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Integrating Site-Specific K Management with Precision Agriculture Practices

Steve Phillips, Ph.D.
Director, North American Program

Introduction

- “Soil test-crop response relationships can be quite site-specific”
- Approximately 70% of US fertilizer dealers offer variable-rate applications
- Precision agriculture technologies can aid in site-specific implementation of 4R practices
- K has not received the specific attention that N and P have

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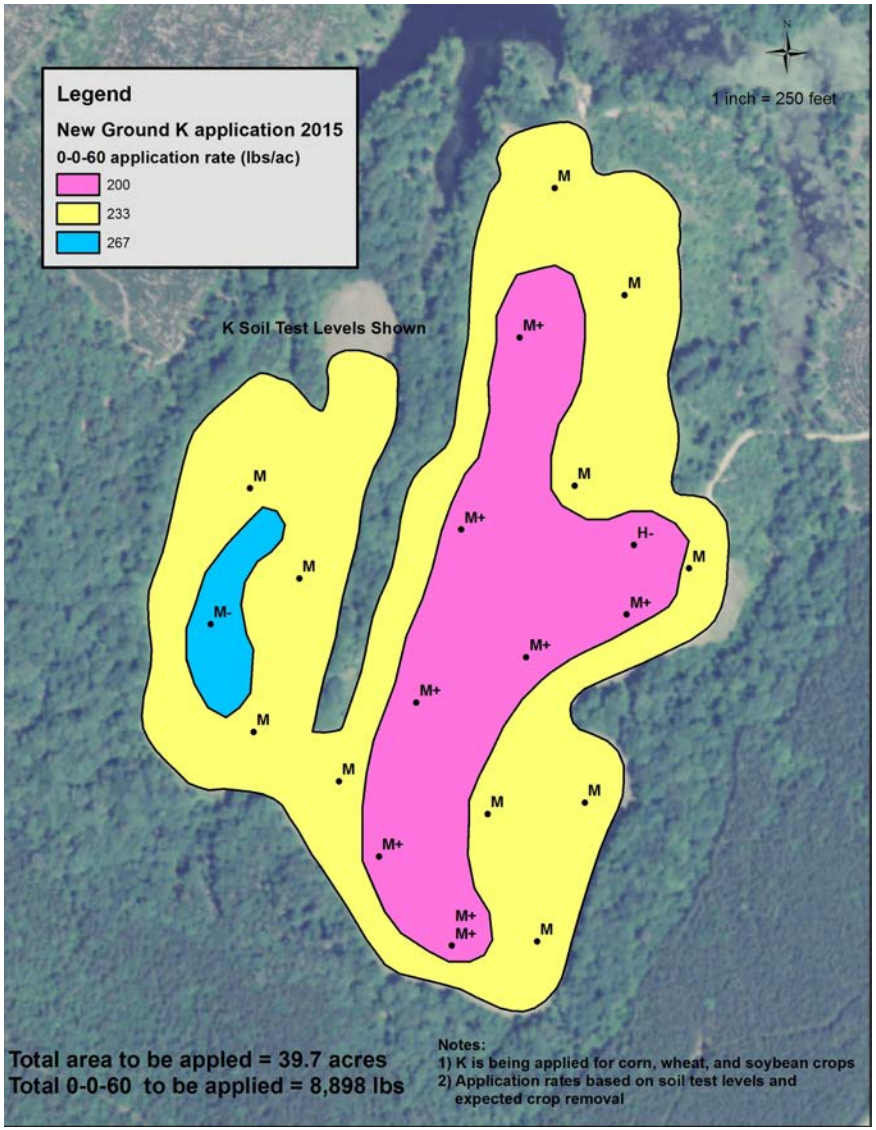
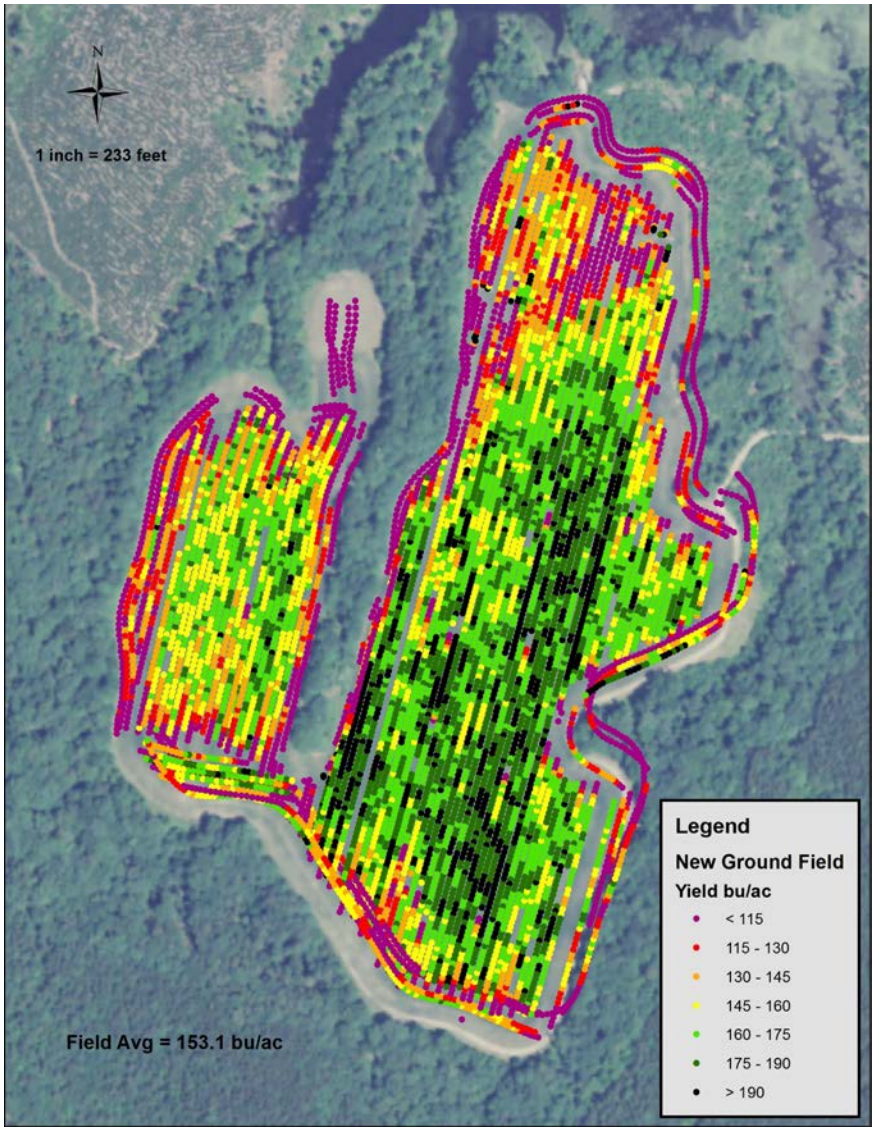
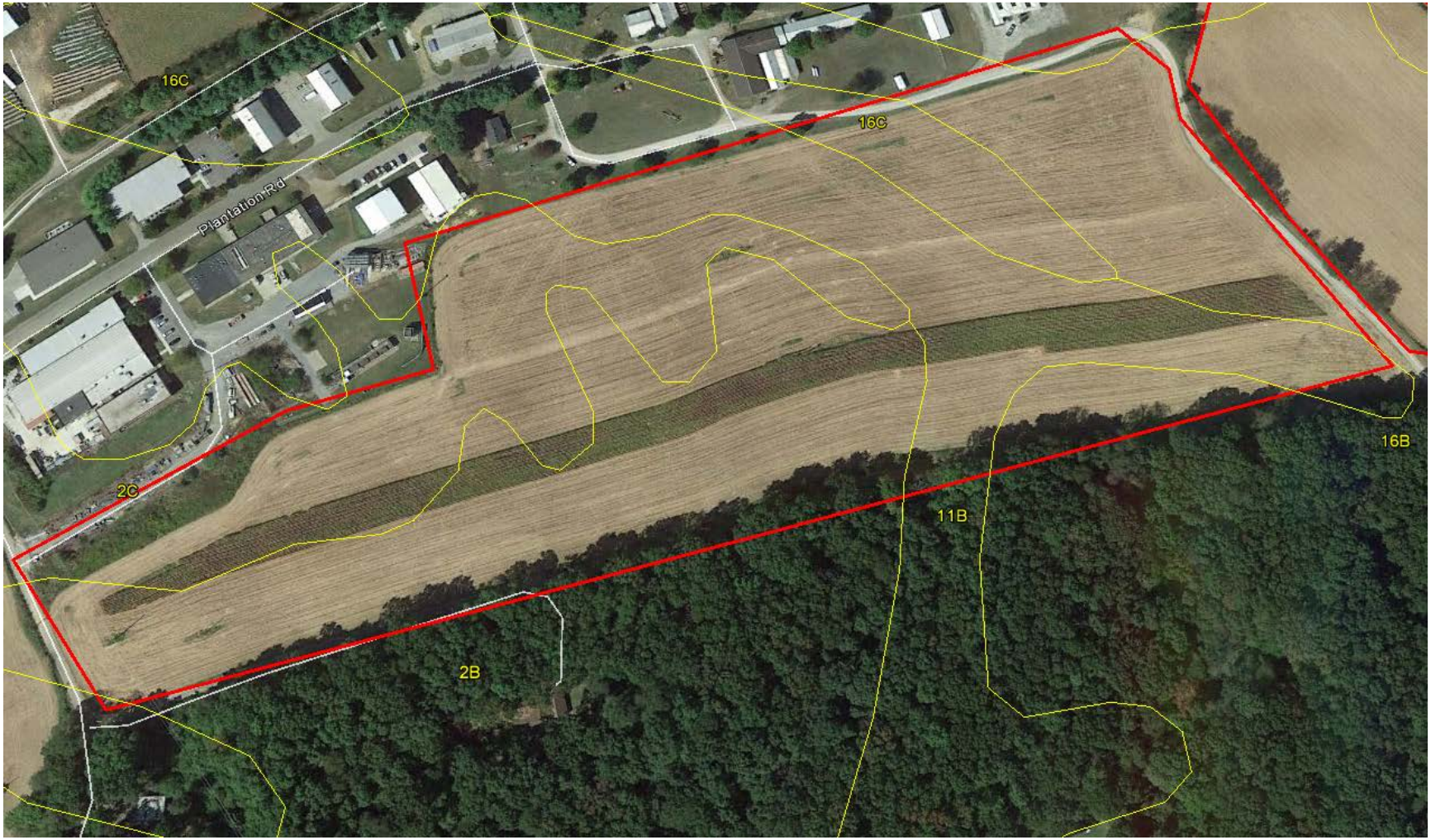
IPNI Global Maize Project – Virginia, USA





