Sustainability: The California Almond Journey
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Almond Board of California
Gabriele Ludwig has been working for the Almond Board of California for some 11 years. The Almond Board of California is a federal marketing order that focuses on research and generic marketing of almonds and is funded by a grower assessment. At the Almond Board, Gabriele gets to combine her passion for agriculture and the environment with research and policy. As Director for Sustainability and Environmental Affairs, she was instrumental in the development of the California Almond Sustainability Program, and continues to encourage a diverse range of research on almonds and environmental issues.

She is currently a participant of the California Roundtable for Ag and the Environment, Board chair for the non-profit Coalition for Urban/Rural Environmental Stewardship, and serves on several government agencies’ advisory committees. Prior to joining the Almond Board, she worked for the consulting firm Schramm, Williams & Associates in Washington, DC. She received her PhD. in plant physiology from the University of California, Davis and her B.A. in Biology from Wellesley College.
The Scope of the California Almond Industry

- Spanning 500 miles (800 km) throughout the Central Valley
  - 2015: 445,154 hectares total
  - 360,170 hectares bearing

- 100% of U.S. production
  - 82% of worldwide production
  - Shipments 67% export; 33% domestic

- $4.8 billion in farm value*
  - California’s #1 ag export**
  - Top U.S. specialty export crop

- 97,000 almond industry-related jobs generated in Central Valley,
  - 104,000 statewide***
  - $11 billion contributions to State GDP

Sources:
*USDA Agricultural Statistics Service, Pacific Region (NASS/PR)
**U.S. Department of Commerce, Foreign Trade Statistics
***Source: Economic Impacts of the California Almond Industry: UC Ag Issues Center
Diverse Industry: Family Farms

Multigenerational, family farmers are at the heart of California’s Almond community.

6,800 almond growers
105 almond processors

More than 90%
Family Farms

Nearly 3/4
Under 100 Acres
(40.5 ha)

91%

Family Farms  Other

74%

<100 Acres  Other
What’s New about “Agricultural Sustainability?”

“My family has been farming this ground for four generations – now that’s sustainability.”

But will your grandchildren be able to do the same? The world is changing…

- More people
- Less land
- More pressure on fewer resources

Fortunately, almond growers do adapt…
Rapidly changing world affecting resources and costs

- Water availability
- Arable land
- Energy / Greenhouse gases / Climate change
- Water quality
- Air quality
- Increasing global population
Regulatory Issues Affecting California Almond Growing

• **Water Availability**
  - Sustainable Groundwater Management Act (SGMA)
  - Endangered Species Act
  - Delta restoration/ SJ River restoration
  - Dam relicensing/ unimpaired flows

• **Water Quality**
  - Porter Cologne Act
    - Irrigated Lands Regulatory Program
    - CV-SALTs
  - Clean Water Act (TMDLs)
  - Waters of the United States (WOTUS) (aka Clean Water Rule)

• **Air Quality**
  - Clean Air Act
    - PM2.5, PM10, Ozone (smog), Montreal Protocol (ozone layer depleting substances)
  - AB32 – reduction in Greenhouse Gases
**Social License**

**Definition:** The privilege of operating with minimal formalized restrictions (legislation, regulation, or market requirements) based on maintaining public trust by doing what’s right.

**Public Trust:** A belief that activities are consistent with social expectations and the values of the community and other stakeholders.

Source: Charlie Arnot (Center for Food Integrity)
The Social License To Operate

Flexible
Responsive
Lower Cost

Rigid
Bureaucratic
Higher Cost

Social License
- Ethics
- Values
- Expectations
- Self-Regulation

High Trust
Complete Autonomy

Tipping Point
Single triggering event
Cumulative impact

Social Control
- Regulation
- Legislation
- Litigation
- Compliance

Low Trust
Prohibition

Source: Charlie Arnot (Center for Food Integrity)
March 20, 2009

Obamas to Plant Vegetable Garden at White House

By MARIAN BURROS

WASHINGTON — Michelle Obama will begin digging up a patch of the South Lawn on Friday, World War II. There will be no beets — the president does not like them — but arugula will make the menu.

While the organic garden will provide food for the first family’s meals and formal dinners, its focus is on vegetables at a time when obesity and diabetes have become a national concern.

“My hope,” the first lady said in an interview in her East Wing office, “is that through children’s gardens they would get engaged in the cycle of growing and eating food. And they would learn the value of hard work and taking responsibility for their food.”

Twenty-three fifth graders from Bancroft Elementary School in Washington will help her dig (not Obama girls’ swing set.)
Desire and expectation from Millennials (next generation almonds users) for:
- A connection to lifestyle brands/products
- Authenticity
- Transparency and ingredient focus
- Health
- Greater good

Millennials are:
- Less trusting of brands
- More willing to switch
- Comfortable with unknown brands & products

→ Want food that is good for them, good for their community, good for the planet

→ Almonds are part of sustainable eating lifestyle
  1. Health as a prime driver of sustainability
  2. If a food is not healthy, it’s not sustainable
Research at the Almond Board of California

- Consistently funding and executing initiatives since 1973

- Total investment of more than $50 million to date.

⇒ Tradition of Continuous Improvement
Sustainable almond farming utilizes production practices that are economically viable and are based upon scientific research, common sense and a respect for the environment, neighbors and employees.

