

# RESEARCH WITH IMPACT



## THE CHALLENGE:

Agriculture in Uruguay initially developed in high potassium (K) soils, under conventional tillage and crop rotations that required no K fertilizer. The scenario changed during the last decades driven by increasing grain prices. The annual cropped area tripled between 2002 and 2014, with soybean now sown on 67% of the area. Cropping systems have intensified, shifting from crop-pasture rotations to continuous annual cropping under no-till cultivation.

The K balances in Uruguay (application minus removal) are negative due to the absence of K fertilization. As soybean production increases, the K balance becomes more negative. In addition, agriculture has expanded into marginal soils that are already low in K.

## THE RESEARCH SOLUTION:

IPNI supported several experiments through a joint project with the Faculty of Agronomy (UdelaR), INIA, and other Uruguayan institutions and with the partial support of Canpotex to identify the need for additional K fertilizer through improved calibration of soil test analysis.

## Documenting the Need for Potassium in Uruguay

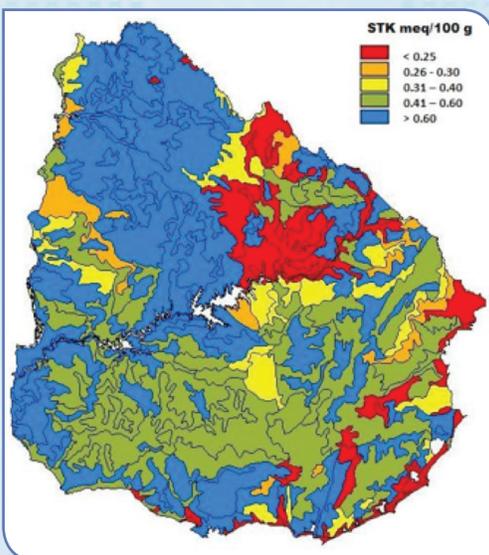
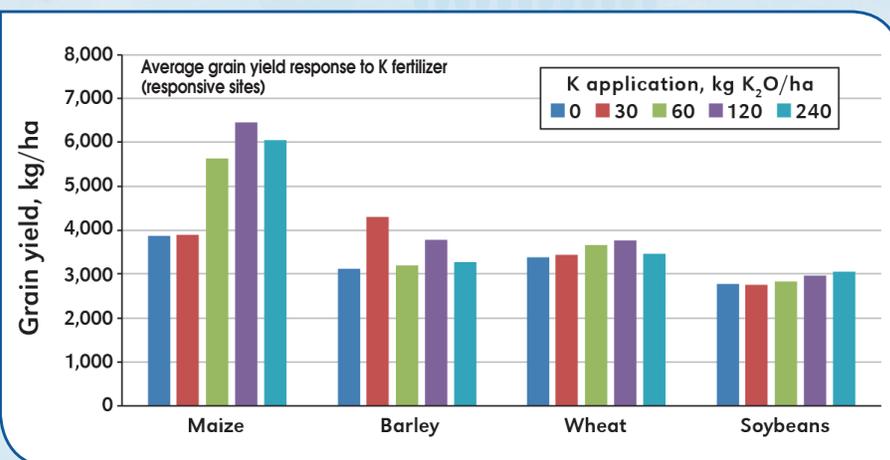
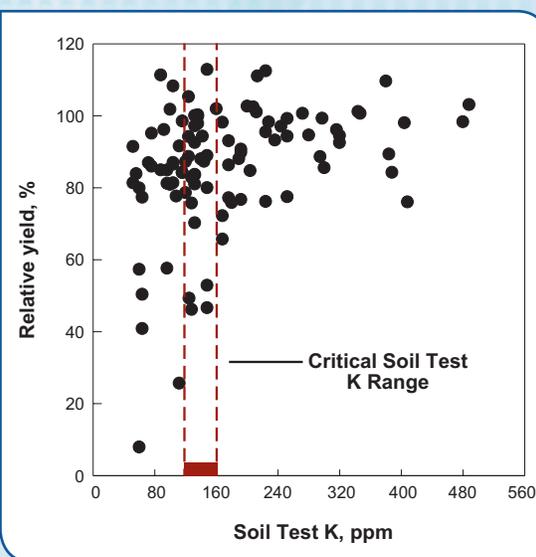
### THE RESULTS:

Field studies between 2007 and 2014 found a response to K fertilizer in 32 of 110 sites. These studies support a critical soil K concentration range of 120 to 160 ppm as a guide to defining

- the need for additional fertilizer.
- However, the scatter plot shows a wide range in predicted K response, which highlights a need for further site-specific research.

These studies represent a breakthrough in fertilizer research in Uruguay, demonstrating the need for K in many cropping systems. Fields that were responsive to K fertilizer averaged 66% higher yields for maize, 37% for barley, 12% for wheat, and 10% for soybean, compared to plots that omitted K.

These results have largely contributed to the increase in annual  $K_2O$  imports to Uruguay, rising from 9,000 t in 2003 to 146,000 t in 2013.



Map of soil test K (STK) for Uruguay.



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