Using Yield Data to Make Decisions

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Reasons for Collecting Yield Data

- Document yields
- Conduct field experiments
- Tile drainage
- Bottom-line considerations
Documenting Yield

• **Yield Levels**
• **Identify good and bad areas**
  – Use agronomics to determine reasons
• **Yield Stability**
• **Post Harvest Analysis, Adaptive management i.e., analyze experiments**
Why?

• The goal for properly interpreting yield data is to provide answers to the question; "how can I increase profits on this field?"

• *However, colorful maps are not knowledge.* If these maps are to be of any real value, data generated from them must be incorporated into the decision-making, analysis, and overall planning process of the farm operation.

• A yield map is of value only when it leads to a management decision or validates management practices.
Yield

• What drives yield?
• A great deal of research to identify what factor best correlates with yield on a given year.
• What drives good and bad yield is often not the same.
• Depth to limiting layer: redox, pan, caleche
• Soil pH
• Texture?
### Pattern Description/Explanation

**Producer Management Practices Straight Line Patterns**

<table>
<thead>
<tr>
<th>Direction of Application</th>
<th>Against Direction of Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>• change in planting date</td>
<td>• drain tile patterns</td>
</tr>
<tr>
<td>• change in hybrid/variety</td>
<td>• historically different fields</td>
</tr>
<tr>
<td>• change in chemical application</td>
<td>• old traffic patterns</td>
</tr>
<tr>
<td>• selected rescue treatment</td>
<td>• manure applications</td>
</tr>
<tr>
<td>• chemical skips and misapplications</td>
<td>• pipelines/phone lines underground irrigation applications</td>
</tr>
<tr>
<td>• equipment errors</td>
<td>• previous compaction</td>
</tr>
<tr>
<td>• poor straw/chaff distribution</td>
<td></td>
</tr>
<tr>
<td>• compaction</td>
<td></td>
</tr>
</tbody>
</table>

### Naturally Occurring Variables Irregular Patterns

**Irregular Line**

<table>
<thead>
<tr>
<th>Irregular Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>• topography changes</td>
</tr>
<tr>
<td>• herbicide drift</td>
</tr>
<tr>
<td>• border shading effects</td>
</tr>
<tr>
<td>• insect infestation from bordering lands</td>
</tr>
<tr>
<td>• improper manure applications</td>
</tr>
<tr>
<td>• Waterways</td>
</tr>
</tbody>
</table>

**Irregular Area/Patch**

<table>
<thead>
<tr>
<th>Irregular Area/Patch</th>
</tr>
</thead>
<tbody>
<tr>
<td>• change in soil type</td>
</tr>
<tr>
<td>• drainage patterns</td>
</tr>
<tr>
<td>• weed infestations</td>
</tr>
<tr>
<td>• soil fertility changes</td>
</tr>
<tr>
<td>• previous crop activity</td>
</tr>
<tr>
<td>• disease infestations</td>
</tr>
<tr>
<td>• herbicide carryover historic occurrences</td>
</tr>
<tr>
<td>• insect infestations</td>
</tr>
<tr>
<td>• changes in organic matter</td>
</tr>
<tr>
<td>• animal damage</td>
</tr>
<tr>
<td>• wet areas</td>
</tr>
</tbody>
</table>
Rendel 2010 Harvest

- 5 - 19.8
- 19.8 - 28.7
- 28.7 - 37.8
- 37.8 - 83.6
- 83.6 - 166.5
Research

Rendel Strip Yield Grid with Points Stated:
- 6.7 - 18.1
- 18.1 - 25.2
- 25.2 - 31.7
- 31.7 - 39.2
- 39.2 - 57

(109.0ac.) Field Boundary
Identifying Yield Potential and Yield Stability

• What can you do with it?
  – Identify soil properties....
  – Variable rate seeding and variable rate N for starters
• Methods
  • Created 90’ by 90’ grids and averaged the yield data points within the cell for each year.
  • Calculated normalized yield for each cell for each year.
    • Normalized yield = Cell average/entire field average
  • For example in Field 3 in 2006 the lightest color red cells were less than 90% of the field average.
  • Then I averaged the cells for every year I had yield data to determine a yield stability and classified each cells as:
    • Low (<90% of field average)
    • Average-low (90-95% of field average)
    • Average (95-105% of field average)
    • Average-high (105-110% of field average)
    • High (>110% of field average)
  • Depending on the stability classification I then assigned a seeding rate for example on Field 3 I assigned seeding rate as follows:
    • Low -27,000
    • Avg-low – 30,000
    • Avg – 32,000
    • Avg-high – 33,000
    • High – 34,000
  • Some fields were very consistent so the entire field got 32,000 with the exception of a few cells where populations check strips got placed.
Field 3; 2006 Normalized Yield
Field 3; 2007 Normalized Yield
Field 3; 2009 Normalized Yield

2009 Yield
- 0 - 90
- 90 - 95
- 95 - 105
- 105 - 110
- 110 - 140

0.2 0 0.2 0.4 Miles
Field 3; Yield Stability 2006-2009
Field 3; Seeding Rate 2010

Population Strips. These will be evaluated with yield monitor.
Summary

• Yield data is valuable from a single year but very valuable with multiple years of data.

• Useful for on-farm research and helping fine-tune management strategies.

• Start collecting data if you think variable rate technology will be used in the next 5 years.
Fertility Ladder

Tissue Analysis for Fertilizer Recommendations

- Secondary and Micronutrients
- Phosphorus and Potassium
- Nitrogen
- Soil pH

Soil Testing
Thank you!!!

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