A Fresh Look at Produce Production and Marketing: The Dish on Today’s Global Trends

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for

Monsanto/Seminis Woodland Field Day

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Agenda

• Location of production

• Fresh produce basics

• International trade

• Selected food industry trends

• Consumer demand trends

• Commodity examples
Location of production matters!

- It’s all about seasonality – which crop, where, when – whether imported or domestic.
- Imports, usually off-season, play important role for many, but not all crops.
- Each commodity has its own story to tell!
- California biggest producer of most produce crops; for many crops CA is the only US producer, over 200 crops grown.
- CA has a Mediterranean climate.
Leading US Fresh Market Vegetable States,* 2013: Geographic concentration of production (due to climate) limits local sourcing, yet it is growing in the summer/fall.

<table>
<thead>
<tr>
<th>Area Harvested</th>
<th>Production</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State</strong></td>
<td><strong>% of Total</strong></td>
<td><strong>State</strong></td>
</tr>
<tr>
<td>CA</td>
<td>45</td>
<td>CA</td>
</tr>
<tr>
<td>FL</td>
<td>11</td>
<td>FL</td>
</tr>
<tr>
<td>AZ</td>
<td>7</td>
<td>AZ</td>
</tr>
<tr>
<td>GA</td>
<td>6</td>
<td>GA</td>
</tr>
<tr>
<td>NY</td>
<td>4</td>
<td>WA</td>
</tr>
<tr>
<td>Other</td>
<td>27</td>
<td>Other</td>
</tr>
</tbody>
</table>

*Excludes potatoes

Source: Vegetables 2013 Summary, USDA/NASS, March 27, 2014
# Market Shares of Leading USA Fresh Fruit Producing States,* 2009

<table>
<thead>
<tr>
<th>State</th>
<th>Percent U.S. Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>53%</td>
</tr>
<tr>
<td>Washington - leads in apples, pears, cherries</td>
<td>21%</td>
</tr>
<tr>
<td>Florida</td>
<td>8%</td>
</tr>
<tr>
<td>Oregon</td>
<td>2%</td>
</tr>
<tr>
<td>Michigan</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>10%</td>
</tr>
<tr>
<td>All U.S. fresh fruit</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Excludes tree nuts. Source: USDA/ERS, Gary Lucier.
In 2012, California produced approximately:

- $6.7 billion of fresh fruit
- $5.8 billion of fresh vegetables
- totaling $12.5 billion in farm gate value.*

*Excludes tree nuts, processing tomatoes and other fruits and vegetables sold in canned, frozen and dried forms.

## Seasonality of Naturipe Farms berry production locations

### Strawberries
- California
- Florida
- Mexico

### Blueberries
- Mexico
- Chile
- Florida
- Georgia
- California
- North Carolina
- Indiana
- New Jersey
- Michigan
- Oregon
- British Columbia
- Washington
- Uruguay
- Argentina

### Raspberries
- Mexico
- California

### Blackberries
- Mexico
- Guatemala
- California
- N. Carolina
- Georgia
- Oregon

### Cranberries
- Quebec
- Halifax
- Wisconsin

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<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawberries</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
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<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
</tr>
<tr>
<td>Blueberries</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
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<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
</tr>
<tr>
<td>Raspberries</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
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<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
</tr>
<tr>
<td>Blackberries</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
<td>🍓</td>
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<td>🍓</td>
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</tr>
</tbody>
</table>

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Organic also available

Peak of Season
Fresh Produce Basics

• Shipping patterns are well established based on ideal growing locations in each season.

• Generally harvested and shipped daily; weather affects supply and demand. Markets are volatile!

• Most growers do not market their own production, they have agreements with shippers or distributors to be their marketers.

