The Art and Science of Variable Rate Seeding

Will Variable Rate Seeding Pay? It depends; consider your equipment cost…

	Cost/acre (Int. & Dep)	Bu/acre needed to pay for technology
Retro fit existing planter with PP V-Drive & Delta Force	$7.14	1.9 bu/a
Used JD 1770 planter upgraded to PP V-Drive & Delta Force	$11.06	2.9 bu/a
New 16 row planter with VRT seed technology	$31.63	8.4 bu/a

Parameters considered:
- Based on 800 acres and $3.75/ bu corn
- Does not include controller
- Planter cost $28,500 (used); $180,000 (new)

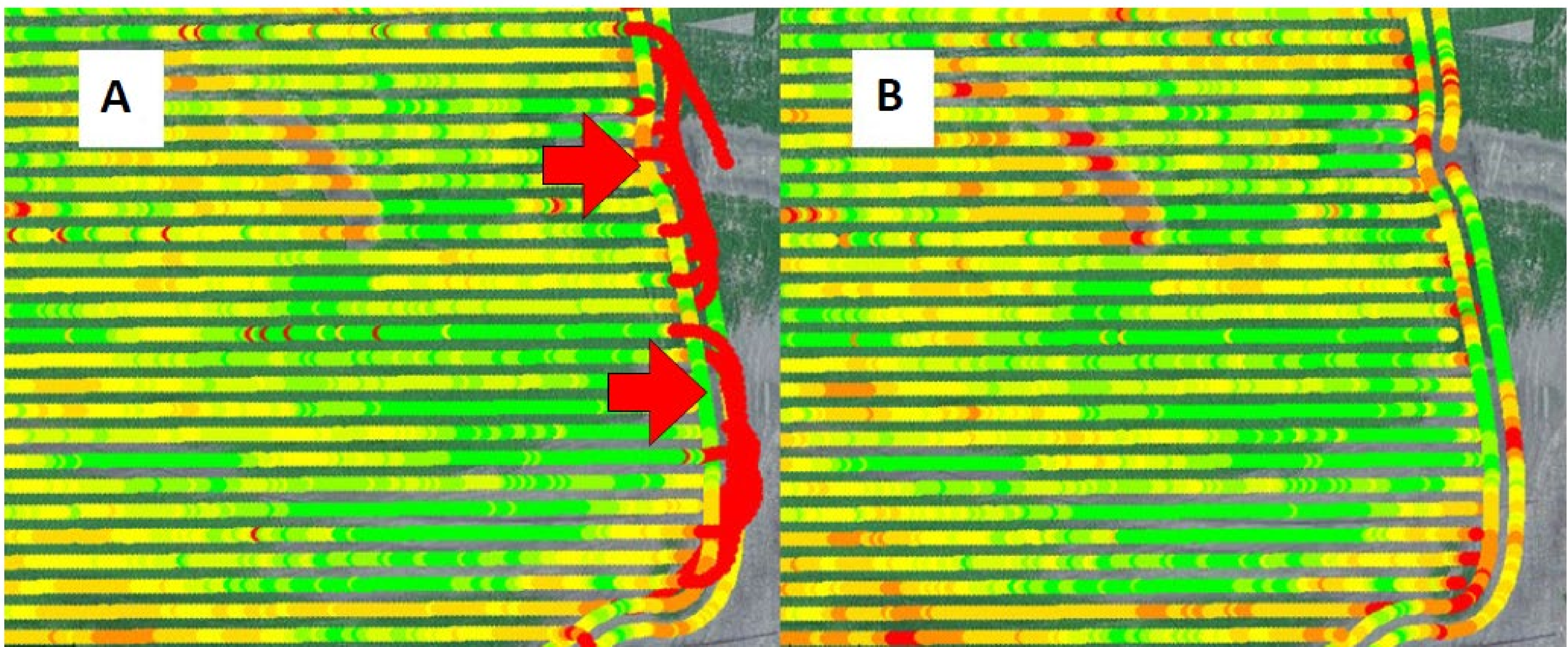College of Agriculture
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Proper data stewardship is critical when using data to make management decisions

Header position sensor errors in raw yield data (A) and clean yield data after removal of errors (B)

