



Intro to Agriscience

Precision Agriculture - Lesson 2 Notes



Types of Hardware

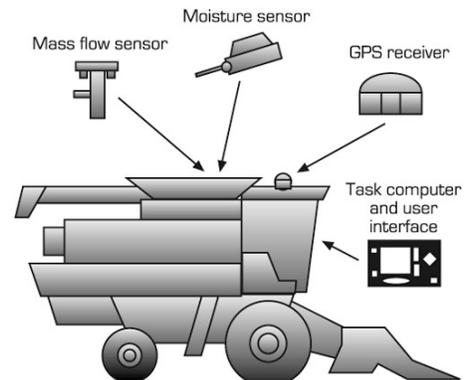
- Any electronic technology system consists of _____ and _____.'
 - Hardware is _____ equipment.
 - Software is _____ equipment.
 - Within precision ag there are three main types of hardware:
 1. _____
 2. _____ ←--Review from lesson 1
 3. _____

Sensors

- Sensors sense something using lasers, _____, _____, thermometers, _____, impact plates, scales and _____.
- Sensors can monitor characteristics of the environment such as; location on a map, when a seed is planted, how close the seeds are, if a seed is _____, if more than one seed is planted, and how much of something is being used.
- An example of a complex sensor being used in Precision Planting is the _____.



- A second example and less complex or technical sensor is the _____ sensor. This sensor measures the weight of the grain being harvested.
- A third example and less complex sensor is the _____ sensor which measures the amount of moisture in the grain on a combine.
- Both these sensors are located on a combine near the flow of clean _____ on the combine.





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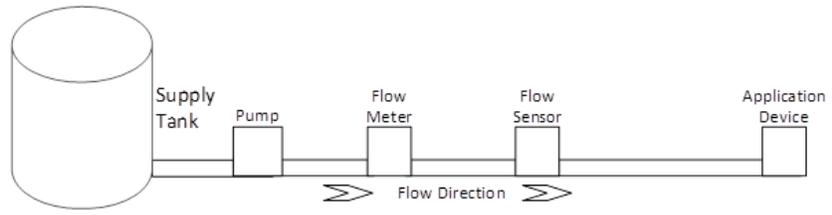
Meters

- A meter _____ the amount of something that is applied
- An example of a meter is a _____ meter.
- _____ meters are valves that are _____ controlled and work with a flow sensor to control the amount of fluid that is allowed to flow through a sprayer, injector or transfer system.

Flow Sensor



Simple delivery system

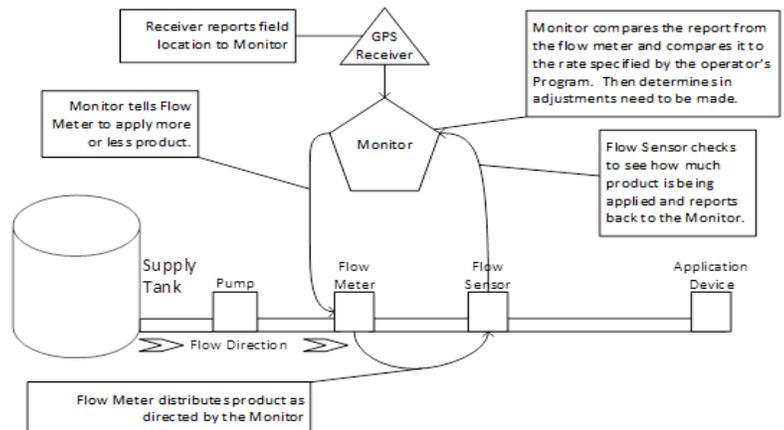


Monitors:

- Pieces of hardware that contain the _____ of the system.
- Monitors take in signals from _____ and interprets if any _____ are needed.
- If changes are needed, the monitor will send a _____ to the meter.



Review: To the right is an example of a complete Precision Ag system including many _____ and _____. The _____ captures all the information so it can be _____ later for future planning and evaluation of management _____.





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Assignment 1 (see separate sheet)

Assignment 2 (see separate sheet)

What can be controlled?

- _____ can be controlled by Precision Agriculture management practices.
 - _____ - can change as the planter moves across the field
 - _____ - (seeding rate)
 - Seed depth
 - Irrigation
 - i. When it's time to water
 - ii. How much is applied
 - iii. Can be varied as the _____ moves across the field
 - Fertilizer
 - i. Initial
 - ii. Starter
 - iii. Subsequent
 - iv. _____
 - Herbicides
 - i. Rate can be varied based on weed pressure
 - ii. _____ types can be ID
 - iii. Can be shut off in areas where it is against the law to apply (waterways)
 - Fungicides
 - _____
 - Soil moisture
 - Soil _____
 - Soil _____
 - Organic matter
 - Yield



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- o In Animals
 - i. Location
 - ii. Maximize milk production
 - iii. Last time animal drank/ate
 - iv. _____ temperature
 - v. Heart rate
 - vi. Invisible _____



Thermal Images show promise in determining heat tolerance for pigs and poultry.



In-class computer search: How are collars like the one shown in this image used in the dairy industry today?



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Scalability of Precision Agriculture

- There are three _____ about precision agriculture among operators today.

