

ALMOND BOARD OF CALIFORNIA

# ALMOND ALMANAC 2016

## ANNUAL REPORT

# WELCOME

## ANNUAL REPORT

The Almond Almanac provides the latest statistics about California Almonds. The statistical analysis found in the report is prepared on a crop-year basis, spanning August 1 through July 31, and includes both current and comprehensive historical information about almond production, acreage and varieties, as well as shipment and market information. The statistical content is compiled using various handler forms required by the industry's Federal Marketing Order. Additional data, including crop estimates and farm price, are supplied by the USDA National Agricultural Statistics Service, Pacific Region Field Office (NASS/PRO).

Almond Board of California's (ABC) Almond Almanac is an annual year-end report that provides a glimpse into what makes up the California Almond growing and processing community. The report provides a comprehensive overview of the Almond Board's programs and how we support all of the almond growers and processors in California. This includes the achievements various programs have made toward meeting ABC's mission and vision.





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# STRATEGIC PRIORITIES + SUPPORTING OBJECTIVES 2016

**INVEST IN PROGRAMS AND RESEARCH THAT BUILD MARKET DEMAND FOR ALMONDS, MAKING THEM THE NUT OF CHOICE**

Expand the science-based knowledge of the health benefits and functional attributes of almonds in dietary patterns and healthy lifestyles

Increase consumers’ perceived value of almonds throughout the supply chain

Implement actions that mitigate trade and regulatory barriers

Use market research and performance analysis for strategy development and resource allocation

Further knowledge and understanding among consumers and customers about almond farming and environmental stewardship

**INVEST IN PROGRAMS AND RESEARCH THAT MAKE ALMONDS A CROP OF CHOICE FOR CALIFORNIA**

Accelerate sustainability\* initiatives of California Almonds

Enhance industry-wide quality and food safety

Support innovative research to advance production, environmental and processing efficiencies

Demonstrate leadership in adoption of water-use efficiency and supply practices

Expand leadership commitment to bee health research, education and outreach

\*Please see page 10 for the Almond Board of California definition of sustainability.

**BUILD AN ALMOND BOARD ORGANIZATION THAT OPTIMIZES ITS EFFECTIVENESS IN ESTABLISHING AND EXECUTING GOALS**

Ensure that Almond Board representatives understand and adhere to fiduciary responsibility standards

Provide resources that continually develop Board of Directors’ skills and effectiveness

Optimize staff and committee structures and processes

Provide fact-based information to support industry advocacy efforts

Enhance the relationship with and education of the growers and almond community



VISION

Bring great taste, health and vitality to people around the world through the enjoyment of California Almonds



MISSION

Make California Almonds essential to customers and consumers worldwide through innovative research, market development and industry support

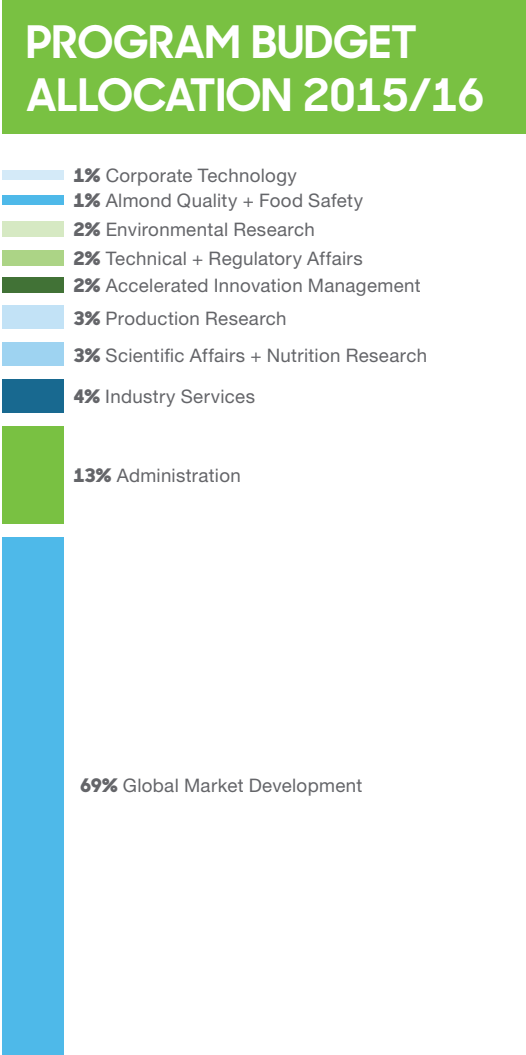




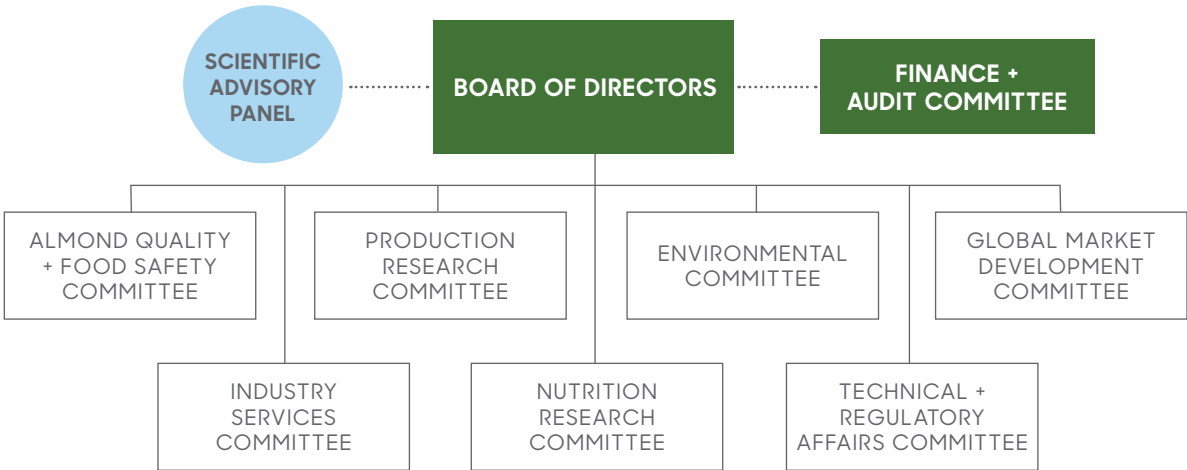
# ALMOND BOARD OF CALIFORNIA PROGRAMS + BUDGET

Almond Board of California programs are funded by a handler assessment placed on each pound of almonds produced. Each year, the ABC Board of Directors, made up of both almond growers and handlers, approves the budget allocation for each program area.

ABC programs are broken out into key areas and work together to educate consumers and to research, innovate and promote almonds in order to help meet our vision and mission. These areas are broken down in the Program Budget Allocation chart to the right and program details can be found throughout the Almanac.



## COMMITTEE STRUCTURE



# WHAT A DIFFERENCE A YEAR MAKES

## 2016 HAS BEEN A YEAR OF SIGNIFICANT MILESTONES

In an increasingly transparent world, Almond Board of California continues to be proactive and share important initiatives that are moving the industry forward, responding to questions being asked about how almonds are grown and processed.

The new Grow What You Know advertising campaign was launched and targeted to California residents to share the many ways the almond industry is innovative and progressive.

By showcasing the California Almond industry's commitment to research and continuous improvement, the Almond Board's proactive public relation's team successfully worked with the media to correct misinformation and share facts about almonds, water and the drought. Those efforts didn't go unnoticed.



### ABC WON TWO PRESTIGIOUS PUBLIC RELATIONS AWARDS



- Public Relations Society of America Silver Anvil Award for Excellence in Issues Management
- PR News Platinum PR Award for Crisis Management

### DID YOU KNOW? ↓

THIS YEAR, THE  
MANAGING DUST AT  
HARVEST TOOLKIT WAS  
EXPANDED TO INCLUDE  
EDUCATIONAL VIDEOS  
IN ENGLISH AND SPANISH

## DRIVING INDUSTRY IMPROVEMENTS



Supporting a priority of the Accelerated Innovation Management (AIM) program, Almond Board has hired an expert in irrigation and water efficiency to interface with growers in the field and use existing tools and research to help those across the spectrum of irrigation management precision improve.



Almond Board expanded its commitment to the AIM program's Sustainable Water Resources initiative with a new partnership with the Lawrence Berkeley National Laboratory. This new expertise uses cutting-edge technology to better understand subsurface water storage, quality and movement.



Responding to recent market shifts and regulatory changes affecting traditional uses of almond coproducts, ABC created a specialized task force in October 2016. The Biomass Task Force consists of a cross-functional group of almond biomass experts, industry members and allied stakeholders who are, together with the Almond Alliance of California, leading research and progress.





## GROWING ACREAGE BRINGS GOOD STUFF

According to the most recent USDA-NASS acreage estimate, California Almonds are grown on 1.11 million acres in California<sup>1</sup>. As acreage has nearly doubled over the last two decades, the benefits of this growing agricultural forest have increased as well with:

675,000 acres

MODERATELY GOOD OR BETTER IN THEIR ABILITY TO RECHARGE GROUNDWATER BASED ON SOIL AND SUBSOIL CHARACTERISTICS<sup>2</sup>

130 million trees

WHICH CLEAN THE AIR AND CAPTURE AND STORE CARBON DIOXIDE, A POTENT GREENHOUSE GAS<sup>3,4</sup>

Producing over 80%

OF THE WORLD'S SUPPLY OF HEART-HEALTHY, NUTRIENT-DENSE ALMONDS<sup>5</sup>

## A BIG YEAR IN HEALTH

Almonds are now “healthy” according to new FDA criteria. With FDA’s September announcement that it will reevaluate the regulatory requirements for use of the word “healthy” on food labels, almonds now meet the agency’s interim “guidance for industry” criteria<sup>5</sup>.

New recommendations for daily nutrient intake in the U.S. mean that almonds now provide 50% of the daily value for vitamin E. Almonds still qualify as an excellent source of vitamin E, magnesium and riboflavin, and as a good source of fiber and phosphorus. Vitamin E, magnesium and fiber were identified in the 2015 U.S. Dietary Guidelines as Nutrients of Public Health Concern, meaning that many Americans are simply not getting enough of them.

2015 Dietary Guidelines were released and included a focus on plant-based foods such as vegetables, fruits, whole grains, nuts—like almonds—and legumes.

## A YEAR OF BIG WINS

- Almond Board of California’s Pre-Export Check program awarded Agricultural Marketing Services Administrators Award for successful implementation.
- Almonds are the #1 nut used in new product introductions worldwide, and for the first time, became the #1 nut used in Europe<sup>6</sup>.
- Unsolicited endorsement from A-list celebrities.



1. USDA-NASS. 2015 Almond Acreage Report. April 2016.  
2. Land IQ. Groundwater Recharge Suitability Analysis. November 2015.  
3. USDA-NASS. 2015 California Almond Acreage Report. Apr. 2016. USDA-NASS. 2016 California Almond Objective Measurement Report. July 2016.  
4. Elias Marvinney, Alissa Kendall, Sonja Brodt, Weiyan Zhu. Life Cycle-based Assessment of Energy Use and Greenhouse Gas Emissions in Almond Production, Part II: Uncertainty Analysis Through Sensitivity Analysis and Scenario Testing. *Journal of Industrial Ecology*, 2015, 10.1111/jiec.12333.  
5. Scientific evidence suggests, but does not prove, that eating 1.5 ounces of most nuts, such as almonds, as part of a diet low in saturated fat and cholesterol may reduce the risk of heart disease. One serving on almonds (28g) has 13g of unsaturated fat and only 1g of saturated fat.  
6. Innova Market Insights, Global New Products Database, 2015.

# 130 MILLION ALMOND TREES



# 130 MILLION REASONS TO TAKE PRIDE<sup>1</sup>

Everyone loves trees. From the day set aside each year to celebrate them to organizations devoted to planting them, trees are valued for the many benefits they provide. How nice that California's #1 crop grows on trees. As the almond community, we provide the world with more than just almonds; job creation, our economy, water efficiencies and more.

1. USDA-NASS. 2015 California Almond Acreage Report. Apr. 2016. USDA-NASS. 2016 California Almond Objective Measurement Report. Jul. 2016.

2. USDA-ARS, NDL. USDA National Nutrient Database for Standard Reference, Release 28. Version Current: September 2015, slightly revised May 2016.

3. USDA-NASS. 2015 Almond Acreage Report. Apr. 2016.

4. Nowak, D., et al. Tree and forest effects on air quality and human health in the United States. Environmental Pollution. 193: 119-129. May 2014.

5. Kendall A, Marvinney E, Brodt S, Zhu W. Life cycle-based assessment of energy use and greenhouse gas emissions in almond production. Part 1: Analytical framework and baseline results. Journal of Industrial Ecology. 2015.

6. Land IQ. Groundwater Recharge Suitability Analysis. November 2015.

7. Ramesh Sagili. Assistant Professor – Apiculture, Department of Horticulture. Oregon State University.

8. Ferris Jabr. "The Mind-Boggling Math of Migratory Beekeeping." Scientific American. August 2013.

9. University of California Agricultural Issues Center. The Economic Impacts of the California Almond Industry. December 2014.

## HEALTH ENHANCING

- An acre of almond trees grow 450 pounds of protein, 260 pounds of fiber and "good" monounsaturated fats, keeping almond lovers energized and satisfied.<sup>2,3</sup>
- Produce oxygen and act as a natural filter, cleaning pollutants from the air, with measurable health benefits.
- Nationally, on average, an acre of trees is associated with \$11 in annual averted health costs.<sup>4</sup>
- Help offset 50% of almond industry carbon emissions.<sup>5</sup>



## BEE HIVE STRENGTHENING

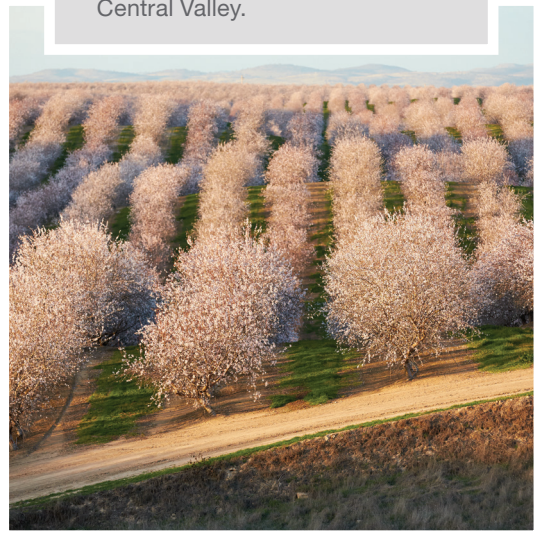
- Provide honey bees with often the first natural source of food each spring.
- Honey bee hives routinely leave stronger after visiting during bloom.<sup>7</sup>
- Beekeepers can then split many of the hives to grow their apiaries.<sup>8</sup>





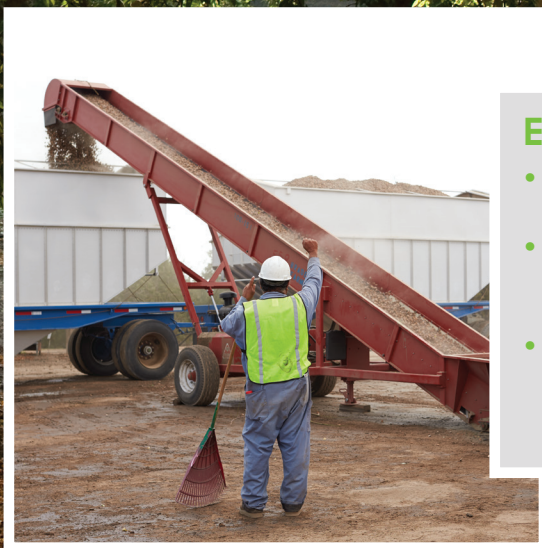
## CALIFORNIA VALUE ADDING

- 60% of almond trees grow on soil good for groundwater recharge.<sup>6</sup>
- Grow three crops with every drop. the hull, the shell and the kernel—all of which are used.
- Enhance the beauty of the Central Valley.