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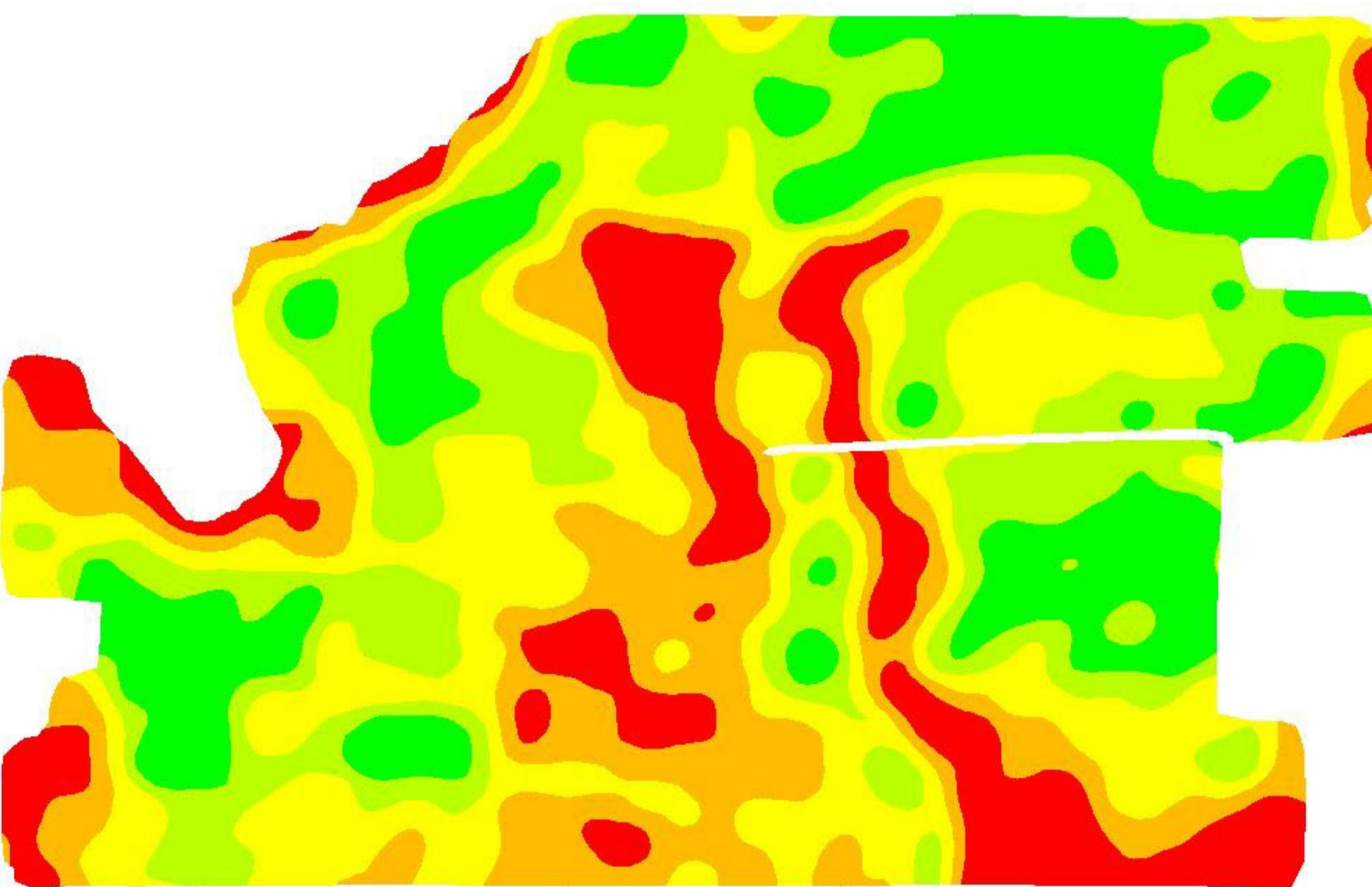MICHIGAN