GK Technology
For Agriculture

VRT – A View From
30,000 Feet
to VRT or Not

4 year Avg. Corn

• Red
  – Avg. 50 bu/ac
  – Rate?

• Yellow
  – Avg. 120 bu/ac
  – Rate?

• Green
  – Avg. 170 bu/ac
  – Rate?

KISS

Yield Zones 4 Yrs-(Bu/Acre)

35  77  117  159  200
VRT Overview

• The “W’s”
• to VRT or Not
• Field Research
• Method – Seed
  – Inputs & RxMaps
• Method - Fertilizer
  – Zone-Grid
  – Process
  – RxMaps
• Summary
The “W’s” of VRT

- **Who** – Joe Farmer
- **What** – fertilizer & seed
- **Where** – Field on foot by foot basis
- **When** – NOW
- **Why** – to VRT or Not
  - Fertilizer or Seed or BOTH
The “W’s” of VRT

• Focus on the “What & Why”
  What=VRT Seed or Fert.
• Why -
  1. Reduce or Equal Inputs
     – Easily measured
  2. Improve Yield
  3. Improve Quality
     – Measured @ harvest
• 2 of 3 = Successful VRT
to VRT or Not

• VRT-Can be applied to any field
  – Should it?
  – What method?
  – At what rates?

• First - Do the “Field Research”
VRT Field Research

One farm 1968 to 2014 - 240ac
2 - 120’s since 1978
3 - 80’s prior to 1978
mid “80” – green manure 1976
late plow down

Values shown are the “P-Olsen” Avg. / 80
off of the GRID’s
pH – 7.8 – 8.2

Image Above : DRG
Note: Farm Yard SW &
Field location
Image Left : 2003
Grid sampled 1996
P-Olsen Results fairly
uniform across each “80”
EXAMPLE FIELD -

- Corn Yield - from 2002-Now
- Veris Data
- Satellite Imagery
  - 1984-2014
- Topography
  - Lidar
- Topography DRG
- Past Soil Tests
  - Conv./Zone/Grid
VRT Field Research

- Meet our VRT Field
- Talk with Farmer
  - **Salinity**
  - **Drainage**
  - **Fence Line**
  - **Good Ground**
- White Lines are Soils Lines
- No Farm Stead & No Manure
- Cropped 1 Field
Electronic Charts for Agriculture

VRト - Veris-Imagery-Yield

Notes:
White Lines = Soils Lines

Client: VRT-Zone Creation
Farm: Rx Mapping
Field: Veris-Imag-Yld
144.5 Acres

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VRT Field Research

DRG
Digital Raster Graphic

LiDAR Topography
13’ drop

Note: The “80” line in Red
VRT Methods

• Biggest responses are going to come from:
  – Seed then Fertilizer

• Break this concept out into three methods.
  – Seed
  – Fert. Zones
  – Fert. Grids
VRT Seed

- **Best**
  - Yield Data (multiple years)

- **Good**
  - Imagery (multiple years)
  - Veris?

- **Poor**
  - Veris?
  - Grid Samples
VRT Seed

• What Seeding Rates
  – Research
  – Personal Experience

• Enter Rates / Zone
  – Yield Goal / Zone
  – Seed Rate

• Rate by Equation
  – Ex. \((\text{Yield Goal}/5.3) \times 1000\)
4 years of Corn Yield merged Zones

Corn Seed
18,000 to 38,000
Avg. – 28,500
VRT Fertilizer (Zone or Grid)

• Method for Soil Testing?
  – Zones
  – Grids

• Research to GUIDE YOU
  – Cropping history
  – Manure history
  – Soil Test Values history
  – Drainage Changes
VRT Fertilizer (Zone or Grid)

• Zones
  – Mobile Nutrients
  – Nitrogen & Sulfur
  – Soil P & K Tests Low

• Grids
  – Manure past 25 yrs.
  – pH & Liming
  – Soil P & K Tests erratic

?? Zones or Grids ??

Cutup crop history
Soil P & K Tests High
Soil Zinc
Drainage Changes
VRT Fertilizer (Zones)

- Primarily
  - Nitrogen & Sulfur
  - Consistent testing P&K
- Zones from
  - Yield
  - Imagery
  - Topography
  - Veris
  - Combinations
### VRT (Zones to Rx)

| Zone ID | Yield Goal | N-Mult | N-Credits | Seed | pH | OM | N-(N1+N2) | P-O ppm | K ppm | S1 lb | Zn ppm | Salt1 | N fert lb | P fert lb | K fert lb |
|---------|------------|--------|-----------|------|----|----|-----------|---------|-------|-------|-------|--------|-------|-----------|-----------|----------|
| D GREEN | 200        | 0.9    | 30        | 36000| 7.7| 3.5| 16        | 9       | 209   | 44    | 1.45  | 0.45   | 134   | 94        | 0         |
| L GREEN | no test    |        |           |      |    |    |           |         |       |       |       |        |       |           |           |
| YELLOW  | 150        | 1      | 30        | 30000| 7.8| 2.9| 6         | 8       | 186   | 120   | 1.16  | 1.05   | 114   | 74        | 15        |
| ORANGE  | 110        | 1.1    | 15        | 22000| 7.8| 2.9| 6         | 8       | 186   | 120   | 1.16  | 1.05   | 100   | 55        | 11        |
| RED     | 50         | 1.2    | 0         | 14000| 7.9| 3.5| 288       | 31      | 385   | 120   | 1.58  | 3.24   | 0     | 0         | 0         |