Variation in Soil Series

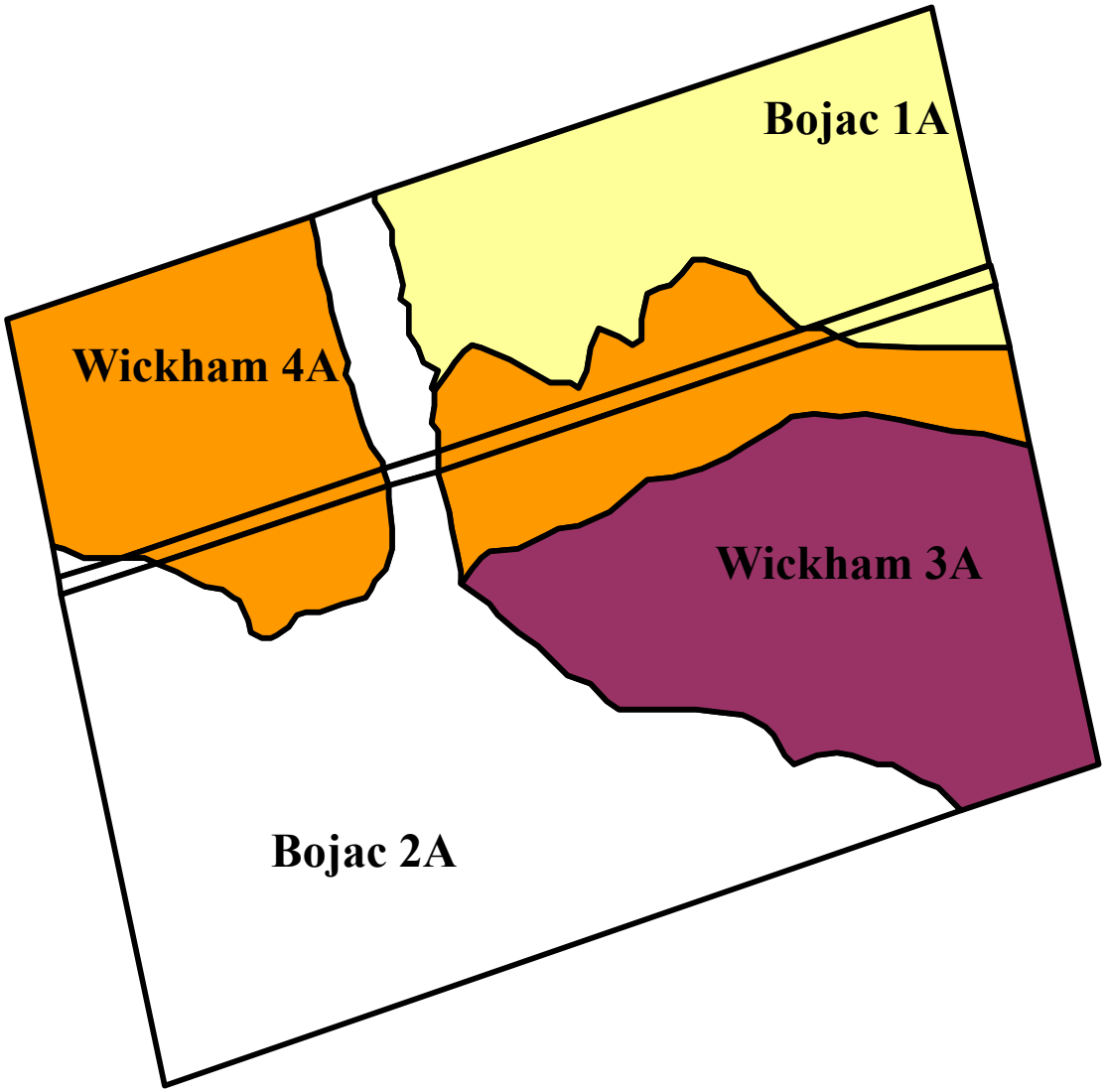


Variation in Productivity Due to Soil Series

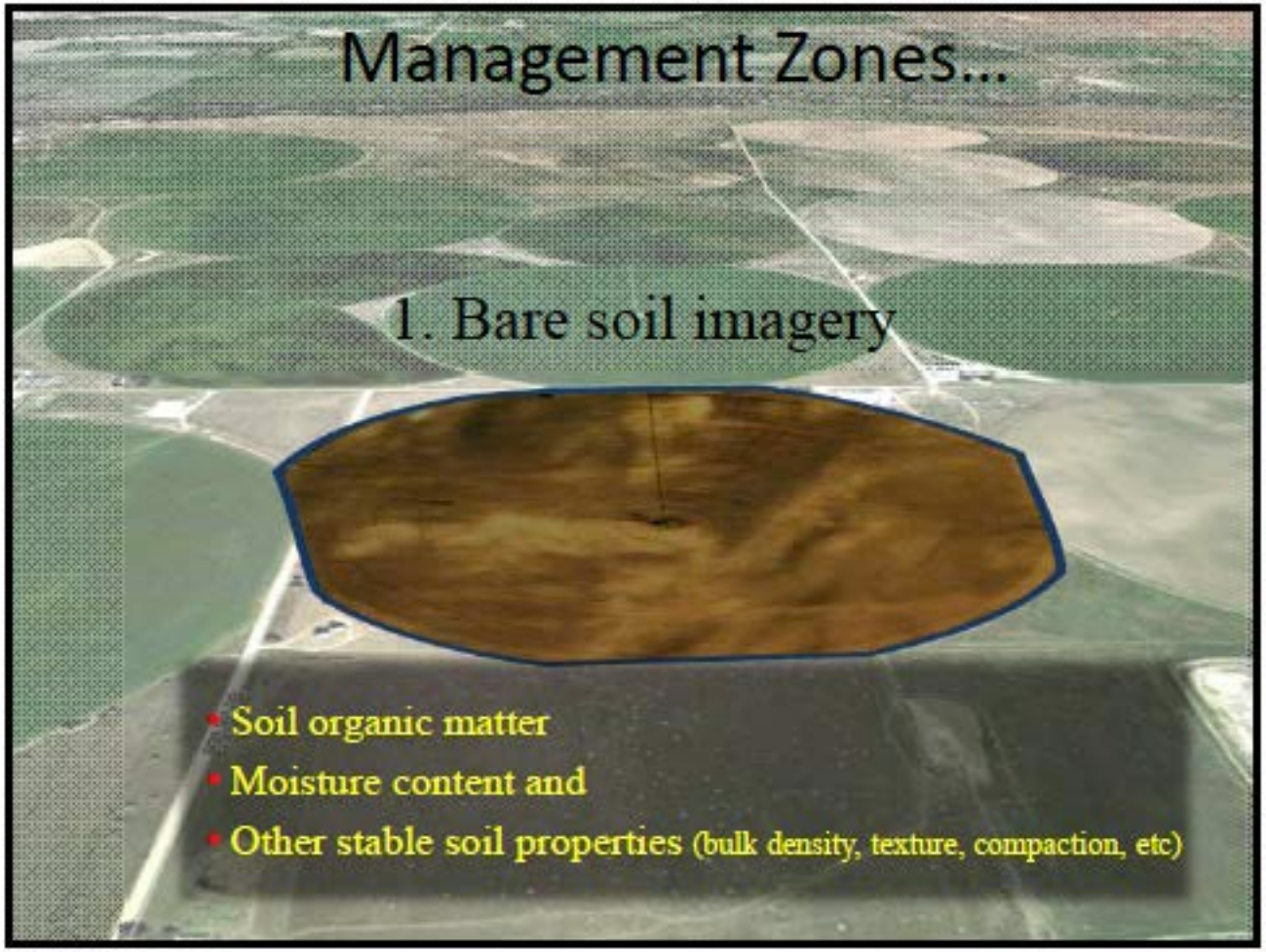
25 ha field in Caroline County, VA

Wheat yields: 2.9 to 5.3 Mg/ha

Corn yields: 5.3 to 11.1 Mg/ha

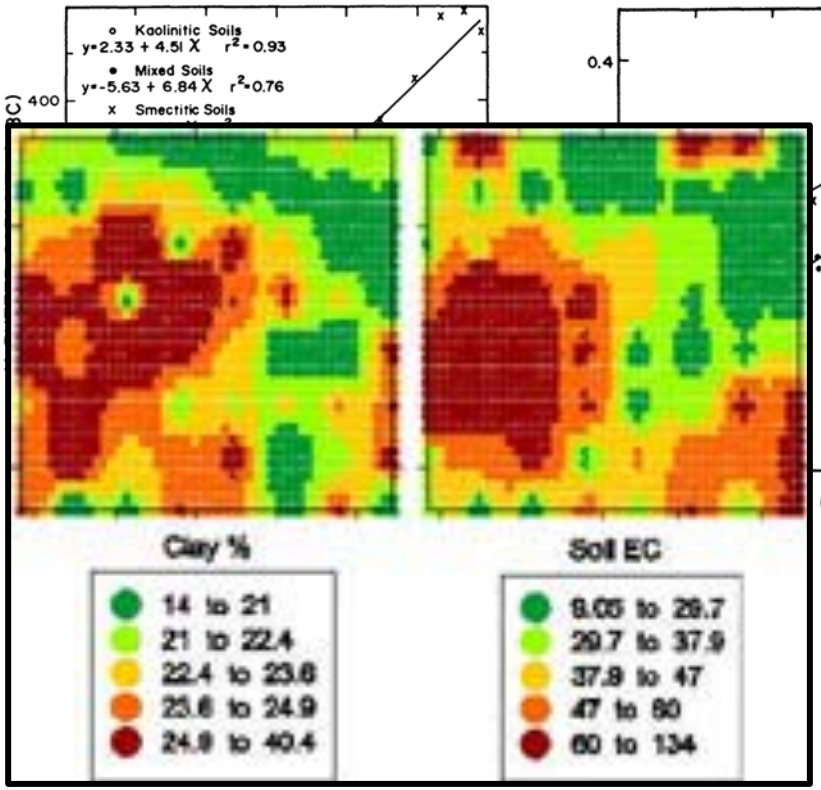