• Most shippers are family-owned forward-integrated grower-shippers, supplementing their own production with that of other growers.
U.S. Fresh Fruit and Vegetable\(^1\) Value Chain, Estimated Dollar Sales, Billions, 2010

1 Excludes nuts and pulses

<table>
<thead>
<tr>
<th>Source</th>
<th>Value (Billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farms</td>
<td>$12.3</td>
</tr>
<tr>
<td>Shippers</td>
<td>$26.8(^2)</td>
</tr>
<tr>
<td>Exports</td>
<td>$6.1</td>
</tr>
<tr>
<td>Imports</td>
<td>$6.1</td>
</tr>
<tr>
<td>Institutional wholesalers</td>
<td>$51.157</td>
</tr>
<tr>
<td>Produce and general-line wholesalers</td>
<td></td>
</tr>
<tr>
<td>Retailer distribution centers</td>
<td></td>
</tr>
<tr>
<td>Food service establishments</td>
<td>$122.132</td>
</tr>
<tr>
<td>Supermarkets and other retail outlets</td>
<td>$69.175</td>
</tr>
<tr>
<td>Consumers</td>
<td>$1.800</td>
</tr>
<tr>
<td>Farm &amp; public markets</td>
<td></td>
</tr>
</tbody>
</table>

Sources: Compilations by Kristen Park, Roberta Cook, and Edward McLaughlin based on U.S. Retail Census, ERS/USDA, NASS/USDA, U.S. Department of Commerce, and other data.
USA Fresh Produce Industry Size

• Produce shippers focus more on retail than foodservice markets since quantity (vs $) sold thru retail channels is much larger than foodservice.

• Biggest contributors to foodservice produce sales are potatoes, lettuce and tomatoes and these are high per capita consumption items. Foodservice shares for most fresh produce are low. Seasonality, perishability, price volatility are obstacles. But this is changing!
Fresh Produce Basics

- Buyers seek yr-round supply.
- Imports increasingly handled by U.S. grower-shippers that import during the off-season. Same requirements for foreign and domestic growers.
- Major food safety requirements, higher cost structure.
- Shippers emphasizing sustainable farming practices.
- Quality, color, shape, flavor, as differentiators, growing role of proprietary seeds.
Fresh Produce Basics

• Cold chain management critical.
• More attention placed on reducing waste.
• Shippers have big investments.
• Price takers.
• Growers and shippers require substantial capitalization to withstand low markets.
• Buyer consolidation induces shipper consolidation.
• Larger firms have greater ability to invest in food safety infrastructure, R&D to increase efficiency and sustainability, new varieties, etc.
Role of branding in fresh produce marketing

• Commodity vs consumer brand marketing perspective.

• Traditionally, few produce items were branded (beyond Chiquita, Del Monte and Dole).

• Development of fresh-cut industry introduced brands.

• Difficult to brand produce items with intra- and inter-seasonal variations in quality.

• Most produce still sold on random-weight basis (vs UPC codes) so less data as compared with CPG items and supplier not identified.

• Shippers often didn’t have consistent distribution in specific chains week in week out.
Role of branding in fresh produce marketing

- Hard to get ROI on investments in branding.
- Under-investment in consumer marketing in produce.
- Role of generic marketing/advertising programs.
- Growth in social media making it less costly to reach target consumers with marketing messages.
- For larger grower-shippers consumer marketing may make sense.
- Traceability changing things (PTI).
- Incentives are becoming more aligned to improve quality and flavor and educate consumers about how to use and prepare fresh produce.
Growing Role of Technology

- Information technology
- Big data
- Precision farming
- Sensors
- Drones
- New varieties
- Mobile
- Consumer insights
- Social media aids in targeting consumers
- Supply chain-wide data sharing
International Trade in Fresh Produce

• Story of diversification of sources of supply and the types of products imported/consumed.

• Provides more redundancy which large foodservice users require to put something on the menu. This may increase produce on foodservice menus.