## ECONOMY BUILDING

- Add \$11 billion annually to California's economy.<sup>9</sup>
- Provide 104,000 jobs across California, 97,000 of which are in the Central Valley.<sup>9</sup>
- Are part of the fabric of their local communities, supporting local schools, businesses, and civic and religious organizations.





# CALIFORNIA ALMOND INDUSTRY OVERVIEW

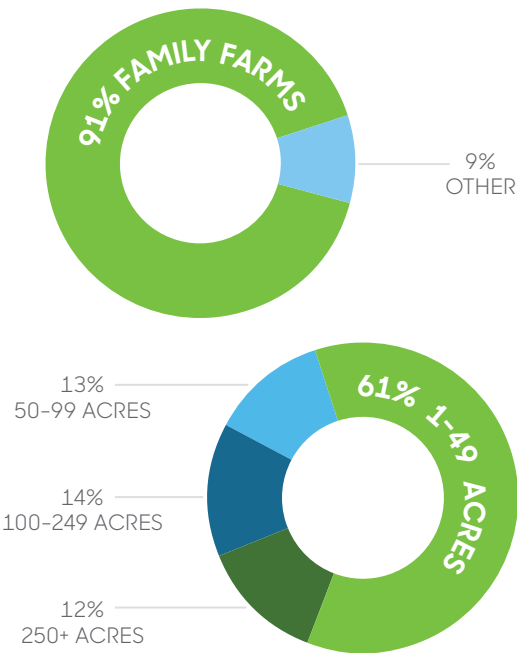
## CALIFORNIA ALMOND GROWERS



THE CALIFORNIA ALMOND GROWING COMMUNITY IS DRIVEN BY FAMILY FARMERS.

According to the 2012 USDA Agricultural Census, there are around 6,800 California Almond farms. Many are owned and operated by third- and fourth-generation farmers who live on their land and plan to pass it on to their children and grandchildren.

### CALIFORNIA ALMOND FARMS



Source: USDA 2012 Census of Agriculture.



NEARLY 75% OF CALIFORNIA ALMOND FARMS ARE 100 ACRES OR LESS.

While much is discussed about the pros and cons of both small and large farms, both have an important role to play. For example, large farms contribute to the industry's overall production with their size and scale lending themselves to operational efficiencies and precision growing practices. Regardless of size, all almond farmers recognize that near-record production must be matched by an unprecedented commitment to sustainability, especially as they depend on natural resources for their livelihoods.



# Almond Handlers

There are 100 California Almond handlers that process almonds, many of which are family owned and operated.

# California Almond Domestic Shipments

2015/16 domestic shipments marked the third largest in history at 593 million pounds.

At 33% share of shipments, the U.S. remains the top global destination for California Almonds.

# California Almond Exports

Export shipments went to more than 90 countries.

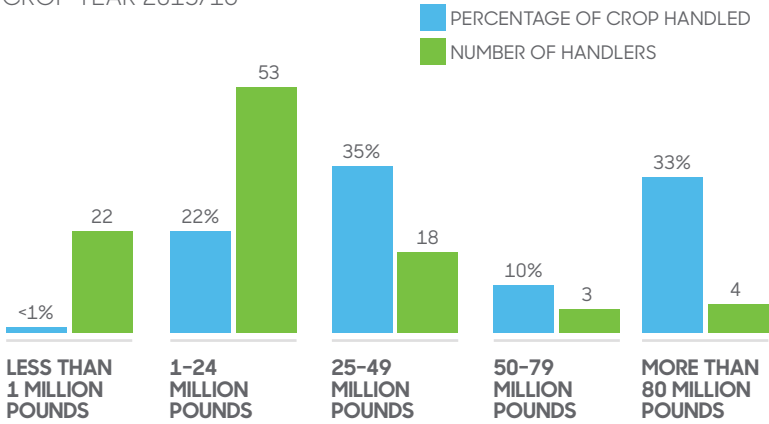
Spain was the top export market.

For the seventh year in a row, more than one billion pounds were exported.

The top ten export markets represent 65% of total export shipments.

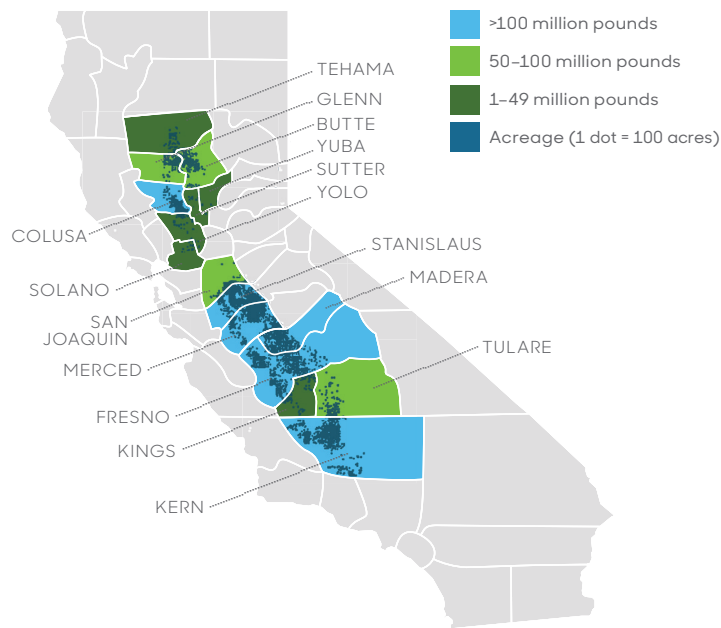
# DISTRIBUTION OF CROP BY HANDLER SIZE

CROP YEAR 2015/16



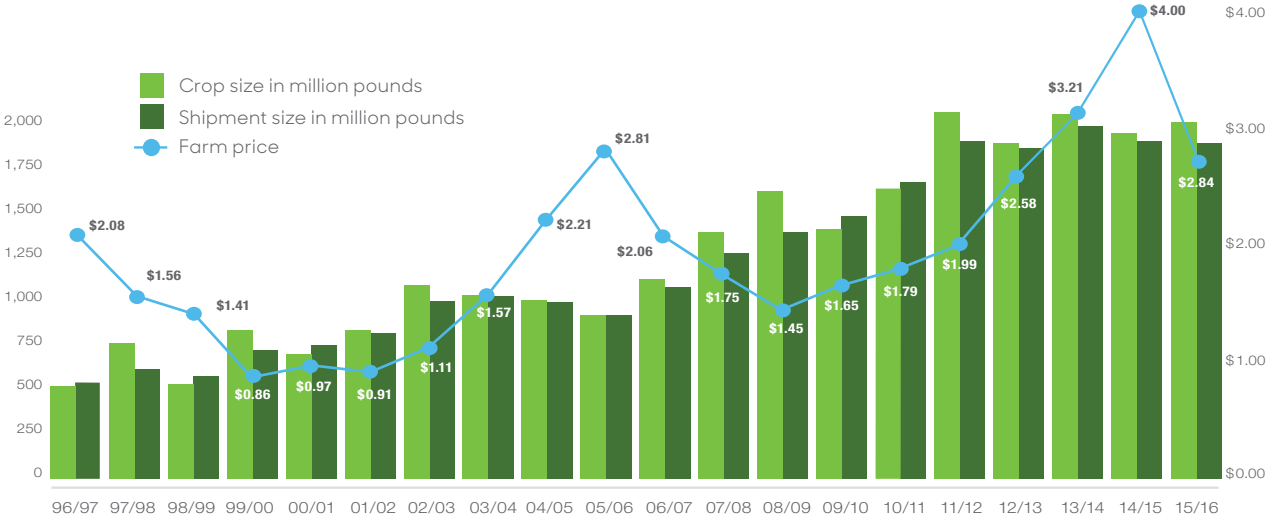
# WHERE ALMONDS ARE GROWN

PRODUCTION BY COUNTY 2015/16



# HISTORICAL CROP SIZE + SHIPMENTS VS. FARM PRICE

CROP YEARS 1996/97-2015/16



Sources: Almond Board of California; USDA, NASS/PRO.


# COMMITTED TO CONTINUOUS IMPROVEMENT


## ABOUT ALMOND SUSTAINABILITY<sup>1</sup>


Sustainability for California Almonds is interconnected and crosses all aspects of the almond lifecycle, inside the orchard and beyond.

Underlying the advancement and innovation in each of the categories below is more than \$60 million in Almond Board-funded research spanning 40 years.

### THIS RESEARCH HAS LED TO IMPROVEMENTS IN:

- 

Management and protection of vital natural resources
- 

Practices that protect neighbors and surrounding communities
- 

Increased understanding of the nutritional benefits of almonds



Together, these advancements continue to pave the way for almonds to be an economically, environmentally and socially responsible crop for California.

1. What defines California Almond sustainability? 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, nutritious, safe food supply.



## CALIFORNIA ALMOND SUSTAINABILITY PROGRAM

When it comes to following sustainable agricultural practices, California Almond growers and handlers continuously challenge themselves to do more.

One of the most important tools available to the California Almond community is the California Almond Sustainability Program (CASP). CASP was established in 2009 to educate participants about sustainable practices, helping them improve and understand the ongoing sustainability practices of growers and handlers related to their operations through self-assessment modules.

As CASP approaches its 10-year anniversary, the program itself is in the midst of its own continuous improvement. Given new sustainable practices and a transition in the way participants utilize the program, shifting from paper-based modules to an online portal, CASP is evolving to match grower and processor needs. These changes will make for a visionary sustainability program that will not only help the industry improve, but also account for increasing regulatory requirements and customer interest in sustainability. Stay tuned as we roll out these changes!

To learn more about the California Almond Sustainability Program and how to participate, visit [Almonds.com/CASP](https://Almonds.com/CASP).

### ..... BETTER TOGETHER

Through the California Almond Sustainability Program, we've achieved:

449,553

ACRES OF CALIFORNIA ALMONDS REPRESENTED BY ASSESSMENTS COMPLETED

3,173

SELF-ASSESSMENT MODULES COMPLETED

120

EDUCATIONAL WORKSHOPS WITH OVER 1,600 PARTICIPANTS

8

EDUCATIONAL SELF-ASSESSMENT MODULES

2

RESEARCH-BASED CALCULATORS:  
• IMPROVING IRRIGATION  
• FINE-TUNING FERTILIZER

1

PROGRAM DEVOTED TO CONTINUOUS IMPROVEMENT

# ROOTED IN RESEARCH

Formally launched in 1973, the Almond Board’s research program has been funding research for over 40 years. This program began with a focus on production research, but has evolved into four distinct research programs, each administered by the committees described below.



## NUTRITION RESEARCH COMMITTEE

Heart Health + Beyond, Diabetes and Metabolic Syndrome, Weight Management, Satiety and Gut Health, Cognition, Composition, Allergens

Founded in 1995. Total investment to date over \$22.9 million, with 92 projects funded.

## ALMOND QUALITY + FOOD SAFETY COMMITTEE

Prevalence and Monitoring, Almond Safety and Quality

Founded in 2001. Total investment to date over \$6.5 million, with 85 projects funded.

## OPTIMIZING ALMOND BOARD RESEARCH

Continuous improvement isn’t only a focus of almond growers and processors. Over the past year, the Almond Board’s Production Research and Environmental committees have engaged in some continuous improvement of their own—strategic planning to ensure their structure, mission and goals align to support a strategic priority of Almond Board of California: making almonds a Crop of Choice for California.

While the Almond Board’s Accelerated Innovation Management program enables the almond industry to meet this objective, it must be underpinned with substantive goals that support advancement in **RESEARCH, OUTREACH, EDUCATION** and **POLICY** across several key areas. With this support, and by focusing on the nine areas defined below, the AIM and traditional research programs are coming together to realize another strategic priority of Almond Board: making almonds the Nut of Choice for consumers around the world.

- Irrigation and Nutrient Management
- Orchard, Tree and Rootstock Improvement
- Harvesting Innovation
- Almond Biomass, Coproducts, Energy
- Soil Health Management
- Pest Management
- Food Safety
- Pollination
- Sustainability

## PRODUCTION RESEARCH COMMITTEE

Pest Management and Entomology, Horticulture and Crop Research, Plant Pathology and Nematology, Aflatoxin Field Studies, Bee Health and Pollination

Founded in 1973. Total investment to date over \$22.3 million, with 330 projects funded.

## ENVIRONMENTAL COMMITTEE

Water Quality, Air Quality, Stewardship and Crop Protection

Founded in 2003. Total investment to date: over \$6.4 million, with 57 projects funded.



# ACCELERATING INNOVATION

Since its launch last year, the Almond Board’s Accelerated Innovation Management program has funded nearly 20 projects. Featuring bold new partnerships and nimbler than the Board’s traditional research program, AIM consists of four major initiatives designed to meet the future needs of the California Almond industry while benefiting local communities and the environment.

Accelerating grower adoption of irrigation practices and management strategies that **maximize crop per drop**.



Accelerating grower adoption of irrigation practices and management strategies that maximize crop per drop. Focusing on **new technologies, innovations and out-of-the box solutions** to bring all components of almond growing into the 22nd century.



Exploring how almond orchards can be leveraged to **recharge stressed groundwater aquifers** and better use water that’s currently going to waste.

Over the past year, Almond Board and its research partners:

**FOUND** that 675,000 acres of California Almond orchards have moderately good or better soil suitability for groundwater recharge.

**FLOODED** two orchard trial sites with excess winter flood flows to better understand the effects on orchard health and water movement in the soil.

**INSTALLED** technology to allow researchers to “see” underground so they can better understand subsurface water storage, quality and movement.

**RECRUITED** 10 almond growers representing 2,200 acres interested in hosting recharge demonstration trials and continued to ensure groundwater recharge is a policy priority.



Understanding how almond production impacts air quality and evaluating options to **decrease emissions**.

Over the past year, Almond Board and its research partners:

**BEGAN** research on potential alternatives to cogeneration facilities, which had traditionally turned trees to alternative energy at the end of their productive lives.

**IMPLEMENTED** five orchard trial sites where whole orchards have been ground up and integrated into the soil and researchers will track the effects on new orchards planted there.

**LAID** the groundwork for a practice that, if proven safe for trees and good for yields, will keep important nutrients in the orchard ecosystem and enhance the carbon storage benefits almond trees already provide.



