Getting Started in Soil Fertility Mapping & Resources Available within UGA Extension

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Disclaimer

Reference to a particular software or product does not imply an endorsement of that product
Variable-Rate Nutrient Management Process

1. Define sampling locations
2. Collect soil samples
3. Map soil characteristics (soil nutrient content)
4. Map prescription rates (nutrient recommendations)
5. Make variable-rate applications
Defining Sampling Locations

• Unlike traditional composite soil sampling, precision ag uses technology to identify sampling locations (grid points, grids, or zones).

• Uses Ag GIS software, mobile apps, or mapping programs to specify sampling locations (GPS coordinates)
Ag GIS Software

Utilizing Precision Ag Technology Workshop
Ag GIS Software

Advantages:
- Fully integrated
  - Sampling, mapping, yield monitoring, reporting
- Many come with mobile/ tablet apps
- Data repository
- May wirelessly connect to equipment
- May support other aspects of farm operations
  - Chemical/supply inventory
  - Expense/budget monitoring
  - Satellite imagery

Disadvantages:
- Expensive ($2,000-$5,000 per year)
  - Some have per acre charges and/or user fees in addition to annual license fee

Examples:
- Agrian- Telus
- Ag Studio- Granular
- Farmer Pro- Trimble
- FieldAlytics- EFC Systems
- FieldView-Climate
- Operations Center- John Deere
- SMS- Ag Leader
- Many more
• Considerations when selecting an Ag GIS software:
  • Cost/fee structure
  • Functions/tasks
  • Equipment supported
  • Platforms (desktop, mobile, tablet)
  • Size of your operation (acres)
  • Cloud, web, or desktop based
  • # of users
  • Technical support
Soil Sampling: Low Cost/No-Cost Options

• Mobile Apps:
  • Soil Sampler (Android only)
  • TerraFlex (subscription based)
  • Traction (subscription based)
  • Soil Test Pro (associated with specific labs)
  • AgPhD (associated with specific labs)
  • Many more
Soil Sampling: Low Cost/No-Cost Options

• Mapping Software:
  • Record Location (coordinates):
    • Apple Maps
    • Google Maps
  • Create Maps (shape files):
    • Google Earth Pro
    • ArcGIS (experience and license required)
Field Data/Sample Collection

- **Mobile phone**
  - Some apps require cell service
  - 3-5 meter accuracy

- **Tablet**
  - Requires GPS receiver
  - <3 meter accuracy
Mapping Soil Characteristics

• GPS coordinates and soil test results must be linked.
Mapping Soil Characteristics

- GPS coordinates and soil test results must be linked.

- Use Ag GIS software to create maps representing the spatial variability in soil characteristics.

- This process is called spatial interpolation, which uses statistics to estimate the values of unknown locations based on known values and locations.
Generating Site-Specific Application Maps

- Use soil nutrient maps to develop fertilizer prescription maps.

- Areas with high soil nutrients are assigned low fertilizer rates.

- Areas with low soil nutrients are assigned high fertilizer rates
File Transfer

- GIS software relies on shapefiles
  - Shapefiles contain **at least** 3 file types:
    - .shp - geometry data
    - .shx – index file
    - .dbf - attribute information

- These files must be transferred together

- File transfer can be done wirelessly or using a flask drive
Making Variable-Rate Applications

• Tractor System Requirements:
  • GPS receiver
  • Display
  • Rate controller

Utilizing Precision Ag Technology Workshop
Resources within UGA Extension

• Extension agents
  • Located in every county across the state
  • provide local support
Resources within UGA Extension

- Extension agents
- Integrative Precision Agriculture Team
  - Experts in latest research and technology

https://precisionag.caes.uga.edu/
Resources within UGA Extension

- Extension agents
- Integrative Precision Agriculture Team
- Agricultural & Environmental Services Labs (AESL)
  - Soil & plant tissue testing
  - New mapping service
Mapping Program: UGA Agricultural & Environmental Services Labs (AESL)

• Current Status:
  • New, pilot program
  • No charge at this time
  • Details may change

• Submission Requirements:
  • Submission form
  • Sample ID list
  • Field boundary (.shp or .kml)
  • Sampling locations (.shp or .kml)
Mapping Program: UGA Agricultural & Environmental Services Labs (AESL)

- Clients receive a unique link to access their results.
- Soil test results are reported in several formats.
  - Graphical
  - Summary spreadsheet
  - Maps
Mapping Program: UGA Agricultural & Environmental Services Labs (AESL)

- Soil test map shapefiles are also provided.

- Growers can work with their local consultant or fertilizer dealer to develop prescription maps based on the fertilizer availability in their area.