• Exporters are generally large, professional firms.
### Fresh fruit and vegetable imports as a share of U.S. fresh utilization/consumption, 2012

<table>
<thead>
<tr>
<th>Item</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables, excl. melons and potatoes</td>
<td>25.0</td>
</tr>
<tr>
<td>Melons</td>
<td>30.5</td>
</tr>
<tr>
<td>Potatoes</td>
<td>7.0</td>
</tr>
<tr>
<td>Fruit, all Excluding Bananas</td>
<td>49.4</td>
</tr>
<tr>
<td>Excluding Bananas</td>
<td>33.7</td>
</tr>
</tbody>
</table>

Source: Economic Research Service, USDA.
US Fresh Produce International Trade: Imports and Exports, by Key Category, $Millions US, 1994-2013

- Imports: Fresh Veg
- Imports: Other Fresh Fruit
- Imports: Bananas/plantains
- Exports: Fresh Veg
- Exports: Fresh Fruit

Source: US GATS online queries, BICO-10.
Value Shares of Total U.S. Fresh Fruit Imports, by Product

Source: Imports Contribute to Year-Round Fresh Fruit Availability, FTS-356-01, Dec. 2013, ERS/USDA

* includes pineapples, mangos, papayas, durians
** includes apricots, cherries, peaches, plums
Value Shares of Total U.S. Fresh Fruit Imports, by Region: Mexico Wins!

<table>
<thead>
<tr>
<th>Region</th>
<th>1990-92</th>
<th>2010-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equatorial countries*</td>
<td>56</td>
<td>34</td>
</tr>
<tr>
<td>Southern Hemisphere countries**</td>
<td>23</td>
<td>26</td>
</tr>
<tr>
<td>Mexico</td>
<td>13</td>
<td>33</td>
</tr>
<tr>
<td>Canada</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

* Equatorial countries include Costa Rica, Guatemala, Ecuador, Colombia, and Honduras
** Southern Hemisphere countries include Chile, Argentina, Peru, New Zealand, Brazil, South Africa, and Australia

Source: Imports Contribute to Year-Round Fresh Fruit Availability, FTS-356-01, Dec. 2013, ERS/USDA
Example: Seasonal Relationship between Imported and Domestic Grapes, 2010-12 Average

Chile leads imports, then Mexico, Peru emerging

Source: Imports Contribute to Year-Round Fresh Fruit Availability, FTS-356-01, Dec. 2013, ERS/USDA
US Fresh Produce Trade

• N. American fresh veg trade mainly intra-NAFTA!

• 77% of US fresh vegetable exports go to Canada, then Mexico, 8%. Extra-NAFTA exports fragmented.

• Veggies often more perishable than many fruits which makes proximity to market important.

• In contrast, fresh fruit trade is diverse both in terms of countries of origin and destination markets.
U.S. Exports of Fresh Fruit, Top 5 Countries, 2006-2010 (other is the 2nd largest category, so diverse mkts)

Source: US GATS, online data queries.
In 2013, fresh produce imports from Mexico totaled $7.8B (54% of total fresh produce imports), including:

- $4.6B fresh veg (67% of total fresh veg imports), and
- $3.2B fresh fruit (38% of total fresh fruit imports).

Mexico is a powerhouse fresh fruit and veg exporter and is an integral part of the North American fresh produce supply chain for certain commodities. Most of its exports go to the USA (unlike Chile whose markets are truly global).
Mexico’s Role in US Fresh Produce Trade

- Tomatoes, bell peppers, chile peppers, cucumbers, eggplant, green beans, asparagus, brussel sprouts, watermelon, limes, avocados, mangoes, table grapes, papaya, blackberries, raspberries (and emerging in blueberries and strawberries), green onions, sugar snap peas, cilantro many tropical and specialty fruit/veg, both Mexican and Asian.

- NOT important in leafy greens, broccoli, cauliflower, celery, onions, potatoes, apples, pears, cherries, kiwi, peaches/nectarines/plums, oranges, tangerines, grapefruit, bananas.
Relative Competitiveness of US Fresh Fruit and Veg Industry

• The relatively strong competitiveness of the US industry is because more than being labor-intensive, fruit/veg are knowledge, technology, capital, and marketing-intensive. LOCATION!

• However, protected culture, which is technology and capital-intensive is emerging elsewhere.

• US growers face an ever more complex regulatory environment.

• Labor availability is increasingly problematic, everywhere. Efforts to mechanize will grow.
Some Comments on China

China’s share of world horticultural exports grew from 2.5% in 2001 (after it joined the WTO) to 5.6% in 2011.
However, this is led by processed hort products vs fresh.
China will not be an important source of fresh produce for the USA, rather it is a growing export market for US producers.