# GETTING THE MOST OUT OF EVERY DROP

## IRRIGATION RESEARCH: THE BASICS + BEYOND

California Almond growers are leaders in water-use efficiency, largely due to decades of Almond Board-funded research and innovation. In fact, improvements in production practices and water-saving technologies over the past 20 years have helped almond farmers reduce the amount of water it takes to grow one pound of almonds by 33%<sup>1</sup>.

To continue to be leaders in this area, Almond Board remains committed to funding irrigation research—both to better understand and refine the basics that support grower day-to-day needs, as well as providing a platform for creative, cutting-edge solutions key to innovation. Here is a sampling of projects currently underway:

### BASIC RESEARCH



#### LYSIMETER WATER-USE MEASUREMENTS:

using a lysimeter (a very large, continuously weighing flowerpot) planted with an almond tree to precisely determine water used by the tree and soil (evapotranspiration) and increase understanding of water saved by reducing irrigation at nonessential times in the growing season<sup>2</sup>



#### WATER PRODUCTION FUNCTION:

relating water applied to almond yield potentials to help growers understand tradeoffs, make informed decisions with limited resources and achieve the most crop per drop<sup>3</sup>



#### CROP-WATER MODELING:

developing a water-demand model that accounts for the complex interaction between almond tree physiology, weather conditions and soil characteristics that can be leveraged to improve water-use efficiency while maintaining almond tree yield and nut quality<sup>4</sup>

### BEYOND RESEARCH



#### SITE-SPECIFIC WATER-DEMAND INSTRUMENTS:

validating and optimizing field-level measures of water used by the tree and soil (evapotranspiration) for an irrigation management tool that could provide growers with site-specific amount and timing of irrigations to meet tree needs<sup>5</sup>



#### SAP-FLOW SENSORS:

developing and adapting sap-flow sensors for almonds—a research tool that can be applied to many trees within an orchard to quantitatively measure water use and even distinguish differences in water requirements between tree varieties—with an eye toward commercialization<sup>6</sup>



#### LEAF MONITORING FOR ZONAL IRRIGATION:

demonstrating an alternative to time-consuming and labor-intensive methods of measuring plant water needs using a network of leaf sensors installed on trees and tied into a wireless network that can account for in-field soil variations to make zonal irrigation management decisions<sup>7</sup>

### DID YOU KNOW? ↓

In 2016, Almond Board hired an expert in irrigation and water efficiency to interface with growers in the field and use existing tools and research to help those across the spectrum of irrigation management precision improve.

1. University of California, 2010. Food and Agriculture Organization of the United Nations, 2012. Almond Board of California, 1990-94, 2000-14.  
2. 16-HORT22-Shackel. Lysimeter – Whole Tree ET Response to Mild and Moderate Water Stress.  
3. 16-HORT17-Shackel. Almond Water Production Function.  
4. 16-HORT27-DeJong. Development of an Operational Dynamic Crop Model for a Better Understanding of Water Management of Almond Orchards in California.  
5. 16-HORT28-McElrone/Parry. Evaluating the Effectiveness of Surface Renewal and Other Technologies to Determine Almond Tree Water Use and Water Stress.  
6. 16-HORT21-Gilbert. Applying an Improved Heat Ratio Method Sap Flow Sensor to Almonds to Test for In-field Variation in Water Use.  
7. 16-HORT24-Upadhyaya. A Leaf Monitoring System for Continuous Measurement of Plant Water Status to Assist in Irrigation Management of Specialty Crops.



# BRINGING RESEARCH TO REALITY

Almond Board has led the way in translating years of research findings, both industry-funded and otherwise, into two web-based, interactive decision-support tools, also known as calculators. Focused on irrigation scheduling and nitrogen budgeting, these tools are available to growers at no cost and are designed to streamline decision making and regulatory reporting requirements while helping protect water quality and quantity.

## IMPROVING IRRIGATION

Using grower-submitted data about orchard and irrigation system setup, this calculator links those factors with local weather data and other inputs to generate irrigation run-time schedules that advise the amount and timing of irrigations. This allows growers to better understand an orchard’s irrigation needs, which has positive impacts on tree health and yields, leading to more crop per drop.

## FINE-TUNING FERTILIZATION

A research-based predictive model, this tool advises how much and when to apply nitrogen fertilizer. Growers input data about yield estimates, tissue sampling and nitrogen available from other sources, which determines the orchard’s nitrogen demand during the growing season and helps meet record-keeping requirements of California’s Irrigated Lands Regulatory program. This allows growers to get the most out of their input investment while protecting water quality.



## GROWING MORE THAN JUST ALMONDS

Just as irrigation research produces multiple benefits, such as improved practices, fine-tuned management and new technology, almond trees and the water used to grow them produce multiple products. In 2015, the California Almond industry grew<sup>1</sup>:

**1.9 BILLION LBS OF  
KERNELS**

a healthy, nutrient-dense, protein powerhouse of a food

**3.8 BILLION LBS OF  
HULLS**

a nutritious feed for dairy cows that reduces the amount of water used to grow other feed crops

**1.3 BILLION LBS OF  
SHELLS**

a natural source of livestock bedding and other value-added uses

**130 MILLION<sup>2</sup>  
TREES**

which clean the air and, at the end of their lives, are used to create alternative energy or even improve soil quality

1. Almond Board of California. Supplement to Almond Industry Position Report. July 2016.  
2. USDA-NASS. 2015 California Almond Acreage Report. April 2016. USDA-NASS. 2016 California Almond Objective Measurement Report. July 2016.



# USING EVERYTHING THE ORCHARD GROWS: OUR COMMITMENT TO ZERO WASTE

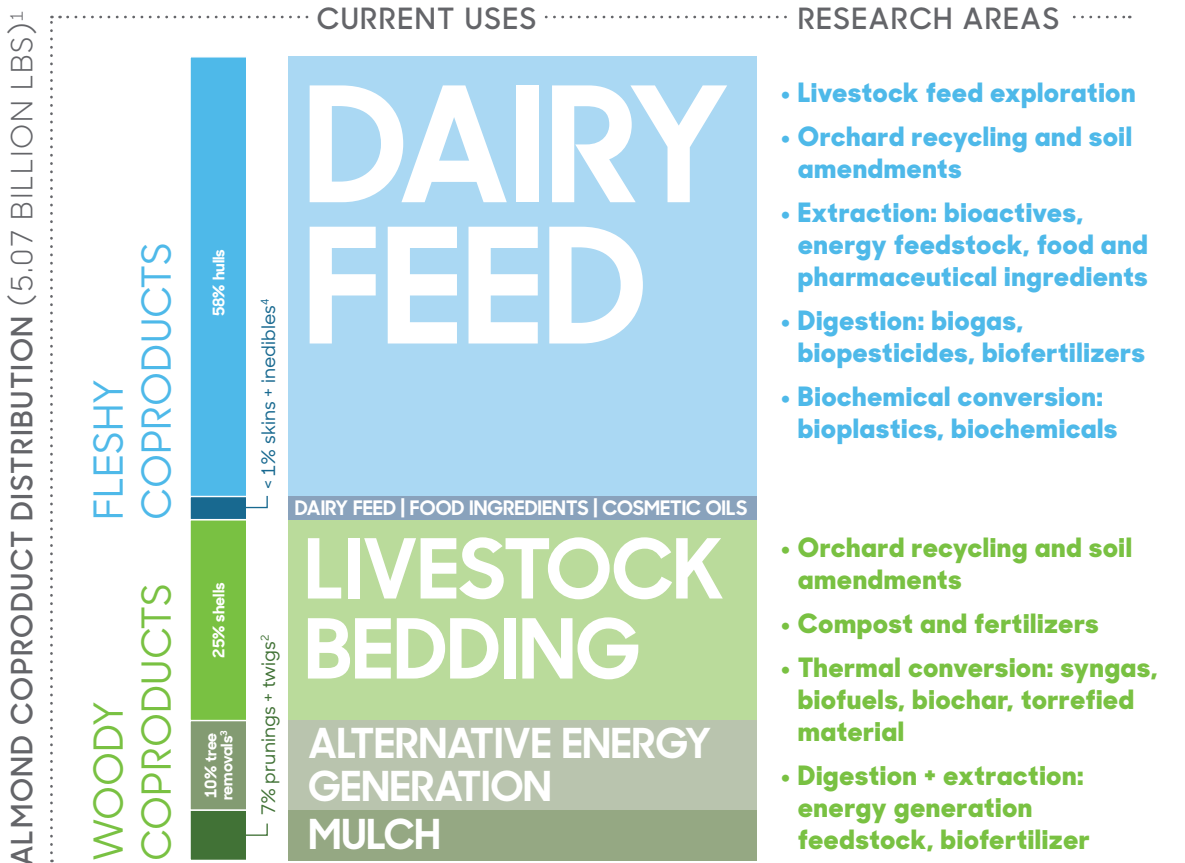
In addition to the almonds for which they are grown, almond trees also produce hulls and shells, which protect the nut during its development, as well as the woody biomass of the tree itself.

For decades, the California Almond industry has utilized these coproducts in a responsible, sustainable fashion, often yielding secondary benefits. However, recent market shifts are forcing changes to those traditional uses and spurring new interest in the highest value use of each almond coproduct.

With the help of the Almond Board’s AIM research program (see page 13 for details), the almond community is stepping up research efforts to identify and understand all utilization options for almond coproducts. This research is needed to determine how to make all of the possible approaches described below usable under a wide range of circumstances and sort out potential regulatory issues.

## UNDERSTANDING ALMOND COPRODUCTS

What are they? How are they used? Are there better uses? Read the table below to learn more about current and future uses of all almond coproducts.



## DID YOU KNOW?

- > To best lead research and progress in this area, Almond Board of California has created a specialized task force. Launched in October 2016, the **Biomass Task Force** is a cross-functional group of almond biomass experts, industry members and allied stakeholders.
- > Along with investing in research, ABC is working closely with the Almond Alliance of California to provide relevant data to assist in its efforts as part of a broad coalition seeking state legislative and regulatory solutions to California’s management of woody biomass.

1. USDA-NASS. 2016 California Almond Objective Measurement Report. July 2016. Brent Holtz. UCCE Cooperative Extension, San Joaquin County. 2015.  
USDA-NASS. California Almond Acreage Report. April 2016.  
2. Almond prunings (5%) are removed from trees for cultural purposes and access reasons. Almond twigs (2%) are those that are shaken from the tree during the harvest process and removed from the orchard with the crop.  
3. On average, almond orchards are economically viable for 25–30 years after which they are removed and often replanted. 10% is the portion of almond coproducts represented by woody biomass from removed almond trees in 2016, not the woody biomass that exists across the industry in the form of living almond trees.  
4. Inedible almonds (0.4%) are those harvested but unfit for consumption. Skins (0.2%) are a byproduct of almond blanching.

# POLLINATION PARTNERS



**ALMOND TREES** need cross-pollination, and honey bees help move pollen from tree to tree, setting the crop.

**BEE HIVES** consistently leave almond orchards stronger than when they came in because almond pollen is very nutritious to bees and is their first natural food source of the year.<sup>1</sup>

## COMMITTED TO HONEY BEE HEALTH

While the number of honey bee hives in the U.S. has remained stable for the past 20 years,<sup>2</sup> overwintering and summer hive losses continue to be of concern. This requires beekeepers to work harder to keep hives healthy and maintain hive numbers.

The decline in honey bee health has been linked to a variety of complex factors, including activities associated with both beekeeping and crop production<sup>3</sup>

Through the investment of industry dollars, Almond Board has funded more honey bee health research than any other crop group with more than 100 research projects since 1995<sup>4</sup>

That research and it's priority areas line up directly with the factors impacting honey bee health. See the table below for how the California Almond industry is supporting to honey bee health.

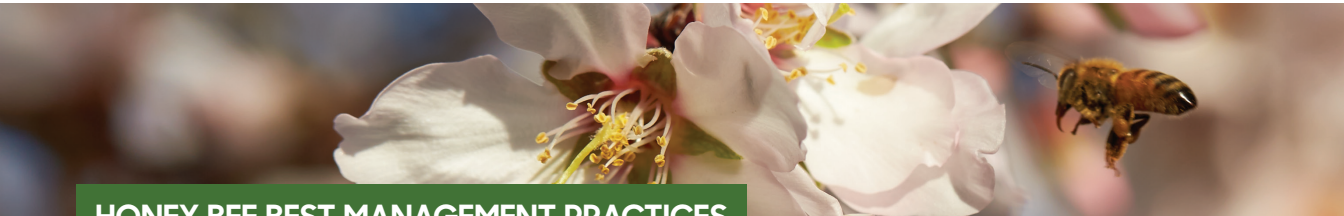
FACTORS IMPACTING HONEY BEES	WHAT WE'RE DOING
<b>VARROA MITES</b>	Investigating treatment options and beekeeper guidance for treating this devastating pest
<b>OTHER PESTS AND DISEASES</b>	Kickstarting Tech Transfer Teams made up of traveling bee doctors who work with beekeepers to monitor hives and advise on pest and disease treatment as necessary
<b>LACK OF GENETIC DIVERSITY</b>	Funding researchers to bring new, foreign genetic material into the U.S. and making it available to U.S. beekeepers for improving breeding stock
<b>PESTICIDE EXPOSURE</b>	Understanding if pest control materials needed to protect the almond crop during pollination impact bees and how those materials can be applied to minimize impact
<b>LACK OF FORAGE AND NUTRITION</b>	Understanding the benefits and best management practices for supplemental forage and supporting the distribution of blooming plant seed to almond growers for helpful bee nutrition before and after almond bloom

1.Ramesh Sagili. Department of Horticulture. Oregon State University.

2. USDA-NASS. Honey Production Report 1986–2015.

3. Honey Bee Health Coalition, 2014.

4. Gene Brandl. Vice President, American Beekeeping Federation.



## HONEY BEE BEST MANAGEMENT PRACTICES

In addition to helping bees stay healthier in their own right, ABC also works with growers and other pollination partners to ensure California Almond orchards remain a good and safe place for honey bees.

The Almond Board's Honey Bee Best Management Practices (BMPs) are based on decades of research and are having an on-the-ground impact on protecting honey bees in the orchard and beyond. They extend to and educate all pollination partners.



# ALMOND FOOD SAFETY

## 2016 MARKS AN IMPORTANT FOOD SAFETY MILESTONE

California Almonds have been at the forefront of food safety, and September 2016 marks the 10-year anniversary of the pasteurization program. Over the years the pasteurization program expanded from the U.S. to include Canada and Mexico and is used in other markets, as requested, based on their local food safety preferences. In the U.S., the program has positioned California Almond growers and handlers well for addressing rules under the Food Safety Modernization Act.

PASTEURIZATION BY THE NUMBERS		↓
Validated Machines	193	
Process Authorities	17	
Handlers with Validated Machines	17	
Custom Processors	23	
Direct Verifiable (DV) Users	33	
DV Auditors	17	
Countries with Validated Machines	3	
Technologies Used	>16	
>1.85 Billion Lbs. Estimated Total Validated Capacity		

## PRE-EXPORT CHECKS PROGRAM—ONE YEAR UNDER OUR BELTS!

In August 2015, California Almonds transitioned from a Voluntary Aflatoxin Sampling Plan program to a Pre-Export Checks (PEC) program. PEC was developed by the California Almond industry to provide an aflatoxin sampling plan for the analysis of ready-to-eat products equivalent to that being used by the European Union (EU) for official testing of incoming consignments. The program ensures the industry is not vulnerable to inconsistent or arbitrary controls.