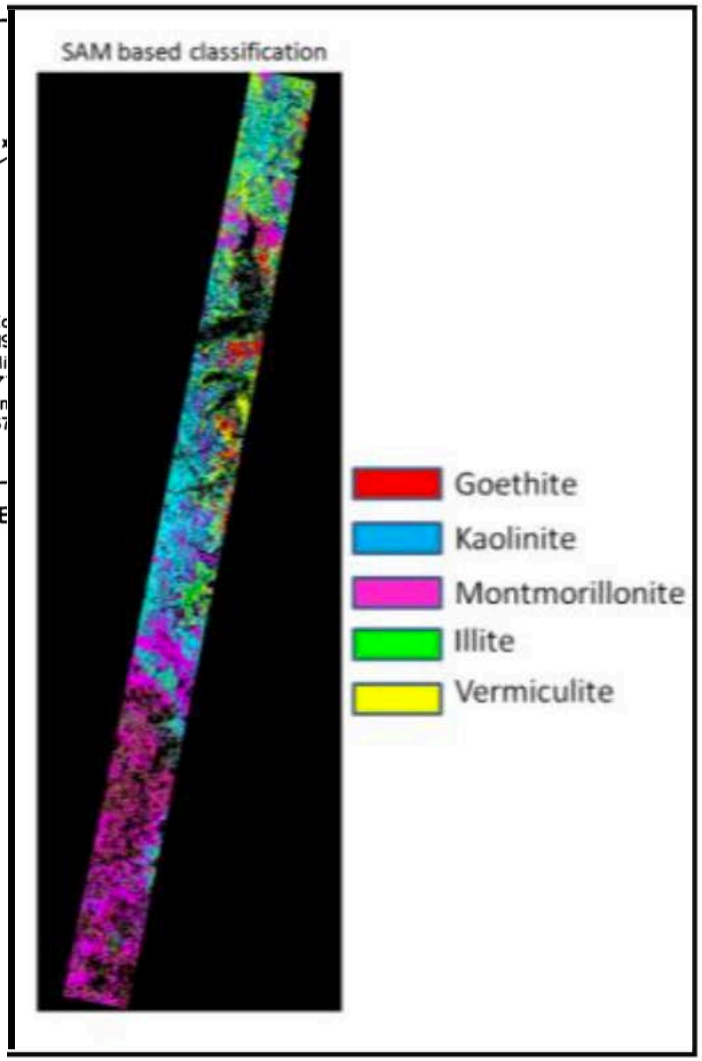
Alley and Roygard, 2000

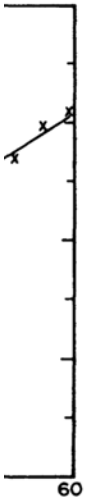

Management Zones…
1. Bare soil imagery
• Soil organic matter
• Moisture content and
• Other stable soil properties (bulk density, texture, compaction, etc)