Source: ARE Update Sep/Oct 2013 17(1):9-11
Select Food Industry Trends

percent

Current $  Inflation adjusted $

In 2009, the quantity of food sold in food stores declined.

“I buy only what I need.” Consumers are increasingly concerned about waste; negative impact on fresh produce demand.

Plus, consumption rates of fresh produce increase markedly with income level. So, more low income people means a challenging environment for the produce industry.

Economic growth should stimulate produce demand.
The economic downturn accelerates pace of change in the food marketing system

- More than originating new trends, it intensified pre-existing forces, such as channel blurring.
- Margin pressure at all levels of the food system!
- Many produce suppliers facing lower profits.
- Need for major investments in info tech systems.
- In aftermath, mergers are up again (food retailers, foodservice, and mergers or joint marketing arrangements between shippers).
US Grocery Market Shares, by Key Channel, 1998 vs. 2013

- **1998**
  - Traditional: 90%
    - Conv supermarket, fresh format, ltd assortment, super warehouse, other
  - Nontraditional: 8%
    - Mass - club - drug supercenter - dollar
  - Convenience: 2%
    - With and without gas

- **2013**
  - Traditional: 46%
  - Nontraditional: 39%
  - Convenience: 15%

Source: Willard Bishop, Competitive Edge, August 2014
Millennials shop a variety of retailers to meet their in-the-moment needs.

**No. of Retailers Shopped for Groceries in the Past 90 Days**

<table>
<thead>
<tr>
<th></th>
<th>Millennials</th>
<th>Gen X</th>
<th>Boomers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9.0</td>
<td>7.1</td>
<td>6.3</td>
</tr>
</tbody>
</table>

Most Millennials spread their shopping across many channels and retailers:

- Lack of planning results in more trips
- Higher use of all channels than older cohorts

Especially true for specialty channels – 46% of Millennials vs. 32% of Boomers

**Myth Busting**: Millennials don’t just shop at cool and unconventional retailers. While they love these stores, many shop at more mainstream retailers most of the time and reserve specialty channels for special occasions.
Emerging marketing channels for fresh produce

- Convenience store potential, drug stores, dollar stores.
- E-commerce. Click 'n collect, delivery, in-store pickup, other models emerging. Amazon Fresh foray in Los Angeles.
- Major initiative to increase fresh produce on foodservice menus despite the barriers.
- Growing international trade provides more redundancy in supply which may help large foodservice users to add produce items to the menu.
Fresh Produce Consumption Trends
Weekly $ sales/store

Weekly quantity sold/store

Organic Fruit

Organic Veg

All FruitVeg* 0.2

Freshcut Fruit 8.8

Salads 6.7

Fresh Cut Veg 10.2

Salad dressings, toppings, etc., which is 10% of produce dept sales dollars and 5% of quantity.

Source: FreshFacts® on Retail, Trends 2013, Perishables Group and United Fresh Foundation.
Consumer Behavior

• Higher income and socially conscious foodies are driving demand; their preferences lean to organic, convenience (fresh-cut), flavor, local.

• For mainstream consumers, positive attitudes about wellness benefits of fresh produce not translating into higher purchases. Improved flavor might help.

• Perception that produce costs more and may be wasted. Better shelf-life might help.

• 47.6 million people on food stamps (SNAP) in FY2012-13 (vs 17.3 in 2000) for cost of $79.8M.
Initiatives to Increase Consumption

- More forces are in play to educate consumers about the benefits of fresh produce (MyPlate, salad bars in schools, PBH, govt and private efforts to increase awareness of fruit/veg health benefits.
- Culinary Institute of America and Harvard School of Public Health Dept of Nutrition Initiative: Menus of Change, The Business of Healthy, Sustainable, Delicious Food Choices. This is designed to introduce more fresh produce on foodservice menus.
- In the meantime, let’s look at how important income is to produce consumption.
Distribution of U.S. Households by Income Level, Share of Total Fresh Produce Expenditures/Income Level & Ave. Fresh Produce Expenditures/Income Level, 2012