The result is a plentiful, healthy and safe food product.

Definition developed using the 3 E’s (or P’s) and grower focus groups in 2005.
Established in 2009, CASP encourages almond grower and handler self-assessments to track adoption of responsible farming practices.

Current CASP modules:
- Irrigation management
- Nutrient management
- Air quality
- Water quality
- Energy efficiency
- Ecosystem
- Financial management
- Pest management
- Workplace and communities

Cycle of Continuous Improvement
Ask: Did you use or not use a practice in the most recent growing season

Occasionally ask how much input was applied

Practices asked about were based on research and extension recommendations, other expert sources

Each module was reviewed together by experts and industry members
Feedback to Grower

Report comparing grower to other participants

<table>
<thead>
<tr>
<th>Practice or Metric</th>
<th>Your Selection</th>
<th>Use Statewide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation Management Module</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orchard Establishment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Were you involved in this orchard's establishment? (If yes, click “No” and skip to question 16.)</td>
<td>Yes</td>
<td>85.6%</td>
</tr>
<tr>
<td>2. Soil maps (e.g., HRCS soil series or web soil survey) were used to identify potential variations in soil texture, salinity, water holding capacity, or other factors.</td>
<td>Yes</td>
<td>69.7%</td>
</tr>
<tr>
<td>3. Aerial or satellite photos (e.g., Google Earth) were used to identify potential variations in soil texture, salinity, or other factors.</td>
<td>Yes</td>
<td>54.5%</td>
</tr>
<tr>
<td>4. Yield maps from the previous crop (almonds or another crop) were used to identify potential variations in soil texture, salinity, or other factors.</td>
<td>Yes</td>
<td>57.4%</td>
</tr>
<tr>
<td>5. A GPS map of soil characteristics using sensing technology (e.g., EC, Veris, or Sik) was made and used to identify potential variations in soil texture, salinity, or other factors.</td>
<td></td>
<td>25.4%</td>
</tr>
<tr>
<td>6. Backhoe pits were dug or deep soil/surface samples were taken (sampled by the above and other observed factors) in strategic places to determine:</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>6a. Texture (percent sand, clay, silt) or saturation percentage</td>
<td>Yes</td>
<td>73.0%</td>
</tr>
<tr>
<td>6b. Compaction layers or other soil stratification</td>
<td>Yes</td>
<td>77.5%</td>
</tr>
<tr>
<td>6c. Salinity</td>
<td>Yes</td>
<td>72.3%</td>
</tr>
<tr>
<td>6d. pH</td>
<td>Yes</td>
<td>75.8%</td>
</tr>
<tr>
<td>6e. Soil organic matter</td>
<td>Yes</td>
<td>66.1%</td>
</tr>
<tr>
<td>7. Deep ripping, slip plowing, or tree hole backhoe pits were dug to address drainage and/or compaction issues (preferably after first testing for these problems).</td>
<td>Yes</td>
<td>90.7%</td>
</tr>
<tr>
<td>8. If suggested by soil sampling, soils were amended to adjust pH, sodicity, salinity, etc., during orchard development.</td>
<td>Yes</td>
<td>80.1%</td>
</tr>
<tr>
<td>9. Soils were amended with organic matter during orchard development.</td>
<td>Yes</td>
<td>44.1%</td>
</tr>
<tr>
<td>10. All water sources were sampled and lab-evaluated for water quality/Irrigation suitability.</td>
<td>Yes</td>
<td>76.6%</td>
</tr>
</tbody>
</table>
Participation to date (as of July, 2016)

Assessed and Managed Acres
(Percentage of 2016 Statewide Total of 890,000 Acres)

- Assessed Acres:
  - 95,496: 11%
  - 198,229: 22%
  - 449,553: 51%

- Managed Acres:
  - 255,891: 29%

2014 Sustainability Report (2009-2013)
Post Report (2013-2016)
2014 First Report Released

- Based on first 4 years
- Statistical Analysis re representativeness
- Calls out strengths and areas for improvement based on value analysis (which practices have widest impacts used/not used)
- Almond Board has used results for continuing education efforts

- Next report 2018? See what has changed
- No Third Party Verification to date because of cost
Uses of the Data: Defense

- Through Almond Board research programs, almond farmers have been funding water efficiency research since 1982 with over 90 projects funded to date.

- Over the past 20 years, almond growers have improved their water use efficiency by 33%, producing more crop per drop.

- 83% of growers practice demand-based irrigation using a combination of weather data, tree demand data, and/or soil moisture data.

- 70% of almond orchards use micro-irrigation, decreasing water runoff, applying water directly in the root zone, and allowing for precise timing and rate of irrigation.
Use of Data

• Outreach events
  – Bring in experts
  – Demonstrations
  – Calculators (Irrig. and N)

• Regulatory Compliance
  – Required N budgets
  – CUE credits
  – USDA- NRCS funding

• Helping almond customers meet their sustainability needs
What next for the Program?

• Currently updating and streamlining
• Continue to seek additional participation/re-assessments every 3 years
• Continue to ensure valued in the supply chain
• Continue to seek ways to increase value to growers
• Review endorsement/verification/certification options
• Assess relevance and value of other measures of sustainability e.g. LCA (have for energy and GHG), water, N footprints, etc.
Thank you!

Questions?

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