

## An economic analysis of variable rate technology

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### Abstrak

*Variable Rate Technology (VRT) offers an opportunity to improve production efficiency by allowing input applications to fluctuate in response to spatial variations in soil characteristics and nutrient levels. Society may also benefit from reduced negative externalities, such as surface and groundwater contamination, from input applications. Using a dynamic spatial model, this study examines how the interaction among variability, spatial autocorrelation, and mean level of soil fertility affects optimal sampling density and the economic gains from VRT. VRT was found to be profitable under selected conditions, and the optimal grid size will vary with these conditions. In the case where variability and mean fertility levels are significantly high associated with low spatial autocorrelation, VRT produces greater net returns than Uniform Rate Technology (URT), even with the smallest grid size to base the input application decisions. Results also demonstrate that optimal grid size increases with increased spatial autocorrelation.*