Khosla, 2013

Variation in Clay Content and Type







Sharpley, 1990; Suresh et al., 2014; Veris, 2017

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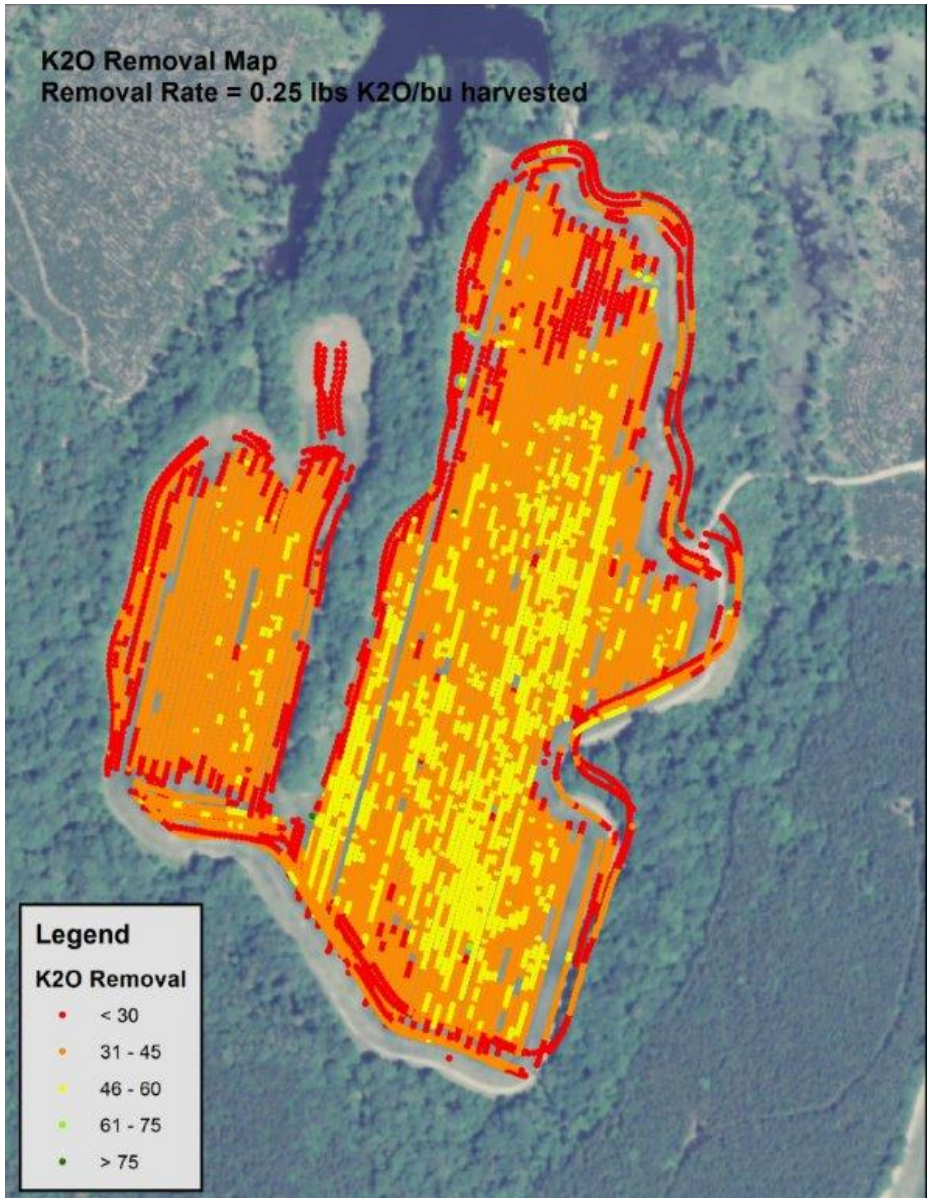
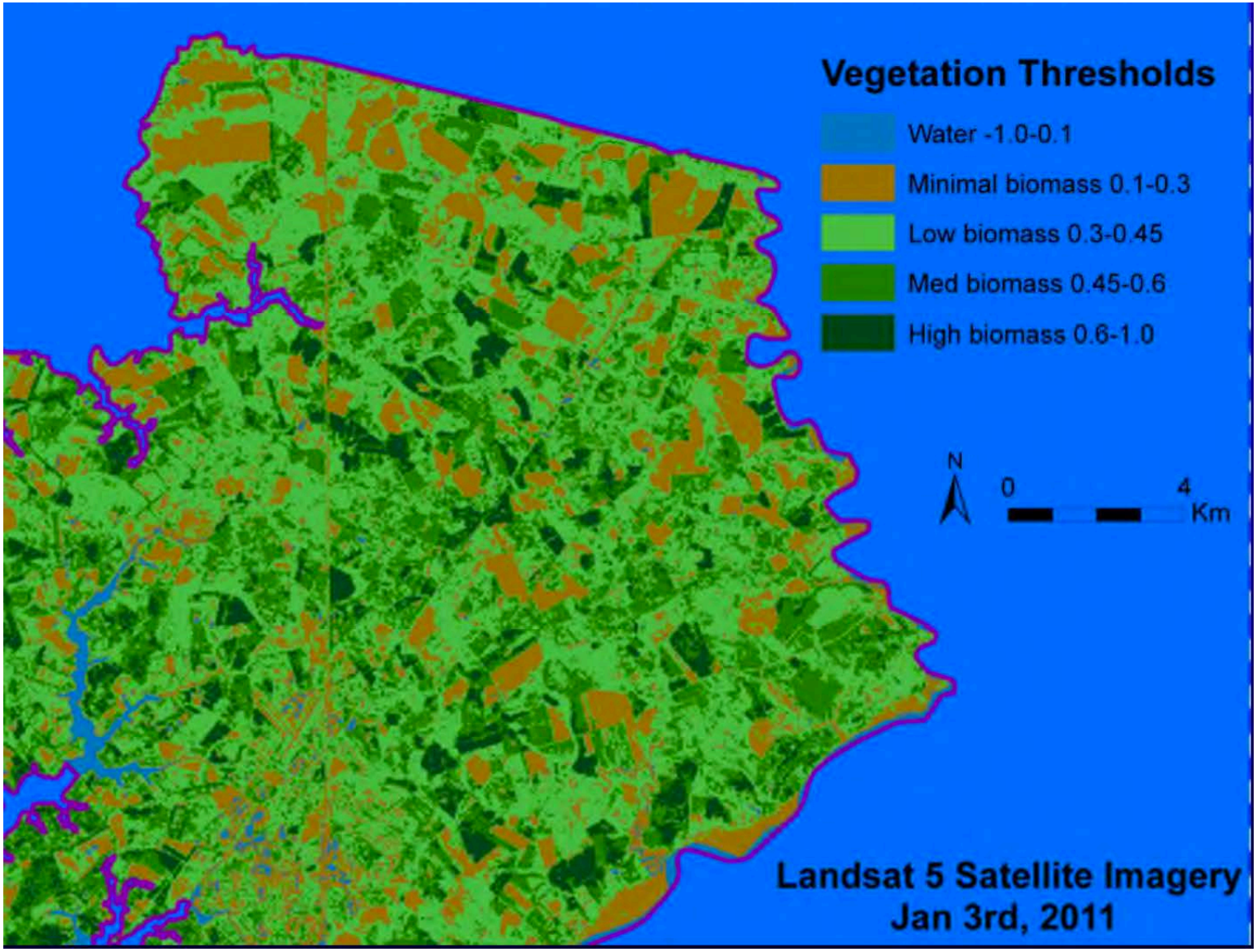


