# NITROGEN MANAGEMENT IN CORN USING SITE-SPECIFIC CROP RESPONSE ESTIMATES FROM A SPATIAL REGRESSION MODEL

**Rodolfo Bongiovanni**
*National Institute for Agricultural Technology (INTA)*
*Manfredi, Córdoba*
*Argentina*

**James Lowenberg-DeBoer***
*Department of Agricultural Economics*
*Purdue University*
*West Lafayette, Indiana*

## ABSTRACT

Adapting variable rate technology (VRT) to Argentine conditions requires methods that use inexpensive information and that focus on the inputs and variability common to Argentine maize and soybean growing areas. The goal of this study is to determine if spatial regression analysis of yield monitor data can be used to estimate the site-specific crop Nitrogen (N) response needed to fine tune variable rate fertilizer strategies. N has been chosen as the focus of this study because it is the most commonly used fertilizer by corn farmers in Argentina. The methodology uses yield monitor data from on-farm trials to estimate site-specific crop response functions. The design involves a strip trial with a uniform N rate along the strip and a randomized complete block design, with regression estimation of N response curves by landscape position. Spatial autocorrelation and spatial heterogeneity are taken into account using a spatial error model and a groupwise heteroskedasticity model. A partial budget is used to calculate uniform rate and VRT returns. First year data indicate that N response differs significantly by landscape position, and that VRA for N may be modestly profitable on some locations depending on the VRT fee level, compared to a uniform rate of urea of 80kg ha$^{-1}$. A more complete analysis will pool data over many farms and several years to determine if reliable differences exist in N response by landscape position or other type of management zone. The study is planned for four years. The purpose of this preliminary analysis is to show how spatial regression analysis of yield data could be used to fine tune input use.

**Keywords:** Precision Agriculture, Variable Rate Nitrogen, Profitability, Spatial Autocorrelation, Argentina.

*Email the author at Lowenberg-DeBoer@agecon.purdue.edu