STATE UNIVERSITY
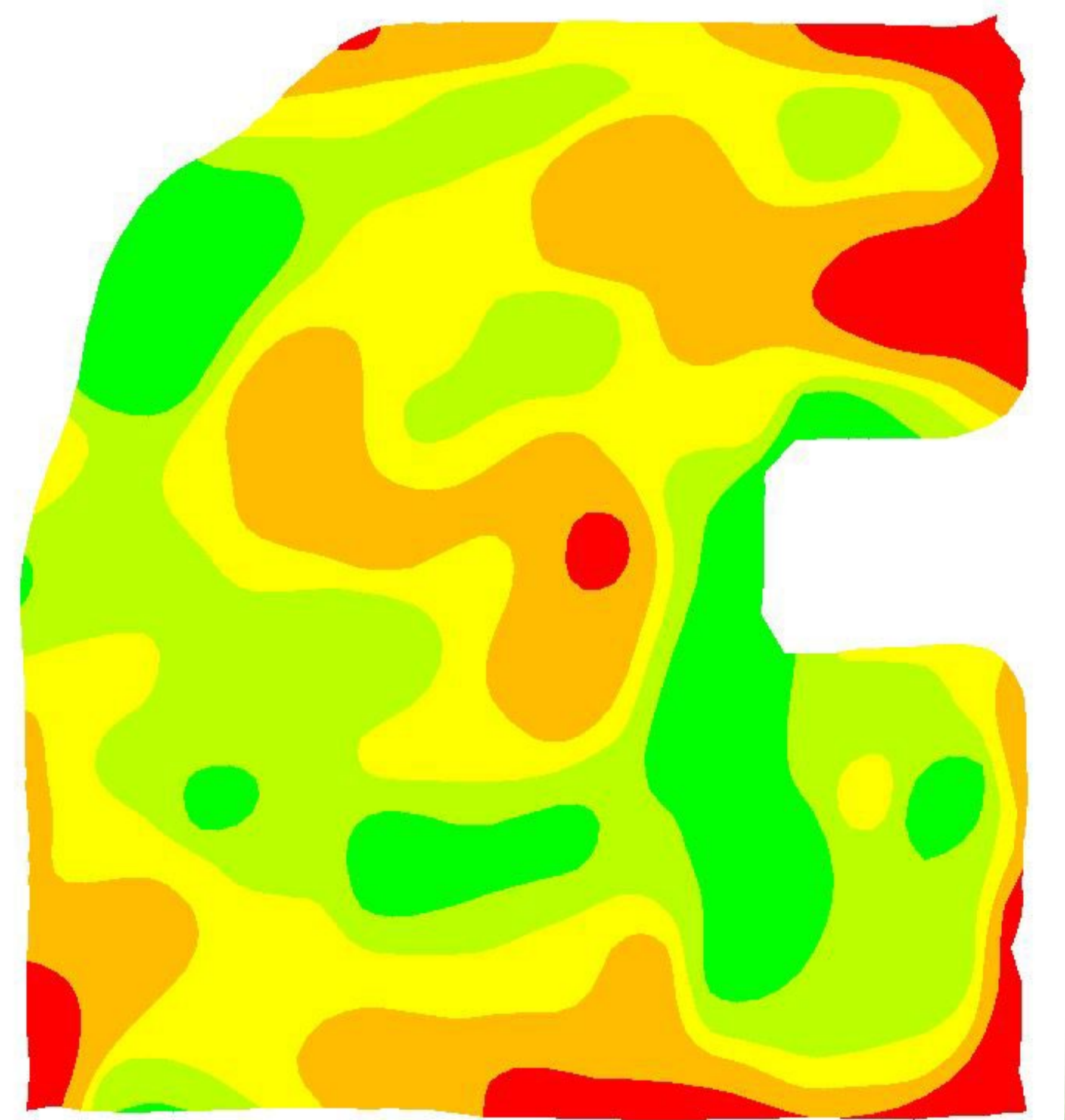
TECHNOLOGY THAT PAYS

