



# Economics of Almond Production

## Almond Board Webinar



## Welcome and Overview

- Sustainable Almond Industry

## Grower Economic Modeling

## Analysis of Industry Financial Returns

## Market Dynamics

- Q&A Session

## Wrap-Up





# Growing Advantage: The California Almond Industry

**Richard Waycott, ABC President/CEO**





# The Scope of the California Almond Industry

**Spanning 500 miles throughout  
Central Valley**

**6,000+ growers, 100 “handlers”**

**100% of U.S. production**

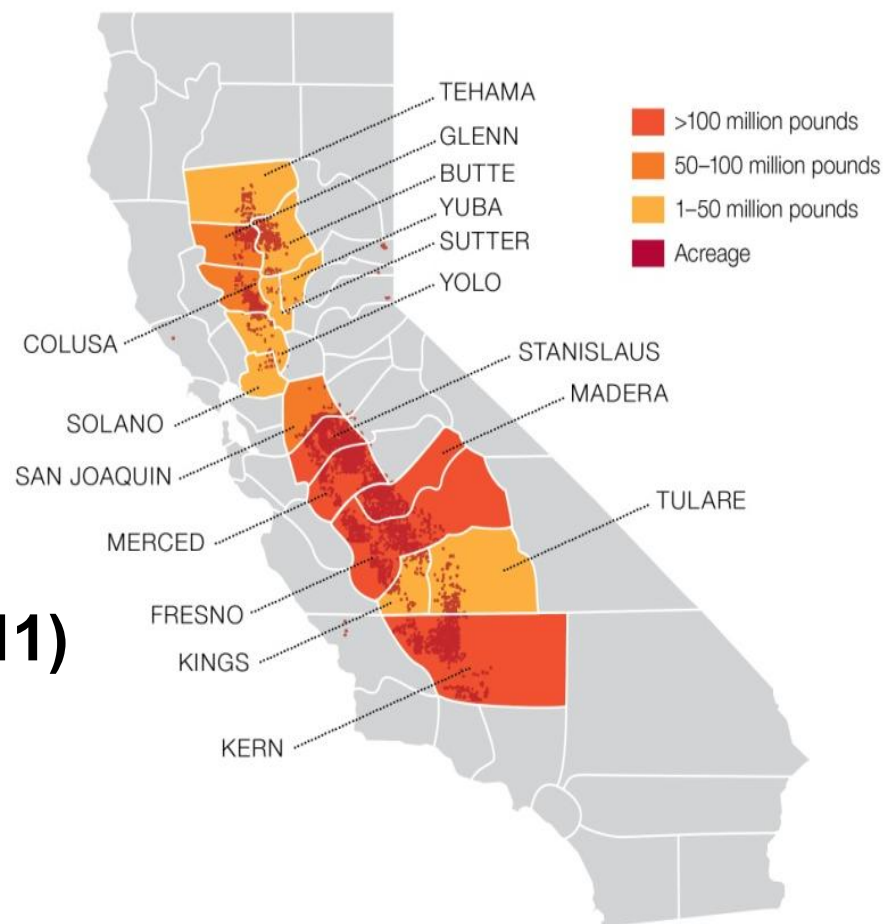
**\$2.8 billion in farm value**

- 3rd most valuable California crop

**75% of worldwide production**

**\$2.4 billion export value (FY 10/11)**

- California's #1 ag export\*
- 33,000+ jobs created
- Top U.S. horticultural export crop



\* Value Basis

Source: Agricultural Issues Center, University of California 2010-2011

## **The California Almond crop is growing!**

- **Fastest growing tree nut crop....by far**
- **Largest tree nut crop in the world**

## **Almonds influence is growing!**

- **An important California crop**
- **An important export crop**
- **An important food product to manufacturers and consumers**
- **An important dietary solution for manufacturers, health professionals and consumers**
- **Leader in tree nut food safety**

***We are on the world's stage...big time***

# We Sustain Our Growth with Focus



# Almond Board Strategic Planning Priorities

- **Board consensus on  
3 Strategic Priorities  
11 supporting objectives**

Invest in programs, research that make  
almonds a Crop of Choice for California

Invest in programs, research that build  
market demand for almonds, making  
them the Nut of Choice

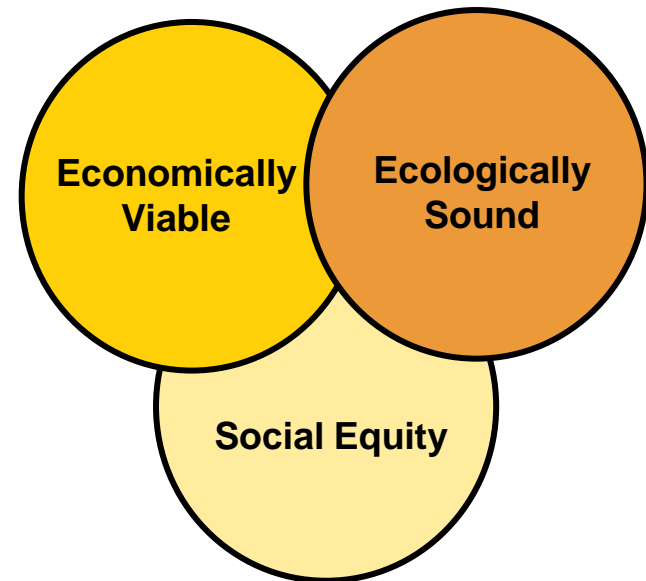
Build an Almond Board organization that  
optimizes its effectiveness in establishing  
and executing goals

- **ABC Sustainability  
Program at the Heart of  
Economic Performance**
- **Have to be Able to Tell Our  
Story - Our Global  
Customers Expect No  
Less**
- **Regulatory Community  
Awards our Kind of  
Leadership**
- **It's a No-Brainer –  
Continuous Improvement  
has Always been a Great  
Thing for this Industry**

# ABC Sustainability Definition – What's There to Argue About?

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

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





# We Must Do This for the Right Reasons

## Tell the Truth – Only the Truth

Need for transparency  
of production practices  
in the marketplace



Need for conveying real  
production information to  
public policy makers



# Sustainability Process, Product and Pride

# The Benefit is Yours

## Self-Assessment (practices per management area)

- Irrigation, Nutrient Management, Air, Energy, Pest Management

## Grower (confidential) & Statewide Reports

- Grower reports enable comparison to statewide averages

## Statewide reports benchmark industry strengths and areas for potential improvement

## Customers will give preference to almonds over other nuts

## This will earn our industry the coveted Nut of Choice designation



California Almond Sustainability Program Report		2010
Practice or Metric	Your selection	Growers using this practice
3. Aerial or satellite photos (e.g. Google Earth) were used to identify potential variations in soil texture, salinity, or other factors.	Yes	21%
4. Yield maps from the previous crop (almonds or another crop) were used to identify potential variations in soil texture, salinity, or other factors.	Yes	29%
5. A GPS map of soil characteristics using sensing technology (e.g. EC, Vezor® or SIS) was made and used to identify potential variations in soil texture, salinity, or other factors.		8%
6. Backhoe pits were dug or deep auger/core samples were taken (guided by the above and other observed factors) in strategic places to determine:	Yes	48%
a. texture (percent sand, clay, silt) or saturation percentage		43%
b. compaction layers or other soil stratification	Yes	43%
c. salinity	Yes	40%
d. pH	Yes	50%
e. soil organic matter	Yes	48%
7. Deep ripping, slip plowing, or tree hole backhoe pits were dug to address drainage and/or compaction issues (preferably after first testing for these problems).	Yes	60%
8. If suggested by soil sampling, soils were amended to adjust pH, sodicity, salinity, etc. during orchard development.	Yes	63%
9. Soils were amended with organic matter during orchard development.	Yes	44%
10. All water sources were sampled and lab-evaluated for water quality/irrigation suitability.	Yes	48%
11. Rootstocks were selected based on soil texture and drainage conditions as well as potential soil pest or disease problems.	Yes	68%
12. The irrigation system was designed to meet or exceed a specific target distribution uniformity.	Yes	69%
13. The irrigation system was designed for the site so that irrigation sets correspond to soil texture zones and/or topography.	Yes	53%
14. An economic analysis utilizing the type of information in this section and expected returns was done prior to moving forward with the orchard development/redevelopment.	Yes	41%
15. Other:		
<b>Irrigation Infrastructure &amp; Maintenance – All Systems</b>		
16. What is the irrigation type for this orchard (not counting systems for frost control)?	Flood	
a. drip		21%
b. micro sprinkler		38%
c. flood/furrow		13%



# How to Take Action....It's Easy

Online [www.sustainablealmondgrowing.org](http://www.sustainablealmondgrowing.org)

Email [CASP@Sureharvest.com](mailto:CASP@Sureharvest.com) for login instruction

Upcoming workshops:

**Wednesday, July 25 3:00-4:00p.m.**

**Webinar tutorial on how to navigate new  
online system**

Contact Kendall Barton at  
[kbarton@almondboard.com](mailto:kbarton@almondboard.com) or 209-343-3245 for details

## ***So where do we stand....***

- ☐ 781 participants
- ☐ 480 submitted assessments
- ☐ Covering 70,754 acres





# Economics of Almond Production

**Karen Klonsky, Dept. of Agricultural & Resource Economics  
University of California, Davis**



# Outline of Presentation

**Costs to establish and produce almonds**

**Risk analysis – breakeven yields and prices**

**Return on investment – internal rate of return**

**Payback period for investment**

**Almond acres planted by year and variety**

**Cost factors impacting net returns**

# **Cost and Return Study**

## **Almond Orchard Assumptions**

**San Joaquin Valley North, 2011**

**16' x 22' spacing, 124 trees per acre**

**40 contiguous acres**

**Microsprinkler irrigation**

**Custom harvest**

**25 year orchard life**



# **Cost and Return Study Authors**

**Roger Duncan, UCCE Stanislaus County**

**Paul Verdegaaal, UCCE San Joaquin County**

**Brent Holtz, UCCE San Joaquin County**

**David Doll, UCCE Merced County**

**Rich DeMoura, Dept. of Ag. & Resource Econ. UCD**

**Karen Klonsky, Dept. of Ag. & Resource Econ. UCD**

# Cost Components

**Cultural Costs**

**Harvest Costs**

**Cash Overhead**

**Noncash Overhead**

# Costs of Production

## Cultural Costs

- Pruning
- Floor management
- Disease and pest control
- Irrigation and fertilization
- ATV and pickup use

## Harvest Costs

## Cash Overhead

## Noncash Overhead



# Costs of Production

## Cultural Costs

## Harvest Costs

- Shake, sweep, rake
- Pick up and haul
- Hull and shell nuts

## Cash Overhead

## Noncash Overhead

# Costs of Production

Cultural Costs

Harvest Costs

**Cash Overhead**

- Office expenses
- Liability Insurance
- Sanitary Service
- Property Taxes and Insurance
- Repairs on Buildings and Irrigation System

Noncash Overhead

# Costs of Production

Cultural Costs

Harvest Costs

Cash Overhead

**Noncash Overhead (Capital Recovery)**

- **Buildings, Shop, and Field Tools**
- **Irrigation System**
- **Fuel Tanks**
- **Equipment ownership**
- **Trees**
- **Land**