For crop year 2015/16, there were over 13,000 PEC certificates generated with a passing rate of over 98%. California Almonds are one of only three commodities recognized under Pre-Export Checks in the EU and the USDA Agricultural Marketing Service (AMS) awarded the almond PEC Program with an AMS Administrators Award for its successful implementation in June 2016.



OVER 13,000 PEC  
CERTIFICATES  
GENERATED WITH  
A PASSING RATE  
OF OVER 98%.

THIS SIGNIFIES THE IMPORTANCE  
OF THE PROGRAM AND THE  
ALMOND INDUSTRY’S CONTINUED  
COMMITMENT TO DELIVERING  
EXPORTS OF UTMOST QUALITY.



# NUTRITION RESEARCH

## STUDY FEATURE: ALMONDS AND HEART HEALTH, EVIDENCE TO DATE

Systematic reviews and meta-analyses provide what is considered the highest level of evidence and allow researchers to draw meaningful conclusions from a comprehensive body of research<sup>1</sup>


A new systematic review and meta-analysis (SRMA) published in the *Journal of Nutritional Science* found that eating almonds results in significant reductions in total cholesterol, “bad” LDL cholesterol and triglycerides while having no significant impact on “good” HDL cholesterol levels. This adds to the weight of evidence that supports the consumption of almonds as part of a healthy diet to help maintain healthy blood lipid levels and reduce the risk of heart disease. In this systematic review, 18 human studies qualified to be included, from which findings were pooled and analyzed.

Based on the evidence from the SRMA, it was concluded that **almonds have favorable effects on total and LDL “bad” cholesterol levels and triglyceride levels while having no significant impact on “good” HDL levels among participants eating at least 1.5 ounces of almonds a day<sup>2</sup>**


1. Haidich AB. Meta-analysis in medical research. Hippokratia. 2010;14(Suppl 1):29-37.  
2. Musa-Veloso et al. The effects of almond consumption on fasting blood lipid levels: a systematic review and meta-analysis of randomized controlled trials. *J Nutr Sci*; 2016,5(e34):1-15.

SYSTEMATIC REVIEW AND META-ANALYSIS RESULTS


EFFECTS OF ALMONDS ON BLOOD LIPIDS



LOWERS  
LDL  
CHOLESTEROL



LOWERS  
TOTAL  
CHOLESTEROL



LOWERS  
TRIGLYCERIDES

MAINTAINS  
HDL CHOLESTEROL

## COMMITMENT TO NUTRITION + HEALTH RESEARCH, 1992-PRESENT

92

PROJECTS INVESTIGATING ALMONDS AND HEALTH

132

PUBLISHED STUDIES

Other areas of research:

- cognition
- gut microbiome
- composition and calorie count
- liver health



**HEART HEALTH:**  
22 RESEARCH PROJECTS  
27 SCIENTIFIC PUBLICATIONS TO DATE



**DIABETES AND METABOLIC SYNDROME:**  
13 RESEARCH PROJECTS  
13 SCIENTIFIC PUBLICATIONS TO DATE



**WEIGHT MANAGEMENT, SATIETY AND GUT HEALTH:**  
21 RESEARCH PROJECTS  
32 SCIENTIFIC PUBLICATIONS TO DATE

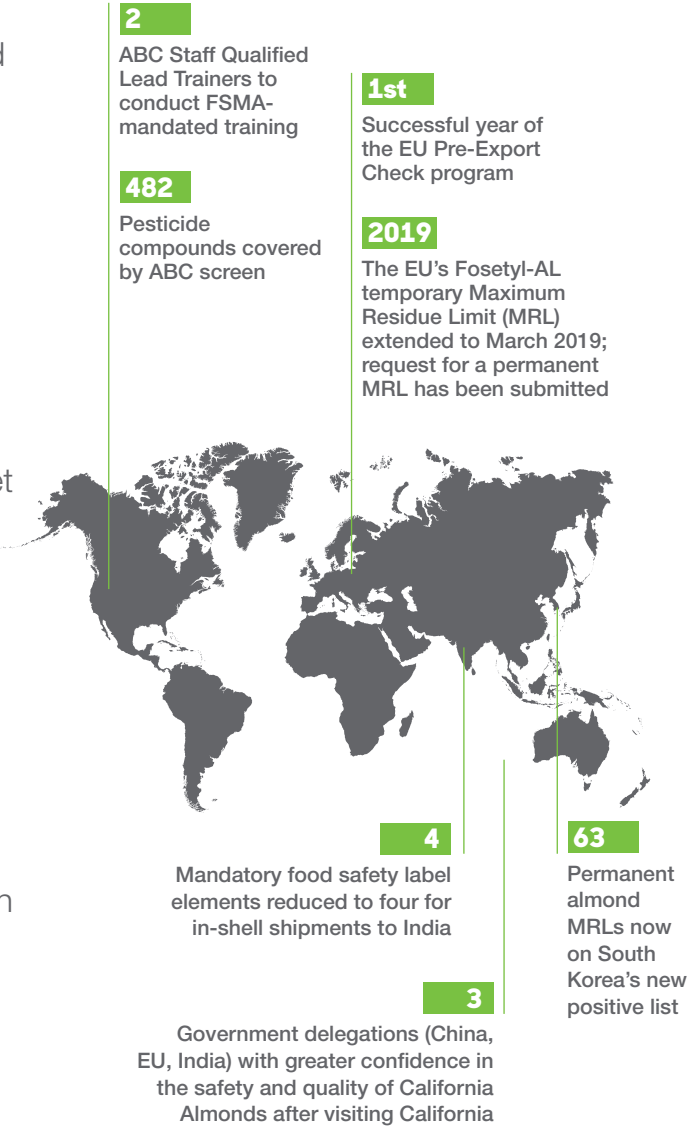


# GLOBAL, TECHNICAL + REGULATORY AFFAIRS

Shipping to more than 90 countries means operating on a global level—understanding and responding to a variety of issues, stakeholders and priorities. Situations can be triggered by new regulations, food safety legislation or import requirements or standards. But whether the focus is on the regulatory environment impacting production practices or consumer priorities in a foreign market, Almond Board has successfully integrated research, technical expertise and relationships to address a rapidly changing market environment.

Government Affairs is an essential part of Almond Board activities. Leveraging its extensive research program, Almond Board educates authorities on industry practices and the impact of regulatory decisions. This has resulted in stronger relationships and a trusted reputation with stakeholders around the world.

## 2016 ACHIEVEMENTS



## OUR GOAL

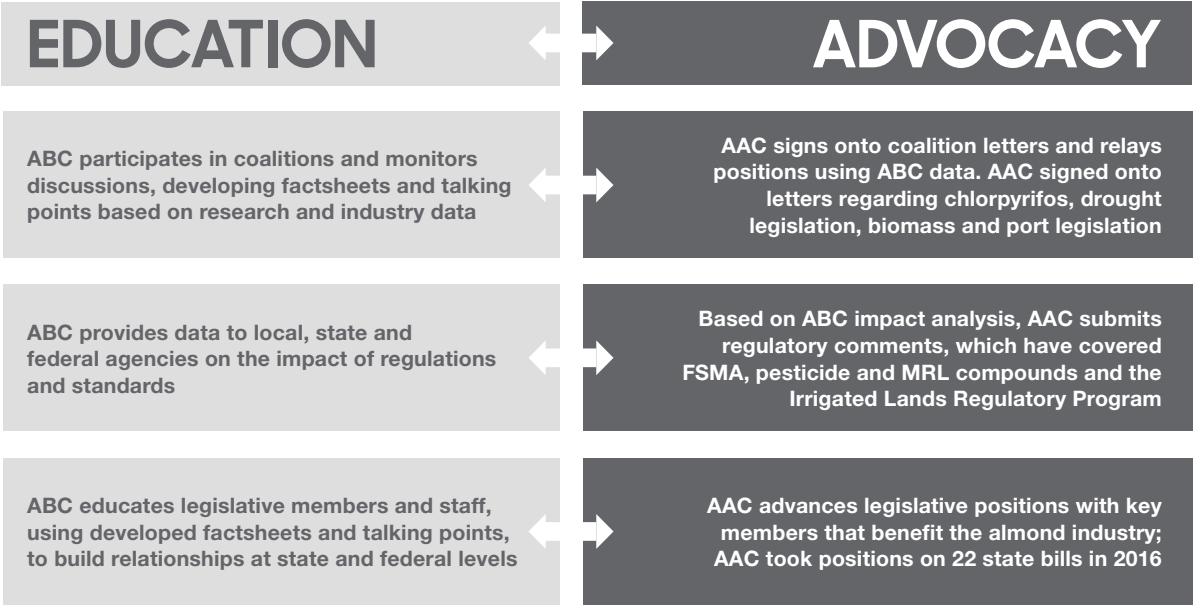
Our goal is to be the primary source of factual, science-based information founded in research, which strengthens our relationships and reputation with stakeholders around the world.



# DOING MORE THROUGH COLLABORATION

## Almond Board of California and Almond Alliance of California

Since 2013, Almond Board of California and the Almond Alliance of California (AAC) have worked together under a Memorandum of Agreement (MOA) to provide the California Almond industry with expanded opportunities to advocate for industry priorities. Specifically, the MOA empowers Almond Alliance to pick up where Almond Board must leave off, advocating policy changes at any level of government. The result is that the investment growers have already made in research through Almond Board is utilized to the fullest extent possible.



ABC

Almond Board, as a Federal Marketing Order, is prohibited from lobbying, but is able to educate and provide important research information on a wide range of almond-industry issues.

TOGETHER

ALMOND BOARD AND ALMOND ALLIANCE WORK ON ISSUES OF MUTUAL CONCERN AND COMPLEMENT EACH OTHER'S UNIQUE STRENGTHS.

# NAVIGATING THE FUTURE OF FARMING + FOOD TOGETHER

## GROWING THE NEXT GENERATION OF ALMOND LEADERS

Through your commitment to developing leaders, more than 115 industry members like yourself have graduated from the Almond Leadership Program and \$20K has been raised for FFA Foundation scholarships.

## BRINGING AG INTO THE CLASSROOM AND THE COMMUNITY

Many students, and even adults for that matter, don't realize that almonds grow on trees. You have helped close this gap in understanding by sharing "An Almond Story" video, lesson plan and activity books with more than 100,000 third graders across the state.

In addition, the new Honey Bee Pavilion, designed for large community events, shows consumers the pollinator's powerful role in almond production and how the almond industry supports honey bee health.

## RESOURCES AND EDUCATIONAL MATERIALS FOR ALMOND PRODUCTION AND PROCESSING

Through your use of the **Honey Bee Best Management Practices**, more industry members recognize the importance of working with all pollination stakeholders to protect honey bee health.

The **Technical Kit** and **eLearning courses**, along with the **Almond Lifecycle video** are powerful tools that educate buyers, regulators and neighbors on the ins and outs of almond farming, varieties, food safety considerations and more.

Based on new **educational videos**, you took key steps to reduce harvest dust, which was recognized in your community with positive media coverage about harvest and fewer letters to the editor.

Farming efficiency tools, such as the **nitrogen and irrigation calculators**, use self-submitted information about your current practices to suggest research based input guidance while helping you to comply with current regulations.

## BECOME INVLOVED

As an industry member who lives and works every day growing and processing almonds or an allied industry member who supports these activities, you are the best person to share the California Almond story!

- **APPLY** for the Almond Leadership program
- **BECOME** an almond ambassador
- **ATTEND** The Almond Conference
- **PARTICIPATE** in the California Almond Sustainability program
- **SHARE** "An Almond Story" with your local school
- **FOLLOW US ON** Twitter @almondboard and on Facebook at Facebook.com/AlmondBoardofCalifornia



# GLOBAL MARKET OVERVIEW



Almond Board of California (ABC) marketing programs are built upon the foundation of solid research insights. ABC commissions comprehensive market research projects to identify the most suitable markets and target audiences that will provide the greatest return on investment. This market research also helps us develop communication strategies that are most compelling and beneficial to that country and target.

Across the globe, ABC currently conducts marketing activities in eight key countries: United States, Canada, United Kingdom, France, Germany, India, China and South Korea. The marketing mix in these countries varies, but includes activities such as advertising, PR and social media.

ABC is also continually evaluating changes we can make to our existing programs and looking at new market opportunities to ensure consumer demand precedes increases in supply. Most recently, investments into new high-potential markets, such as Japan and Mexico, are being evaluated.

This approach is a commitment to building long-term consumer demand for almonds across the globe.



## DID YOU KNOW?

#1

Almonds are the #1 nut used in new product introductions worldwide and, for the first time ever, became the #1 nut used in Europe!



### FARM TO FORK

As people around the world express increased interest in knowing where their food comes from and how it's grown, our marketing programs have evolved to focus more on educating people about how almonds get from the orchard to consumers' hands.

1. Innova Market Insights, Global New Products Database, 2015.







# NORTH AMERICA

**ALMONDS ARE VIEWED AS ONE OF THE HEALTHIEST SNACKS,** but the snacking landscape is cluttered, with almonds included in only 4% of snacking occasions. Consumers are hungry to know and feel good about how their food is grown and produced.

## APPROACH

Promoted almonds as the perfect go-to snack by sharing the health benefits and featuring craveable, convenient snacking ideas. The message was spread in a compelling way by partnering with third-party spokespeople and advocates.

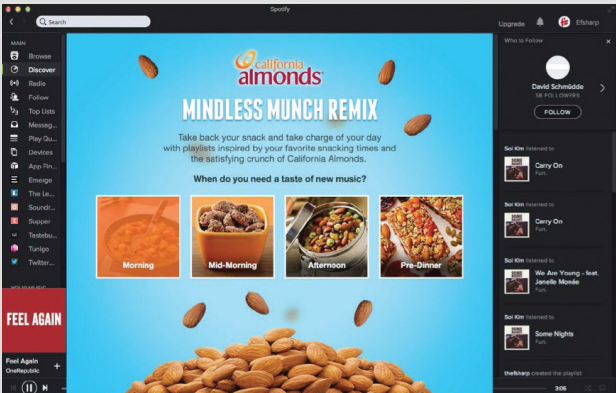
Also launched the Grow What You Know campaign to help drive awareness of the almond industry's long time commitment to sustainability.

Endorsements like never before from A-list celebrities.

Featured prominently and favorably in the latest Dietary Guidelines for Americans.

Almonds are now "healthy," according to new FDA guidelines.<sup>1</sup>

Active since	1999
Category of focus	SNACKING
Consumer target	male + female super-snackers who are food involved and concerned about their health
Reaching consumers	
Advertising	Public Relations
Social Media	



# ELLE

Divine Secrets of the Handful-of-Almonds Sisterhood  
What do Cameron, Jennifer, Gwyneth, and Kate all have in common? A lot, it turns out.



1. A one-ounce serving of almonds contains 14 grams of total fat, of which 9 grams are monounsaturated and 3.5 grams are polyunsaturated (another "good" type of fat), and only 1 gram of saturated fat.