- $819 31%
- $594 18%
- $478 14%
- $409 17%
- $339 13%
- $254 8%

$ = Average fresh produce expenditures per income group

% = Percent of total fresh produce expenditures contributed by each income group

Source: Calculations by Roberta Cook from the Food Institute’s Demographics of Consumer Food Spending, 2014.
Factors affecting demand for fresh produce

- Commodity price, consumer income, prices of substitutes and complements, population growth rates, ethnicity, culture
- Quality: appearance, flavor, color, shape and size; more breeder emphasis on flavor
- Info on produce selection, ripening, recipes
- Convenience in prep, usage and consumption; packaging role
- Shelf-life, postharvest technology
- Consistent availability, year-round supply
Per Capita Consumption of Fruits and Vegetables, All Product Forms

- Changes in total consumption mask significant changes in:
  - product form
  - product mix
  - diversity within product segments
Fresh includes fresh-cut and bulk.

Processed includes frozen, dried and canned.

Processed vegetables includes lentils and dry peas, and excludes dry beans.

Source: USDA/ERS, Vegetables and Melons Situation and Outlook Yearbook, May 30, 2014; compiled by Dr. Roberta Cook, UC Davis, fresh and processed sweet potato share of total sweet potatoes is estimated; processed vegetables includes lentils and dry peas, and excludes dry beans.
U.S. Per Capita Disappearance of Select Fresh Vegetables, 1985-2013
(includes fresh-cut and bulk)

Pounds per capita

Culture has shifted from a reactive HEALTH paradigm to a proactive WELLNESS culture

Past:
REACTIVE HEALTH
“Do as I say!”
Condition management • Externally measured • Authoritative • Compliance • Crisis • Quick fixes • Control • Asceticism

BE
HEALTHY

listen to your doctor!
proper nutrition!
listen to your mom!
take your vitamins!
avoid germs!
exercise!
lose weight!
Continued:
Culture has shifted from a reactive HEALTH paradigm to a proactive WELLNESS culture

Now:
PROACTIVE WELLNESS

“Know thyself”

Preventative • Internally validated • Self-assessed • Common sense • Holistic • Integrated • Balanced energy • Fun and enjoyment

Source: Outlook on the Millennial Consumer 2014, a presentation for PMA from the Hartman Group
Shoppers seek several claims in tandem, revealing motivation

<table>
<thead>
<tr>
<th>Claim</th>
<th>Percent of Shoppers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole grain</td>
<td>48</td>
</tr>
<tr>
<td>Low sodium</td>
<td>41</td>
</tr>
<tr>
<td>Low sugar</td>
<td>37</td>
</tr>
<tr>
<td>High fiber</td>
<td>35</td>
</tr>
<tr>
<td>No preservatives</td>
<td>33</td>
</tr>
<tr>
<td>No trans fats</td>
<td>33</td>
</tr>
<tr>
<td>No chemical additives</td>
<td>32</td>
</tr>
<tr>
<td>Low calorie</td>
<td>31</td>
</tr>
<tr>
<td>No/Low fat</td>
<td>30</td>
</tr>
<tr>
<td>No HFCS</td>
<td>28</td>
</tr>
<tr>
<td>Natural</td>
<td>24</td>
</tr>
<tr>
<td>Non-GMO</td>
<td>22</td>
</tr>
<tr>
<td>Low cholesterol</td>
<td>22</td>
</tr>
<tr>
<td>Heart healthy</td>
<td>21</td>
</tr>
<tr>
<td>Antioxidant-rich</td>
<td>20</td>
</tr>
<tr>
<td>Certified organic</td>
<td>18</td>
</tr>
<tr>
<td>Gluten-free</td>
<td>11</td>
</tr>
</tbody>
</table>

Regularly = at least “fairly often”
When shopping, about ¼ of consumers look for food and beverages that . . .