# Equipment Costs

## Cultural costs

- **Fuel and lube**
- **Repairs**

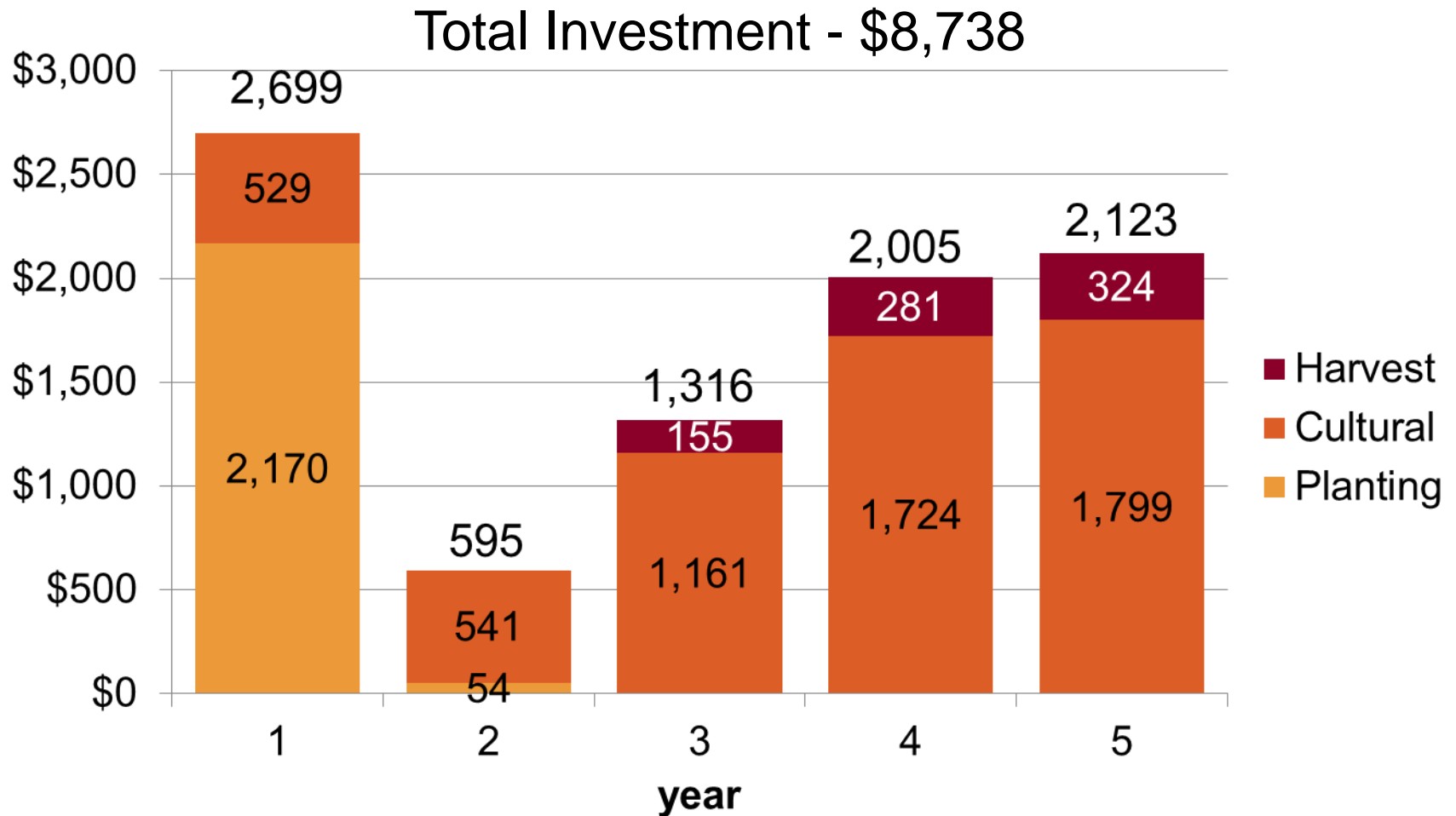
## Cash overhead

- **Insurance**
- **Taxes**

## Noncash Overhead (Capital recovery)

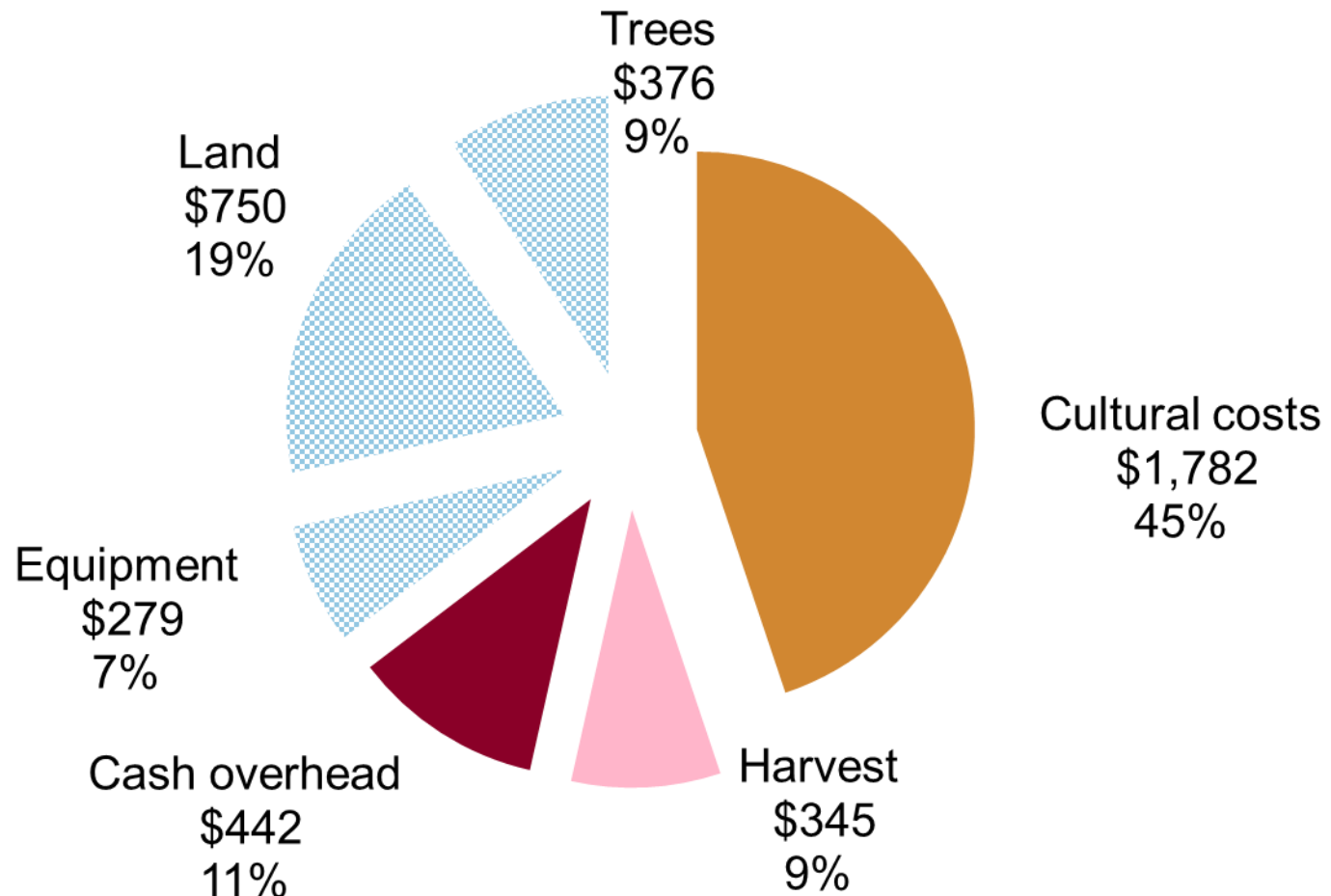
- **Principle and interest or ownership costs**

# Almond Orchard Establishment Cost per Acre



# Almonds

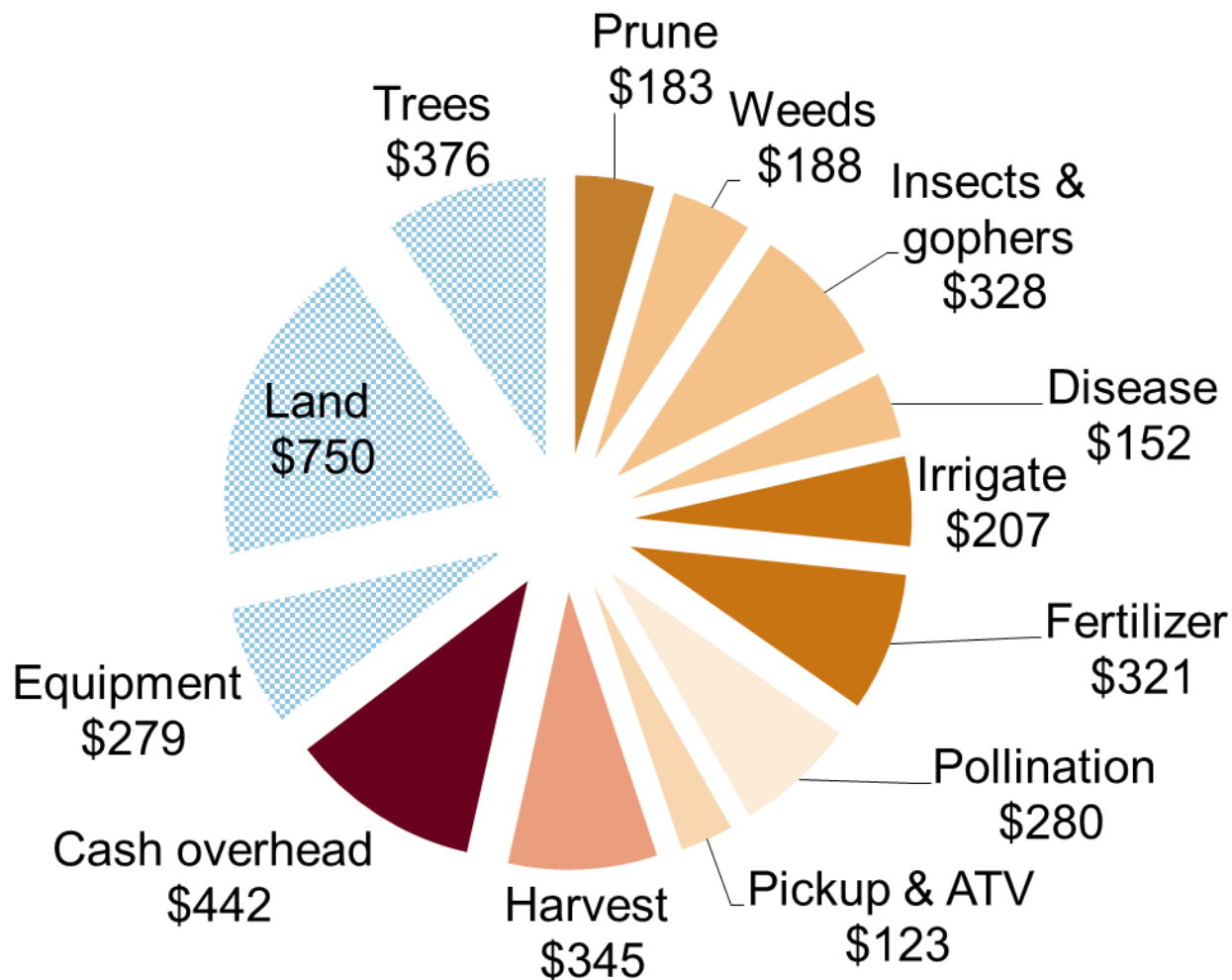
**Total Cost of Production \$3,974 per acre**