Almonds are now the #1 nut in the UK, France and Germany for new snack product introductions!<sup>1</sup>

Active since	2008
Category of focus	SNACKING
Consumer target	women who are open to snacking, concerned about their health, enjoy cooking and prefer eating fresh foods

Reaching consumers



Advertising



Public Relations



Social Media

\*UK + France only. †UK only.

UNITED KINGDOM



THE TARGET AUDIENCE IN THE UK IS GETTING YOUNGER and they believe almonds are something to eat in moderation because of weight-gain concerns.

APPROACH

Expanded the target audience to include millennial almond lovers and launched a new advertising campaign to focus on the most important motivators for eating almonds: health and weight management. To demonstrate how almonds easily fit into the target's life, ABC teamed up with a very popular lifestyle blogger and a dietitian and created buzz through social channels.



Top-of-mind awareness has more than doubled since 2007 in the nut category<sup>2</sup>

Consumers rated almonds the #1 healthiest nut<sup>2</sup>

1. Innova Market Insights, Global New Products Database, 2015.  
2. EU3 Consumer Awareness, Attitude, and Usage Study, Sterling-Rice Group 2015.

FRANCE



ALMONDS ARE DEFINITELY "A THING" RIGHT NOW IN FRANCE.

To keep the momentum, ABC focuses on reinforcing these positive perceptions.

APPROACH

Launched a new advertising campaign in December 2016 to remind consumers that almonds are a natural, satisfying snack that is even better than they thought—and they should be eating even more! ABC also partnered with two prominent and inspiring TV presenters and created a strong and engaged #AlmondLovers community through Facebook.



Almonds are now ranked #2 for top-of-mind awareness in the nut category (from 1% in 2007)<sup>2</sup>

Consumers rated almonds as #1 healthiest nut and #2 nut eaten as a snack<sup>2</sup>

GERMANY



IN GERMANY, ALMONDS ARE ASSOCIATED WITH BAKING; HOWEVER, SNACKING IS ON THE RISE, creating a great opportunity to increase awareness and usage of almonds as a snack.

APPROACH

Conducted PR efforts to educate about almonds and snacking. This included a partnership with six German publishing houses and popular bloggers to launch a 21-day almond challenge.

The German market is an established marketplace with almond-relevant trends, providing a solid foundation for future almond growth. ABC is investing in consumer research to develop consumer advertising in 2017.



## INDIA

### INDIAN CONSUMERS LOVE EATING ALMONDS

but there is an opportunity to encourage them to eat almonds on a more regular basis.

#### APPROACH

Educated consumers about the health benefits of almonds through PR activities such as events and chef demonstrations. Utilized advertising to demonstrate to adult consumers that eating almonds can help them achieve their own success.



Score for “consumed most often as a snack” has increased from 31% in 2013/14 to 50% in 2014/15<sup>1</sup>

Consumers reportedly ate 20% more almonds per serving in 2014 than they did in 2012<sup>2</sup>



## CHINA

### IN CHINA, THERE ARE CHALLENGES POSED BY DIFFERENTIATING ALMONDS FROM OTHER NUTS AND SEEDS.

Generally, nuts and seeds are perceived to have the same benefits.

#### APPROACH

Through extensive consumer research, Almond Board has found California Almonds can be differentiated from other nuts by emphasizing California as the origin. A campaign “Taste the Sunshine” was launched and is focused on almonds’ California origin and the skin and beauty benefits of vitamin E.



Consumers rating almonds as “healthy” increased 7 percentage points from September 2014 to September 2015 and awareness of Ba Dan Mu, the word for almonds, continues to grow<sup>2</sup>

Active since 2010

Category of focus SNACKING

Consumer target young male + female adults who are seeking success in their own lives and housewives who focus on caring for the children and the home

Reaching consumers



Advertising



Public Relations



Active since 1999

Categories of focus SNACKING & BAKERY

Consumer target women who are trendsetters and health seekers who also snack and eat nuts

Reaching consumers



Advertising



Public Relations



Social Media



1. India Attitudes, Awareness, and Usage Study, Sterling-Rice Group 2015.  
2. Global Perceptions Study, Sterling-Rice Group 2015.





Active since 2011

Category of focus SNACKING

Consumer target males + females seeking snacks that offer the trifecta of taste, convenience and health

Reaching consumers



Public Relations



Social Media

SOUTH KOREANS HAVE A LIMITED UNDERSTANDING OF WHERE ALMONDS FIT BEST IN THEIR DAY

and of their benefits, especially when compared to other nuts.

APPROACH

Launched the Charge Your Day PR campaign, which emphasized eating almonds as a mid-morning snack. ABC partnered with a TV chef, local model and fitness expert to help share why they have incorporated almonds into their mid-morning routines.

Almonds featured prominently in six episodes of South Korea's #1 hit show *Descendants of the Sun*. The series then aired across Asia, trending in China and Japan.

Almonds are ranked #1 in top-of-mind awareness in the nut category<sup>1</sup>



GLOBAL TRADE PROGRAM  
ALMONDS, THE HERO NUT

ABC aims to educate manufacturers on the increasing consumer demand of almonds so they view almonds as an essential ingredient. Almond nutrition, versatility, consumer demand and sustainability are the cornerstone messages of the trade stewardship program. ABC has implemented a comprehensive program, including trade shows, media outreach, advertising and trade meetings, to deliver our message to key manufacturers.



Almonds remain the #1 nut in global new product introductions since 2007<sup>2</sup>

Confectionery is the #1 ingredient category for new product introductions for almonds<sup>2</sup>



1. Global Perceptions Study, Sterling-Rice Group 2015.  
2. Innova Market Insights, Global New Product Introductions Report, 2016.

# POSITION REPORT

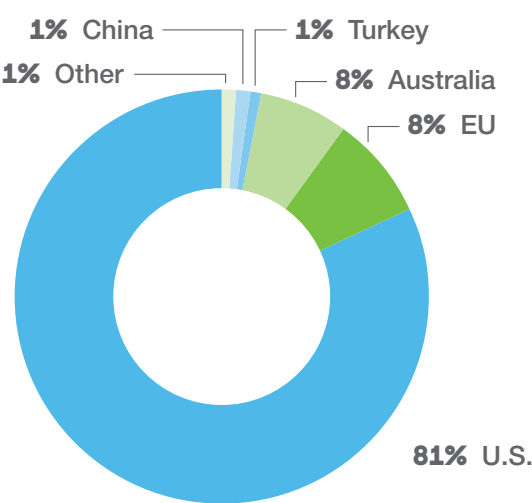
## CALIFORNIA ALMONDS

IN MILLION POUNDS

Crop Year	Redetermined Marketable	Carry-in	Reserve	Total Salable Supply	Domestic Shipments	Export Shipments	Total Shipments	Salable Carryover
1997/98	736.8	48.3	N/A	785.1	159.6	452.4	612.1	172.0
1998/99	492.4	172.0	N/A	664.4	167.0	405.5	572.5	91.8
1999/00	795.5	91.8	0.0	887.3	209.6	503.0	712.6	174.7
2000/01	672.4	174.7	0.0	847.1	211.2	528.7	739.8	107.3
2001/02	794.8	107.3	N/A	902.1	239.3	581.8	821.1	80.9
2002/03	1,063.5	80.9	N/A	1,144.4	291.7	690.6	982.4	162.0
2003/04	1,011.1	162.0	N/A	1,173.1	312.2	712.1	1,024.3	148.9
2004/05	972.8	148.9	N/A	1,121.7	331.6	652.5	984.1	137.7
2005/06	888.7	137.7	N/A	1,026.4	303.9	610.4	914.2	112.2
2006/07	1,087.8	112.2	N/A	1,200.0	368.3	697.8	1,066.1	133.9
2007/08	1,358.3	133.9	N/A	1,492.2	394.8	866.4	1,261.2	231.2
2008/09	1,571.9	231.2	N/A	1,803.1	411.0	978.4	1,389.4	413.7
2009/10	1,379.0	413.7	N/A	1,792.7	449.5	1,022.0	1,471.5	321.3
2010/11	1,600.3	321.3	N/A	1,921.6	489.7	1,177.9	1,667.6	254.0
2011/12	1,979.9	254.0	N/A	2,233.9	546.7	1,351.9	1,898.6	335.2
2012/13	1,848.4	335.2	N/A	2,183.6	588.4	1,278.0	1,866.5	317.2
2013/14	1,970.0	317.2	N/A	2,287.2	641.8	1,295.6	1,937.4	350.6
2014/15	1,838.6	350.6	N/A	2,189.2	639.4	1,173.1	1,812.5	376.6
2015/16	1,846.6	376.6	N/A	2,223.2	593.2	1,218.0	1,811.2	412.0
2016/17*	2,009.0	412.0	N/A	2,421.0	660.0	1,340.0	2,000.0	421.0

Source: Almond Board of California. Note: Totals may not add precisely due to rounding. \*Estimated.

## WORLD ALMOND PRODUCTION 2015/16



California’s Central Valley is one of the few places in the world, and the only place in the U.S., with an ideal almond-growing climate due to its mild winters and abundant sunshine.

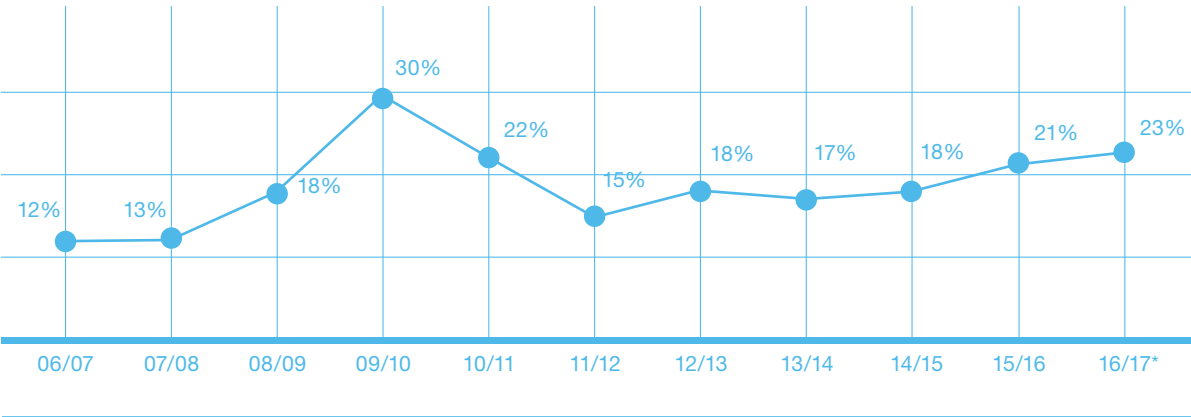
Source: Almond Board of California, Almond Board of Australia and INC.





## CARRY-IN AS A PERCENTAGE OF PRIOR YEAR SHIPMENTS

2006/07-2016/17\*



Source: Almond Board of California. \*Estimated.



# CALIFORNIA ALMOND ACREAGE + FARM VALUE

ACREAGE						YIELD		VALUE IN DOLLARS		
Crop Year	Bearing	Non-Bearing	Total	New Plantings	Average Trees per Acre	Bearing Acre Yield (lbs.)	Production* (million lbs.)	Farm Price	Farm Value (\$1,000)	Value per Bearing Acre
2005/06	590,000	110,000	700,000	34,033	104.0	1,550	911.7	\$2.81	\$2,525,909	\$4,281
2006/07	610,000	145,000	755,000	31,970	105.0	1,840	1,116.7	\$2.06	\$2,258,790	\$3,703
2007/08	640,000	125,000	765,000	14,381	105.0	2,170	1,383.0	\$1.75	\$2,401,875	\$3,753
2008/09	710,000	115,000	825,000	21,678	107.0	2,300	1,614.6	\$1.45	\$2,343,200	\$3,300
2009/10	750,000	90,000	840,000	18,264	108.0	1,880	1,405.9	\$1.65	\$2,293,500	\$3,058
2010/11	770,000	85,000	855,000	13,362	108.0	2,130	1,628.2	\$1.79	\$2,903,380	\$3,771
2011/12	800,000	75,000	875,000	14,960	111.0	2,540	2,020.3	\$1.99	\$4,007,860	\$5,010
2012/13	820,000	110,000	930,000	12,269	112.0	2,300	1,885.0	\$2.58	\$4,816,860	\$5,874
2013/14	850,000	120,000	970,000	11,105	112.0	2,360	2,009.7	\$3.21	\$6,384,690	\$7,511
2014/15	880,000	170,000	1,050,000	19,868	114.0	2,150	1,870.0	\$4.00	\$7,388,000	\$8,395
2015/16	890,000	220,000	1,110,000	25,795	114.0	2,130	1,895.0	\$2.84	\$5,325,000	\$5,983
2016/17†	900,000	‡	‡	‡	116.0	2,280	2,050.0	‡	‡	‡

Source: USDA, NASS/PRO. Note: Almond Board does not track prices. \*Production numbers provided by Almond Board of California. †Estimated as of July 6, 2016.  
‡Not available at time of publication.

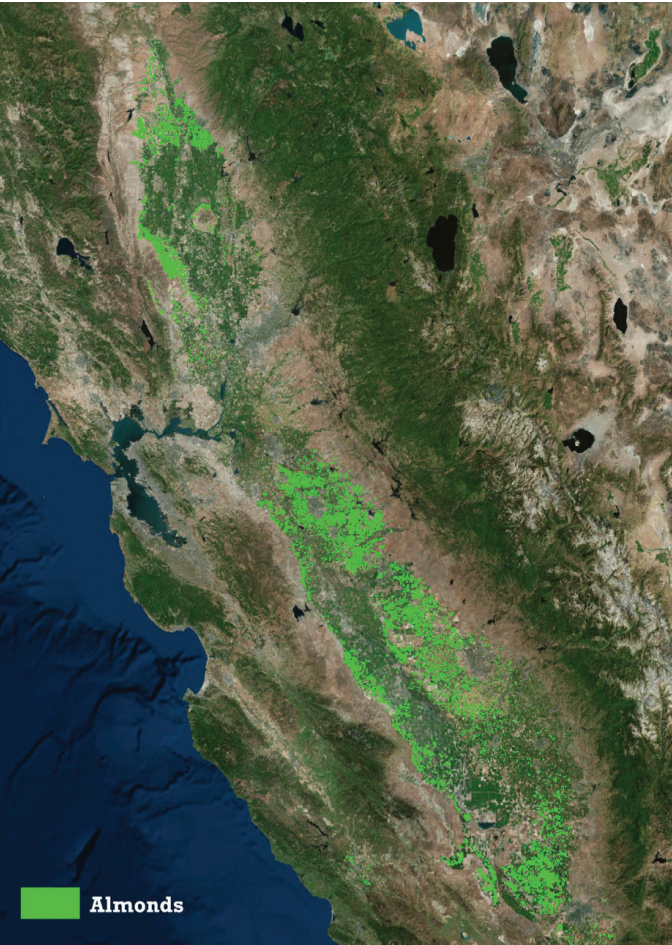
## SEEING IS BELIEVING



While the USDA’s National Agricultural Statistics Service has traditionally supplied the California Almond industry with data about its acreage footprint, new research with agricultural and environmental consulting firm Land IQ has been developing a spatial database of almond acreage in California and performing analyses based on the data.