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ROI of VRS is field specific, not all fields have enough variability to justify variable rate seeding

Yield (Dry) (bu/ac)

- 135.90 - 185.91 (33.85 ac)
- 119.92 - 135.90 (48.27 ac)
- 98.81 - 119.92 (47.28 ac)
- 79.87 - 98.81 (32.11 ac)
- 42.38 - 79.87 (23.29 ac)

Yield (Dry) (bu/ac)

- 59.91 - 68.46 (3.914 ac)
- 57.61 - 59.91 (8.578 ac)
- 55.55 - 57.61 (8.408 ac)
- 52.31 - 55.55 (7.132 ac)
- 26.57 - 52.31 (2.202 ac)

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Include check strips to evaluate the accuracy of prescriptions
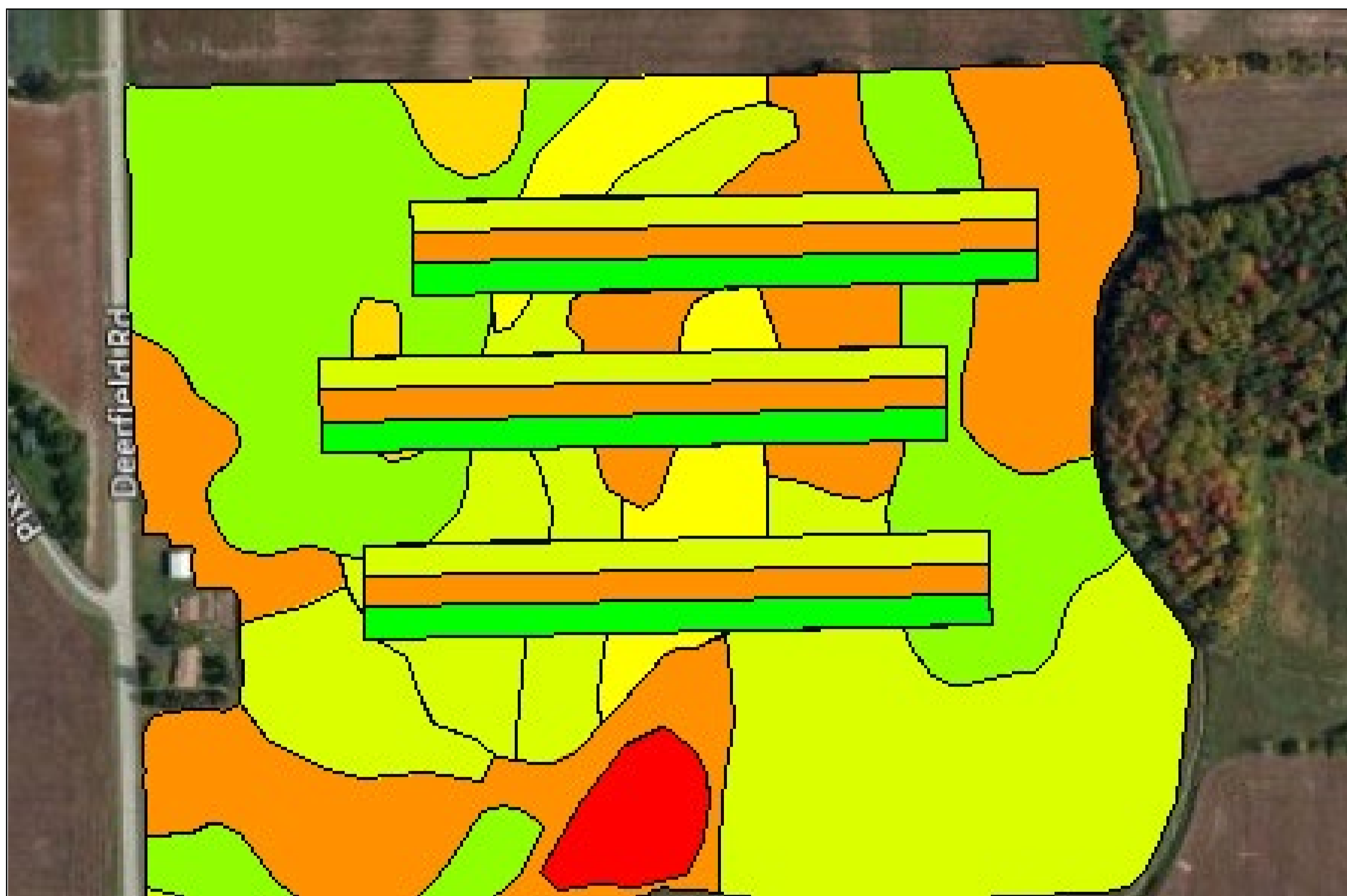
Seeding Rates