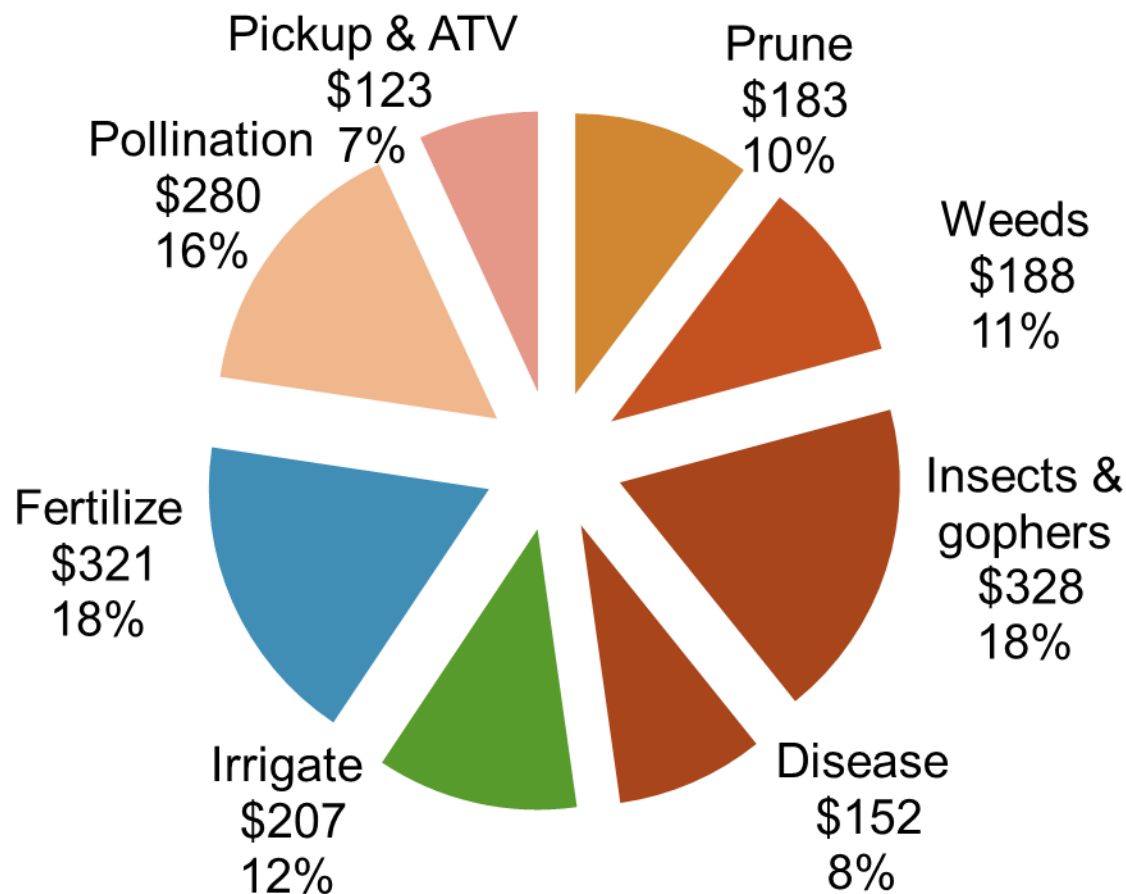
# Almonds

**Total Cost of Production \$3,974 per acre**



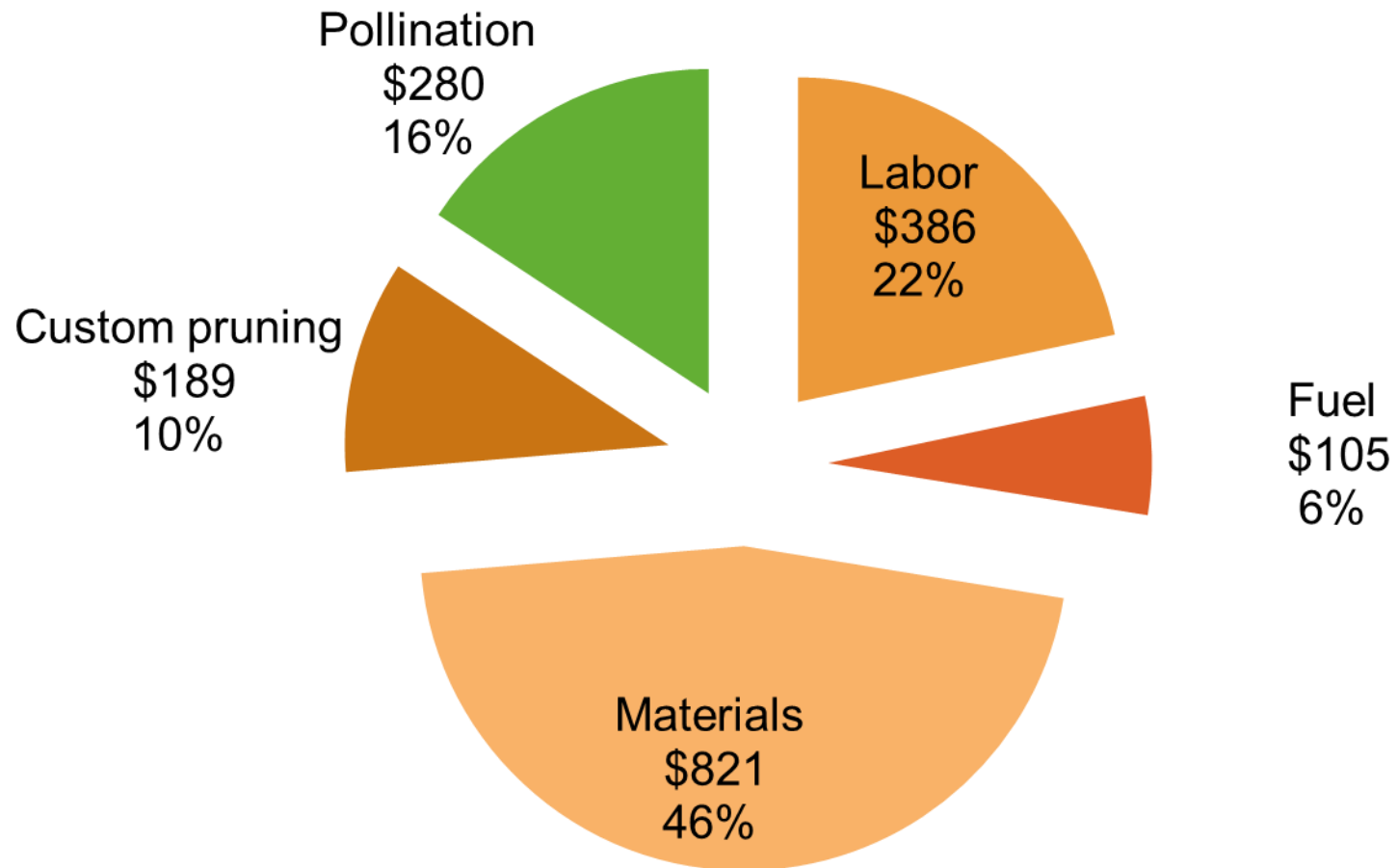
# Almonds

## Cultural Costs \$1,782 per Acre



# Almonds

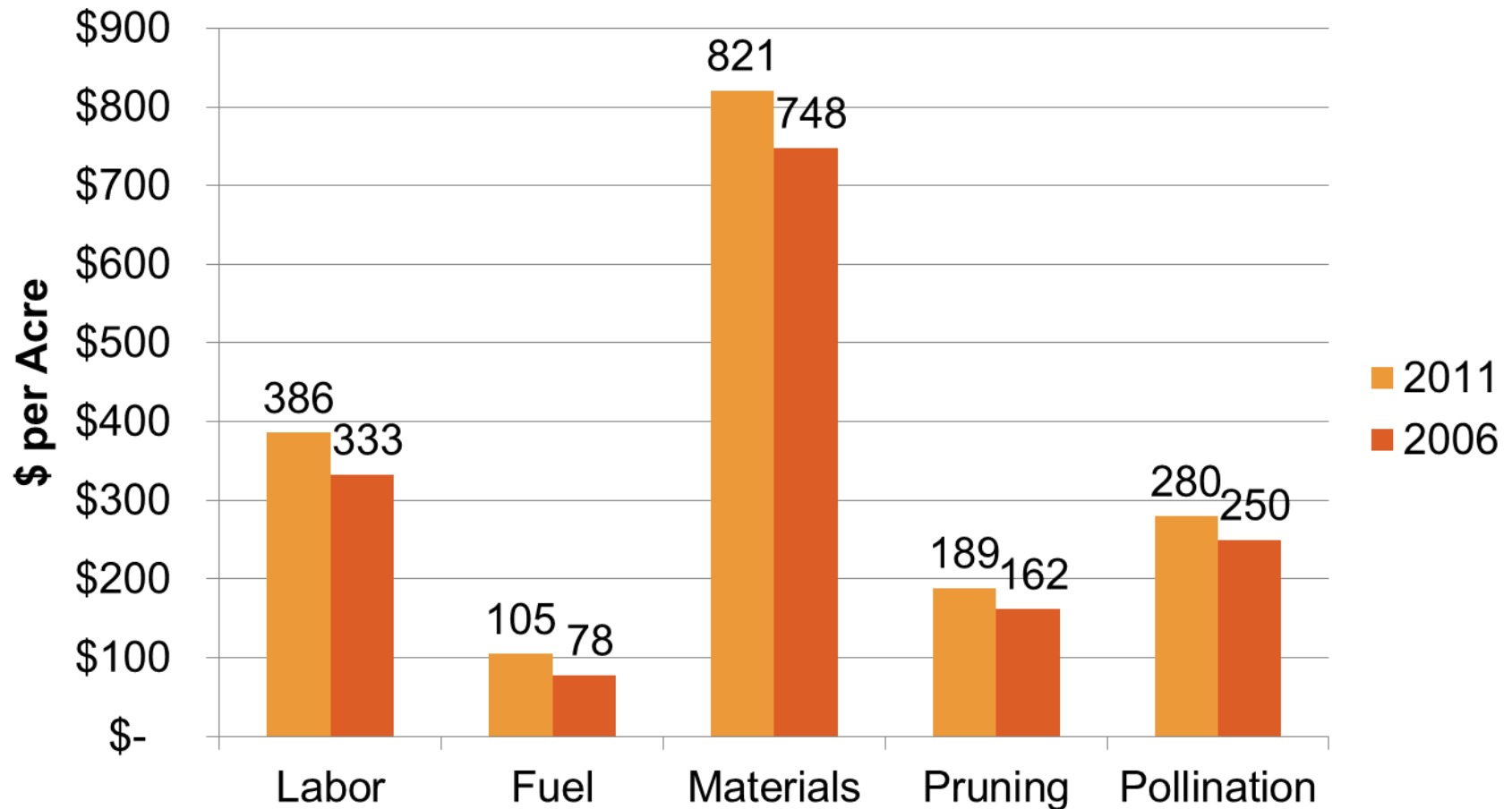
## Cultural Costs \$1,782 per Acre





# Comparison of 2011 and 2006 Cultural Costs

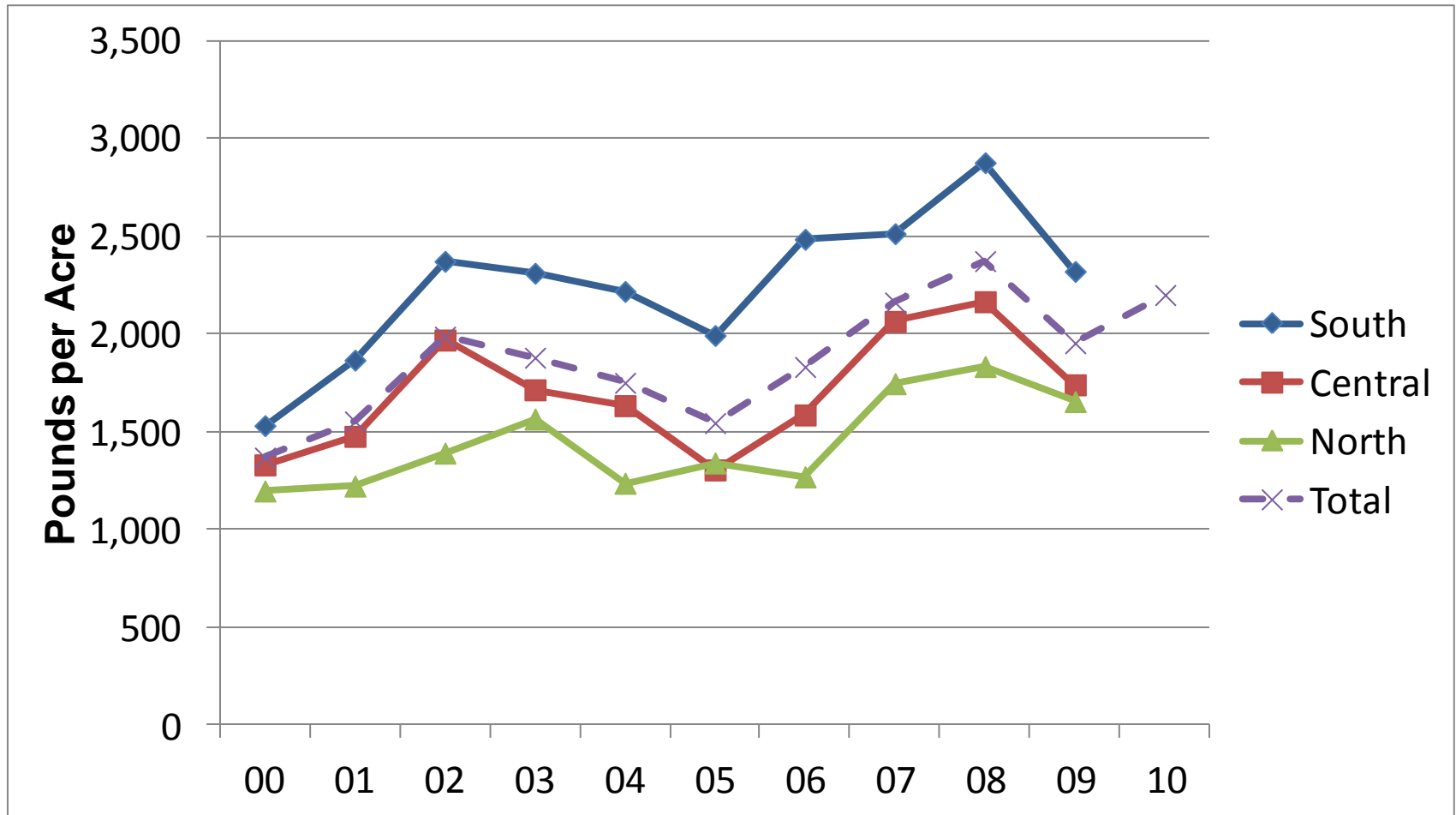
\$1,782/acre in 2011 up from \$1,578 in 2006



**Expected yield range: 1,400 – 2,600 lbs. per acre**

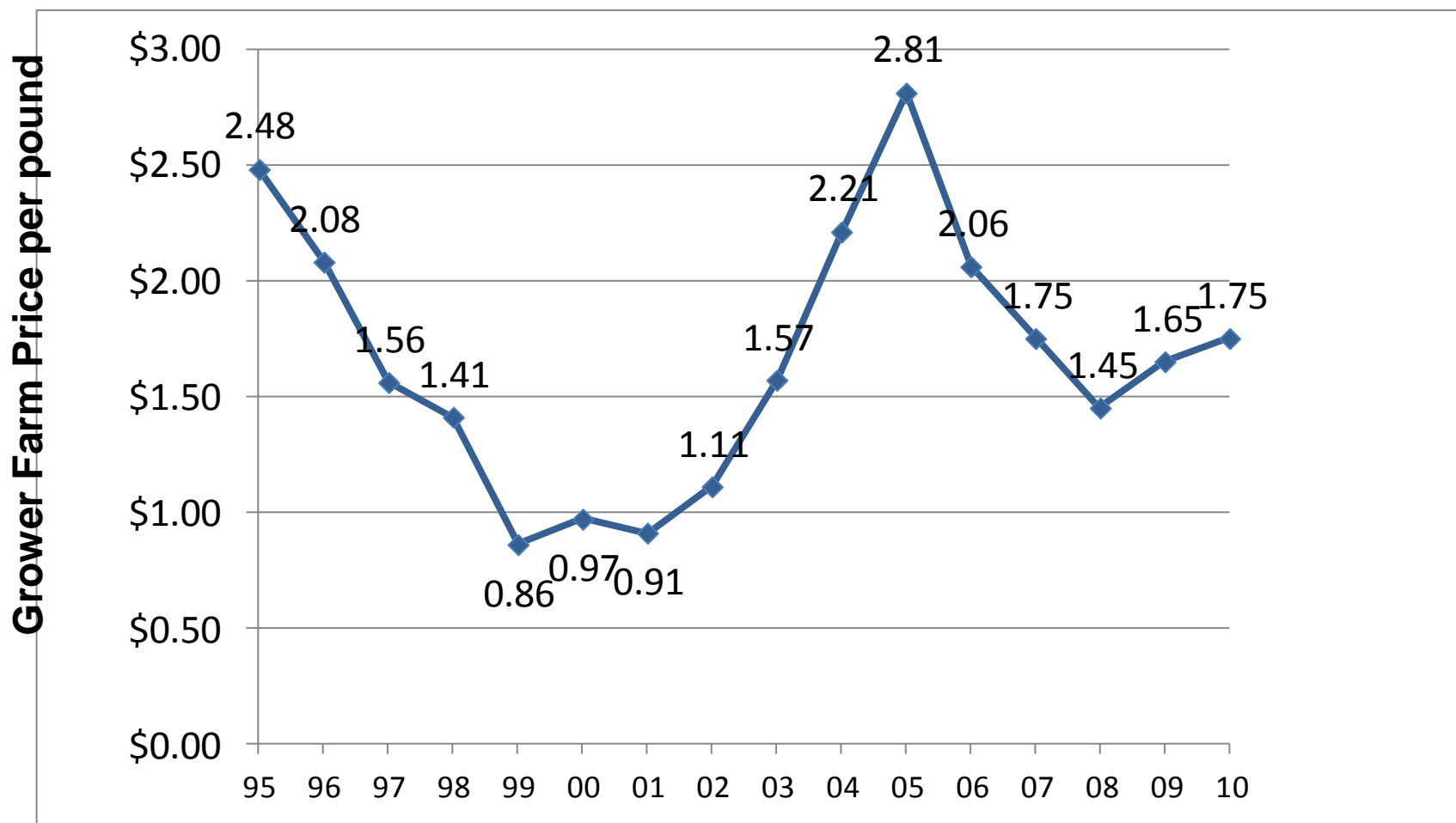
**Expected grower farm price range: \$.90 - \$2.81**