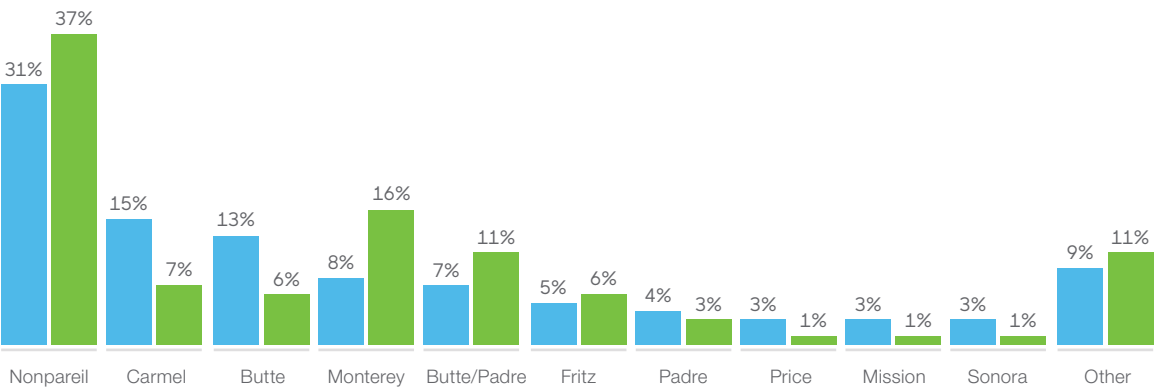
When the current work is finished, ABC will possess spatially determined almond acreage data and mapping for 2010, 2012, 2014 and 2016, with a very high confidence level as to the information’s accuracy. That accuracy is ensured by combining publicly available spatial imagery with extensive on-the-ground verification, or ground-truthing.

While the NASS acreage report and subjective and objective crop reports will continue to be the official statistics for the industry, this data will be used by NASS to support the acreage surveys and serve as a complementary almond industry resource.



# TOP TEN ALMOND-PRODUCING VARIETIES

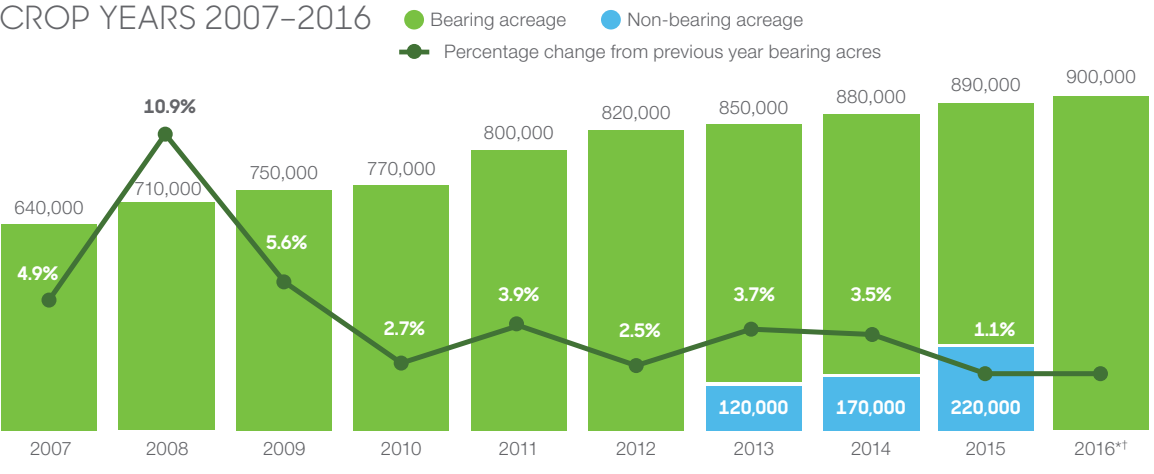
2005/06 VS. 2015/16 TONNAGE



Source: USDA Incoming Receipts from FV193 certificates reported to Almond Board of California.

# CALIFORNIA ALMOND ACREAGE

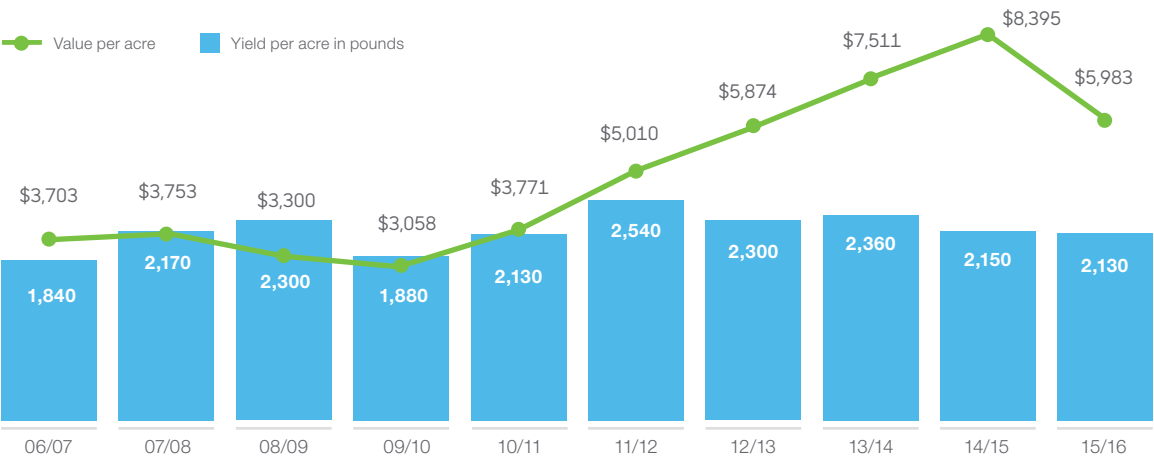
CROP YEARS 2007–2016



Source: USDA, NASS/PRO 2015 Acreage Report. \*Non-bearing acreage available in April 2017. †Estimate.

# CROP VALUE + YIELD PER BEARING ACRE

CROP YEARS 2006/07–2015/16



Source: USDA, NASS/PR 2015 Acreage Report.

# CALIFORNIA ALMOND PRODUCTION BY COUNTY

IN MILLION POUNDS | CROP YEARS 2005/06-2015/16

## COUNTY GROWING REGIONS

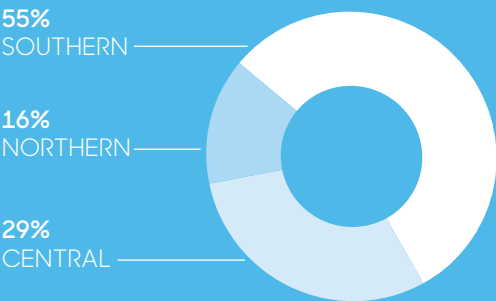
	NORTHERN							CENTRAL			SOUTHERN						
CROP YEAR	Colusa	Glenn	Butte	Yolo	Tehama	Sutter	Solano	Stanislaus	Merced	San Joaquin	Kern	Fresno	Madera	Tulare	Kings	All Others	TOTAL
2005/06	40.3	42.6	50.4	5.6	8.4	4.6	1.7	132.2	102.1	41.8	210.1	160.1	82.4	15.9	12.0	1.1	911.4
2006/07	50.8	38.4	41.8	6.3	7.7	4.9	2.5	163.6	124.6	55.6	247.8	232.7	100.1	21.5	17.7	1.3	1,117.3
2007/08	66.2	51.8	66.7	10.0	11.4	5.6	4.3	223.3	172.9	75.2	271.0	253.8	125.3	26.7	17.9	1.4	1,383.6
2008/09	86.0	48.6	56.9	10.4	9.7	5.3	4.1	240.6	187.3	82.1	354.3	322.2	142.7	36.2	23.4	1.0	1,611.0
2009/10	75.7	52.7	49.2	12.4	10.9	5.2	3.7	198.8	156.7	70.7	317.9	281.9	112.3	32.6	20.6	1.2	1,402.6
2010/11	83.0	55.8	47.1	13.6	11.7	4.9	4.4	202.5	164.2	68.0	403.5	344.2	149.7	42.4	29.9	1.6	1,626.6
2011/12	85.5	59.7	49.0	17.9	11.9	6.9	5.1	269.7	216.7	87.9	472.6	443.0	206.1	44.5	39.0	1.6	2,017.2
2012/13	85.1	57.9	50.9	18.1	12.5	7.0	5.4	261.8	201.4	91.5	393.4	413.6	203.5	49.1	30.7	2.1	1,884.1
2013/14	103.6	69.7	56.0	22.5	14.7	7.3	6.0	284.9	213.8	95.9	427.2	398.1	216.9	55.8	32.6	1.9	2,006.9
2014/15	90.2	58.7	55.2	18.1	13.3	7.7	5.1	274.4	198.2	94.3	390.3	370.5	202.9	57.0	31.9	1.9	1,869.7
2015/16	109.7	75.4	57.4	27.3	16.0	7.4	6.0	260.7	188.7	97.2	366.1	376.5	215.2	53.9	32.4	2.3	1,892.1

Source: USDA Form FV193, Report of Inedible Content of Almond Receipts.

## PRODUCTION PERCENTAGE

CROP YEAR 2015/16

BY GROWING REGION





# CALIFORNIA ALMOND RECEIPTS BY COUNTY + VARIETY

IN POUNDS | CROP YEAR 2015/16

COUNTIES	PERCENTAGE CROP	NONPAREIL	MONTEREY	BUTTE/PADRE	CARMEL	BUTTE	FRITZ	ALL OTHERS	ALL VARIETIES
NORTHERN									
BUTTE	3.0%	22,853,209	2,769,891	2,398,541	5,369,367	4,865,247	673,091	18,430,004	57,359,350
COLUSA	5.8%	46,790,423	11,945,824	1,497,977	10,331,820	13,869,959	7,604,916	17,688,920	109,729,839
GLENN	4.0%	35,322,517	4,738,322	2,273,544	8,060,780	8,592,795	1,306,369	15,089,011	75,383,338
HUMBOLDT	0.0%	0	0	0	0	2,394	0	0	2,394
MODOC	0.0%	4,579	0	0	0	6,544	0	8,682	19,805
PLACER	0.3%	2,896,056	190,222	279,919	397,090	1,055,480	13,450	1,242,460	6,074,677
SHASTA	0.0%	13,538	0	0	15,467	51,011	0	61,599	141,615
SUTTER	0.4%	2,054,216	467,440	1,017,423	483,682	793,662	57,907	2,512,416	7,386,746
TEHAMA	0.8%	7,165,852	405,396	951,587	2,116,692	2,078,532	0	3,265,742	15,983,801
YOLO	1.4%	11,413,649	3,673,249	834,411	2,082,409	2,978,535	833,779	5,512,842	27,328,874
YUBA	0.1%	712,672	234,105	81,793	103,861	13,907	69,027	396,033	1,611,398
TOTAL	15.9%	129,226,711	24,424,449	9,335,195	28,961,168	34,308,066	10,558,539	64,207,709	301,021,837
CENTRAL									
CONTRA COSTA	0.0%	36,505	0	23,099	0	0	0	0	59,604
MARIPOSA	0.0%	83,284	72,280	0	0	0	0	34,656	190,220
MERCED	10.0%	63,277,765	21,820,491	25,576,910	19,279,992	11,767,100	8,845,645	38,120,522	188,688,425
MONO	0.0%	0	0	0	13,411	0	0	0	13,411
SAN JOAQUIN	5.2%	36,312,870	4,908,878	16,345,436	13,922,572	3,949,012	4,647,377	17,656,973	97,743,118
STANISLAUS	13.8%	89,520,699	25,259,156	36,835,376	33,640,060	12,364,063	11,379,579	51,651,858	260,650,791
TUOLUMNE	0.0%	0	0	0	0	0	0	70,406	70,406
TOTAL	28.9%	189,231,123	52,060,805	78,780,821	66,856,035	28,080,175	24,872,601	107,534,415	547,415,975
SOUTHERN									
FRESNO	19.9%	138,758,167	77,086,802	52,154,900	14,250,976	21,771,649	16,590,180	55,888,122	376,500,796
KERN	19.3%	135,732,014	88,048,994	32,780,033	9,276,019	22,953,597	36,811,849	40,452,683	366,055,189
KINGS	1.7%	10,857,461	5,647,952	6,525,901	686,752	1,318,861	2,588,311	4,725,159	32,350,397
MADERA	11.4%	73,294,747	43,058,416	31,976,909	14,080,564	8,078,939	10,806,563	33,905,722	215,201,860
MONTEREY	0.0%	0	25,566	0	105,991	0	0	22,587	154,144
SAN BENITO	0.0%	0	0	989	0	0	0	0	989
TULARE	2.8%	19,489,163	13,236,768	5,706,838	972,376	1,789,183	6,080,933	6,614,945	53,890,206
TOTAL	55.2%	378,131,552	227,104,498	129,145,570	39,372,678	55,912,229	72,877,836	141,609,218	1,044,153,581
GRAND TOTAL	100.00%	696,589,386	303,589,752	217,261,586	135,189,881	118,300,470	108,308,976	313,351,342	1,892,591,393

Source: USDA Form FV193, Report of Inedible Content of Almond Receipts.



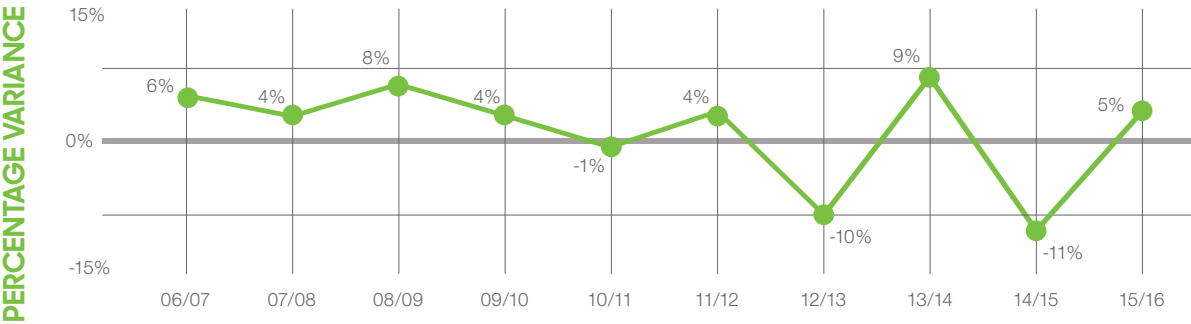
# CALIFORNIA ALMOND CROP ESTIMATES VS. ACTUAL RECEIPTS

IN MILLION POUNDS

Crop Year	Objective Forecast	Handler Receipts	Loss and Exempt	Redetermined Marketable Weight	Pounds Rejects in Receipts
1997/98	680.0	756.5	19.7	736.8	14.3
1998/99	540.0	517.0	24.6	492.4	14.9
1999/00	830.0	829.9	34.4	795.5	9.3
2000/01	640.0	698.4	26.0	672.4	15.7
2001/02	850.0	824.1	29.3	794.8	16.7
2002/03	980.0	1,083.7	20.2	1,063.5	8.2
2003/04	1,000.0	1,032.9	21.8	1,011.1	19.8
2004/05	1,080.0	998.0	25.2	972.8	14.5
2005/06	880.0	911.7	23.0	888.7	16.0
2006/07	1,050.0	1,116.7	28.9	1,087.8	24.0
2007/08	1,330.0	1,383.0	24.7	1,358.3	17.2
2008/09	1,500.0	1,614.6	42.7	1,571.9	13.9
2009/10	1,350.0	1,405.9	26.9	1,379.0	19.6
2010/11	1,650.0	1,628.2	27.9	1,600.3	18.1
2011/12	1,950.0	2,020.4	40.5	1,979.9	16.1
2012/13	2,100.0	1,884.0	35.6	1,848.4	23.1
2013/14	1,850.0	2,009.7	39.0	1,970.7	21.0
2014/15	2,100.0	1,867.9	29.3	1,838.6	23.4
2015/16	1,800.0	1,894.4	47.8	1,846.6	25.3
2016/17	2,050.0	*	41.0	2,009.0 <sup>†</sup>	*

Source: Almond Board of California. Objective forecast provided by USDA, NASS/PRO. \*Not available at time of publication. <sup>†</sup>Estimate.