High Productivity Areas

Increase Corn

Decrease Soybeans

Low Productivity Areas

Decrease Corn

Increase Soybeans

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The Art and Science of Variable Rate Seeding

Managing Field Variability with Precision Agriculture

Step 1: Identify Field Level Variability

In order to manage variability, you must know where the variability exists on your farm and how much variability you have. Yield maps are a great way to visualize field level variability and begin the process. Other types of data that can be used include aerial imagery and soil maps.
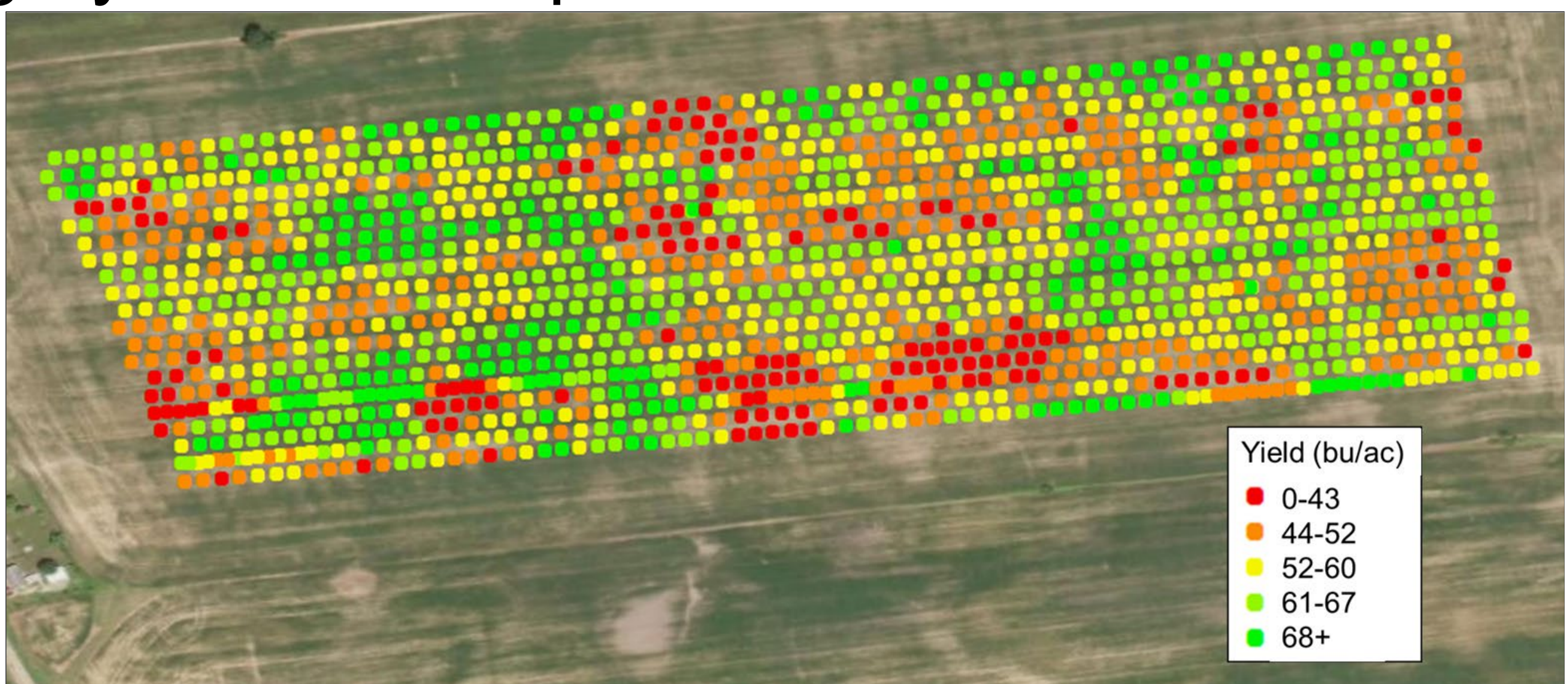

Figure 1. This yield map can be used to identify spatial variability in a field.