Remote Sensing Groundcover/Residue



Hively et al., 2014

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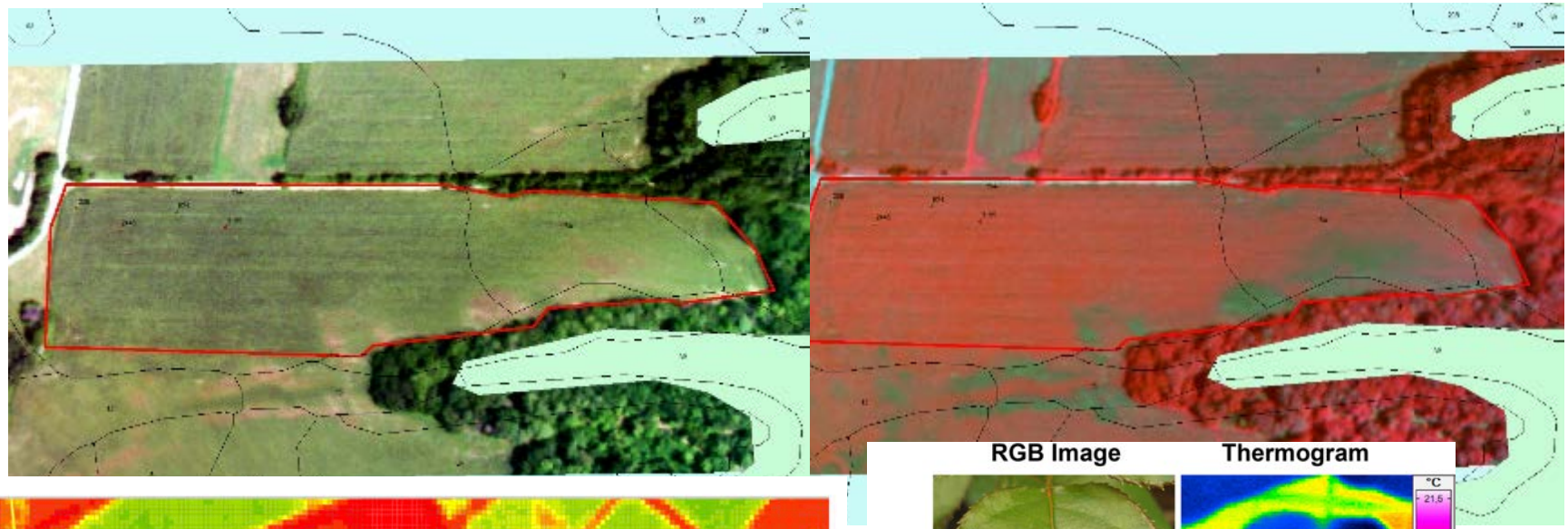
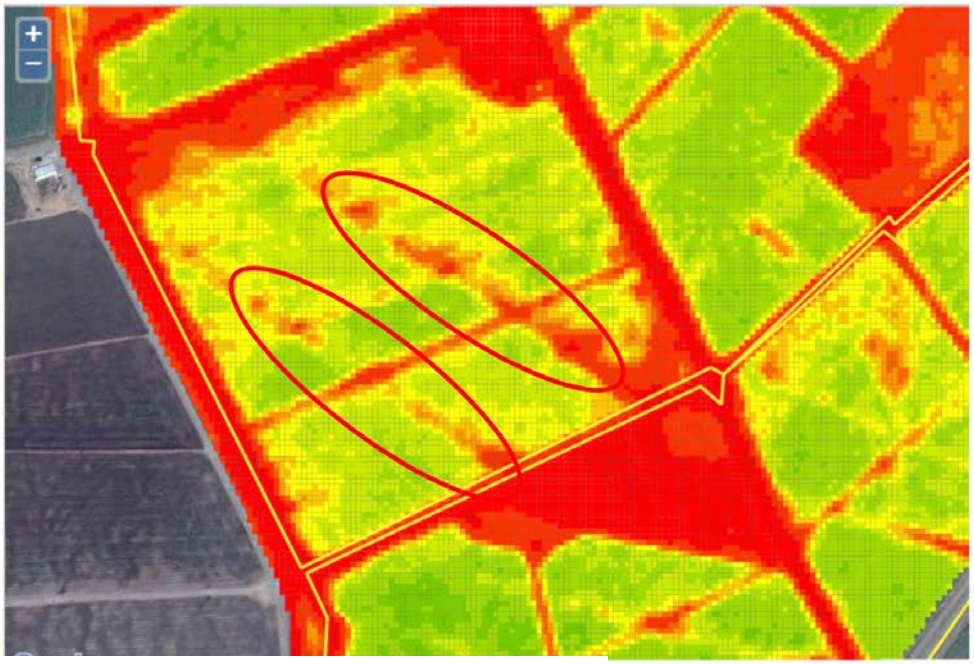
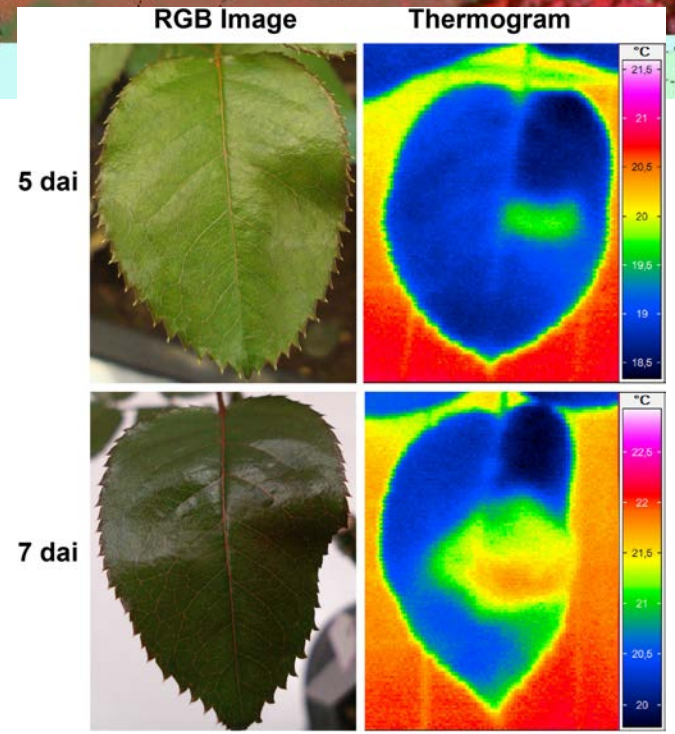
Remote Sensing and In-season Imagery