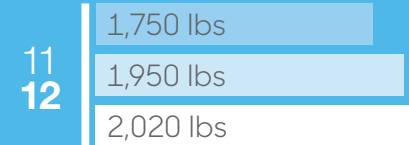
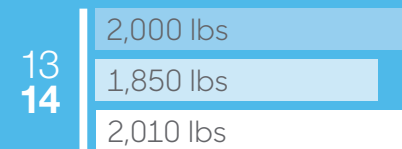
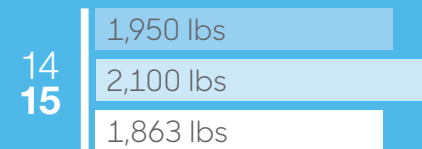
## CALIFORNIA ALMOND RECEIPTS VARIANCE FROM OBJECTIVE FORECAST CROP YEARS 2006/07–2015/16



Source: Almond Board of California. Note: Objective forecast provided by USDA, NASS/PRO.

CALIFORNIA ALMOND CROP  
ESTIMATES VS. ACTUAL RECEIPTS  
CROP YEARS 2007/08-2015/16 | IN MILLION POUNDS

Subjective forecast    Objective forecast    Actual production





# WORLD DESTINATIONS

IN MILLION POUNDS

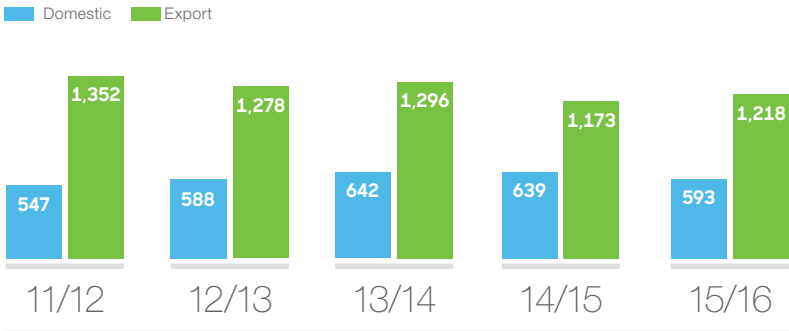
World Region	Destination	2015/16	2014/15	2013/14	2012/13	2011/12
AMERICAS						
North America	United States (domestic)	593.19	639.40	641.81	588.40	546.71
	Canada	44.65	38.78	40.67	44.22	47.79
	Mexico	17.42	16.60	14.53	14.53	10.55
	Total North America (exports)	62.12	55.48	55.20	58.74	58.34
Latin America/Caribbean	Argentina	0.51	0.97	1.21	0.74	0.25
	Brazil	1.24	2.07	4.03	1.89	0.53
	Chile	3.93	7.65	10.06	7.74	7.86
	Colombia	1.75	1.88	1.80	1.50	0.45
	Costa Rica	0.69	0.43	0.54	0.47	0.29
	Peru	0.97	1.06	1.42	0.99	0.73
	Trinidad	0.56	0.51	0.62	0.50	0.47
	Total Latin America/Caribbean	10.36	15.58	21.07	14.44	11.06
	TOTAL AMERICAS	72.48	71.05	76.27	73.18	69.40
ASIA-PACIFIC						
Northeast Asia	China/Hong Kong	141.66	128.13	144.82	208.18	236.19
	Japan	61.31	65.87	75.85	65.96	61.87
	South Korea	46.23	53.48	53.50	45.99	44.84
	Taiwan	9.33	10.93	12.69	10.90	11.77
	Total Northeast Asia	258.53	258.41	286.86	331.03	354.66
Southeast Asia	Indonesia	2.81	2.68	2.14	2.33	1.72
	Malaysia	6.37	4.16	5.96	4.95	5.69
	Singapore	3.33	3.65	3.50	2.24	1.99
	Thailand	4.12	4.00	4.15	3.80	3.34
	Vietnam	22.12	18.74	18.40	15.44	17.53
	Total Southeast Asia	39.25	33.53	34.40	28.99	30.53
South/Central Asia	India	126.45	123.69	102.16	125.09	118.97
	Pakistan	12.81	2.64	2.62	4.06	5.67
	Total South/Central Asia	140.10	127.01	105.44	130.12	125.10
Australasia/Oceania	Australia	2.77	4.54	4.01	5.81	4.14
	New Zealand	3.80	4.02	3.34	3.19	2.44
	Total Australasia/Oceania	6.58	8.56	7.34	9.01	6.58
	TOTAL ASIA-PACIFIC	444.45	427.52	434.04	449.14	516.88
EUROPE						
Western Europe	Belgium	20.12	19.91	20.78	19.21	22.86
	Denmark	7.28	8.24	9.06	9.44	9.21
	Finland	0.53	0.72	1.01	1.04	1.33
	France	23.25	20.12	23.03	24.18	28.31
	Germany	102.81	122.15	126.82	121.03	116.52
	Greece	7.80	7.02	8.97	7.87	8.90
	Ireland	0.71	1.77	0.13	0.09	0.27
	Italy	57.72	42.52	53.47	37.22	45.27
	Netherlands	46.84	43.26	45.34	41.90	38.80
	Norway	6.56	5.41	4.48	4.73	5.68
	Portugal	1.43	1.34	2.39	1.73	1.85
	Spain	201.10	153.06	193.40	158.52	156.99
	Sweden	6.70	6.24	6.68	7.94	8.44
	Switzerland	7.90	6.82	8.60	6.64	5.99
	United Kingdom	32.45	29.18	27.86	26.41	24.51
	Total Western Europe	523.31	468.04	532.32	468.34	475.42
Central/Eastern Europe	Bulgaria	1.86	2.09	2.94	1.96	2.63
	Croatia	1.13	1.59	1.62	1.57	1.99
	Czech Republic	1.41	2.32	2.70	3.50	3.73
	Estonia	3.85	1.81	1.41	2.19	0.92
	Latvia	0.62	1.15	1.95	2.19	1.88
	Lithuania	1.80	3.41	4.15	2.85	1.75
	Poland	1.82	1.53	1.89	2.14	2.95
	Romania	0.67	0.48	0.42	0.48	0.41
	Ukraine	0.53	0.63	2.17	3.32	2.16
	Total Central/Eastern Europe	15.97	18.83	55.48	65.63	59.80
	TOTAL EUROPE	539.28	486.87	587.80	533.97	535.22
MIDDLE EAST/AFRICA						
Middle East	Bahrain	0.94	0.69	1.03	0.57	1.19
	Cyprus	1.06	0.95	1.29	1.38	1.30
	Israel	8.72	7.14	6.35	2.38	4.63
	Jordan	8.60	6.43	8.51	6.62	8.60
	Kuwait	3.62	2.88	2.48	3.31	3.02
	Lebanon	6.76	4.86	5.15	4.55	6.85
	Qatar	0.39	0.62	0.26	39.21	1.00
	Saudi Arabia	14.19	13.54	14.27	9.81	19.63
	Turkey	37.15	36.59	52.70	39.21	59.30
	United Arab Emirates	57.32	98.07	86.08	81.40	93.92
	Total Middle East	139.37	171.87	178.16	149.64	199.59
North Africa	Algeria	8.33	6.02	6.40	11.61	11.97
	Egypt	5.73	3.27	3.98	4.61	9.41
	Libya	0.65	1.07	1.54	0.79	1.18
	Tunisia	3.02	0.51	1.72	0.00	2.47
	Total North Africa	17.74	10.87	13.82	17.59	25.57
Sub-Saharan Africa	South Africa	4.47	4.77	5.05	4.13	4.76
	Total Sub-Saharan Africa	4.73	4.95	5.48	4.53	5.25
	TOTAL MIDDLE EAST/AFRICA	161.83	187.69	197.45	171.76	230.41
TOTAL SHIPMENTS						
Total Export Shipments		1,218.05	1,173.14	1,295.57	1,278.05	1,351.91
Total U.S. Shipments		593.19	639.40	641.81	588.40	546.71
TOTAL GLOBAL SHIPMENTS		1,811.24	1,812.53	1,937.38	1,866.45	1,898.62

Source: Almond Board of California. Note: Totals may not add precisely due to rounding. Destinations that shipped more than 500,000 pounds are listed.



## DOMESTIC + EXPORT SHIPMENTS

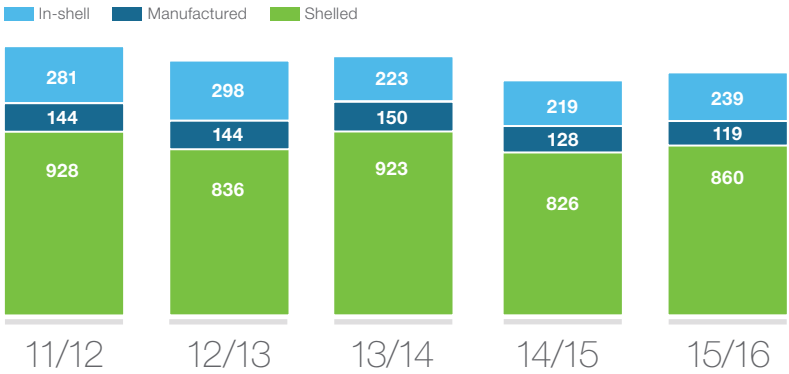
IN MILLION POUNDS | 2011/12-2015/16



Source: Almond Board of California.

## EXPORT SHIPMENTS BY PRODUCT TYPE

IN MILLION POUNDS | 2011/12-2015/16

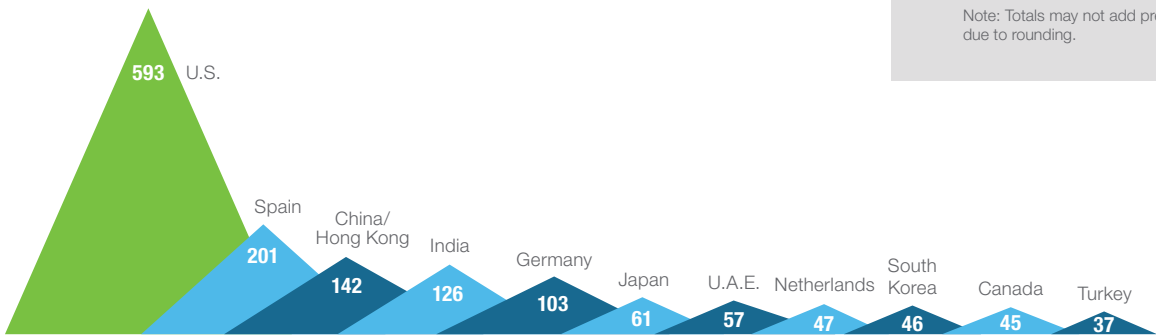


Source: Almond Board of California.

## TOP WORLD DESTINATIONS

IN MILLION POUNDS | 2015/16

Top ten export markets represent 65% of total export shipments.



Source: Almond Board of California, July 2016 Position Report.

## 2015/16 SHIPMENTS BY REGION

North America

36%

Western Europe

29%

Asia-Pacific

25%

Middle East/Africa

9%

Central/Eastern Europe

1%

Latin America

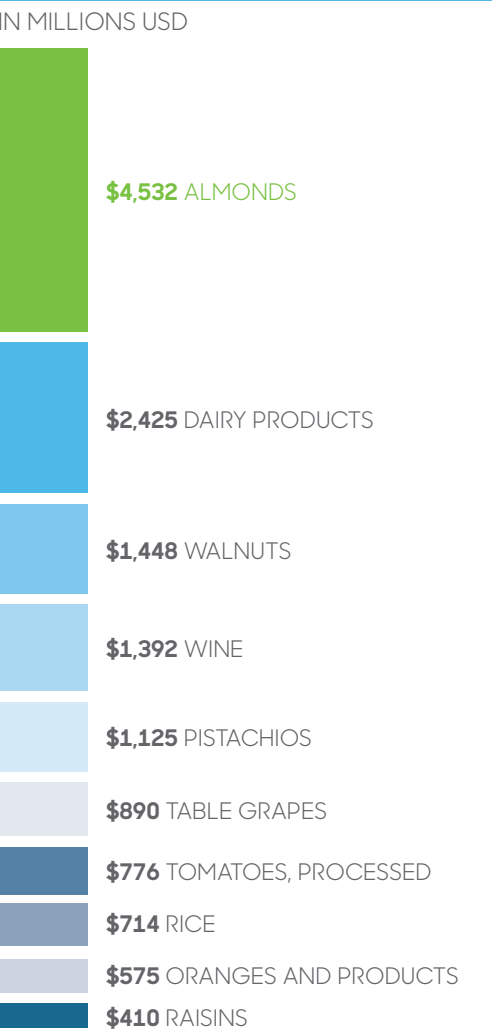
1%

Source: Almond Board of California.

Note: Totals may not add precisely due to rounding.

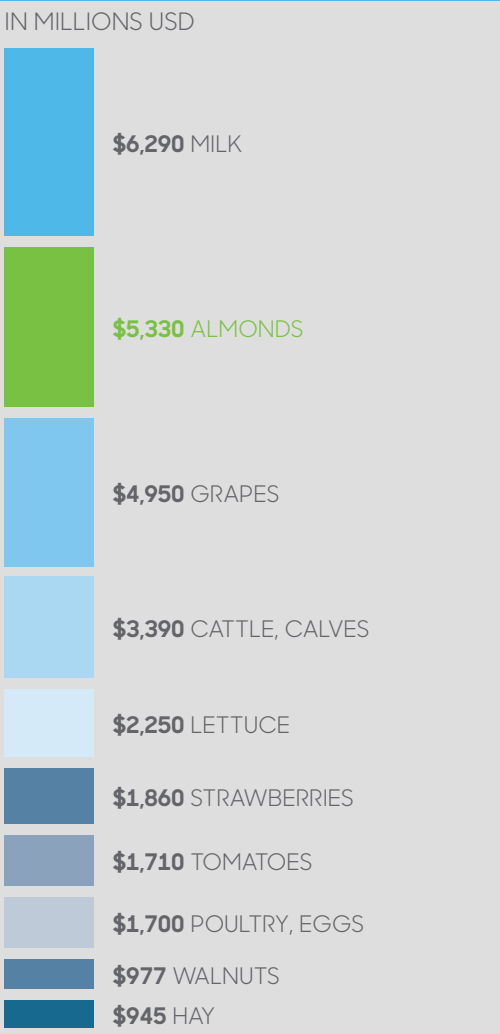
# CALIFORNIA AGRICULTURE

## CALIFORNIA'S TOP AGRICULTURAL EXPORTS BY VALUE



Source: University of California, Agricultural Issues Center.  
Calendar year January through December 2015.

