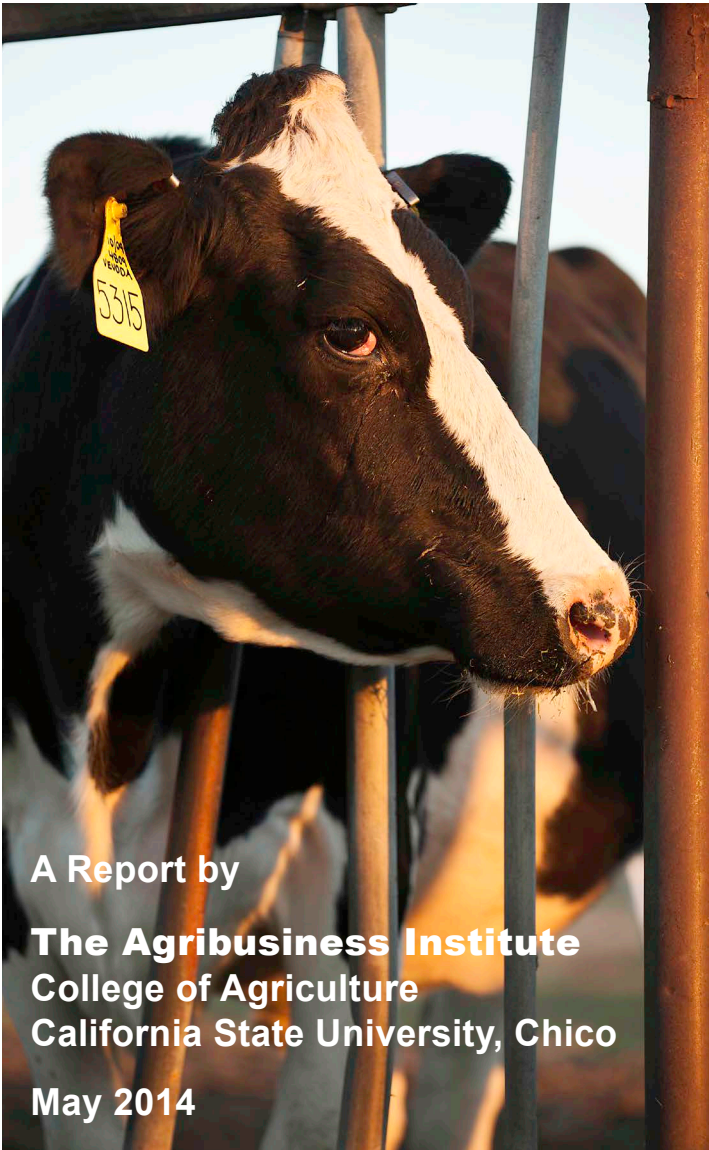


A wide-angle photograph of an orchard with rows of trees in full white blossom. A paved road curves through the orchard, and a line of bare trees stands on the right side. The sky is clear and blue.

# The Contribution of Agriculture to Northeastern California's Economy in 2012





## About the Author



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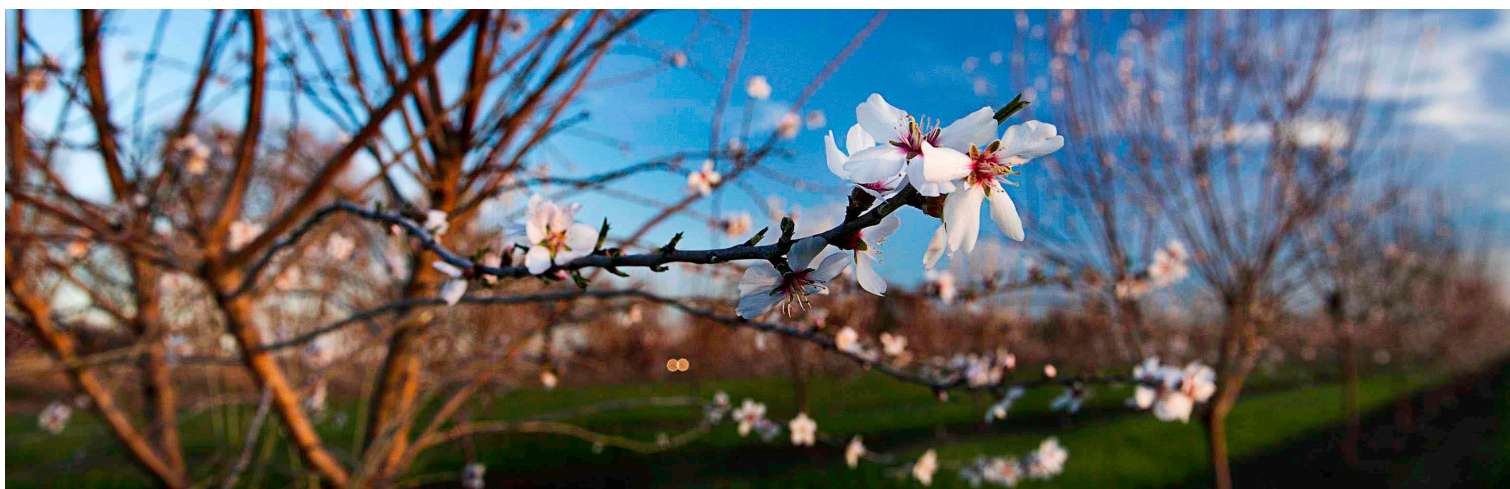
## Acknowledgements