# Historic Yields



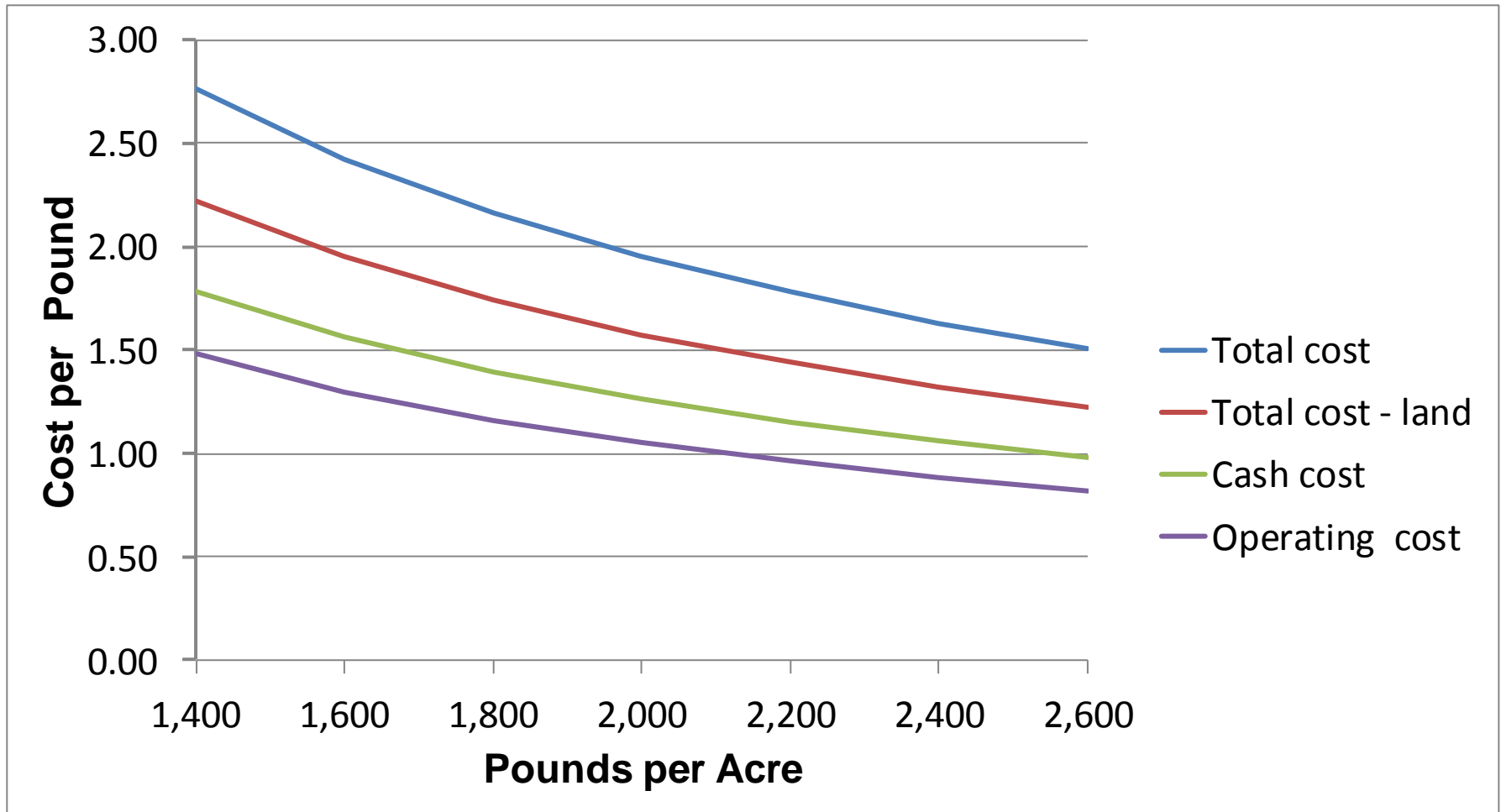


# Average Annual Prices



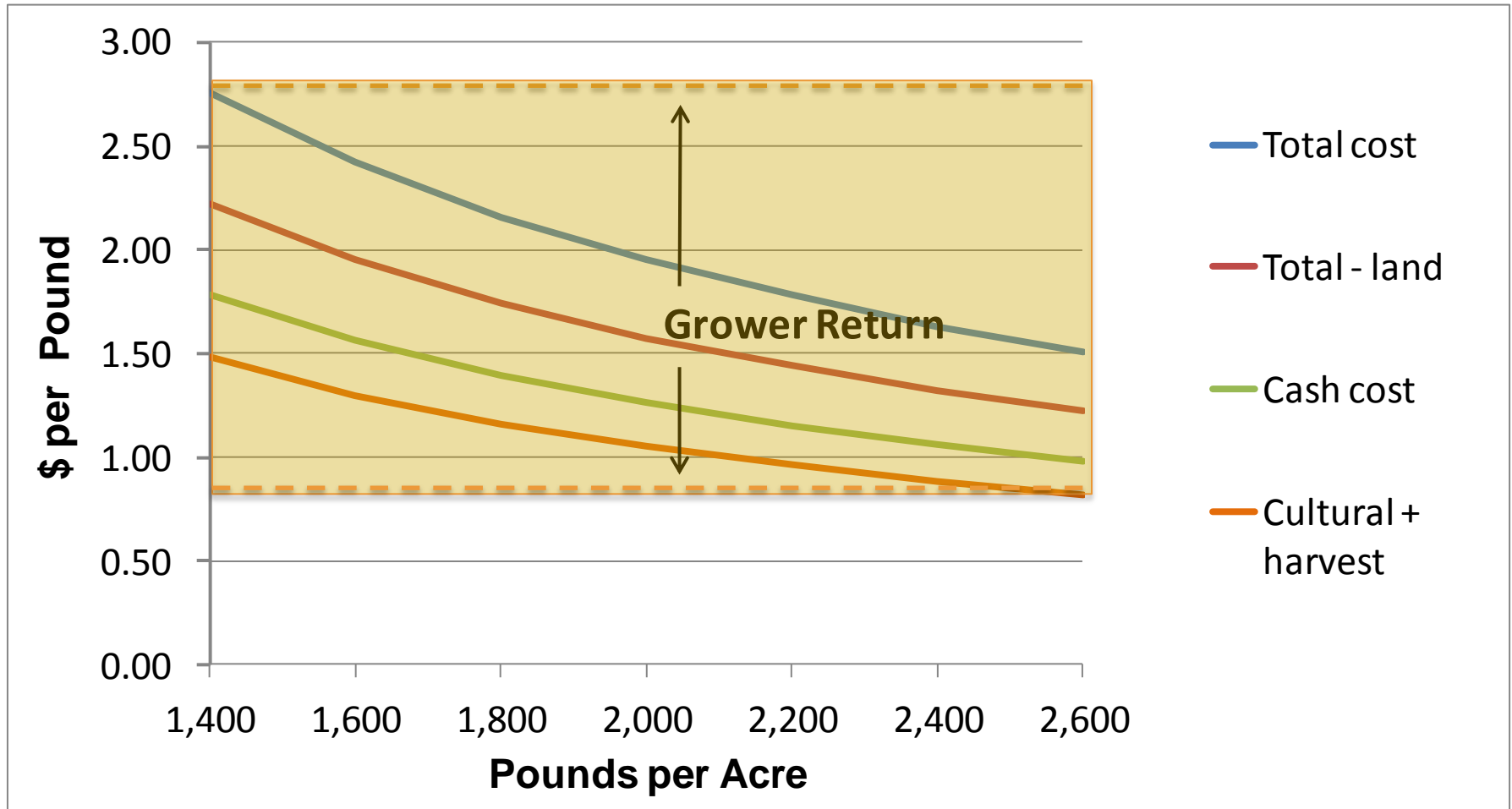
# Almonds

## Cost Per Pound at Varying Yields



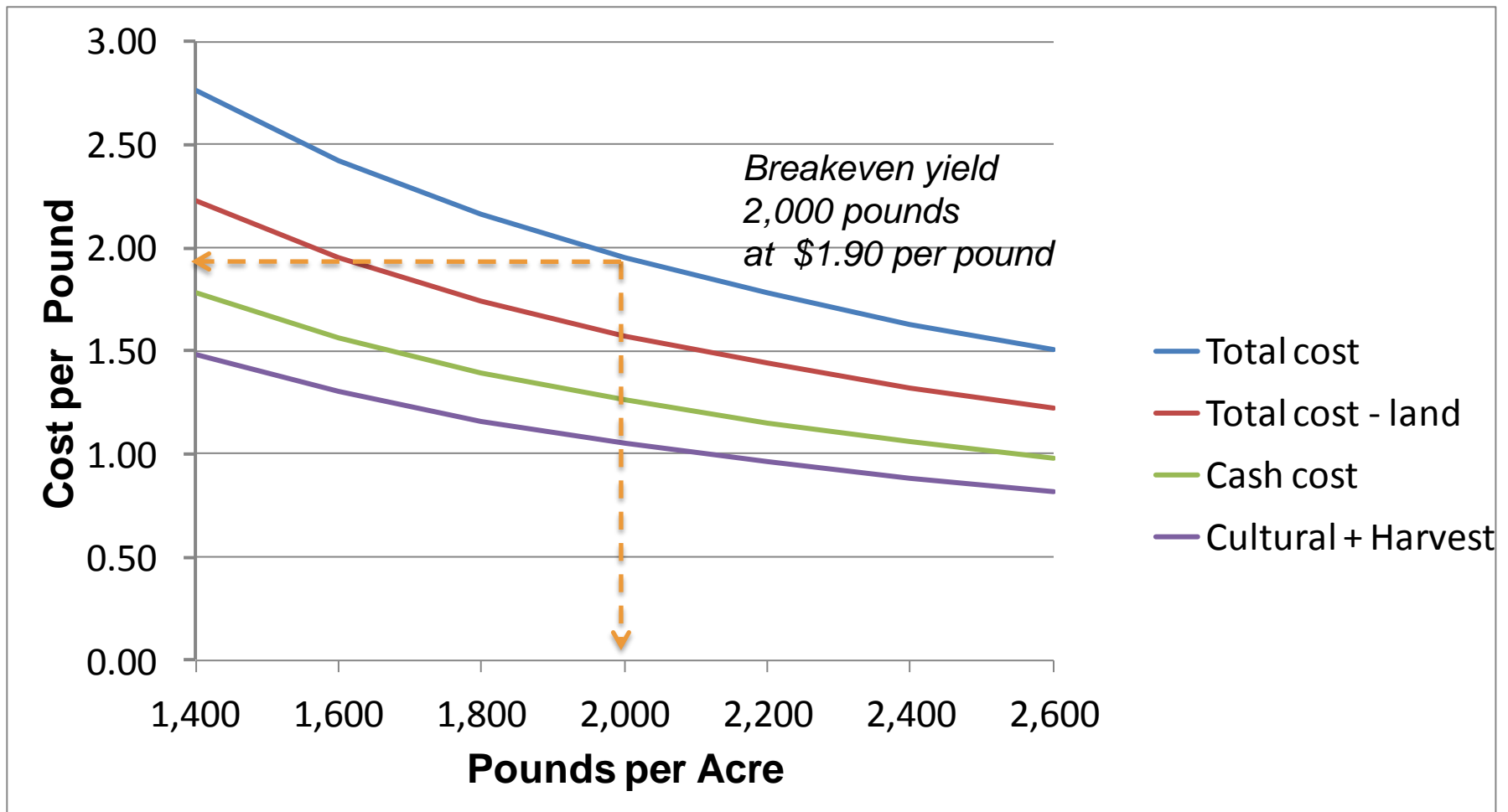
# Almonds

## Cost Per Pound at Varying Yields



# Almonds

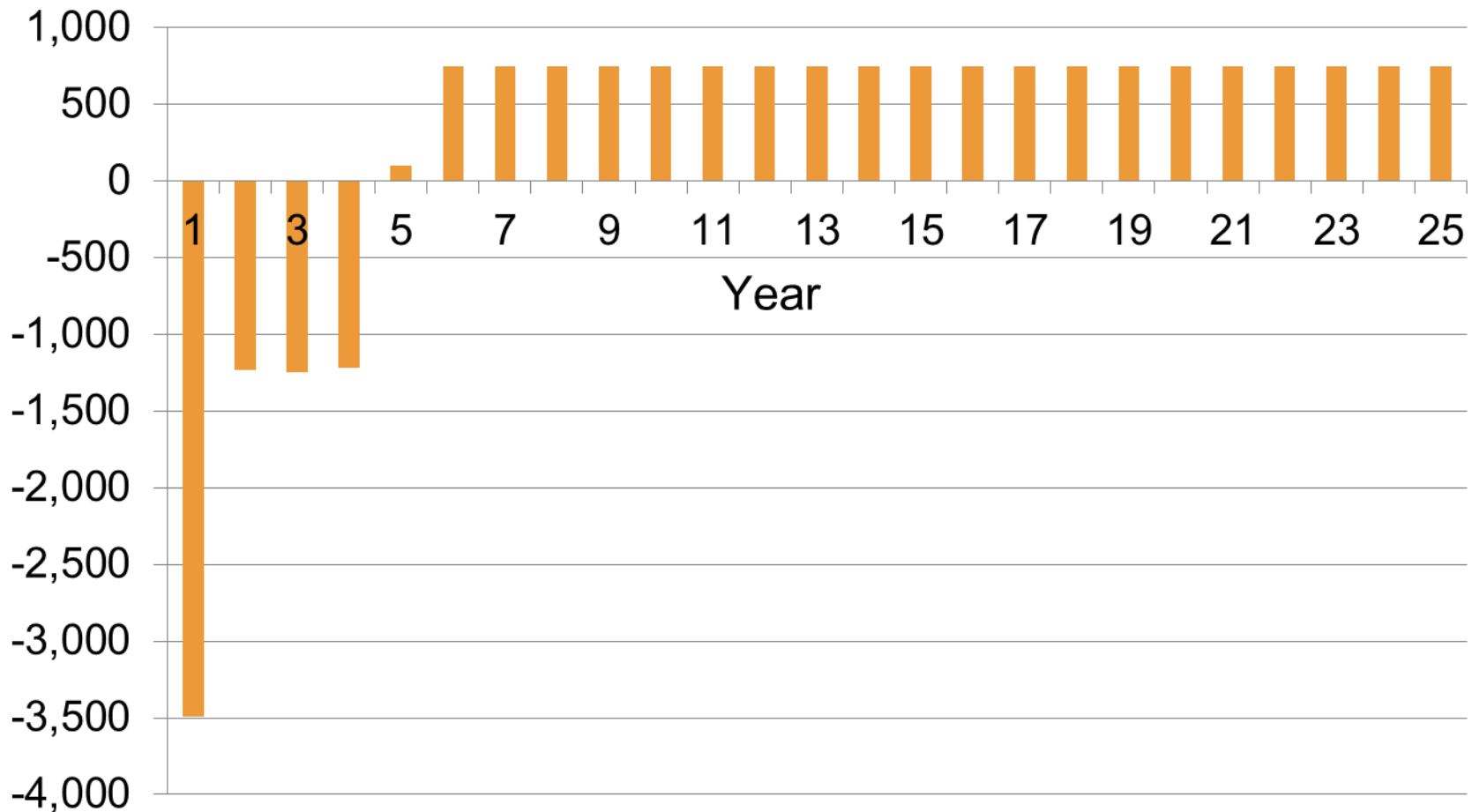
## Cost Per Pound at Varying Yields





# Annual Net Returns Excluding Land Cost\*

## 2,000 Pounds Per Acre, \$1.80 Per Pound



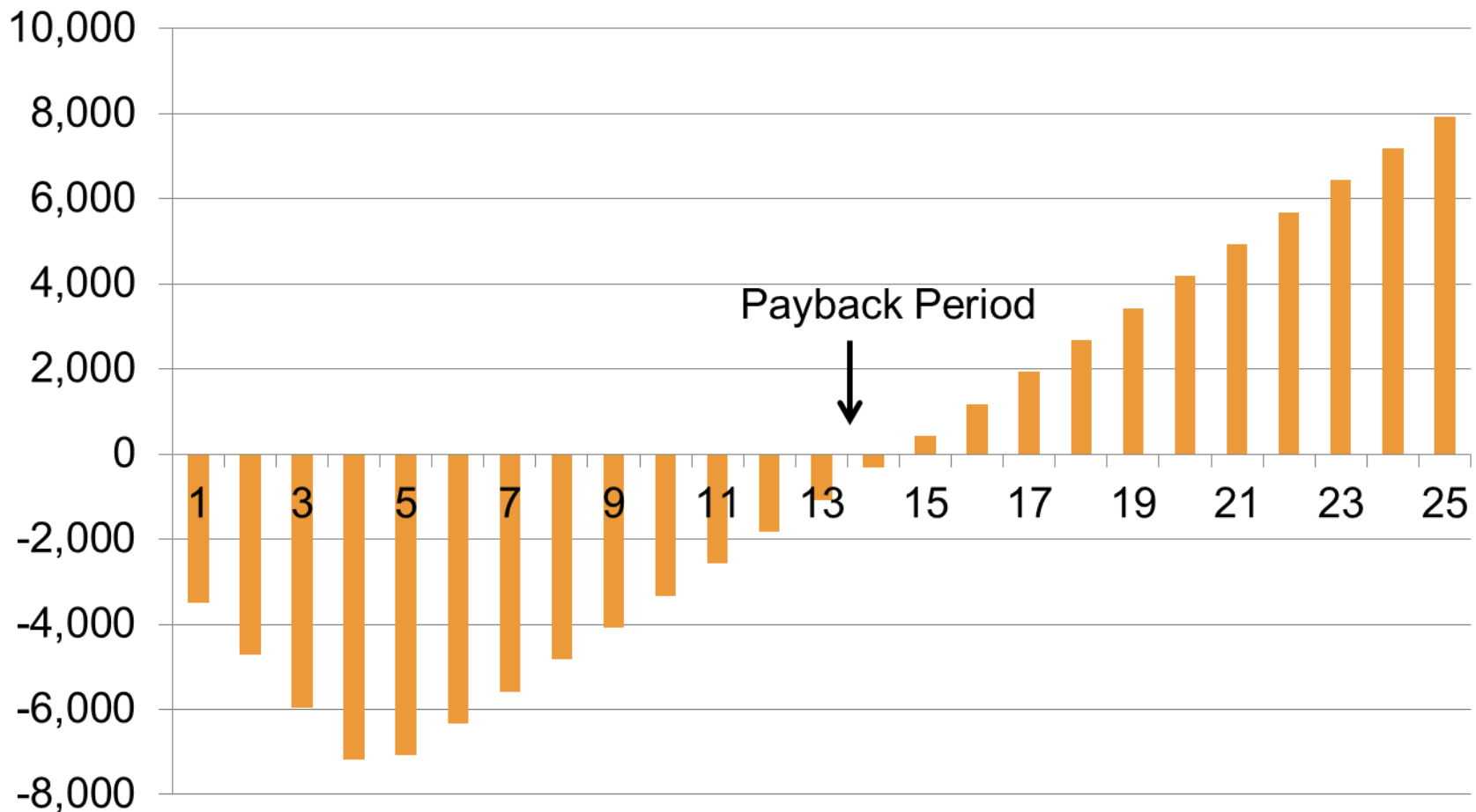
\* This would be below breakeven with land costs INCLUDED

# Internal Rate of Return at Varying Yields and Prices\*

Lbs. /A	1,800	1,900	2,000	2,100	2,200	2,300	2,400
\$1,50	---	---	-7%	-2%	1%	3%	5%
\$1.60	-13%	-5%	-1%	2%	4%	6%	8%
\$1.70	-4%	0%	3%	5%	7%	9%	11%
