

# **Assessment of the production and economic risks of site-specific liming using geostatistical uncertainty modeling**

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Precision Agriculture (PA) offers the potential to improve the efficiency and environmental impact of conventional crop production systems. However, its implementation will depend on perceptions of how the adoption of technology will increase their yields and profit, and lower their production risk. This article presents an approach to help with this type of decision making. In this instance the consequences of three management scenarios (no lime, single-rate liming and site-specific lime applications to acidic field soil) were assessed in terms of production and economic risks. The methodology involved modelling the uncertainty about wheat yield, accounting for the local uncertainties about soil pH and lime requirement, and the uncertainties about crop model parameters used in the simulations. Indicator kriging (IK) was used together with Latin Hypercube Sampling (LHS) of the probability distributions of variables and model parameters for the propagation of uncertainties through to the output yield and net profit maps. These maps together with a sensitivity analysis were used to aid with decision making. Comparison of the three scenarios showed that under the economic conditions of the analysis, the optimum was reached for a single-rate application of 3.5 Mg/Ha over the entire field instead of site-specific lime applications.