Where and Why Will Tree Crops Replace Rangeland?

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California Ag Trends: 1992 - 2012
(Klonsky, California Agriculture, July-September 2012).

- Almond acreage increased by 307,000 acres (74%)
- Pistachio acreage increased by 79,500 acres (108%)
- Walnut acreage increased by 38,000 acres (18%)
- Orchard acreage overall increased from 2.2 to 2.8 million acres
- Vineyard acreage increased 197,000 acres (66%)
- Vegetable crop acreage down by 10%
- Field crops down from 15% of farm income to 9%

• The greatest decline has been in pasture and grazing land, and this trend will likely continue.

Trend in Almond Orchard Bearing Acreage in Stanislaus County

Almond acreage increased from 98,700 acres in 2006 to 155,114 acres in 2012, an increase of 57% in six years.

Trends in Almond & Walnut Orchard Bearing Acreage in Stanislaus County

Almonds
Walnuts
Trend in Walnut Orchard Bearing Acreage in Stanislaus County

Bearing Acres

Walnut acreage increased from 27,300 acres in 2006 to 38,295 acres in 2012, an increase of 40% in six years.

Nurseries Cannot Keep Up with Demand

- Nurseries are selling out of almond trees one year in advance
- Walnut trees are sold out two years in advance

Almonds are Very Profitable

- Growers currently paid $2.75 - $3.00 / pound
- Average production ~ 2,500 pounds / acre
- Cash operating costs ~ $2,150 / acre*
- $6,875 - $7,500 gross income
- $4,725 - $5,350 per acre net income

*University of California 2011 Sample Costs to Establish an Almond Orchard and Produce Almonds

Why??

$
Walnuts are Even More Profitable

• Growers getting $2.00 / pound
• Average production ~ 2.5 tons / acre
• Cash operating costs ~ $1,400 / acre*

• $10,000 gross income
• $8,600 per acre net income

*University of California 2012 Sample Costs to Establish a Walnut Orchard and Produce Walnuts

Walnut Establishment Costs per Acre:

• Land Preparation: $550
• Purchase trees (65 / acre): $1,073
• Planting costs: $528
  • Total $2,151

• If previous orchard exists, orchard removal & fumigation costs.

*University of California 2011 Sample Costs to Establish an Almond Orchard and Produce Almonds

Why are Almonds Grown so Successfully in California?

• Excellent soils in much of Central Valley
• "Plentiful", high quality water
• Mediterranean climate – long, hot, dry summers with relatively low chance of severe frost after March 1.
• Mostly mechanized

Almonds have a relatively large window to be harvested and do not need to be processed immediately

Unprocessed almonds can be stockpiled for several weeks
Almonds originated from wild species indigenous to deserts of Uzbekistan, Turkmenistan, Afghanistan & Iran

- They are well adapted to mild, wet winters and very long, dry, hot summers.
- Can tolerate poor soil conditions and drought.

California produced about 82% of the world’s almond supply in 2013 & 100% of U.S. production.
- Australia 5%, Turkey 2%, all Europe 6%.

Limitations to Profitable Almond Growing

Overly Wet / Poorly Drained Soils
Due to past and ongoing University of California rootstock field trials, we now have rootstocks much more tolerant to wet soils than the most commonly used rootstocks today.

### Salt Toxicity
- Sodium
- Chloride
- Boron

### Relative Salt Tolerance of 15 Almond Rootstocks

<table>
<thead>
<tr>
<th>Rootstock</th>
<th>% Sodium</th>
<th>% Chloride</th>
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<tbody>
<tr>
<td>Nemaguard</td>
<td>0.99</td>
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<tr>
<td>Lovell</td>
<td>0.70</td>
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<tr>
<td>Guardian</td>
<td>0.76</td>
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<td>Cadamman</td>
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<td>Empyrean 1</td>
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<td>Hansen</td>
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<td>GF 677</td>
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<td>Krymsk 86</td>
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<td>Penta</td>
<td>0.30</td>
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<td>Judor</td>
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<td>0.16</td>
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<tr>
<td>Adesoto</td>
<td>0.06</td>
<td>0.04</td>
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**July Critical Levels**
- Na: 0.25%
- Cl: 0.3%

New University of California Studies show that optimal irrigation of almonds is 25% more than previously believed.

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<thead>
<tr>
<th>DATE</th>
<th>Previous Water Use Guidelines</th>
<th>New Water Use Guidelines</th>
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<tbody>
<tr>
<td>Mar 1-15</td>
<td>NA</td>
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<td>Mar 15-31</td>
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<td>Apr 1-15</td>
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<td>Apr 16-08</td>
<td>0.66</td>
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<td>May 1-15</td>
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<td>May 16-31</td>
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<td>June 1-15</td>
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<td>June 16-30</td>
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<td>July 1-15</td>
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<tr>
<td>July 16-31</td>
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<td>Aug 1-15</td>
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<td>Total ETc</td>
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</table>

Dr. Bruce Lampinen, UC Davis

Have We Flooded the Market?

- According to Blue Diamond’s 2013 Industry Overview: "Demand continues to outstrip supply"
When Will the Madness End?

When California runs out of land and water

Thank you for your attention.

Questions?

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