\$1.80	1%	4%	6%	8%	10%	11%	13%
\$1.90	4%	7%	9%	11%	12%	14%	15%
\$2.00	7%	9%	11%	13%	14%	16%	17%

**\* Land Costs are EXCLUDED in the calculation of Internal Rate of Return**

# Accumulated Net Return per Acre\* 2,000 lbs. per acre and \$1.80/lb.



\* EXCLUDING Land Costs

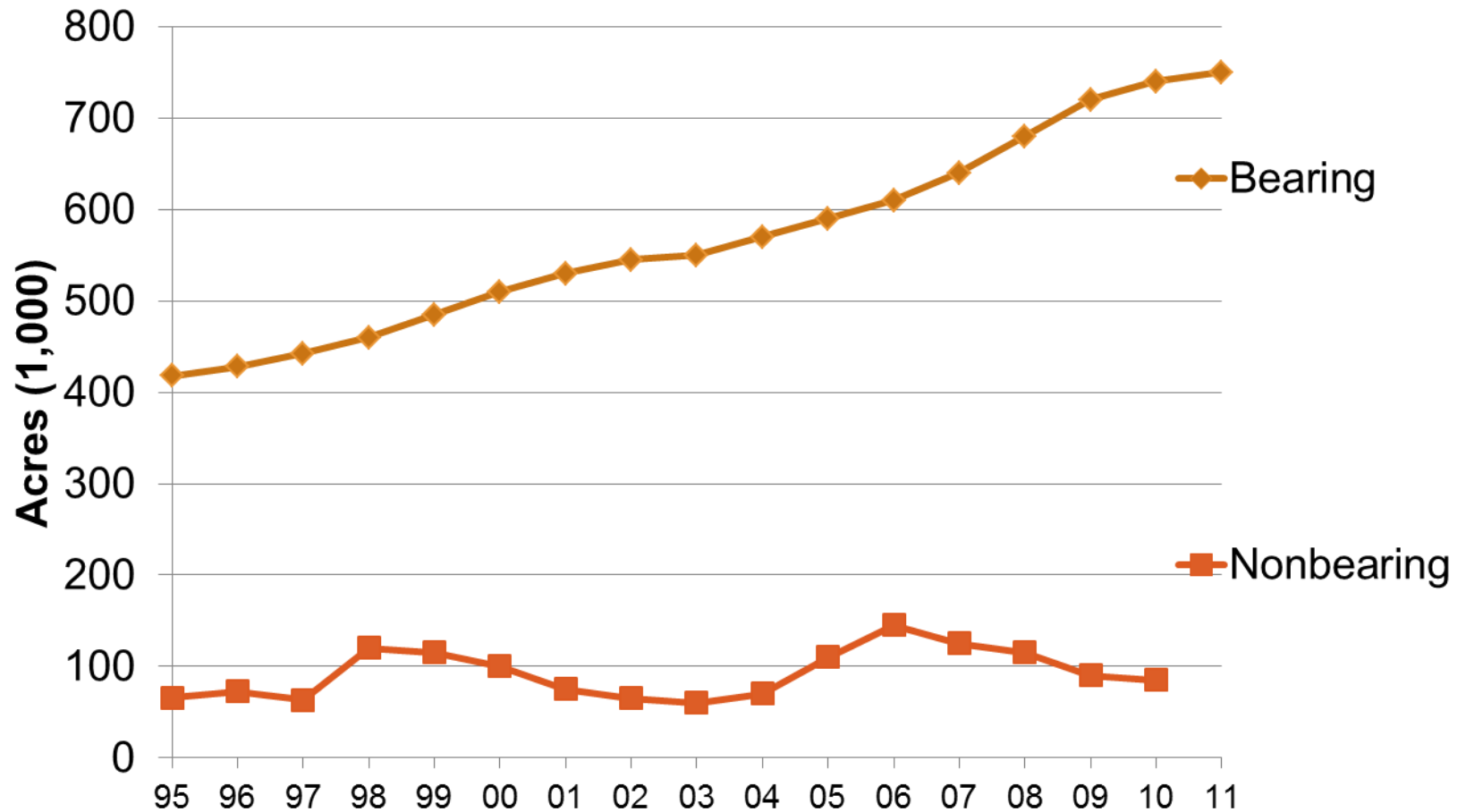
# Payback Period for Investment (Years)

## Varying Yields and Prices\*

Lbs. /A	1,800	1,900	2,000	2,100	2,200	2,300	2,400
<b>\$1.50</b>	---	---	---	---	23	19	16
<b>\$1.60</b>	---	---	---	21	17	15	13
<b>\$1.70</b>	---	25	19	16	14	13	12
<b>\$1.80</b>	23	18	15	13	12	11	10
<b>\$1.90</b>	17	14	13	11	11	10	10
<b>\$2.00</b>	14	12	11	10	10	9	9

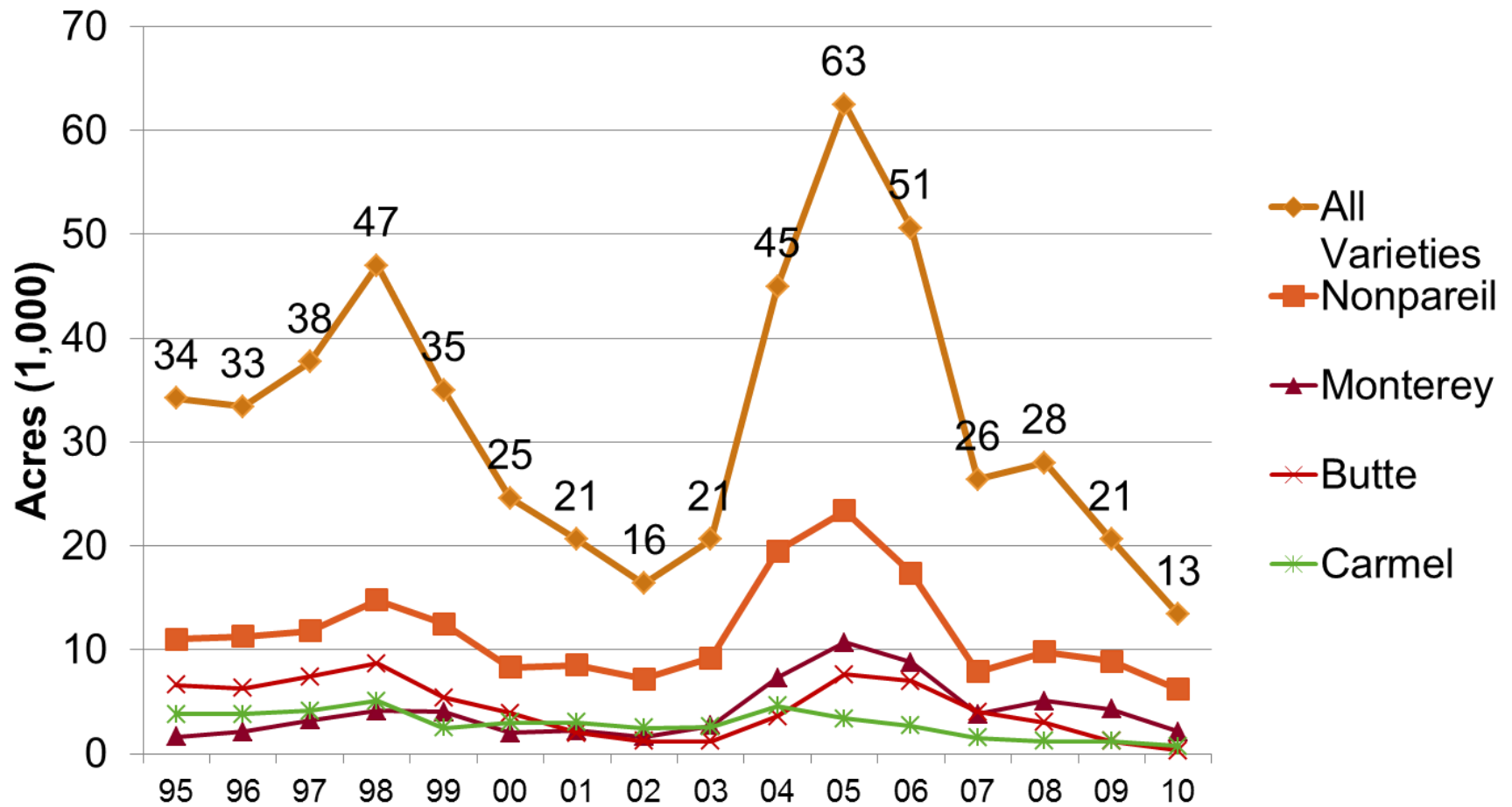
\* Land costs are EXCLUDED in this payback period calculation