- are minimally processed
- contain only recognized ingred's
- are locally grown/produced
- have shortest ingred. list

Source: The Hartman Group Health and Wellness Reports, 2007-2013
Frequency of Purchases of Locally Grown Products

Source: FMI U.S. Grocery Shopper Trends 2014
food choices

Question: How important is each factor in deciding what food you eat?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Millennials</th>
<th>Gen X</th>
<th>Boomers</th>
</tr>
</thead>
<tbody>
<tr>
<td>made with natural ingredients</td>
<td>52%</td>
<td>51%</td>
<td>45%</td>
</tr>
<tr>
<td>no GMOs</td>
<td>44%</td>
<td>39%</td>
<td>36%</td>
</tr>
<tr>
<td>no allergens</td>
<td>41%</td>
<td>37%</td>
<td>29%</td>
</tr>
<tr>
<td>made with organic ingred.</td>
<td>41%</td>
<td>37%</td>
<td>29%</td>
</tr>
<tr>
<td>grown locally</td>
<td>39%</td>
<td>33%</td>
<td>31%</td>
</tr>
<tr>
<td>manufactured locally</td>
<td>36%</td>
<td>32%</td>
<td>26%</td>
</tr>
</tbody>
</table>

Source: Outlook on the Millennial Consumer 2014, a presentation for PMA from the Hartman Group
Commodity Example: Lettuce
U.S. Iceberg Lettuce Market, 1960-2013: Case of declining demand; International trade not a factor; Production based in coastal CA and shifts to CA/AZ desert in winter

U.S. Per Capita Utilization/Consumption of Lettuce, by Type, 1985-2013^p (includes fresh-cut and bulk, foodservice and retail)

Lettuce innovation: cross between iceberg and romaine
Growth of the Hothouse Tomato Industry in the US, Canada and Mexico: Game changer
US Per Capita Utilization/Consumption of Fresh Tomatoes (1985-2013$^P$)

Pounds per capita

P=Preliminary
US Fresh Tomato Retail Market Shares (in Lbs) by Key Type, 2013: Story of Market Transformation

- **Roma**: 27%
- **TOV**: 22%
- **Grape**: 14%
- **Vine Ripe**: 12%
- **GH**: 9%

*Mainly mature green

Source: FreshLook Marketing
Specialty and Greenhouse Tomatoes

Y.E.L.O. Youth, Energy, Life, Om...™
Fresh Field Tomato Production in CA and FL,* 1982-2013: Case of declining retail demand for mature green tomatoes, lower growth in foodservice demand and loss in competitiveness

**Source:** USDA/NASS. *excludes other states and greenhouse
U.S. Fresh Tomato Market, 1990-2013: Case of growing import dependence, led by product differentiation and technological innovation (protected culture); Mexico primary import source.

Total US Tomato Imports, by Key Tomato Type, All Countries, 2009-2013 (millions of pounds): Product Differentiation

Sources: US Department of Commerce. US Census Bureau, Foreign Trade Statistics and ERS calculations.
Conclusions

• Margin pressure puts emphasis on streamlining the supply chain, more collaborative relationships between buyers and suppliers. Should reduce waste and benefit consumers.
• Technology will improve yields, water and input efficiency, supply chain efficiency and cost control.
• Local will grow, but CA will remain the dominant US producer of most fresh produce crops due to Mediterranean climate.
• Consumer demand for fresh produce should grow as the economy improves.
• More efforts to stimulate fresh produce consumption – both public and private – may gain traction.
• Innovation will improve flavor, shelf-life and performance.
Supplemental Information
California Drought Impact on Fresh Produce
Average Value of Water Used in CA, Based on Value of Crop Sales, 2012

Pasture
Rice
Other Field
Alfalfa
Dry Beans
Cotton
Safflower
Corn
Grain
Onions and Garlic
Grapes
Processing Tomatoes
Almonds & Pistachios
Citrus
Deciduous fruits
Fresh Tomatoes
Vegetables

Water value ($/acre foot)

Source: Labor, Water and California Agriculture in 2014, Goodhue and Martin, ARE Update, Giannini Foundation of Agricultural Economics, University of California
• Growers will divert water to higher value crops, which protects fresh fruit and veg crops from major reductions.

• The drought effect is worst south of the Delta and leafy greens, celery, broccoli, cauliflower are largely not grown there.

• Summer production of fresh market tomatoes, melons, peppers, are important in the central valley, as well as orchards and vineyards.

• South of the Delta most growers have ground water sources which mitigate loss of surface deliveries.

