



# POLY4

## REGIONAL SOIL CHALLENGES VIETNAM



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AngloAmerican

# VIETNAMESE SOIL DEFICIENCIES

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

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.


There are also other macro nutrient deficiencies including potassium (seen in 80% of soils) and calcium (seen in 72% of soils).<sup>2</sup>



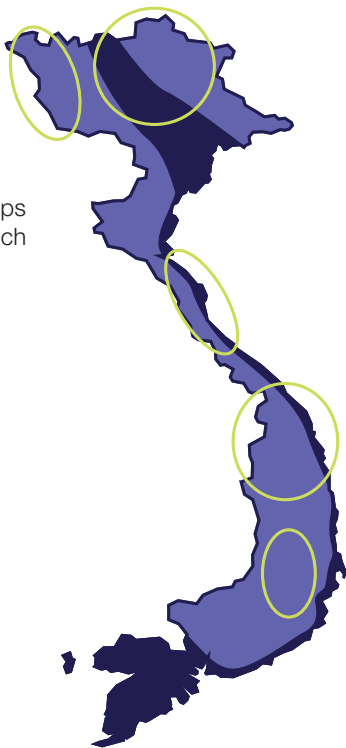
# MAGNESIUM DEFICIENCIES<sup>1</sup>

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. Broad-acre crops, including sugarcane and corn, represent 9.4 million hectares.<sup>3</sup>

 Regions with magnesium deficiencies

 High-value cropping areas



# RICE FARMING CHALLENGES IN VIETNAM


Rice yields in Vietnam average at 5.75 tonnes per hectare compared to rice yields of 6.8 tonnes per hectare in China.<sup>3</sup> This demonstrates the need for improved fertilizer practices particularly 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 globally<sup>6</sup>. 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 ANNUM<sup>3</sup>**

**NUTRIENT DEFICIENCIES AND IMBALANCES, DISEASES AND TOXIC ELEMENTS IN SOILS ARE THREE OF THE KEY CHALLENGES FACING FARMERS ACROSS THE COUNTRY. SEE HOW POLY4 CAN HELP OVER THE PAGE...**



“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.”<sup>2</sup>

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.”<sup>1</sup>

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.”<sup>1</sup>

IPNI, An introduction to the major soil types in Vietnam

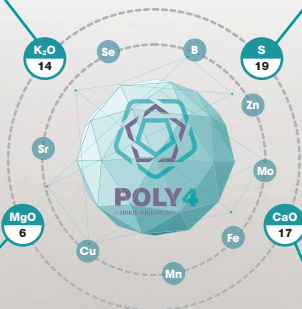
Notes: 1) IPNI, An introduction to the major soil types in Vietnam; 2) Vietnam Soil Resources, Asian Soil Partnership Consultation Workshop on Sustainable Management and Protection of Soil Resources Tran Minh Tien, PhD; 3) FAO (2014); 4) Mekong Delta Development Research Institute, Can Tho University; 5) Anglo American; 6) Hai et al. (2007).

# 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.

Renowned for rice blast tolerance.<sup>4</sup>  
Vital for plant cell wall strength.

Crucial for photosynthesis and  
thus efficient energy absorption.  
An important component  
of proteins.



Crucial for photosynthesis, resulting in  
more efficient energy absorption.

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

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

# THE POLY4 CORNERSTONES

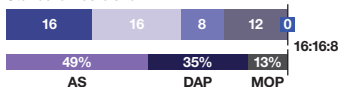
POLY4 has four key attributes that can benefit Vietnamese rice farmers by increasing their profits in a sustainable way through improved yields, reduced costs or both.

## 1 EFFICIENCY

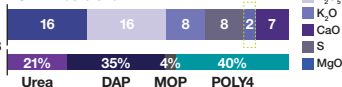
- Improves fertilizer use efficiency by delivering greater nutrient uptake.
- Desirable nutrient release profile.
- High nutrient density, delivering four macro nutrients in one easy-to-use, cost-effective granular delivery system.

POLY4 delivers nutrients over a timeframe 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.<sup>5</sup>

## 3 FLEXIBILITY

- Low chloride and pH neutral product
- Successful as a straight fertilizer or as a component of blend or complex compound formulations.
- Allows farmers to choose the timing of application.

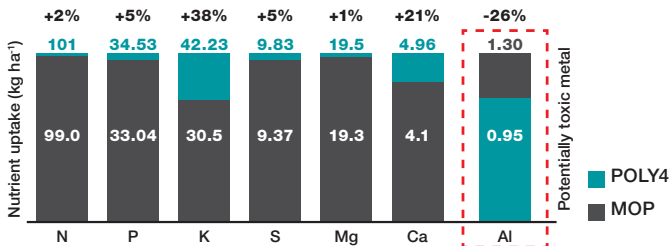
High-value crops require Cl-free fertilizer sources while a lot of broad-acre crops benefit from lower Cl applications.

## 2 EFFECTIVENESS

- Improves both yield and quality.
- Improves macro and micro nutrient uptake.<sup>5</sup>
- Minimises crop losses through disease resilience.
- Granular product that handles, stores, blends and spreads effectively.

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

Tests have shown that POLY4's dissolution rate was similar to MOP. POLY4's natural dissolution rate effectively regulates release of nutrients to crops.



## 4 SUSTAINABILITY

- Improves soil strength, structure and nutrient legacy.
- Reduces the impact of agriculture on the environment by improving fertilizer use efficiency, reducing erosion and nutrient loss;
- Certified for organic use;
- Excellent environmental profile.

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.

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