Myth 1) I have to be a big _____ to use precision agriculture

Myth 2) The operator has to _____ an entire precision agriculture package across the operation in order to see a benefit.

Myth 3) The operator has to _____ all new _____ in order to implement Precision Ag, costing additional tens if not thousands of dollars. Any _____ equipment can be equipped with Precision Ag technology.

- Three of the most well-known vendors who set up older equipment with Precision Ag technology are:

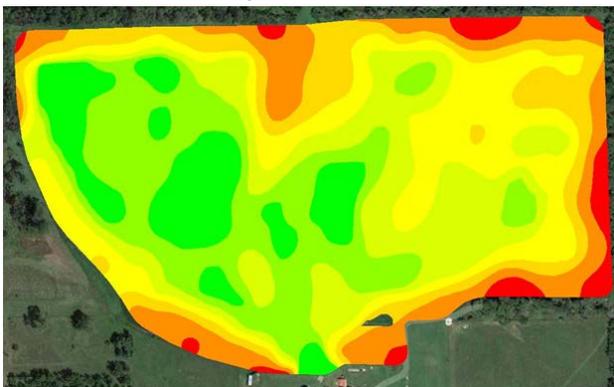
1. _____
2. _____
3. _____

Types of Precision Ag Maps

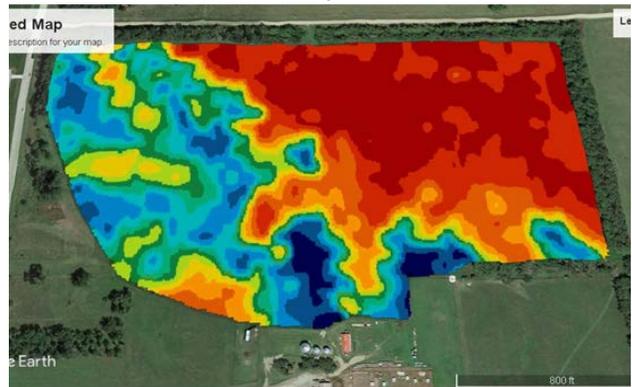
- Each map was produced when information was _____.
- Each kind of map _____ different kinds of data. Here are examples.

**layers are built in, starting with yield first. The following maps go in "order.

1. Yield Map



2. Subsoil Moisture Map



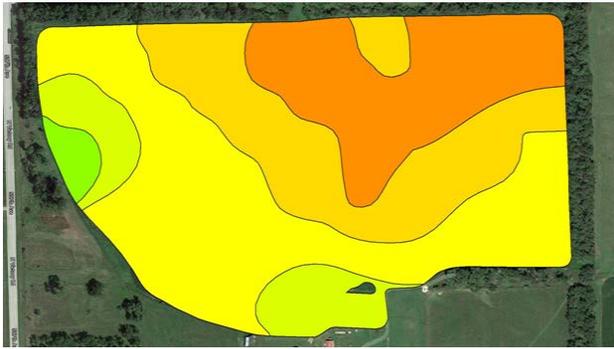


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3. Nutrient Maps (fertility)

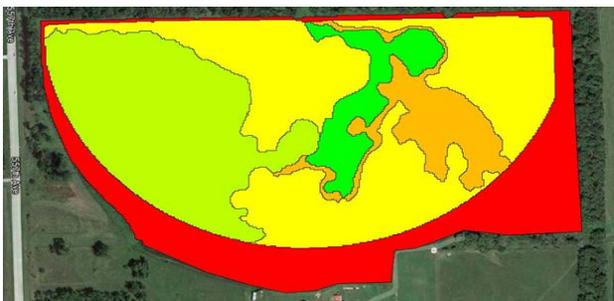
3.A) Organic Matter Map



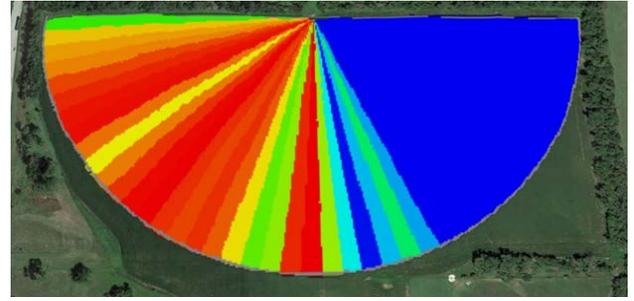
3.B) Soil Phosphorus Map



3.C) Fertilizer Application Map



4. Water- Irrigation Application Map



Map Review:

Based on the Subsoil Moisture Map and The Irrigation Application map: Write down in the space below telling about the decisions that were made based on what the maps show?



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Lesson 2 Review: Fill in the blanks for the Pros and Cons of Precision Agriculture. Go ahead and list more of what is required if you can!

Pros

1. Get more information about the operation
2. Make better informed decisions
3. GPS allows fields to be surveyed with ease
4. Yield and soil characteristics can be mapped

5. _____

6. _____
7. _____
8. _____

Cons

1. Will take several years to gather the data needed to fully implement the system
2. Steep learning curve to analyze data

3. _____
4. _____
5. _____

Activity 1 (see separate sheet)