Thomason, 2017; Paganella, 2016; Mahlein, 2016

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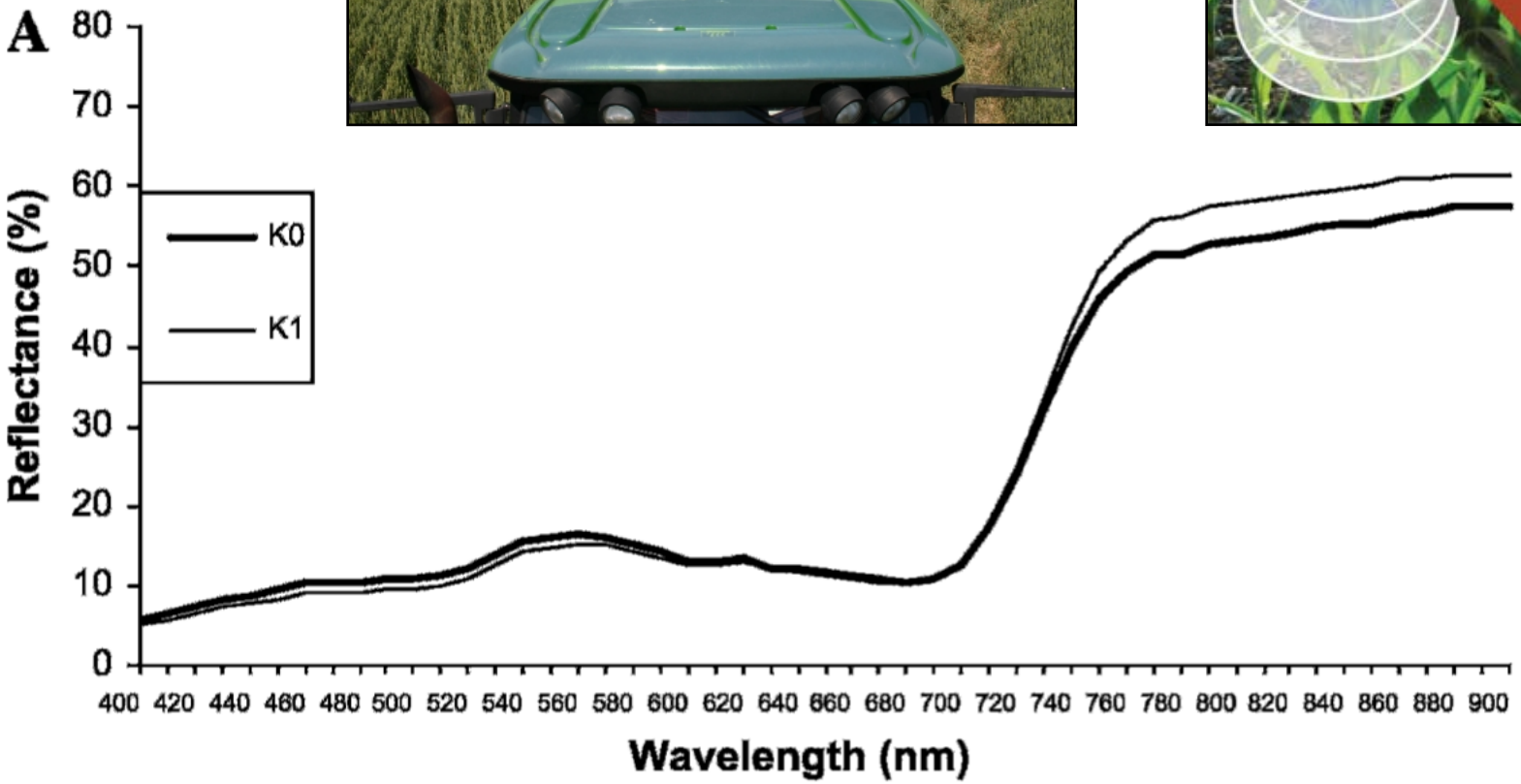
Evaluation of Nutrient Deficiency Using UAVs

