Economics of Orchard Establishment and Almond Production

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ECONOMICS OF ORCHARD ESTABLISHMENT & ALMOND PRODUCTION

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Cost Studies – Data Collection Process
Contributors

• Growers and Packers
• UC Extension Cooperative Advisors and Specialists
• Industry Representatives
  – Agricultural Lenders
  – Chemical Companies
  – Equipment Manufacturers
  – Labor Contractors
  – Custom Services Providers
Cost Study Components

• Cultural Costs
• Harvest Costs
• Cash Overhead
• Non-cash Overhead
Cost Study Components – Cultural Costs

- Cultural Costs
  - Pruning
  - Disease and Pest Control
  - Floor Management
  - Irrigation
  - Fertilization
- Harvest Costs
- Cash Overhead
- Non-cash Overhead
Cost Study Components – Harvest Costs

• Cultural Costs
• Harvest Costs
  – Shake, Sweep & Rake
  – Pick up and Haul
  – Hull and Shell Nuts
• Cash Overhead
• Non-cash Overhead
Cost Study Components – Cash Overhead

• Cultural Costs
• Harvest Costs

• Cash Overhead
  – Office Expenses
  – Liability Insurance
  – Property Taxes and Insurance
  – Sanitary Services
  – Environmental Fees
  – Repairs on Buildings and Irrigation System

• Non-cash Overhead
Cost Study Components – Non-Cash Overhead

• Cultural Costs
• Harvest Costs
• Cash Overhead
• Non-cash Overhead (Capital Recovery)
  – Buildings, Shop and Field Tools
  – Irrigation System
  – Fuel Tanks
  – Equipment
  – Trees
  – Land
Cost Study Components - Example: Equipment

- Cultural Costs
  - Fuel and Lube
  - Repairs
- Cash Overhead
  - Insurance
  - Taxes
- Non-cash Overhead (Capital Recovery)
  - Principle & Interest or Ownership Costs
Cost Studies - Disclaimer

• Benchmark/Sample – not statistical average
• Specific to assumptions listed in the study:
  – Orchard size
  – Crop variety & Organic vs. Conventional
  – Outsourcing practices (i.e. custom operator harvest)
  – Pest pressures at the time
  – Environmental factors (i.e. drought).
  – Economic conditions (i.e. crop prices).
Cost Study Example

• San Joaquin Valley South – 2016
  – 16’ x 22’ tree spacing, 124 trees per acre
  – 100 acre orchard
  – Double Line Drip Irrigation
  – Grower Harvest
  – 23 year orchard life
Cost Study Example – San Joaquin Valley South - 2016

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Almond Orchard Establishment - Operating Cost per Acre

Total Investment - $14,782

Year 1: $2,998
  - Planting: $744
  - Cultural: $365
  - Irrigation: $625
  - Harvest: $365

Year 2: $806
  - Planting: $121
  - Cultural: $869
  - Irrigation: $369
  - Harvest: $202

Year 3: $1,418
  - Planting: $1,607
  - Cultural: $1,369
  - Irrigation: $1,839
  - Harvest: $1,493

Total Investment: $14,782

Legend:
- Harvest
- Cultural
- Irrigation
- Planting
Almond Production – Total Cost per Acre

Total: $6,242/acre

- Trees: $581, 9%
- Land: $938, 15%
- Equipment: $200, 3%
- Cash Overhead: $562, 9%
- Harvest: $421, 7%
- Cultural Costs: $2,050, 33%
- Irrigation: $1,490, 24%
Almond Production – Cultural Costs

Total: $3,540/acre

- Irrigate $1,490 (42%)
- Fertilize $491 (14%)
- Prune $145 (4%)
- Pollination $400 (11%)
- Insects $197 (6%)
- Disease $400 (11%)
- Other $417 (12%)
Almond Production – Cultural Costs (cont.)

- Water: $1,364 (39%)
- Custom: $410 (12%)
- Pollination: $400 (11%)
- Fuel & Repairs: $87 (2%)
- Labor: $292 (8%)
- Materials: $988 (28%)

Total: $3,540/acre
Comparison of Cultural Costs – 2008 to 2016

2008 ($2,029/acre) to 2016 ($3,540/acre)

- Custom
- Pollination
- Fuel & Repairs
- Materials
- Labor
- Water

2008 vs 2016
Risk Analysis - Cost per Pound at Varying Yields

• Expected Yield Range: 2,000 – 3,900 lbs. per acre
  – Yields will vary by location, grower, year, and age of orchard, among other factors.

