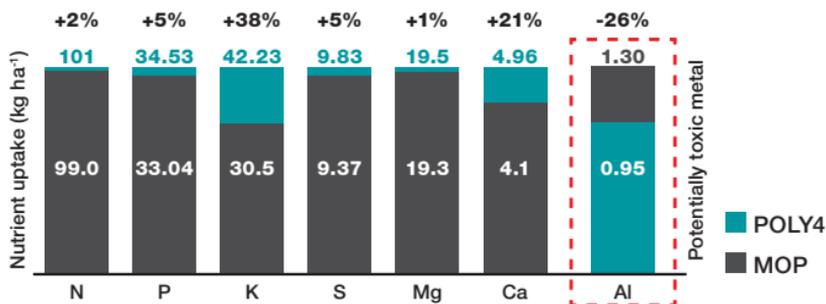
Tests have shown that POLY4 dissolves in water much faster than SOP-M and as quickly as SOP with all nutrients released into soil solution and more than 90% becoming available within six to twelve hours.

2 EFFECTIVENESS

- Improves both yield and quality.
- Minimises crop losses through disease resistance.
- Low chloride and pH neutral.
- Improves macro and micro nutrient uptake.⁵

The Mg, S, Ca and K in POLY4 supports metabolic resistance to diseases, helps with the photosynthesis process, reduces free radicals and activates key enzymes within the plants.

High value crops require Cl-free fertilizer sources while a lot of broadacre crops benefit from lower Cl applications.



4 SUSTAINABILITY

- Improves soil strength, structure and nutrient legacy.
- Certified for use in organic systems and is produced using methods with a low environmental impact.
- Reduces agriculture's impact on the environment by improving Fertilizer Use Efficiency, reducing erosion and nutrient loss.

POLY4 increases soil tensile strength by 40% and soil's resilience to compaction by 60%.

K, S and Ca play important roles in combating heavy metal uptake and toxicity.