# Almond Acres

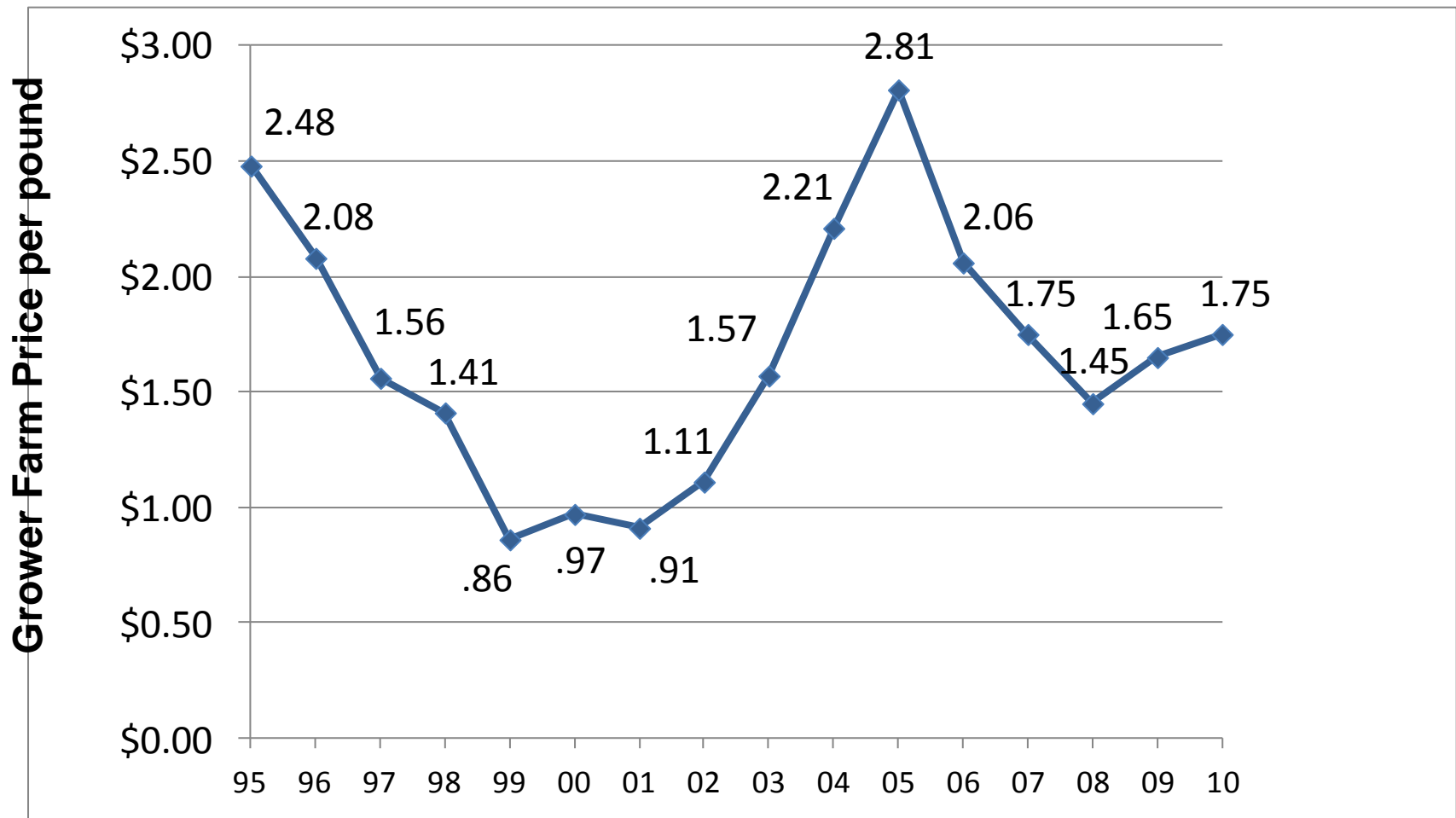




# Almond Acres Planted by Year and Variety



# Almond Grower Farm Price Per Pound



## Agricultural & Resource Economics **UCDAVIS**

<http://coststudies.ucdavis.edu>







# Economics of Almond Production

Bill Harp – Almond Grower



# Grower Return by Region for 2010 CY

Almond Growing Region			
Northern	Central	Southern	State

Yield Per Acre	1,698	1,853	2,762	2,200
Bearing Acres	130,869	318,129	291,002	740,000
Total Reported Production	222,198,895	586,123,982	819,869,378	1,628,192,255
Total Paid Weight <sup>1</sup> :	220,465,744	579,288,604	810,308,061	1,610,062,409
Total Paid Weight/Acre:	1,685	1,821	2,785	2,176
Grower Price/Lb <sup>2</sup> :	\$1.80	\$1.77	\$1.79	\$1.78
Paid Grower Revenue/Acre <sup>3</sup> :	\$3,030	\$3,215	\$4,974	\$3,874
Growing Costs/Acre SJ Valley:	\$2,700	\$2,700	\$2,700	\$2,700
Discounted Growing Cost per Acre <sup>4</sup> :	\$400	\$200	\$0	\$157
Net Estimated Grower Cost:	\$2,300	\$2,500	\$2,700	\$2,543
Net Grower Return/Acre:	\$730	\$715	\$2,274	\$1,331

1. Excludes inedibles
2. Based on the grower returns per pounds by Variety as reported by the State top 5 processors
3. Based on 2010 UC Davis Study. Excludes land and trees at \$1,106/acre.
4. Due to cheap water



- The yearly return of one bearing acre divided by the market value of one bearing acre

$$\frac{\text{Grower Return \$}}{\text{Market Value \$}} = \frac{\text{\$1,331}}{\text{\$18,000}} = 7.4\%$$

CY10 ROA

# Grower Return (ROA) History

## Almond Grower Return - Return on Asset Analysis

Analysis of the most recent past 10 Years: 2001 - 2010

	Crop Year Grouping				10 Yr History
	2001-2003	2004 - 2007	2008 - 2010	2010	2001 - 2010
Wtd. Avg Yield/Acre	1,810	1,830	2,172	2,200	1,943
Wtd. Avg Net Return/Acre	\$545	\$1,854	\$981	\$1,331	\$1,207
Wtd. Avg Market Value of 1 Acre <sup>1</sup>	\$7,675	\$13,956	\$17,187	\$18,000	\$13,423
Pre-Tax Return on Asset <sup>2</sup>	7.1%	13.3%	5.7%	7.4%	9.0%
Wtd. Avg Asset Appreciation	\$ 669	\$ 1,849	\$ 673	\$1,000	\$ 1,131
Asset Appreciation %	8.7%	13.2%	3.9%	5.6%	8.4%
Pre-Tax Return on Asset <sup>2</sup> incl Asset Appreciation	15.8%	26.5%	9.6%	12.9%	17.4%

1. Value of 1 Mature Acre - Source from the "Trends" in Agricultural Land and Lease Values Annual Report & cross checked with local land appraisers records.

2. ROA = based on weighted average market value of 1 acre of mature almonds for given period.

# Almond Grower ROA Target Range

## Almond Grower ROA Target Range<sup>1</sup>

- **10-20% Yearly Return on Asset (excluding asset appreciation)**
- Supported by the expectations of other growers knowledgeable of the risks associated with Almonds Orchards **based on at least a 20-25 year life**
- **Use 10% as a minimum target ROA**

1. Grower's Perspective: As an independent California Almond Grower and Investor, my opinion of an acceptable ("fair and reasonable") Almond Grower ROA is as follows.

# Return on Asset Analysis vs. Target

## Almond Grower Return - Return on Asset Analysis vs. Target Analysis of the most recent past 10 Years: 2001 - 2010

### State-wide average per Acre

Target Average Net Return @ 10% pre-tax ROA

Actual Average Net Return more/(less) than Target:

Crop Year Grouping				10 Yr History
2001-2003	2004 - 2007	2008 - 2010	2010	2001 - 2010
\$768	\$1,396	\$1,719	\$1,800	\$1,342
(\$223)	\$458	(\$737)	(\$469)	(\$135)

### State-wide Total (\$ millions)

Average Annual Net Revenue vs. Target:

Crop Year Grouping Net Revenue vs. Target:

(\$121)	\$276	(\$465)	(\$347)	(\$84)
(\$362)	\$1,104	(\$1,394)	(\$347)	(\$836)

# Projection of Bearing Acreage Increase based Known & Estimated Plantings and Removals

	Projected Bearing Acres 2012- 2017					
2011	2012	2013	2014	2015	2016	2017
Actual	Already Reported Plantings			Estimated Plantings		

Forecasted Bearing Acres	760,000	780,000	794,797	803,733	844,733	885,733	926,733
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Acres Planted 3 years prior: (as originally Reported)		22,832	18,623	14,960	35,000	35,000	35,000
Adj. Planted Acreage: 60% more than Orig. Reported		36,696	29,797	23,936	56,000	56,000	56,000
Expected Removals (average of 2004-2011)		16,696	15,000	15,000	15,000	15,000	15,000
Net Increase in Bearing Acres (estimated) vs prior year:		20,000	14,797	8,936	41,000	41,000	41,000

Acres Planted and are Standing as of 2011 that are more than 20 years old (1990 or earlier planting):	110,337
Acres Planted and are Standing as of 2011 that are more than 17 to 20 years old (1991-1993 plantings):	38,584

Average Net Increase in Bearing Acres 2004-2012: 26,250 acres
Largest Net Increase in Bearing Acres from one crop year to the next: 40,000 acres (In 2008 & 2009 Crop Years).



# California Almond Demand History





Recent Crop Year Demand Growth Averages					
	3 Year	5 Year	10 Year	15 Year	Period when Target ROA Achieved
	'09-'11	'07-'11	'02 - '11	'97 - '11	'04 - '07
<u>Actual Demand Growth</u>					
Domestic	10.2%	8.4%	9.0%	10.0%	4.8%
Export	12.1%	14.7%	9.5%	9.2%	8.2%
Total	11.5%	12.7%	9.3%	9.3%	7.0%

Outlook 2011 Crop Year Demand Growth = 15.3%  
 Actual 2010 Crop Year Demand Growth = 13.3%

