

Simple GPS data collection and mapping

Precision agriculture (PA) can seem a bit overwhelming for those who are just starting out. There is new equipment, new computer programs to learn, the challenge of data management, and perhaps even a new way of thinking about your farm management strategies.

However, there are some low-cost ways to work toward PA on your farm, including basic spatial data collection and mapping. Spatial data simply means that data is linked to a specific location or 'space'. Recording information in relation to its location gives you the ability to return to the same location in the future and helps you to understand relationships between land management actions and resulting outcomes (crop yield, soil quality, etc.) in a specific area.

Two tools that can be used for recording and interpreting spatial information are handheld GPS units and Google™ Earth software. Information can also be shared between these two sources.

For Example

You can record the location of soil samples and other activities on your farm using a handheld GPS unit and then download this information into Google™ Earth for a variety of uses.

or

You can mark a location of interest in Google™ Earth and transfer the coordinates to your handheld GPS unit, which you can then use to navigate to the desired location. You can also share marked points with other users.

Free and low-cost technology

Google™ Earth is a free program that can be downloaded at: www.google.com/earth/download/ge/agree.html

If you haven't used Google™ Earth before, try downloading the program and finding your farm. You might be surprised at what you can learn just from looking at the map!

The most common type of handheld GPS units are made by Garmin and cost approximately \$200-400. In order to download and map your points you must have a unit that can connect to a computer.

These units are so common that a free program called DNRGPS has been created to transfer data between Garmin GPS units and GIS software (such as Google™ Earth). This program can be downloaded at:

www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html

How to use this technology

Uses for these technologies are limited only by your imagination, but here are some instructions to get you started with the activities described above.

Mapping points from your handheld GPS in Google™ Earth:

1. Get out on the farm and collect some waypoints at locations where you have conducted activities that you want to record.
2. Connect your GPS unit to your computer (most likely via USB).
3. Open the DNRGPS program.
4. Go to the 'GPS' tab and select 'Find GPS'. The program will search until it finds your unit. (If this is not working you may need to install drivers for the GPS unit from a CD or the internet.)
5. From the 'Waypoints' tab select 'Download', then select the points that you want and click 'OK'. (Hint: If you want to select more than one point at a time hold down the Control key and click on each file you want, or hold down the Shift key and click the first and last points in the list to select all.)
6. All of your waypoints should now be showing in the waypoints table. Now, under the 'File' tab select 'Save to' > 'File'.
7. Name your file, choose where you want to save it, and where it says 'Save to type' select Google Keyhole Markup Language (.KML).
8. Open Google™ Earth and select 'File' > 'Open' > find the location where you saved your file and open it. If this file shows up in 'Temporary Places', click and drag to move it to 'My Places'.



Transferring points from Google™ Earth to Garmin GPS:

1. Open DNRGPS > 'File' > 'Load From' > 'Google Earth' > 'My Places' > Select the points or set of points you want and click 'OK'.
2. Go to the 'GPS' tab and 'Find GPS'. The program will search until it finds your unit. If this is not working you may need to install drivers for the GPS unit from a CD or the internet.
3. Under the 'Waypoints' tab select 'Upload' > type in a name > select 'OK'.
4. The points should now be loaded into your GPS unit where you can select and navigate to them.

A note about handheld GPS units

It is important to remember that handheld GPS units are not as accurate as those used for Autosteer and Controlled Traffic, which can have an accuracy of 2 cm.

The accuracy of handheld units varies from 5 m upwards, which is one of the main reasons for the price difference. So while they can give you general location information, handheld units shouldn't be used in circumstances where highly accurate information is needed.

For additional information, consult the DNRGPS user guide and Google™ Earth help resources.

Glossary

GIS (Geographic Information System)

A system for storing and manipulating geographical information on a computer.

GPS (Global Positioning System)

An accurate worldwide navigational and surveying facility based on the reception of signals from an array of orbiting satellites.

Precision Agriculture (PA)

The use of spatial data to inform farm management decisions to manage variability.

Waypoint

A set of coordinates that identifies a point in physical space.