



Variable Rate Application (VRA) for Precision Farming

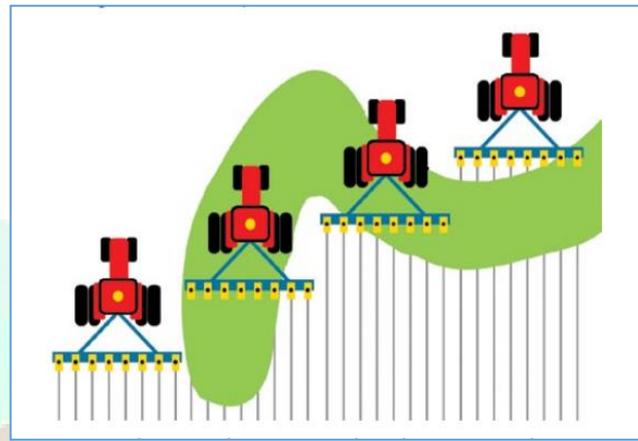
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Variable rate application (VRA) in precision agriculture is an area of technology that focus on the automated application of inputs to a desired crop. The agricultural inputs application is based on information that is recorded by sensors, maps and GPS. These inputs contain things like fertilizers, chemicals, and seeds, and they all aid to augment the farmers crop production. There are several types of technology that are used in variable rate application for precision agriculture. They contain different modern agricultural tools like drones and satellite imaging, to IOT and artificial intelligence (AI). Applying fertilizers and chemicals is a common farming activity that can be entirely automated with the precise execution of variable rate application technology (VRT).



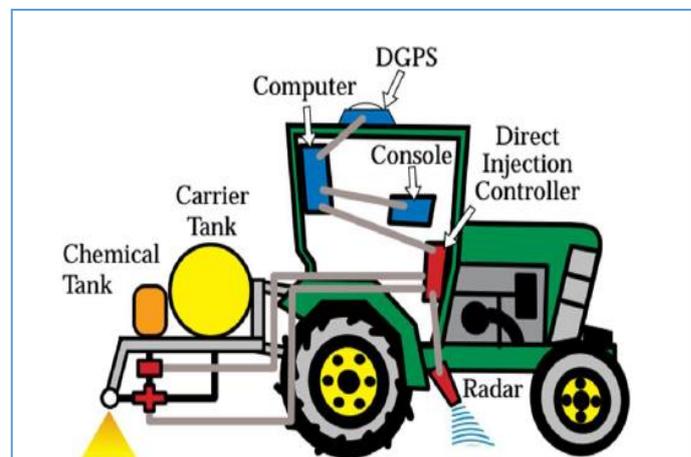
Variable Rate Technology (VRT) has been used in agriculture for many years with major success: increased yields, higher profitability, lower costs and more efficient yields. Over the years, VRT has improved even more, growing through to all crop types. The resolution at which we can make prescription maps has increased level of accuracy, selection to appreciate how much to place and where to obtain the best outcomes.

Ultimately, the aim of VRA is to gather information about an area of land, and then deliver it in a way that allows farmers to make smart decisions in farming operations. Progressively, innovative equipment's are becoming handier with the help of cloud technology. As agriculture is full of unpredictability, having access to data that takes the presumption out of agricultural operations has always been more significant.

There are 2 major types of application of VRA:

- 1. Map Based VRA**
- 2. Sensor Based VRA**

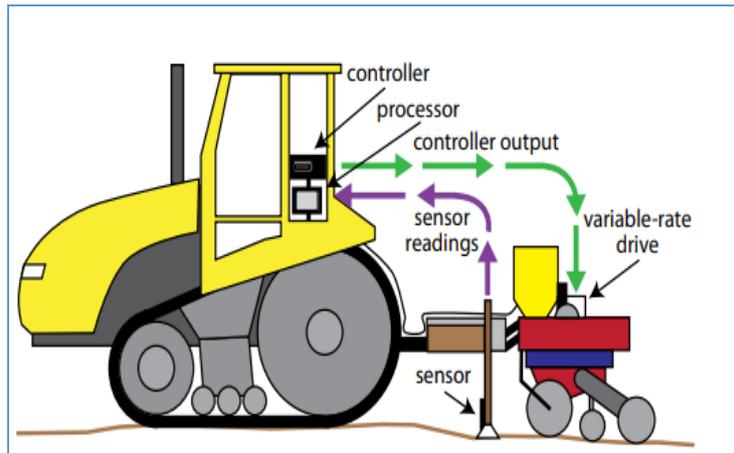
Map-Based VRA: - In this type of VRA the application rate based on an electronic map (prescription map). By means of the ground location from a GPS receiver and a prescription map of preferred rate, the application of input is varied as the vehicle travels through the area. The map-based technique uses maps of earlier measured items and can be applied using a quantity of different approaches. Farmers and





experts have made approaches for variable inputs based on different kind of soils, soil color and texture, Elevation, crop production, and many other information related to crop, area and weather.

Sensor-Based VRA: - The sensor-based technique provides the proficiency to differ the application rate of resources with no earlier mapping or data gathering involved. On the go sensors record the required information commonly soil and crop characteristics. Measurements recorded by the sensors and then managed and used instantaneously to regulate a variable-rate applicator. This technique doesn't essentially require the use of GPS system, nor does it need wide data analysis prior to making variable-rate applications. Nevertheless, GPS is used for data recording, the data can be used in upcoming site-specific crop management practices for forming a prescription map for other and future tasks, as well as to maintain application history for the farmer.



Other Applications and Benefits

Variable rate application in precision agriculture focuses on many other areas than just fertilization. VRA technology can be used in application of herbicide, weedicide and in applying micronutrient as well as for disease detection in the crops. Overall, VRA technology is mainly used to both spot information about a given site and to have a arrangement take decisions based on that data. The decisions that are made by the variable rate application technology systems regulate which supplies should be applied to the crop.

The advantage of VRA system is that it can assistance computerize this part of the farming process. The more computerization and precision that a firm introduces to their jobs, the more profit they can earn through higher production and efficiency. VRA increases financial return by tactically optimizing inputs in each agricultural operation. VRA allows to focus inputs on crops that provide the maximum return, while decreasing inputs in inferior productivity areas or where earlier management has brought about in a condition for reduced input essential.



BENEFITS OF VARIABLE RATE TECHNOLOGY

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- 01** Improved crop yield through optimal use of resources
 - 02** Greater on-farm productivity and efficiency
 - 03** Reduction in unnecessary use of materials
 - 04** Minimized over-application means reduced risk of run-off
 - 05** Reduced likelihood of excess spraying that could be harmful for the wider environment
 - 06** Conservation and optimal use of water resource

Reference

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