VG16009 Adoption of Precision systems technology in vegetable production

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Background

• Queensland DAF vegetable project through federal Innovation Grant 2014-2016
  – Assessing spatial variability
  – Yield monitoring: carrots, potatoes and sweet potatoes
  – Variable rate applications

Conventional lime cost: 60 t @ $9,600
VRT lime cost: 35 t @ $5,600 strategic spread

40% lime savings
Project VG16009

- Commercially available precision ag technologies and practices

- How can these be applied to vegetable production to make management decisions?

- Installation, optimisation and groundtruthing

- Cost benefit analysis and return on investment
Demonstration sites

- Farm action plans
- Assessment of variability - crop sensing imagery, EM38 soil mapping
- Groundtruthing activities
- Yield mapping and yield prediction
- Management options
- Cost benefit analysis
Assessing spatial variability

EM38 soil mapping and/or Radiometrics

Crop sensing imagery

High Biomass

Low Biomass
Groundtruthing

GPS sampling points  Hyperspectral imagery  Soil sample

Yield assessments
Western Australia - carrots

- Assessing spatial variability
- Yield monitor
- Potential for VRI
Western Australia – Yield prediction

<table>
<thead>
<tr>
<th>Zone</th>
<th>(ha)</th>
<th>%</th>
<th>(ton/ha)</th>
<th>(ton)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0.3</td>
<td>5%</td>
<td>30</td>
<td>9</td>
<td>2%</td>
</tr>
<tr>
<td>Low-medium</td>
<td>1.4</td>
<td>21%</td>
<td>53</td>
<td>73</td>
<td>17%</td>
</tr>
<tr>
<td>Medium-high</td>
<td>2.7</td>
<td>40%</td>
<td>64</td>
<td>172</td>
<td>40%</td>
</tr>
<tr>
<td>High</td>
<td>2.3</td>
<td>34%</td>
<td>74</td>
<td>172</td>
<td>40%</td>
</tr>
</tbody>
</table>

Yield forecast: 63 ton/ha
Harvested yield: 61.8 ton/ha

Maximum forecasted yield: 499 tonnes (if the field achieved 74t/ha)
Current estimated yield: 423 tonnes
Estimated potential loss of production: 76 tonnes
Estimated potential loss in productivity: 15%
Western Australia - brassicas

- EM38 Soil mapping of new development and existing pivots
- UAV/drone crop sensing imagery
- Groundtruthing in progress
- Potential for VR applications
South Australia - carrots

- Existing spatial data and VRI
- Groundtruthing EM38
  - Soil analysis in progress
- High res satellite imagery
- Yield monitor on carrot harvester
- Potential for VR applications
South east Queensland- carrots

- Yield prediction and yield mapping
- Data analysis and interpretation
- VR applications
South east Queensland

- Long term data
- Temporal data
- Analysis of different spatial layers to help explain variability
QUESTIONS?

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