## CALIFORNIA'S TOP TEN VALUED COMMODITIES FOR 2015



Source: California Department of Food and Ag/Statistics.  
<https://www.cdffa.ca.gov/Statistics/>.

## DID YOU KNOW?

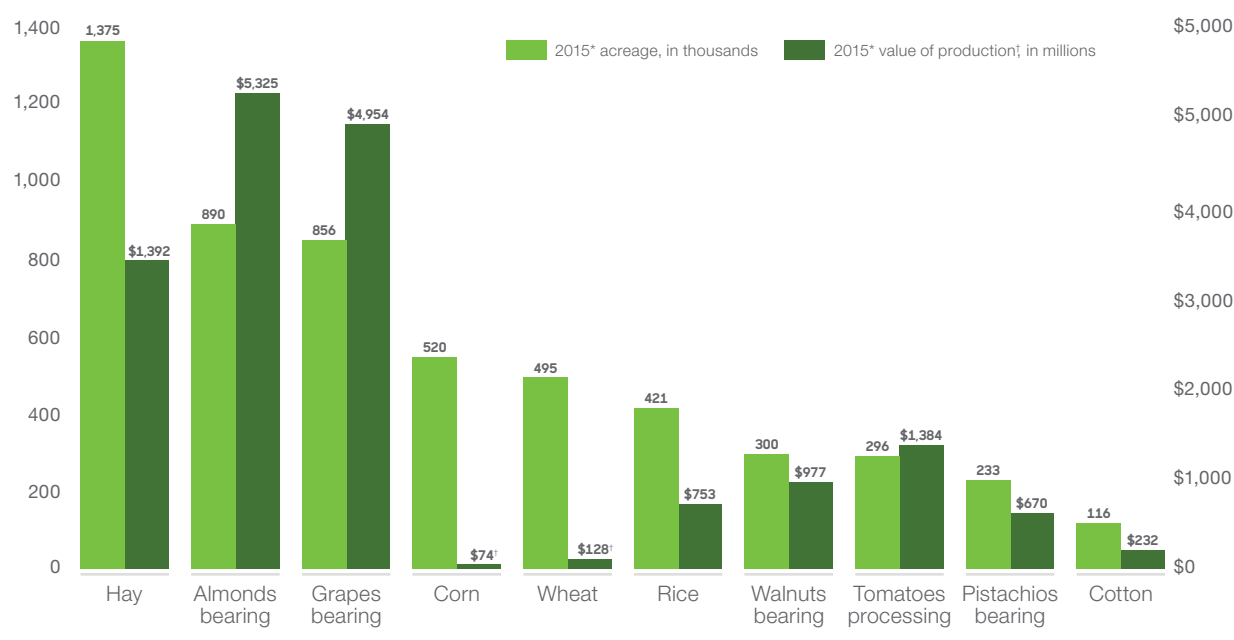
California's agricultural abundance includes more than 400 commodities. Over a third of the country's vegetables and two-thirds of the country's fruits and nuts are grown in California.







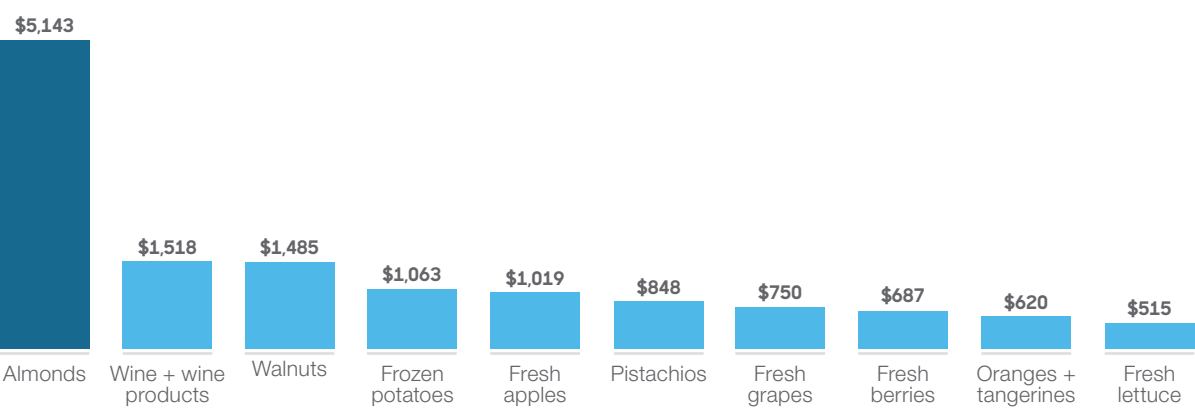
# TOP TEN CALIFORNIA CROP ACREAGE



Source: USDA, NASS. \*Calendar year January through December 2015. Value based on farm-gate prices. †This is the corn and wheat values for 2014.

# TOP TEN U.S. SPECIALTY CROP EXPORTS BY VALUE

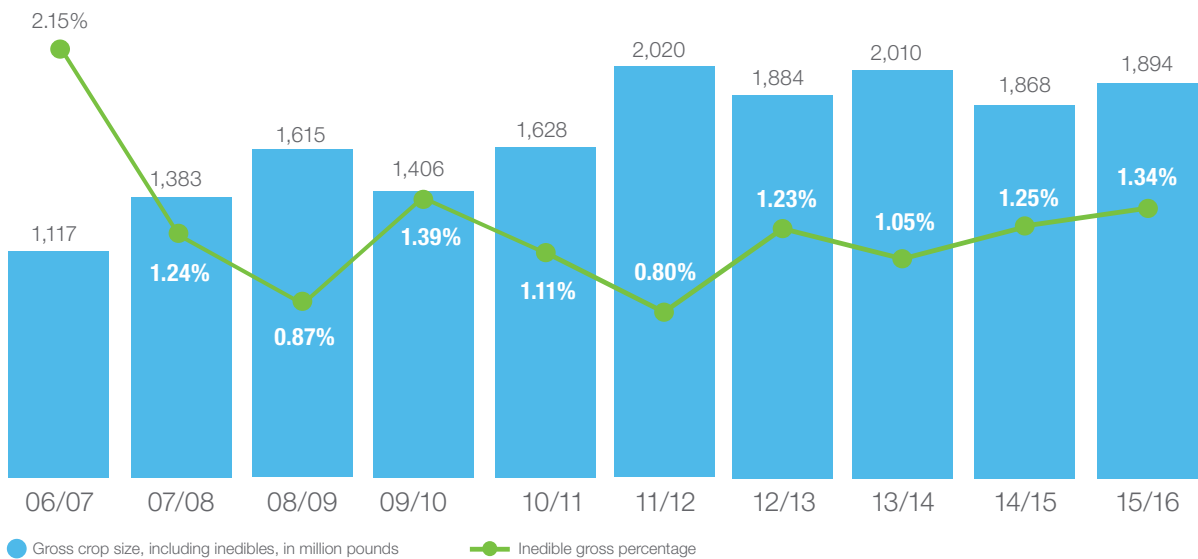
2015\* | IN USD MILLIONS



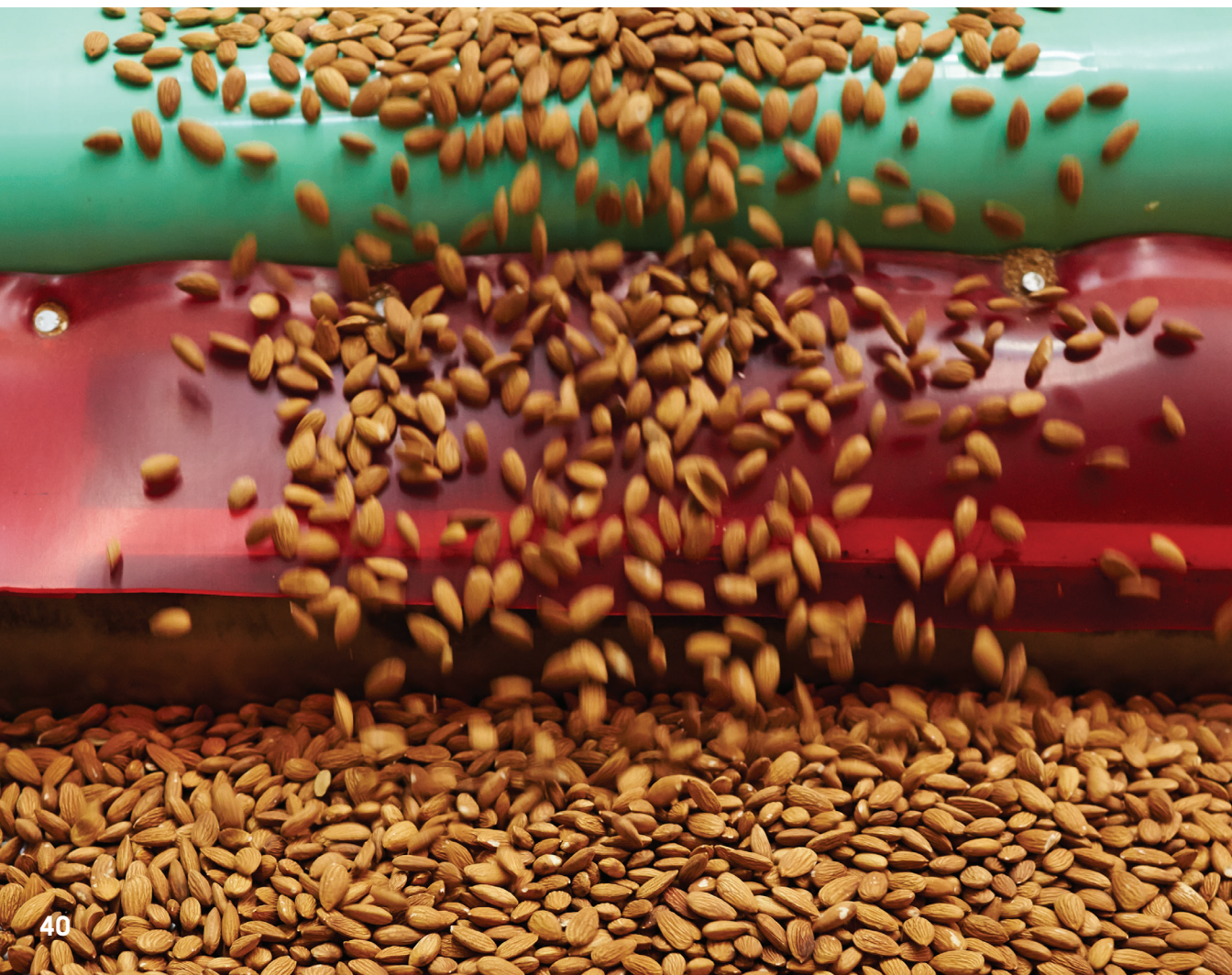
Source: Bureau of the Census, U.S. Department of Commerce, Foreign Trade Statistics. \*Calendar year January through December 2015.

# CALIFORNIA ALMOND CROP-SIZE HISTORY VS. INEDIBLE PERCENTAGE

CROP YEARS 2006/07–2015/16



Source: Almond Board of California.



# U.S. TREE NUT CATEGORY



## U.S. MARKETABLE PRODUCTION AND IMPORTS OF TREE NUTS

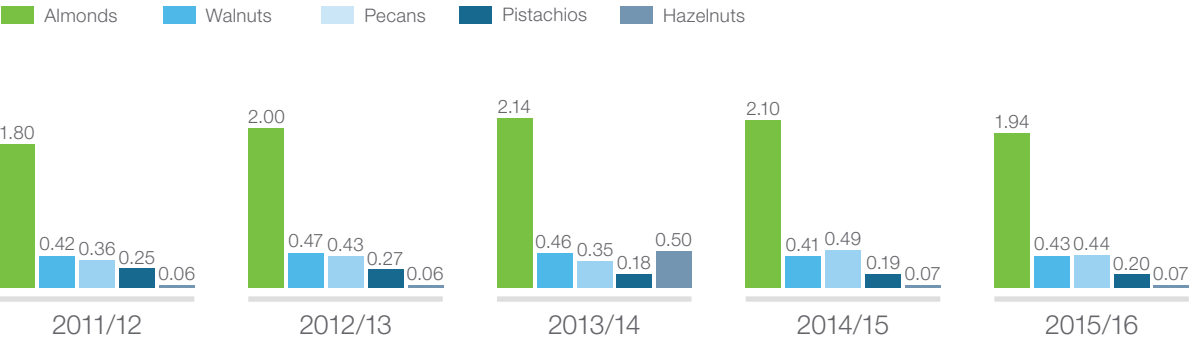
2006/07–2015/16 | IN MILLION POUNDS (SHELLED BASIS)

CROP YEAR	ALMONDS		WALNUTS		HAZELNUTS		PECANS		PISTACHIOS		OTHER NUTS*	
	Crop	Imports	Crop	Imports	Crop	Imports	Crop	Imports	Crop	Imports	Crop	Imports
2006/07	1,087.8	8.1	294.6	2.3	36.4	13.5	91.4	57.0	119.0	1.4	27.8	358.8
2007/08	1,358.3	7.1	295.0	9.0	28.6	13.4	180.3	79.9	207.0	0.9	16.4	378.3
2008/09	1,571.9	4.2	395.5	2.0	26.2	10.0	94.3	61.9	135.4	0.9	32.7	360.4
2009/10	1,379.0	5.6	381.5	3.2	36.8	8.0	127.5	80.1	174.8	1.3	19.1	366.4
2010/11	1,600.3	8.1	436.8	0.5	20.8	11.0	140.4	82.8	250.1	0.5	18.2	379.5
2011/12	1,979.9	15.9	399.8	4.9	21.9	9.7	124.6	74.6	222.0	0.9	22.3	339.0
2012/13	1,848.4	39.4	441.2	8.0	27.7	15.2	141.0	79.3	278.3	1.2	23.1	371.9
2013/14	1,970.0	33.9	436.8	11.9	36.7	14.5	130.8	92.5	234.5	0.5	18.6	425.7
2014/15	1,838.6	31.2	505.2	21.2	26.1	10.9	128.1	104.0	246.3	0.9	13.1	473.9
2015/16†	1,846.6	31.8	529.6	10.8	47.3	9.2	104.5	114.8	135.0	1.2	24.0	339.5

Source: USDA, Economic Research Service, *Fruit & Tree Nut Situation and Outlook*. Note: Marketable production is utilized production minus inedibles and noncommercial use. \*Other Nuts includes Brazil nuts, macadamia nuts, pine nuts, chestnuts, cashews and mixed nuts. †Preliminary.

## DOMESTIC PER CAPITA CONSUMPTION OF TREE NUTS

2011/12–2015/16 | IN POUNDS PER CAPITA



Source: USDA, Economic Research Service, *Fruit & Treenut Situation and Outlook*. Almond Board of California.





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