



Variable Rate Fertilizer Application Maps

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For the past several decades North Dakota crop farmers have applied fertilizer based on a specific crop yield goal for each field, but today some farmers are varying the amount of fertilizer applied across fields. Farmers can now use the global positioning system (GPS) coupled with other technologies to refine their crop fertility practices. Instead of applying a uniform fertilizer rate throughout a field, with the use of GPS and variable rate application equipment, farmers are experimenting with spatial management practices, varying crop yield goals within fields. These farmers are attempting to make more efficient use of the total amount of fertilizer applied to each field by dividing fields into management zones. However, these farmers have to decide which factors to use in developing variable rates for each field. Traditional fertilizer recommendations are based on an analysis of a composite soil sample taken from several locations across the field. The farmers experimenting with varying the fertilizer application within fields are incorporating information from a variety of sources.

Management zones are made using geographic information system (GIS) computer programs to combine information from soil survey maps, GPS-marked soil tests, variable soil properties across a field, previous years' satellite imagery, aerial photographs, and crop yield data to develop management zones. The zones are assigned unique yield goals. Farmers can further refine their fertilizer recommendations by soil testing each zone. Much of this information needed to develop management zones is available in digital format without cost on the Internet.

Digital soil maps for each county are available at:

<http://www.ncgc.nrcs.usda.gov/products/datasets/ssurgo/>

Color aerial photographs are available for North Dakota at: http://gis1.state.nd.us/NAIP_2003/
and for Minnesota at: <http://www.lmic.state.mn.us/chouse/naip03mrsid.html>

Landsat satellite images are available at: <http://digital-ngp.umac.org/newdngp303/index.php>

One of the problems facing farmers who want to use spatial management practices in crop production is how to combine information to develop management zones, and then how to make variable rate application maps (often called prescription maps) that can be used in their fertilizer application controllers. This process requires a computer GIS program and the skills to use it. Some fertilizer supply companies sell this service on a per acre basis. There are several GIS computer programs available to make variable rate application maps including general GIS programs such as ArcView, MapInfo and Farm Works. Most of the major agricultural equipment companies sell GIS programs. Not all GIS programs are capable of handling images data or able to export maps to use in variable rate application equipment so it is important to evaluate GIS software before purchasing it.

I will use future columns to evaluate GIS computer programs that can be used to prepare variable rate fertilizer application maps. Individuals interested in learning more about preparing variable rate application maps can contact their NDSU extension office or John Nowatzki by telephone at 701-231-8213 or email at John.Nowatzki@ndsu.edu