• Expected Grower Farm Price Range: $1.00- $4.00/lb.
  – Prices will vary depending on market condition, almond variety and quality, among other factors.
Risk Analysis – Cost per Pound at Varying Yields

- Total Cost
- Total Cost – Land
- Total Cash Costs
- Cultural + Harvest

Cost per Pound

Pounds Per Acre

2,000 2,300 2,600 3,000 3,300 3,600 3,900

$- $0.50 $1.00 $1.50 $2.00 $2.50 $3.00 $3.50
Risk Analysis – Cost per Pound at Varying Yields
Risk Analysis – Cost per Pound at Varying Yields

Breakeven Yield for Cultural & Harvest Costs
3,000 lbs./acre
at $1.35/lb.
Accumulated Net Return per Acre
- CULTURAL & HARVEST COSTS ONLY

3,000 lbs/acre and $2.10/lb

Payoff
$2.10/lb
Year 8
Accumulated Net Return per Acre
- CULTURAL & HARVEST COSTS ONLY

3,000 lbs/acre at $2.10/lb and $3.00/lb

Payoff $2.10/lb Year 8
Payoff $3.00/lb Year 6
Accumulated Net Return per Acre
- TOTAL CASH COSTS (incl. Cash Overhead)

3,000 lbs/acre at $3.00/lbs

Year 7
Payoff
$3.00/lb

$88,000
$80,000
$72,000
$64,000
$56,000
$48,000
$40,000
$32,000
$24,000
$16,000
$8,000
$(8,000)
$(16,000)
Accumulated Net Return per Acre
- TOTAL COSTS (incl. Non-Cash Overhead)

3,000lbs/acre at $3.00/lb

- $(16,000)
- $(8,000)

Payoff
$3.00/lb
Year 11
Accumulated Net Return per Acre
- COST COMPARISON

3,000 lbs/acre at $3.00/lb

- Cultural and Harvest Costs only
- Total Cash Costs (incl. Cash Overhead)
- Total Cost (incl. Non-Cash Overhead)

Payoff Year 6
Payoff Year 7
Payoff Year 11
Organic vs. Conventional - Comparison of Operating Cost

San Joaquin Valley North – 2016

Source:
“Sample Costs to Establish an Orchard and Produce Almonds - San Joaquin Valley North - 2016.”
“Sample Costs to Produce Organic Almonds - San Joaquin Valley North - 2016.”
University of California Cooperative Extension Agriculture and Natural Resources Center Agricultural Issues Center (2016)
## Organic vs. Conventional - Comparison of Net Returns

<table>
<thead>
<tr>
<th>Study</th>
<th>Organic</th>
<th>Conventional</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Yield (lbs/acre)</td>
<td>1,800</td>
<td>2,200</td>
<td>~20% yield reduction</td>
</tr>
<tr>
<td>Estimated Returns ($/lb)</td>
<td>3.50</td>
<td>2.50</td>
<td>~$1/lb. premium</td>
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<tr>
<td>Gross Returns ($/acre)</td>
<td>6,300</td>
<td>5,500</td>
<td>~15% higher returns</td>
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<tr>
<td>Less Operating Costs ($/acre)</td>
<td>2,971</td>
<td>2,225</td>
<td>~25% higher costs</td>
</tr>
</tbody>
</table>
Users of Cost Studies

• Growers
• Crop Commissions/Associations/Cooperatives
• Industry Representatives
• University of California
• Government Agencies
• Foreign entities

• Cost Studies Website: 1.2 Million downloads in 2015
Interactive Cost Study Tool

- Template to estimate costs to produce almonds
- Pre-loaded with cost study data
- Output Tables:
  - Costs per Acre
  - Costs per Month
  - Ranging Analysis
- Challenges:
  - Complexity of data points
  - Interactive cost modeling
  - Funding for software development
Agricultural Issues Center - Cost Studies Website

- Link: http://coststudies.ucdavis.edu/
- Search Options:

  Filter Current Studies by Commodity, Location, or Year:

  Commodity: All commodities, Show Organic
  Region: All regions
  County: All counties
  Year: All years

- Tools: Tree Loss Calculator
  - Replacement Costs
  - Loss of Income
  - Value of Tree lost @ Age
Questions?