The author would like to thank the Center for Economic Development (CED), their Associate Director, Warren Jensen, and Student Research Associate, Dillon Johnson, for their valuable contributions. This research was partially funded by a U.S. Economic Development Administration (EDA) and an Agricultural Research Institute grant (ARI Project: 13-05-006).

*Layout and Design by Tempra Board & Associates. Photography by Brian Miller, David Yager, Jeanean Gendron, and California State University, Chico's College of Agriculture.*

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# Executive Summary

The objective of this study is to document the significance of agricultural production, processing, and its related industries to the overall economy of Northeastern California. Although agriculture has played a major role in shaping the landscape and stimulating economic growth in Northeastern California, no other studies have focused exclusively on this region of California. While agriculture contributes to the economy through numerous direct agricultural activities, it also plays an important role through its interactions with other economic sectors. This report addresses all of these impacts in order to show the true value of agriculture in this region.

## Key Findings Include:

- The unemployment rate in Northeastern CA was 15% in 2012. This is 4.5% higher than the state and 6.9% higher than the U.S.
- Inflation adjusted per capita personal income has been increasing at a much faster rate between 2000 and 2012 in Northeastern CA than the state as a whole (23% versus 4.5%).
- The total value of agricultural production was nearly \$4 Billion (\$3,966M) in 2012, it has more than doubled since 2002 (105% increase).
- Butte County had the highest value of production in 2012 (\$712M).
- The highest valued commodities in Northeastern CA were rice (\$765.7M), walnuts (\$673.7M), and almonds (\$509.6M).
- The highest valued commodities in the mountain dominant counties were strawberry plants (\$151.8M), alfalfa (\$125.1M), and cattle (\$117.4M).
- Farm production expenses have increased approximately 28% between 2000 and 2011.
- Net farm income has increased by over 550% from 2000 to 2011 while total government payments have decreased by over 50%.
- Agriculture was responsible for creating 57,005 jobs in Northeastern CA in 2012 (16% of all jobs and 20% of all private sector jobs). This includes 38,013 jobs directly in agriculture and an additional 18,991 jobs created through multiplier (indirect and induced) effects.
- Agriculture was responsible for creating \$2,719M in labor income in Northeastern CA in 2012 (17.2% of all labor income).
- Agriculture is responsible for creating \$4,282M in total value added to the Northeastern CA economy in 2012 (16% of the total value added or \$.16 of every dollar created by the Northeastern CA economy is associated with agriculture).



