Precision Agriculture in the United States
– Ideas to Reality

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Top Trends in Precision Agriculture - 2015

1. Mobile Devices
2. On-Farm Data Management
3. Variable-Rate Applications
4. Remote Imaging
5. Unmanned Aerial Vehicles

Mobile Device Technology - Agricultural Applications
Customer Data Support Services

- Print Maps for Customers (Yield/EC/Soil Maps, etc.) 82.0%
- No Aggregate Data; Individual Farm Data Only 38.7%
- Data Aggregated Among Farmers But Not Outside the Dealership 19.5%
- Data Aggregated Among Farmers Including Those Outside the Dealership 12.3%
- Do Not Help Customers With Their Farm-Level Data 9.2%

VRT Services Offered Over Time
Profitability of Precision Services

<table>
<thead>
<tr>
<th>Service</th>
<th>% of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custom application (not prec.)</td>
<td>1.7%</td>
</tr>
<tr>
<td>VRT SINGLE nutrient app</td>
<td>15.6%</td>
</tr>
<tr>
<td>VRT MULTIPLE nutrient app</td>
<td>14.8%</td>
</tr>
<tr>
<td>VRT seeding prescriptions</td>
<td>16.0%</td>
</tr>
<tr>
<td>Guidance/autosteer sales/support</td>
<td>28.7%</td>
</tr>
<tr>
<td>Not breaking even</td>
<td>74.4%</td>
</tr>
<tr>
<td>Breaking even</td>
<td>75.3%</td>
</tr>
<tr>
<td>Generating a profit</td>
<td>34.2%</td>
</tr>
<tr>
<td>Do not know</td>
<td>35.1%</td>
</tr>
</tbody>
</table>

Precision Agriculture Services Offered Over Time

Response to trending interests
Profitability of Precision Services

<table>
<thead>
<tr>
<th>Service</th>
<th>Not breaking even</th>
<th>Break even</th>
<th>Generating a profit</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil sampling</td>
<td>25.9%</td>
<td>42.9%</td>
<td>31.2%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Soil electrical conductivity mapping</td>
<td>10.6%</td>
<td>5.9%</td>
<td>3.9%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Yield monitor sales/support</td>
<td>22.0%</td>
<td>32.3%</td>
<td>32.3%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Satellite/ aerial imagery</td>
<td>35.8%</td>
<td>20.3%</td>
<td>20.3%</td>
<td>12.6%</td>
</tr>
<tr>
<td>UAVs</td>
<td>10.0%</td>
<td>13.3%</td>
<td>13.3%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Data analysis for yield monitors</td>
<td>30.4%</td>
<td>13.7%</td>
<td>13.7%</td>
<td>4.5%</td>
</tr>
<tr>
<td>TOTAL PRECISION PACKAGE</td>
<td>60.1%</td>
<td>19.7%</td>
<td>19.7%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

Issues Creating Barriers to Adoption - Dealers

- The equipment needed changes quickly
- The fees we can charge aren't high enough
- Incompatibilities across equipment
- Finding employees
- Our competitor's prices
- Cost of the equipment
- Demonstrating the value to growers is a challenge
- Cost of the employees
- Equipment required is too complex
- Hard to create better program than traditional
- Lack of manufacturer support

[Bar chart showing the percentage of respondents agreeing or strongly agreeing with each issue]
Desired Skills for an Entry-Level PA Consultant

1. Describe growth stages of primary crop grown in your region.
2. Describe economic benefits of precision agriculture practices.
3. Describe the basic technology behind GPS.
4. Select hybrids and varieties for production management systems.
5. Generate knowledge from multiple data sets.
6. Find a parcel of land using a legal land description.
7. Upload product recommendations into multiple displays.
8. Use the Web Soil Survey to determine soil characteristics.
9. Collect soil samples from grids or zones.
10. Operate spatial analysis software.
11. Be a Certified Crop Advisor.
12. SSI
13. Use software to clean yield monitor data.
15. SMS
16. FarmWorks
17. MapShots

Note: not included are those respondents that responded as "neutral" to the statement.

Issues Creating Barriers to Adoption - Customers

1. Topography in area limits use by farmers
2. Farm income pressure limits use of precision services
3. Customers lack confidence in site-specific recommendations
4. Soil types in area limits profitability of precision
5. Cost of precision services to customers greater than benefits
6. Interpreting/decisions too time consuming for customers

Note: not included are those respondents that responded as "neutral" to the statement.
Market Area Using VRT Over Time

Note: 2018 is predicted

Expected Investment in Precision Agriculture by Dealers
Summary

• Expectation for PA market growth in the US is high
  • Planned investments are higher than ever
  • All PA service offerings expected to increase over next three years
• Higher emphasis on customer support
  • Less than 10% of dealerships don’t assist customers with on-farm data analysis
• Need for more PA-trained employees at dealerships

Thank You

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