Simulation of Optimum Revenue, Profit and Prices of Aerial Applicators Incorporating Risk

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Motivation

- Aerial applicators face increasing competition from various aerial operators for spray jobs
- Small differences in the price charged per acre could make or break a business
Questions for thought?

- What is the best price to charge?
- What is the desired profit margin for a spray job and business?
- Would there be a range of prices you can work with for a spray job?
- Is your current profit margin enough
  - To cover the next big purchase?
  - To overcome unforeseen contingencies?
Questions for thought?

• What is your aircraft operating cost per hour, and how does that factor into the equation?
• Does your current profit margin cover all or most of your expenses?
• Does the price per acre really represent the price per job?
Revenue

- Pretty simple 😊
- Revenue
  - Price per job (in terms of aircraft time)
  - Price per acre (this is what farmer/client wants)
  - Area (in acres)
Cost

- Fixed expenses
  - Aircraft
  - Facilities (hanger, runway)
  - Other equipment (loader trucks, application equipment—booms and nozzles, guidance system)
  - Insurance

- Variable expenses
  - fuel
  - Aircraft repair and maintenance
  - Runway repair and maintenance
  - Labor (workman’s comp, pilot, mixer/loader and scheduler)
  - Taxes
  - Costs associated with distance to travel to the filed from hanger
Risks

- Risks associated with operation
  - Obstacles (cell tower, wind turbines, trees, power lines, center pivots)
  - Sensitive crops (organic farms, non-round up ready crops, home gardens)
  - Elementary schools, hospitals
  - Aircraft turnaround times
  - Unanticipated mechanical expenses
Scenario 1

100 Acres
Application time: 21.295 minutes
Distance to field: 5 miles

100 Acres
Application time: 23.085 minutes
Distance to field: 5 miles

100 Acres
Application time: 28.225 minutes
Distance to field: 5 miles
## Scenario 1: Charge same price

<table>
<thead>
<tr>
<th></th>
<th>Aircraft operating cost</th>
<th>Labor cost</th>
<th>Total cost</th>
<th>Price per acre</th>
<th>Gross revenue</th>
<th>Net revenue</th>
<th>Profit margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot</td>
<td>$200.00</td>
<td>$200.00</td>
<td>$200.00</td>
<td>$10.00</td>
<td>$1,000.00</td>
<td>-$146.48</td>
<td>-14.65%</td>
</tr>
<tr>
<td>Mixer/Loader</td>
<td>$5.65</td>
<td>$4.62</td>
<td>$4.26</td>
<td>$10.00</td>
<td>$1,000.00</td>
<td>$25.88</td>
<td>2.59%</td>
</tr>
<tr>
<td></td>
<td>$940.83</td>
<td>$769.50</td>
<td>$709.83</td>
<td>$10.00</td>
<td>$1,000.00</td>
<td>$85.91</td>
<td>8.59%</td>
</tr>
</tbody>
</table>
### Scenario 1: Charge different prices

<table>
<thead>
<tr>
<th></th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aircraft operating cost</strong></td>
<td>$940.83</td>
<td>$769.50</td>
<td>$709.83</td>
</tr>
<tr>
<td><strong>Labor cost</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pilot</td>
<td>$315.60</td>
<td>$258.00</td>
<td>$238.00</td>
</tr>
<tr>
<td>Mixer/Loader</td>
<td>$5.65</td>
<td>$4.62</td>
<td>$4.26</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td>$1,262.08</td>
<td>$1,032.12</td>
<td>$952.09</td>
</tr>
<tr>
<td><strong>Price per acre</strong></td>
<td>$15.78</td>
<td>$12.90</td>
<td>$11.90</td>
</tr>
<tr>
<td><strong>Gross revenue</strong></td>
<td>$1,578.00</td>
<td>$1,290.00</td>
<td>$1,190.00</td>
</tr>
<tr>
<td><strong>Net revenue</strong></td>
<td>$315.92</td>
<td>$257.88</td>
<td>$237.91</td>
</tr>
<tr>
<td><strong>profit margin</strong></td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
</tr>
</tbody>
</table>
Scenario 2

100 Acres
Application time: 25.58 minutes
Distance to field: 10 miles
Price: $10/acre
Profit margin: -5.78%

100 Acres
Application time: 21.295 minutes
Distance to field: 5 miles
Price: $10/acre
Profit margin: 8.59%

100 Acres
Application time: 28.225 minutes
Distance to field: 5 miles
Price $10/acre
Profit margin: -14.65%

100 Acres
Application time: 32.51 minutes
Distance to field: 10 miles
Price $10/acre
Profit margin: -29.02%
Scenario 2

100 Acres
Application time: 25.58 minutes
Distance to field: 10 miles
Price: $14.30/acre
Profit margin: 20%

100 Acres
Application time: 28.225 minutes
Distance to field: 5 miles
Price $15.75/acre
Profit margin: 20%
Scenario 3
Risks

Price: ??

Price: ??

Price: ??

Price: ??
What next?

- **Transformational outcome of the work**
  - Tool that can incorporate all scenarios that allows you to gain a profit to stay in the business
  - Develop an application (app) to predict price for different jobs to stay in the business
- **Encourage to start keeping good records, especially cost side to plug into the model to run scenarios for your operation**
Questions, Comments…

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