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Managing Field Variability with Precision Agriculture

Step 2: Understand the Cause

Knowing the underlying cause of the variability is critical to accurately determine the best way to manage it. Many types of data can be used to help understand the variability including precision soil sampling, proximal soil measurements (e.g. Precision Planting SmartFirmer, Veris Soil Scan), aerial imagery, or geo-referenced crop scouting.
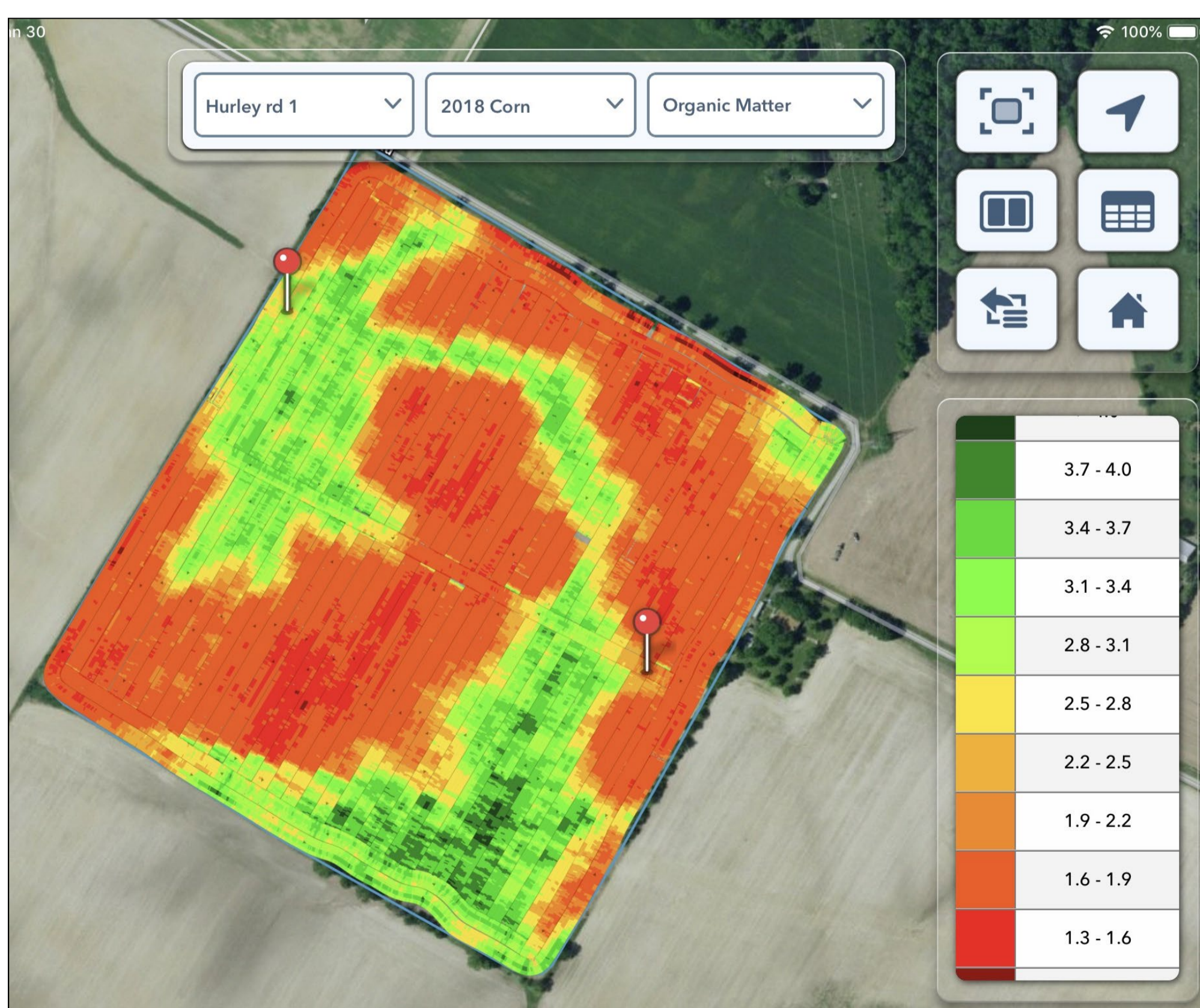

Figure 2. Organic matter map from SmartFirmer estimates.

