Uses, Tools and Processes of Precision Agriculture
Today’s Topics

- Definition
- 5 K’s of Precision Agriculture
- Uses of Precision Agriculture
- Tools of Precision Agriculture
- Processes of Precision Agriculture
- Activity
Here’s a short video clip about the future of technology on the farm.
Precision Agriculture involves many different pieces of technology utilized in making management decision.
Definition of Precision Farming

A management system that utilizes geospatial technology to make decisions on a subfield basis to improve efficiency and provide economic and environmental benefits.

This is one definition of precision farming.
Precision farming can help today’s farmer meet these new challenges by applying the **Right input**, in the **Right amount**, to the **Right place**, at the **Right time**, and in the **Right manner**.
These are three categories of how farmers use precision farming.

In the 1990’s farmers considered the variable rate as the main (or possibly only) use of precision farming.

Now with assisted steering and guidance systems farmers are investing in these tools.

Control and Guidance is the first use of Precision Agriculture:
The first image shows different guidance patterns that are available on most machines with GPS. Some of the most common guidance patterns are Straight AB; A Plus, Curved and Headland. The next picture shows an “autonomous” tractor and the third is an example variable rate map.
Recordkeeping is the second use of Precision Farming. Farmers have always kept records, but with precision farming they are able to keep records on a site specific or spatial basis.
The following images, show a cab display for keeping records; a image of software that is utilized in keeping records and a “puck” that automatically tracks spatial records.
The third use of Precision Farming is spatial analysis where the data is analyzed with the goal of making a decision with objective and unbiased information from GPS and GIS.
The following examples are yield maps, satellite imagery, SWAT maps with 3 D overlay and drone (UAV) imagery.
GPS can be used as a toy, but if can be used for management purposes it becomes a tool; which should be the goal of producers or managers. Basically, the GPS determines the location of objects.
The GPS system includes a Space Segment, a Control Segment and a User Segment.
Geographic Information Systems are software used with spatial objects.
There are hundreds of GIS companies providing software for farmers. Some of the most common as SMS Advanced, Trimble, GK Technology and Climate/Fieldview.
The final tool for Precision Farming is IDI or Intelligent Devices and Implements. These devices aid in control in instruments and in data collection.
These examples are IDI and include a sensor that finds weeds, so that applicators are spray only the weed, not the crop. (WeedSeeker), a Greenseeker that measures the chlorophyll in a crop in order to estimate if the crop needs more nitrogen, an UAV with sprayer capacity and a SmartFirmer that collects data as it firms the soil around a seed.
Once you have the tools for precision farming you need processes or a protocol to use the tools effectively.

Data Collection is the process of building your data set. This is done as you’re seeding, harvesting, crop scouting and so forth. There are many tools available to gather data, including ipads, monitors/displays, IDI’s, UAV’s, satellite imagery and digital data available on the internet.

Data Analysis is the process of looking at the data that you’ve collected. Once you’re collected data, take the time to look at the data and see if it helps you determine what happened in your field.

Interpretation is analyzing the data in order to make decisions. For Example, your yield map may show an area of the field that did really well. Next year in this area, you may wish to add more seed or more fertilizer in order to increase yields even further. Likewise you may find an area in your field where the yield is poor and in this case you may wish to save money on fertilizer and/or seed.
Complete the Worksheet