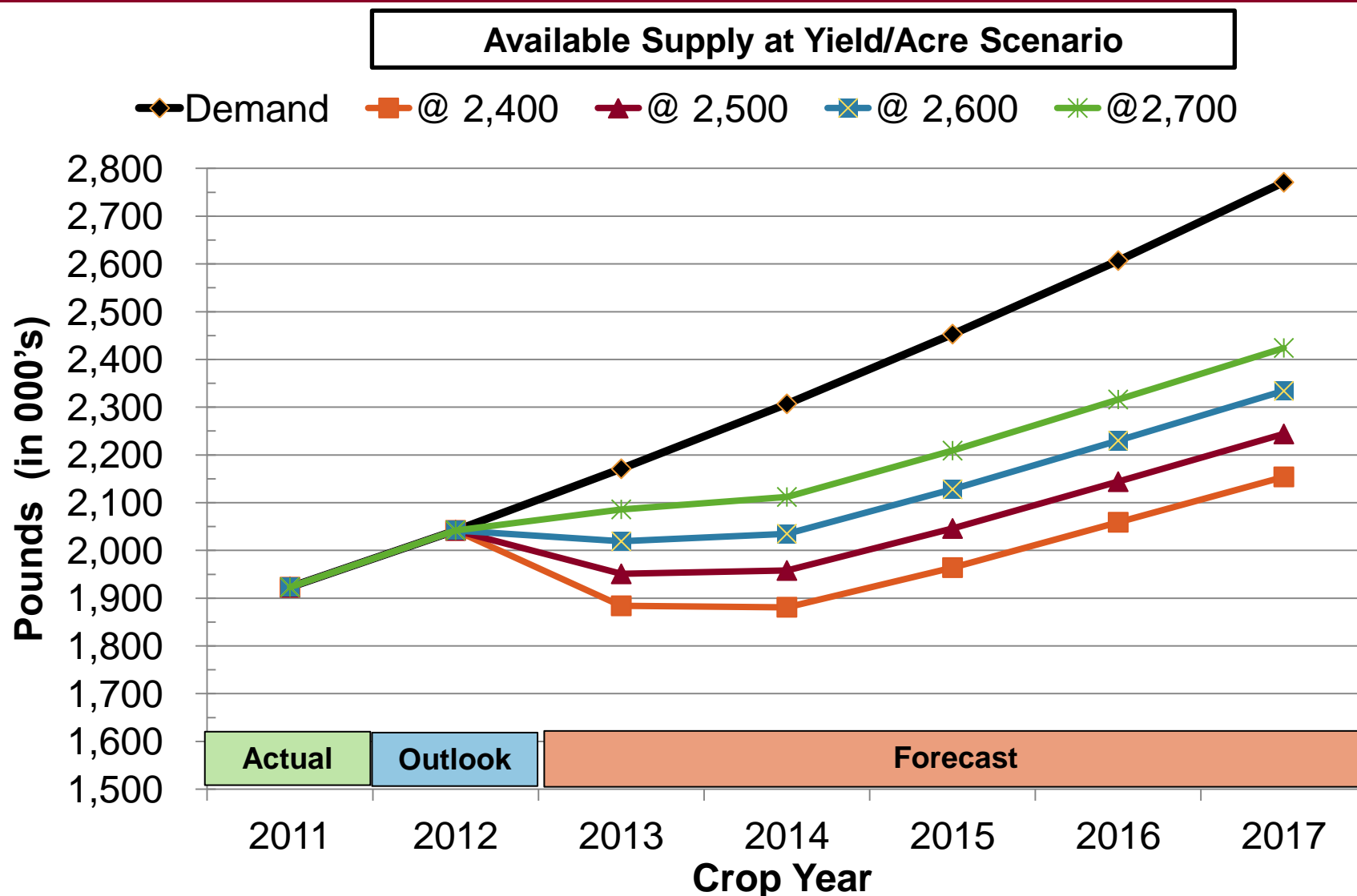
# It Appears Future Demand Growth will be Restricted by Acreage Growth

## 2012 - 2017 Demand Growth based on Projected Bearing Acres

	Restricted Growth Based on Projected Bearing Acres @ Random Yield/Acre Averages 2012 - 2017				Unrestricted Conservative Demand Growth
	2,400	2,500	2,600	2,700	
<u>Projected Demand Growth</u>					
Domestic	1.8%	2.6%	3.3%	4.1%	7.5%
Export	2.5%	3.3%	4.1%	4.9%	7.3%
Total	2.0%	2.8%	3.6%	4.3%	7.3%
					(CAGR = 6.3%)

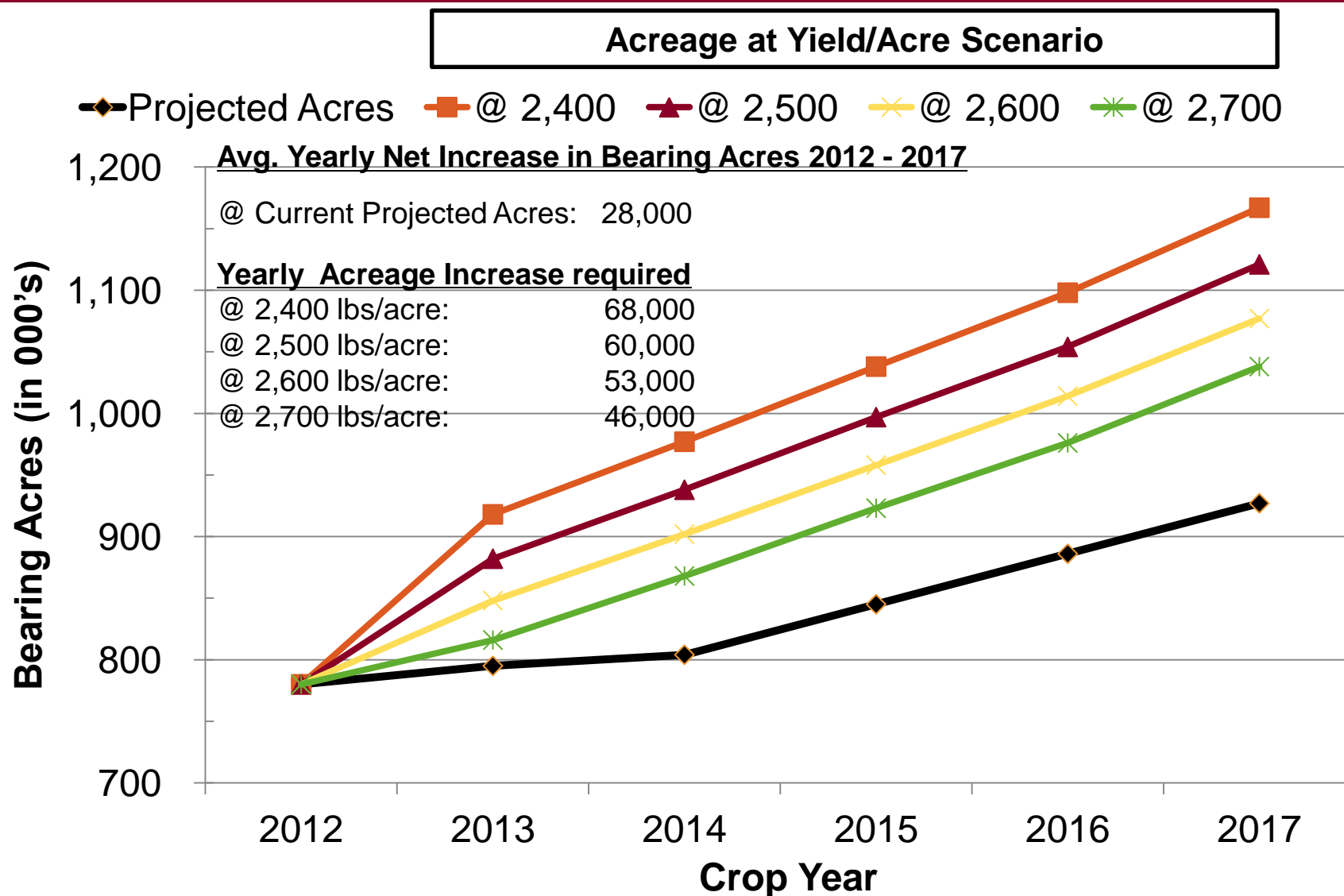
	= Conservative Demand Growth Forecast based on Research & Recent History
	= Actual Avg. 2008 - 2010
	= Deloitte 2011 Study
	= Assumes Industry must carry-out 13% of Total Supply each year.

# Acreage Restricted Supply (Available to Ship) vs. Conservative Unrestricted Demand Growth @ 6.3% CAGR



Acreage Restricted Supply = Net Edible Production + carry-in supply – (less: required carryout supply)  
 Required carryout = 13% of Total Supply for a given CY.

# Bearing Acreage Required to Meet Projected Average Demand of 7.3% (2012 – 2017)



Model assumes 15% of Total Current Demand must be carried-out each crop year (=13% of Total Supply)

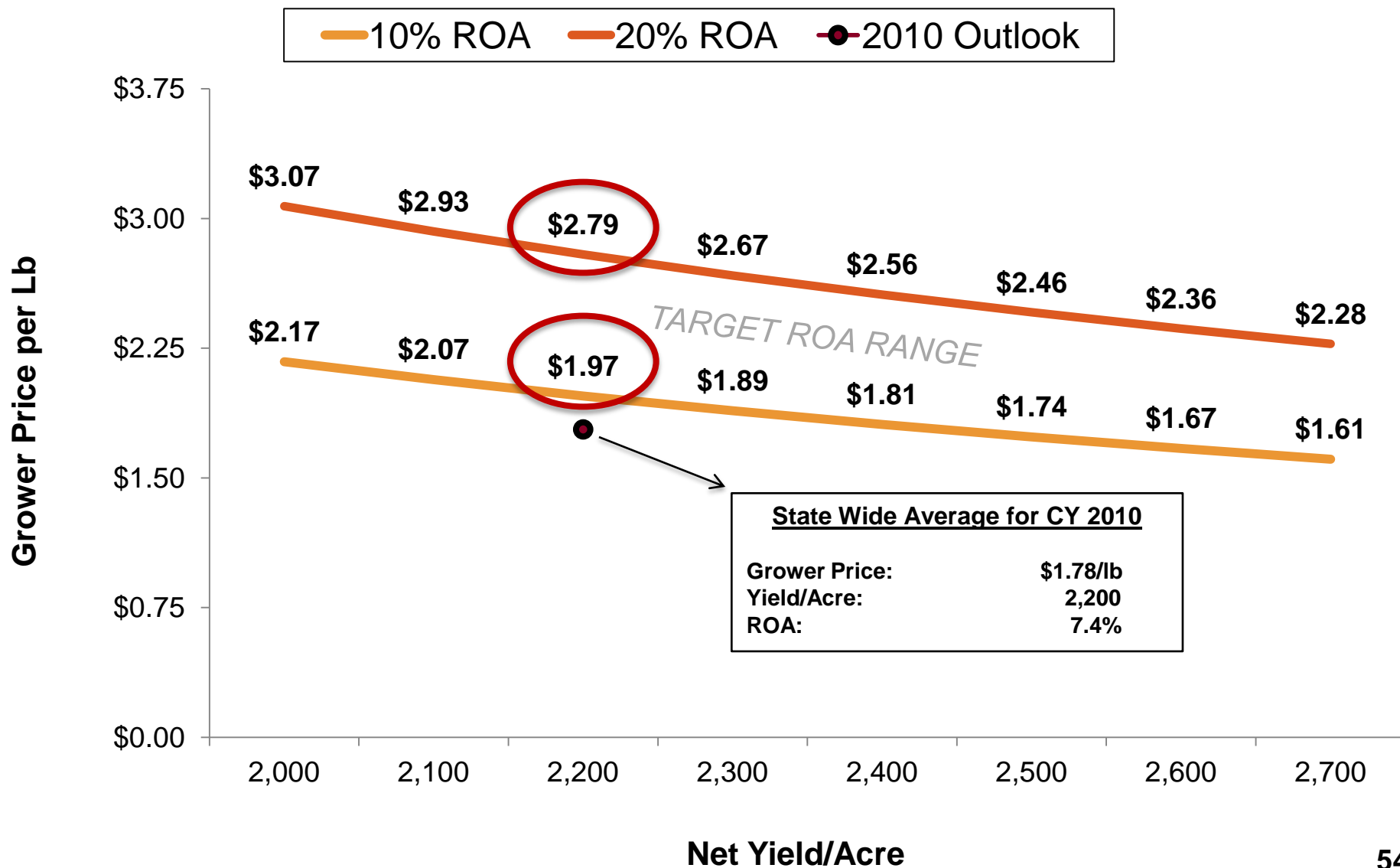
# Caution: Do not RUSH to Overplant

- **Be Humble, Be Wise – Use the 4 S's**
  - **Slow (Study Costs and ROA before Planting)**
  - **Steady in Planting**
  - **Stable Price and Supply for Growers and Customers from Supply Management**
  - **Sustainable ROA and Health of Almond Industry**

Remember

**DO Not Rush to Overplant**

# Grower Price Range that Achieves Target ROA





# Outlook for 2011-2016

## **Optimism for Grower Returns for 2011-2016<sup>1</sup>:**

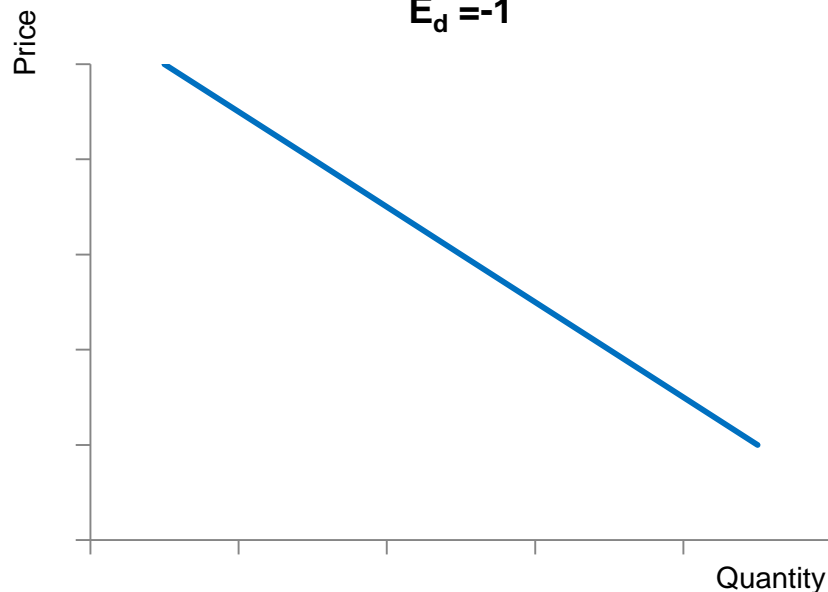
- **10-20% Grower ROAs are possible with projected almond supply and demand fundamentals**
- **Asset Appreciation may be minimal for 2011-2016**
- **Growers need to become informed, aware, and involved to support our capable Almond Handlers**
- **Review Monthly information and reports from Almond Board**
- **Research and study Almond Market Dynamics and apply principles to practice on regular basis**
- **Get involved and communicate with growers statewide**

