The Profitability of Variable Rate Application of Nitrogen

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Internationally, input costs, especially fertilizer, increased substantially in recent years, forcing farmers to find means of making the use of fertilizer more efficient. Variable rate application of inputs, a relatively new concept in South Africa, is one of the most important modern technologies in agriculture that can assist farmers in an endeavour to promote sustainable success of their farming operations. Farmers are increasingly viewing precision agriculture as a tool that can help them increase yields and/or improve the efficiency of input use. However, variable rate fertilizer application involves radical changes and/or high investment in the technology as well as additional management capacity; and the widespread adoption of this technology has been limited by questions relating to the profitability of thereof. This paper evaluates the profitability of variable rate application of nitrogen (N) as applied to a maize field in the Bothaville district of the Free State Province in South Africa. The strip plot design of 180 strips was used for this research. This design involved treatments that run in the same direction across the field as planting and harvesting. The objective was to determine the maize crop response to different N rates and to estimate the profitability of variable rate (VR) relative to the single rate (SR) application of N. The results indicate that yield and ultimately profit, differ between management zones, as well as between the two treatments. Higher profit is obtained with VR in comparison to SR.

Keywords: variable rate fertilizer application, profitability, single rate application, yield monitor data, on-farm comparisons