- Example Field
- 2014 Soybeans to Corn
- No test on the L.Green
- Yellow & Orange pulled as 1 zone
VRT - Fertilizer from Zones

2014 Soybeans
2015 Corn RxMaps

Client: VRT-Zone Creation
Farm: Rx Mapping
Field: Veris-Imag-Yld
144.8 Acres

Notes:
Average: 162 Bu/Acre Total: 23449 Bu

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Average: 22.2 Lbs/Acre Total: 4663 Lbs
Average: 211.8 Lb Total: 20624 Lbs
Average: 146 Lb Total: 21141 Lbs
VRT Fertilizer (Grid)

• Primarily –
  – Manure
  – pH
  – Phosphorus*
  – Potassium*

• Requires Yield or Yield Goals

• Example
  – 2’ Sample Cores
VRT (Grid to Rx)

• Grid Sample Soil Test
• Yield Goal Layer
• Equation for N

\[ N = YG \times 1.1 - N \text{ Soil Test} - \text{Credits} \]

\[(\text{Credits} = \text{Prev. Crop} + N \text{ from P} + \text{Starter})\]

• Creating VRT map for Nitrogen / 0.46 = UREA

Thanks to: Precision Consulting Service for above Graphics
2014 Soybeans
2015 Corn RxMaps

Client: VRT-Zone Creation
Farm: Rx Mapping
Field: Veris-Imag-Yld
144.8 Acres
<table>
<thead>
<tr>
<th>Method</th>
<th>$/Unit</th>
<th>Grid (56)</th>
<th>Zones (3)</th>
<th>Conventional (1)</th>
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<tbody>
<tr>
<td>Row Crop Test</td>
<td>$30</td>
<td>$1,680</td>
<td>$90</td>
<td>$30</td>
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<tr>
<td>Sample Cost</td>
<td>$70</td>
<td></td>
<td>$210</td>
<td>$70</td>
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<tr>
<td>Grid Sample Cost</td>
<td>$10</td>
<td>$560</td>
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<tr>
<td>VRT Mapping</td>
<td>$4</td>
<td>$580</td>
<td>$580</td>
<td>$0</td>
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<table>
<thead>
<tr>
<th></th>
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<th>$2,820</th>
<th>$880</th>
<th>$100</th>
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<tbody>
<tr>
<td>Cost Map &amp; Samples</td>
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<tr>
<td>46-0-0</td>
<td>$450</td>
<td>$5,688</td>
<td>$6,890</td>
<td>$8,699</td>
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<tr>
<td>Avg Rate 46-0-0</td>
<td></td>
<td>175</td>
<td>211</td>
<td>267</td>
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<tr>
<td>11-52-0</td>
<td>$520</td>
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<td>Avg Rate 11-52-0</td>
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<td>122</td>
<td>146</td>
<td>154</td>
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<td>0-0-60</td>
<td>$500</td>
<td>$590</td>
<td>$411</td>
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<tr>
<td>Avg Rate 0-0-60</td>
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<td>16</td>
<td>11</td>
<td>30</td>
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<table>
<thead>
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<th></th>
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<th>$10,882</th>
<th>$12,798</th>
<th>$15,577</th>
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<tbody>
<tr>
<td>Cost Fertilizer</td>
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<tr>
<td>Total Cost</td>
<td>$13,702</td>
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<td>$15,677</td>
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<tr>
<td>Cost / Savings</td>
<td>-$1,975</td>
<td>-$1,999</td>
<td>$0</td>
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<tr>
<td>Cost / Acre</td>
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<td>$94.46</td>
<td>$108.27</td>
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<tr>
<td>Cost / Savings</td>
<td>-$13.64</td>
<td>-$13.80</td>
<td>$0.00</td>
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</table>
Take a look at the Rx Maps Zone-Grid

Zone Fert VS Grid Fert

Notes:

Client: VRT-Zone Creation
Farm: Rx Mapping
Field: Veris-Imag-Yld
144.8 Acres

Average: 141.5 Bu/Acre Total: 20490 Bu
Yield & Quality Improvements

• Not measured in this example
• Need to put out check strips to measure
• This is the most difficult to measure
  – Requires planning
  – Also follow up

2 PROBLEMS
Summary

- Know the W’s
  - Why & What to VRT
- Field Research
- Seeding
  - Know your Varieties
- Fertilizing
  - Why to Grid
  - Why to Zone
- Measure Results
  - Requires “Check Strips”
QUESTIONS?

Contact:

www.gktechinc.com

Thanks to John Lee & Richard Jenny