Figure 3. Soil samples can be used to help understand variation in fertility.

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Managing Field Variability with Precision Agriculture

Step 3: Select the Right Management

Matching your management approach with the underlying causes of your field variability will increase the likelihood of seeing a positive ROI. Identifying zones that have a stable yield response from year to year will also improve your chances of success when using technology like variable rate seeding.
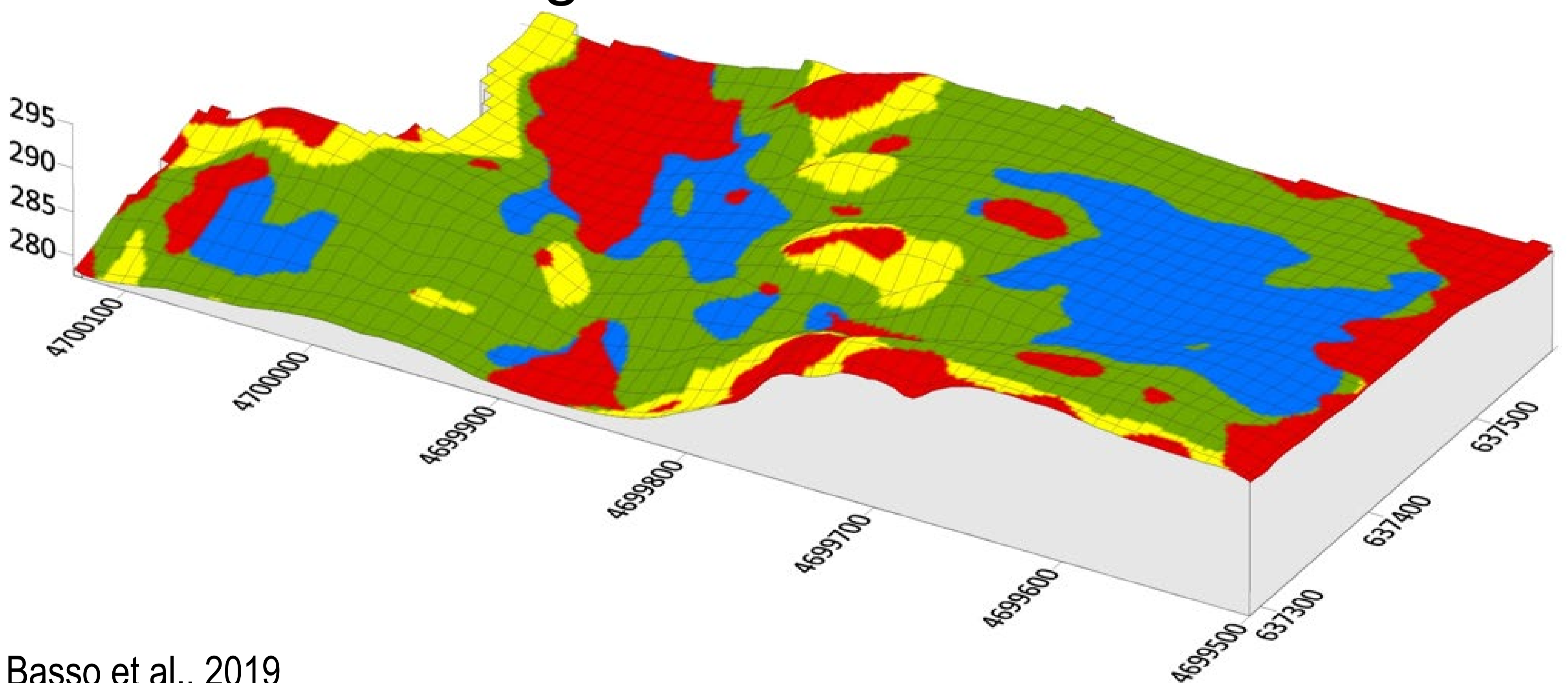
Basso et al., 2019

Figure 4. Identifying stable zones that respond to varied management practices like seeding or fertilizer. Not all field variation is consistent from year to year.

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