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WILL PROVIDING CUSTOM VARIABLE RATE APPLICATION SERVICES BE PROFITABLE FOR YOUR AGRIBUSINESS?

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Abstract

It is imperative that agricultural service providers have the most accurate cost information possible before making a considerable investment in variable rate application (VRA) equipment. Costs differ widely among the various VRA systems available. In Tennessee, the 1-bin and 2-bin spreader beds mounted to existing chassis with an owner-added variable rate controller and global positioning system (GPS) are the most feasible. The truck spreader systems required substantially more acreage or larger custom charges making it difficult to breakeven and nearly impossible to earn a profit.

Introduction

Farm fields have numerous areas that differ from one another with respect to soil type, topography, microclimate, and other factors that influence crop yields. VRA has been widely heralded as a means of applying crop inputs in a non-uniform manner based on varying needs throughout a field with advantages including higher average yields, lower farm input costs, and environmental benefits from applying fewer inputs. Aside from its potential benefits to producers, this relatively new technology requires a significant investment by service providers.

Crop prices play a large role in the adoption of precision technologies such as VRA. If crop prices remain low, producers are unlikely to utilize VRA; thereby, affecting the agricultural service providers willingness to offer VRA services. The volatility of demand for VRA services in part determines the willingness of agricultural service providers to invest large sums of money in VRA equipment. Ultimately, agricultural service providers want to earn a profit. Therefore, they must explore different VRA equipment alternatives to determine what best meets their VRA demand and provides the optimal level of profit.

The objective of this research was to explore breakeven acreage requirements and profitability scenarios for single and multi-nutrient VRA fertilizer spreaders for agricultural service providers who offer 1) VRA with soil sampling services and 2) VRA services only.

Data and Methods

A partial budgeting framework is used to establish a breakeven equation among the cost of purchase and custom hire of variable rate application equipment and services:

$$\pi = (P - VC)A - FC, \tag{1}$$

where π is net dollar return to VRA per acre, P is the custom charge per acre for VRA, A is the number of acres, VC is the variable costs associated with VRA equipment, and FC is the fixed costs associated with VRA equipment. Using this same formula breakeven acreage and a breakeven custom charge for a specific profit margin can be calculated.

Budgets were developed for four VRA spreader systems: 1-bin and 2-bin spreader beds attached to existing truck chassis with a variable rate controller and a GPS unit added to each spreader by the owner and 1-bin and 2-bin truck spreaders factory equipped with a variable rate controller and an owner-added GPS unit. The two truck spreader systems were evaluated with and without an additional single, granular microbin. Grid soil sampling equipment was also included in the budgets since it was necessary to determine the nutrient requirements of the soil to which fertilizer will be variably applied. A new computer system was also included to meet the memory space demands of the mapping software. Equipment pricing was gathered through an Internet search. A telephone survey of VRA providers in Tennessee was conducted to gather custom application and soil sampling charges then averaged to provide the costs used in this analysis.

Results

According to the survey of VRA providers, the average custom charges for VRA and soil sampling in Tennessee for 2001 were $5.79/acre and $3.02/acre, respectively. The custom VRA and soil sampling charge of $8.82/acre used in the calculations was a combination of the average VRA charge of $5.79/acre and a soil sampling charge of $3.02/acre.

Breakeven acreage needed for the 1-bin and 2-bin spreader bed systems when both VRA and soil sampling services were offered at a custom charge of $8.82/acre were 1,054 and 1,482 acres, respectively. The breakeven base of 8,663 acres needed for the 1-bin truck spreader system rose to 9,331 acres when a microbin was added. For the 2-bin truck spreader system to breakeven, 10,669 acres were required at a custom VRA charge of $8.82/acre. When a microbin was added to the 2-bin truck spreader system breakeven acreage rose to 11,231 acres.

Breakeven acreage requirements when only VRA services were offered at $5.79/acre for the 1-bin and 2-bin spreader bed systems were 1,179 and 1,870 acres, respectively. A 1-bin truck spreader required 13,765 acres to breakeven. The addition of a microbin increased breakeven acreage for the 1-bin truck spreader by 1,228 acres to 14,993 acres. Breakeven acreage increased substantially for the 2-bin truck spreader system to 18,165 acres. Adding a microbin to the 2-bin truck spreader increased breakeven acreage to 19,345.

Agricultural service providers who already own a 1-bin spreader bed system, would need to increase their custom uniform application charge by 129% from $3.85 to $8.82/acre for VRA and soil sampling or service 2,036 (240%) more acres at $3.85/acre to breakeven. Providers offering a 2-bin spreader bed system would also need to increase their uniform application charge by 129% to $8.82/acre for VRA and soil sampling or spread 129% (2,562) more acres at $3.85/acre to breakeven. Those providers interested in offering VRA only would require a 50% increase in their custom charge to breakeven at $5.79/acre. Leaving the custom charge at $3.85/acre would require 1,053 acres (124%) and 1,228 acres (62%) more to be serviced by the 1-bin and 2-bin spreader bed systems, respectively, to breakeven for VRA services only.

Sensitivity analysis was used to evaluate the affect on breakeven acreage when the custom charges increased or decreased and equipment costs fluctuated 10% in either direction. As the cost of the spreader system increased, so did the number of acres required to breakeven. The number of acres serviced and custom application charge necessary to achieve a 10 or 15% profit goal also increased with the cost of the spreader system.

Discussion

The 1-bin and 2-bin spreader bed systems owner-equipped with a variable rate controller and GPS unit would best fit the Tennessee area. Breakeven acreage for these systems was 1,054 acres for the 1-bin and 1,482 acres for the 2-bin at a custom VRA and soil sampling charge of $8.82/acre. For the custom VRA only charge of $5.79/acre, breakeven acreage requirements were 1,179 acres for the 1-bin spreader bed system and 1,870 acres for the 2-bin spreader bed system.

Agricultural service providers can achieve a specific profit margin by increasing the custom charge or servicing more acres. As variable rate technologies become more widely adopted by agricultural service providers and producers, equipment costs could potentially decline making it easier to achieve or exceed profit goals.