



Geospatial Applications: Evaluating GIS Computer Programs for Farm Use

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Farmers and land managers who use spatial management practices in crop production need geographic information system computer programs to visualize and interpret soil and crop variations within fields. The GIS computer programs also are needed to prepare variable-rate crop-input maps. Several GIS programs, including some programs written specifically for farm applications are commercially available. This column evaluates John Deere's mapping program called, JD Office, and Ag Leader's Spatial Management Systems (SMS) mapping program.

The evaluations are based on the following functions:

- Display and layer spatial data, such as field boundaries, soil survey information and crop yield information
- Visualize and interpret crop-yield and soil-test analysis data
- Display and interpret aerial photography and satellite imagery
- Display and analyze economic data
- Prepare and analyze multiyear yield data
- Prepare variable-rate crop-input maps.
- Export variable rate maps to other GIS programs and other variable rate controllers.

Ag Leader has two versions of its spatial management systems software, SMS Basic and SMS Advanced. This evaluation refers to functions of SMS Advanced.

JD Office requires all layers to be in WGS 84 map projection. JD Office also requires a John Deere boundary file for each field in order to display data from other GIS programs. JD Office generates a field boundary from John Deere harvest yield data. If you don't have John Deere yield data an alternative way to generate a field boundary for JD Office is the JDO Boundary Tool computer program available free from John Deere's Stellar Support website at https://stellarsupport.deere.com/en_US/ag/stellarsupport/index.html. The JDO Boundary Tool makes boundary files from generic shapefiles.

GIS Function	JD Office	SMS Advanced Functions
Display and Layer Spatial Data	Displays and layers John Deere layers and generic shapefiles. JD Office generates boundary files and several other GIS layers from John Deere harvest yield data.	Displays and layers shapefiles, digital elevation models, MapInfo, National Elevation models, Spatial Data Transfer Standard elevation models, Tiger data.
Supported Yield Data Formats	John Deere and Ag Leader yield data.	All available yield data formats.
Interpret Yield Data	Creates grid and contour yield maps; edits yield data.	Creates grid and contour yield maps; edits yield data; correlates yield data to other layers, such as soil maps or satellite imagery.
Display Economic Data	Economic data can be displayed in tabular format and but not correlated to spatial layers or maps.	Economic data can be displayed in tabular format and correlated to spatial layers and displayed as maps. SMS does not have the ability to import economic data from recordkeeping software. Each data record must be entered separately.
Analyze Multiple Years of Data	Summarizes data from multiple years in tabular format.	Displays multiple years of yield data in one multiyear average map.
Prepare Variable Rate Application Maps	Creates variable rate maps for John Deere controllers.	Creates variable rate maps and exports them for use in Ag Leader, AgChem, MidTech and Trimble controllers. The variable rate maps also can be exported as shapefiles, MapInfo files and text files.
Display and Use Image Files	Does not support image data.	Displays gif, jpg, sid, png, tiff, bmp and wmf image file formats. Can geo-reference images and prepare normalized vegetative indexes (NDVI). (I have been unable to properly display Landsat images in SMS.)
Change Map Projections	All data must be in WGS 84 projection.	SMS cannot change data map projections. It has the ability to import and display most projections. Users will need a separate GIS program to change the map projection of their data.
Clip Data to Field Boundaries	N/A	Clips image and soil files to field boundaries.
Profit and Loss Spatial Maps	Prepares profit and loss data in tabular format.	Prepares and displays single-year and multiple-year profit and loss maps.

More information about geospatial technology is available from the NDSU Agriculture and Biosystems Engineering Department Web site at <http://www.ageng.ndsu.nodak.edu>. Follow the links to Extension Programs and Geospatial Technology Education.