1. Grower's Perspective: As an independent California Almond Grower and Investor,

**Price Elasticity ( $E_d$ ) measures the change in quantity demanded in response to a change in price**

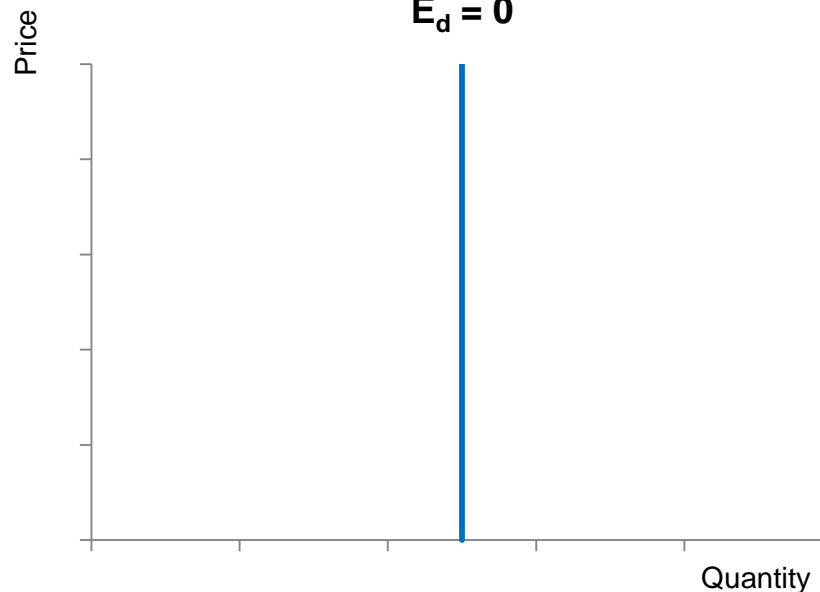
$$\frac{\% \Delta \text{ Quantity Demanded (shipments)}}{\% \Delta \text{ Price}} = E_d$$

**Moderately Elastic**  
 $E_d = -1$



- A 10% **increase** in price will likely cause a 10% **decrease** in quantity

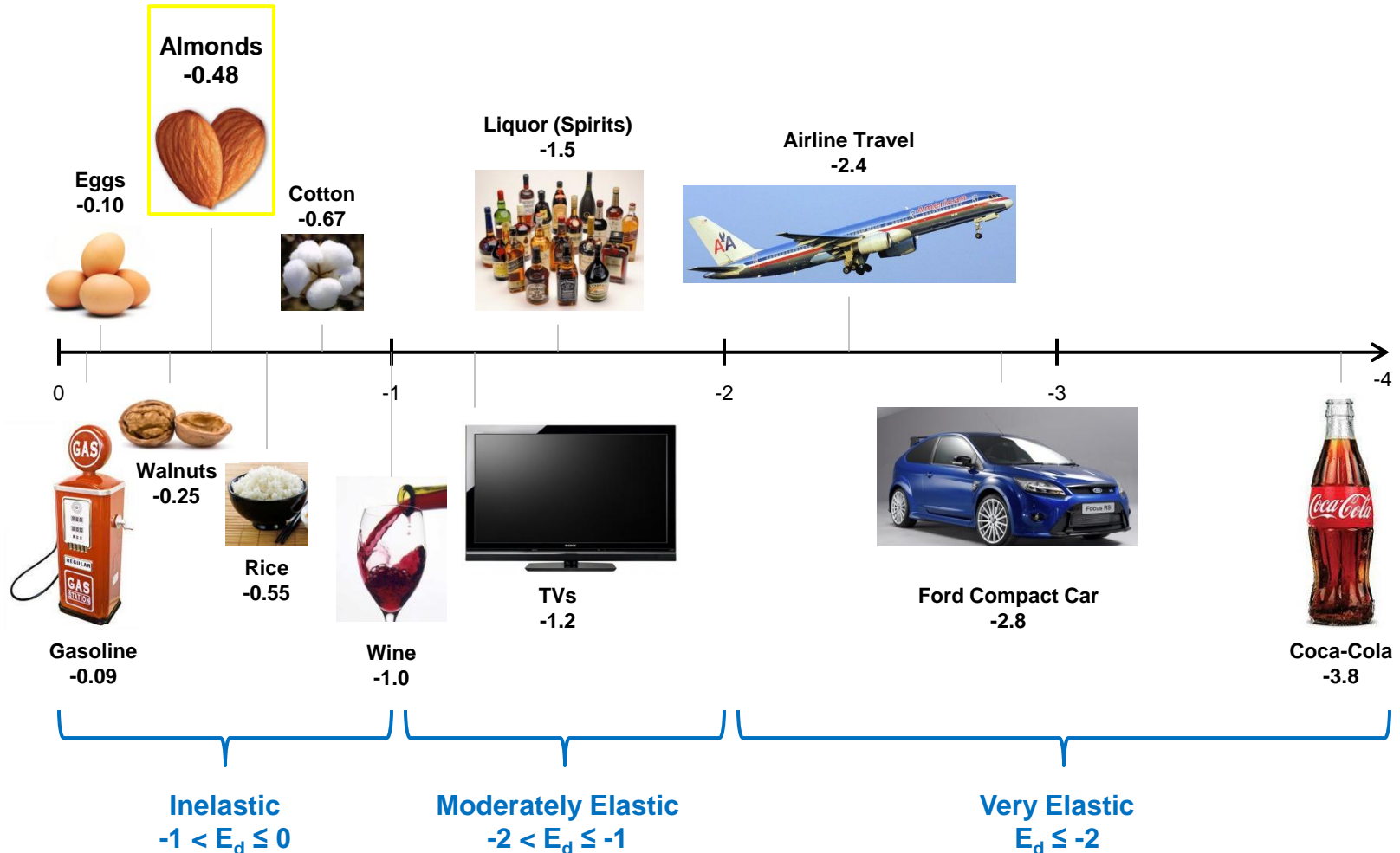
**Perfectly Inelastic**  
 $E_d = 0$



- A 10% **increase** in price will likely cause **no change** in quantity

# Price Elasticities of Select Consumer Goods

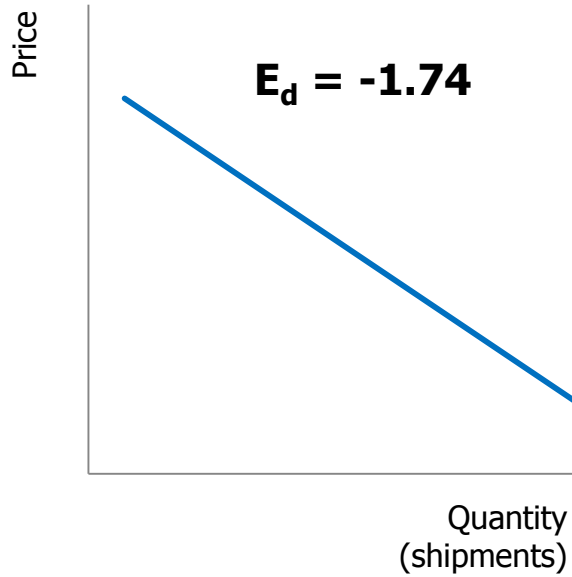
Goods that are more essential to everyday living and that have fewer substitutes are typically inelastic



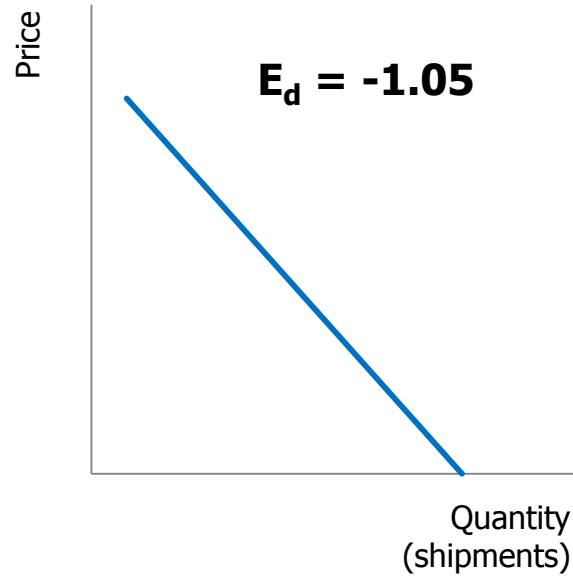
# Almond Price Elasticity

Almonds have become more inelastic over the last 40 years

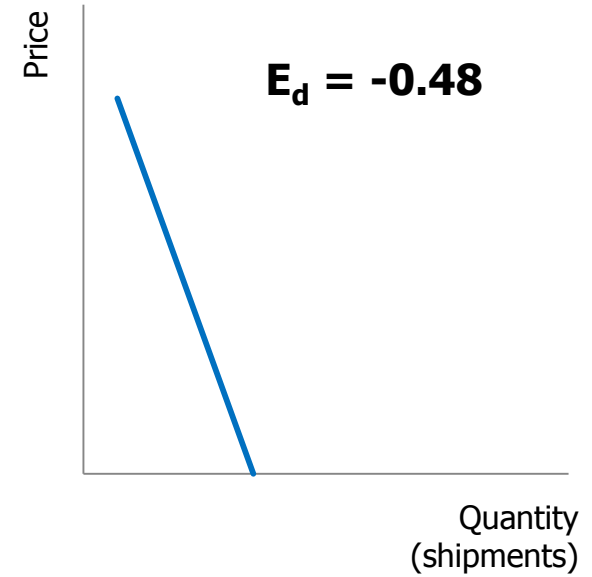
**1970s**



**1990s**

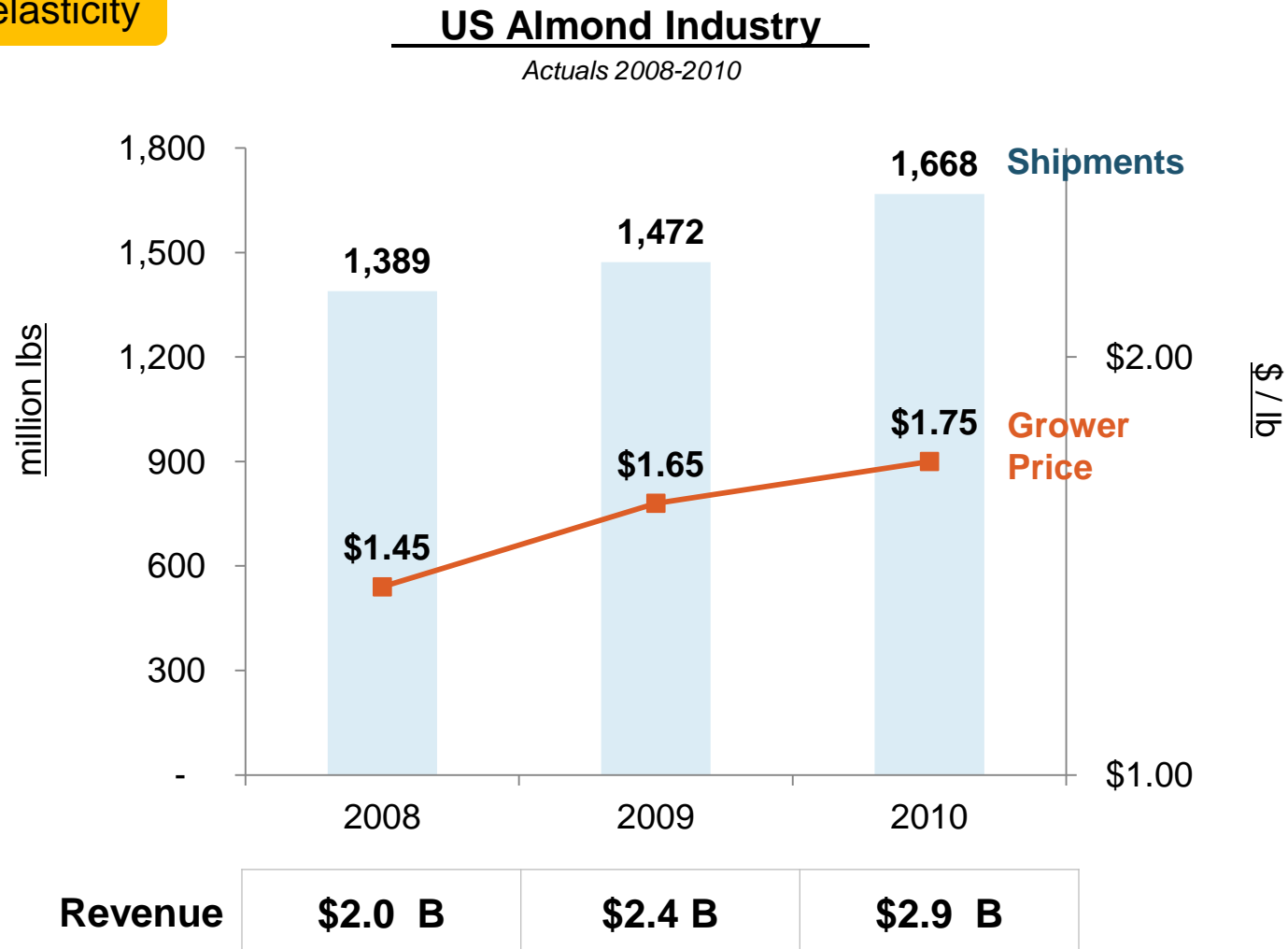


**Today**



# Over last 3 years, both prices and demand (shipments) have gone up!

Proof of inelasticity



**A change in price of almonds  
will likely not  
create significant change in demand**

- This has been proven over the last 3 years, where almond prices went up from \$1.45 to \$1.75 / lb and shipments increased from 1.4 billion lbs to 1.7 billion lbs

# Key Takeaways

1. **10-20% Grower ROAs are possible** and can be achieved consistently due to the price inelasticity of almonds
2. **Effective supply management can reduce price volatility**
3. **Growers and handlers should work together** to achieve an improved ROA







# ROA Planning Tool

## Worksheet



## Q & A







# Economics of Almond Production

## Almond Board Webinar