GreenSeeker®
Variable Rate Application and Mapping Systems



Gomez-Casero et al., 2007

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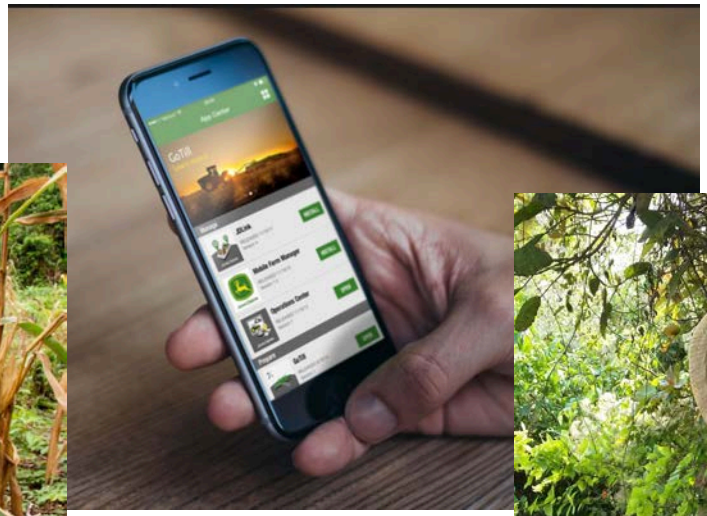
Mobile Devices – Agricultural Apps



Summary

- Several site-specific factors affecting spatial variability in plant available K can be managed using precision agriculture technologies
  - Targeted soil sampling
  - Yield mapping
  - Imagery and remote sensing
  - Mobile device decision support

- More research is needed to determine proper approach for variable-rate K fertilizer recommendations

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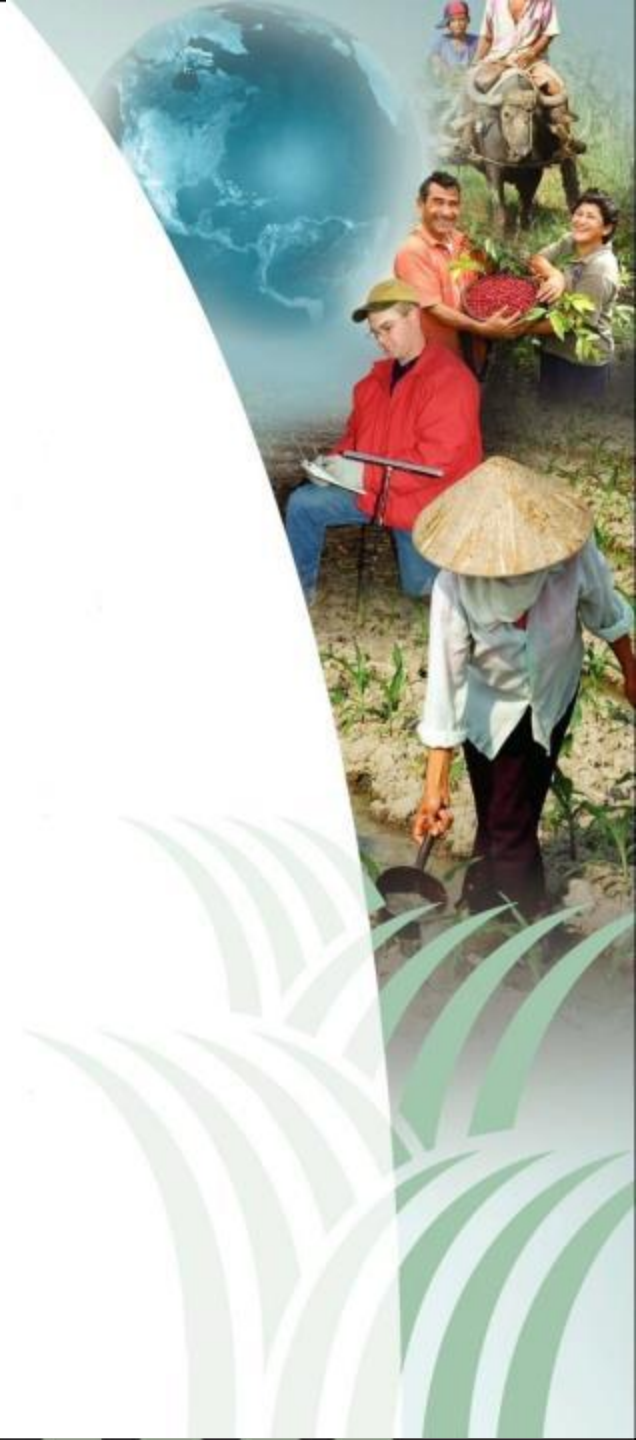

Thank You

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