On-line resources to make digital zone management maps
Pedro Andrade and John Heun

Content in this presentation:
I. Review of concepts, technology evaluation
II. Examples of zone management using soil sensors and yield monitors in Arizona
III. On-line options to delineate management zones

Points to analyze in this presentation:
• Factors limiting the adoption of zone management in AZ
• Machine operational side?
• Digital (computer) interface?
• Other?
Theoretical concept of using multiple need-based rates of production inputs was conceived long ago.

Map of grid soil samples tested for pH and suggested management zones for variable-rate lime application (Linsley and Bauer, 1929)
Developments of spatial analysis and advances in digital technology made Zone Management one of the first developments of Precision Agriculture

“Farming by Soil Types”. First VRT project in the US

• Mid 1980’s in Minnesota
• Private Partnership:
  • Ag-Chem Equipment Co., Inc. and Soil Teq, Inc. Minnetonka, MN.
"A zone is a group of like areas in a field that respond to inputs in much the same way. Divide a field into multiple similar areas and you have management zones for Precision Ag use."

"Managing high yielding fields the same as low yielding fields doesn’t make sense. Likewise, the same thing can be said for areas within a field."

"Most of us recognize areas within fields that respond differently to inputs such as fertilizer, seed, water, and pesticides. By grouping areas within a field that behave similarly more efficient application of inputs is guaranteed."

https://www.cropquest.com
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Fertility Management

Review of technical specs:

- High-flotation power unit
- GPS auto-steer
- 40 Acres/hour productivity (@ 12mph, 350 lb/A, 60ft boom)
- Rate control:
  - Hydraulic motors driven
  - Sensor-controlled rotational speed
  - 20-800 lb/A rate control
  - 4 L/R metering
  - Turning compensation
  - Raven controller compatible

Farm Pro, Yuma AZ

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Precision Planting
- Variable seeding rate (PP Vset)
- Variable downward force (PP DeltaForce)
- Variable depth (PP SmartDepth)

Precision Spraying (Pest control)
- Sensor-controlled spot spraying (WeedSeeker2, Weed-IT)
- PWM rate control
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Soil electrical conductivity survey. Safford AZ
Randy Norton, site-specific management of cotton Root-rot

Soil Apparent Electrical Conductivity (mS/m)

- 35.1 - 63.5
- 28.9 - 35.0
- 24.7 - 28.8
- 20.9 - 24.6
- 18.0 - 20.8
- 14.6 - 17.9
- 6.7 - 14.5

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Durum yield monitoring. Sacaton AZ
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Create maps with advanced tools

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Google Earth imagery of field in Gila Bend AZ

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USDA-NRCS Web Soil Survey maps with imagery as background in Gila Bend AZ
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Limiting factors in the adoption of zone management in AZ

• Machine operational side?
• Digital (computer) interface?
• Economics (ROI)?
• Other?

Thanks for your attention!