• No major changes expected in 2014.
California Drought Impact on Fresh Produce

- In the central valley (the main area affected), about 1% of fruit/nut and veg acreage may be fallowed, according to a major longstanding UC Davis economic model, the Statewide Agricultural Production (SWAP) model.
- Water quality is declining due to drawdown of ground water and higher salinity.
- Drought hasn’t reduced produce production yet, impact to be felt in 2015 if don’t get big winter snowpack.
California Drought

There is plenty of supply to handle more fresh produce on foodservice menus. Prices will continue to depend a lot on daily weather - affects yields, quality, TIMING of production, seasonal overlaps, and demand. Higher energy, water pumping, and labor costs, but grower-shippers are price takers and can’t pass on many costs. Over time, CA will see major changes in crop mix, fresh produce will still be the star!
**SWAP Estimated Changes in Irrigated Crop Area: 2014**

<table>
<thead>
<tr>
<th>Category</th>
<th>Sacramento Valley, SD, and ED</th>
<th>San Joaquin Valley</th>
<th>Tulare Lake Basin</th>
<th>Central Valley Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed Crops</td>
<td>-83,481</td>
<td>-39,269</td>
<td>-23,967</td>
<td>-146,718</td>
</tr>
<tr>
<td>Vegetables</td>
<td>-3,801</td>
<td>-2,638</td>
<td>-3,838</td>
<td>-10,277</td>
</tr>
<tr>
<td>Trees &amp; Vines</td>
<td>-8,931</td>
<td>-7,514</td>
<td>-24,483</td>
<td>-40,929</td>
</tr>
<tr>
<td>Grains</td>
<td>-40,785</td>
<td>-20,105</td>
<td>-35,105</td>
<td>-95,995</td>
</tr>
<tr>
<td>Other Field Crops</td>
<td>-13,523</td>
<td>-55,883</td>
<td>-45,501</td>
<td>-114,907</td>
</tr>
<tr>
<td><strong>Region Total</strong></td>
<td><strong>-150,521</strong></td>
<td><strong>-125,409</strong></td>
<td><strong>-132,894</strong></td>
<td><strong>-408,825</strong></td>
</tr>
</tbody>
</table>

Misc. Supplemental Information
US Fresh Tomato Imports, All Types, by Key Country, 2009-2013, million pounds

<table>
<thead>
<tr>
<th></th>
<th>Mexico</th>
<th>Canada</th>
<th>Other Countries</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td></td>
<td></td>
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<tr>
<td>2010</td>
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<td>2012</td>
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<tr>
<td>2013</td>
<td></td>
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</tr>
</tbody>
</table>

Sources: US Department of Commerce, US Census Bureau, Foreign Trade Statistics and ERS calculations.
## Export and Import Trade Annual Growth Rates of China’s Labor-Intensive Agricultural Products, 2001-2011

<table>
<thead>
<tr>
<th></th>
<th>Aquaculture</th>
<th>Livestock</th>
<th>Horticulture</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exports</strong></td>
<td>13.3%</td>
<td>7.7%</td>
<td>18.0%</td>
</tr>
<tr>
<td><strong>Imports</strong></td>
<td>13.5%</td>
<td>15.8%</td>
<td>21.0%</td>
</tr>
</tbody>
</table>

Source: ARE Update Sep/Oct 2013 17(1):9-11
China's Trade Balance with the U.S. in Horticulture*

*Processed and fresh fruit/veg, nuts, flowers and ornamentals.

Source: ARE Update Sep/Oct 2013 17(1):9-11
Avocado sources of supply in the U.S. market: Availability of Mexican supply displaces Chile and expands total market size

Source: Hass Avocado Board, online data queries.
US Per Capita Total Fruit Disappearance/Consumption, Including Melons, Pounds 1976-2012, (all channels, foodservice and retail)

Obstacles to Fresh Produce in Foodservice

- Seasonality
- Perishability
- Price volatility
- Seasonal shoulders especially risky
- Labor for prep
- Even the largest fresh produce suppliers are small relative to food manufacturers
- Sourcing often not as direct as for retail
- Variations in quality, flavor