

Module 4.1-1 Fertilizer nitrogen required by wheat and maize in Argentina is best determined prior to planting.

In fact, evaluation of available (inorganic) N at planting time has been a useful tool to determine fertilizer N needs in sub-humid and semi-arid regions throughout the world. In a particular area, the level of available N at planting above which no response to fertilizer N is expected can be estimated. This methodology has been calibrated with success in several areas of the Pampas region of Argentina for wheat and corn. Nitrogen fertilizer rates (Nf) are estimated from the difference between the NREQ level and the amount of $\text{NO}_3\text{-N}$ determined before planting: $\text{Nf} = \text{NREQ} - \text{X}$

Where: Nf is the amount of fertilizer N to be applied,
NREQ is the soil N plus fertilizer N required,
X is the amount of $\text{NO}_3\text{-N}$ in the soil at 0-60 cm depth.

In **Figure 1**, if soil testing at planting indicates an availability of 70 kg/ha $\text{NO}_3\text{-N}$, the estimated yield would be 7,700 kg/ha. Thus, if the attainable yield in the specific field is 10,000 kg/ha, a NREQ of 150 kg/ha of available N should be reached, and the recommended N rate would be 80 kg/ha fertilizer N.

Levels of NREQ for wheat and maize, according to the expected yields for areas with different soils and climates are shown in **Table 1**.

Source: Bianchini A., F. Garcia, and R. Melchiori. 2008. In J. Hatfield and R. Follet (Eds.). Nitrogen in the environment: Sources, problems, and management. Elsevier - Academic Press, San Diego, CA. USA pp 105-124.

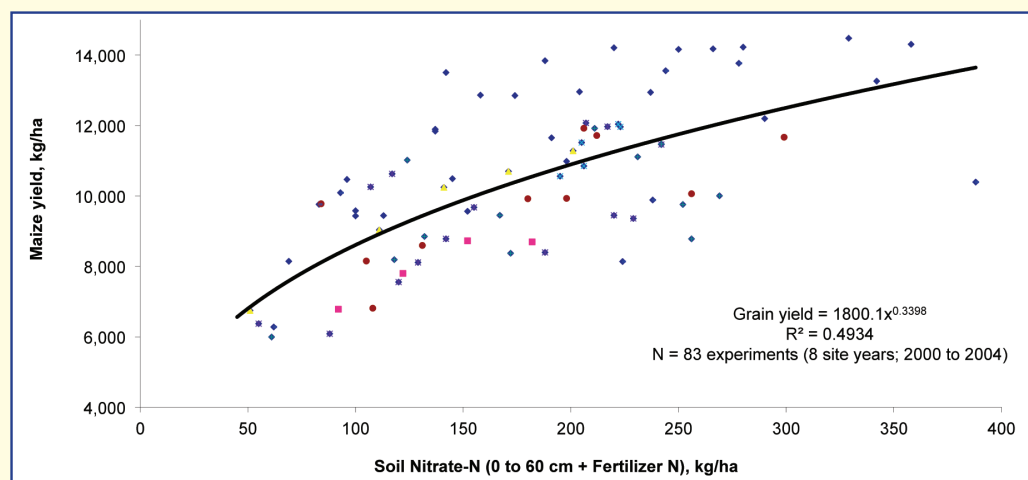


Figure 1. The relationship between soil available N ($\text{NO}_3\text{-N}$) and maize grain yield for 83 field experiments from 8 site years, (2000 to 2004) in the central Pampas.

Table 1. Expected yields correspond to N requirements for different areas.

Area	NREQ level, ($\text{NO}_3\text{-N}$, 0-60 cm)	Expected yield	Reference
----- kg/ha -----			
<i>Wheat</i>			
Southeastern Buenos Aires	125	3,500	González Montaner et al., 1991
Southeastern Buenos Aires	175	5,000-5,500	González Montaner et al., 2003
Central and South Santa Fe	92	3,500-4,000	Salvagiotti et al., 2004
Southern Santa Fe and Córdoba	100-150	3,200-4,400	García et al., 2006
<i>Maize</i>			
Northern Buenos Aires	150	9,000	Ruiz et al., 2001
Northern Buenos Aires	150-170	10,000	Alvarez et al., 2003
Central and South Santa Fe	135 162	< 9,500 > 9,500	Salvagiotti et al., 2004
Southern Santa Fe and Córdoba	150-200	10,000-11,000	Nutrition network CREA Southern Santa Fe, 2009

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