# Section 1

## Overview of Northeastern California



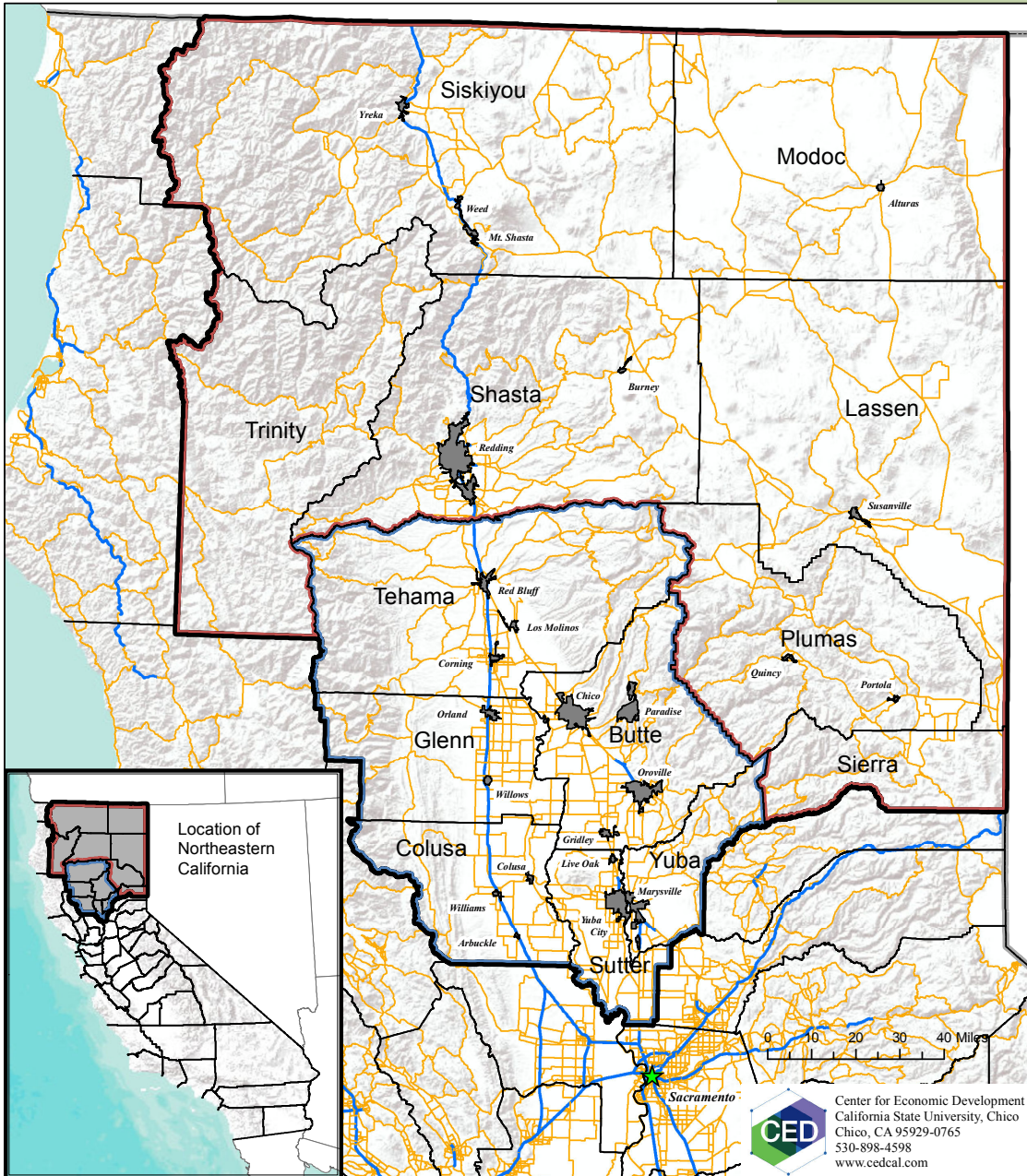
### 1.1 Study Area

Northeastern California is a diverse part of the state with large variations in terrain, weather, and land use. There are large, highly productive valleys that are near sea level and mountains that reach above 14,000 feet. Much of Northeastern California has been developed around the Sacramento River, which is the state's largest river.

For the purposes of this study, "Northeastern" California will be defined as the region containing the following 13 counties: Butte, Colusa, Glenn,

Lassen, Modoc, Plumas, Shasta, Sierra, Siskiyou, Sutter, Tehama, Trinity and Yuba (See Figure 1). Because of the diversity of agriculture within this vast region it can be difficult to summarize and describe the industry. As such, the Northeastern California region will occasionally be subdivided into six Valley Dominate Counties (Butte, Colusa, Glenn, Tehama, Sutter and Yuba) and seven Mountain Dominant Counties (Lassen, Modoc, Plumas, Shasta, Sierra, Siskiyou and Trinity).

# Northeastern California Agriculture Profile Study Area Map

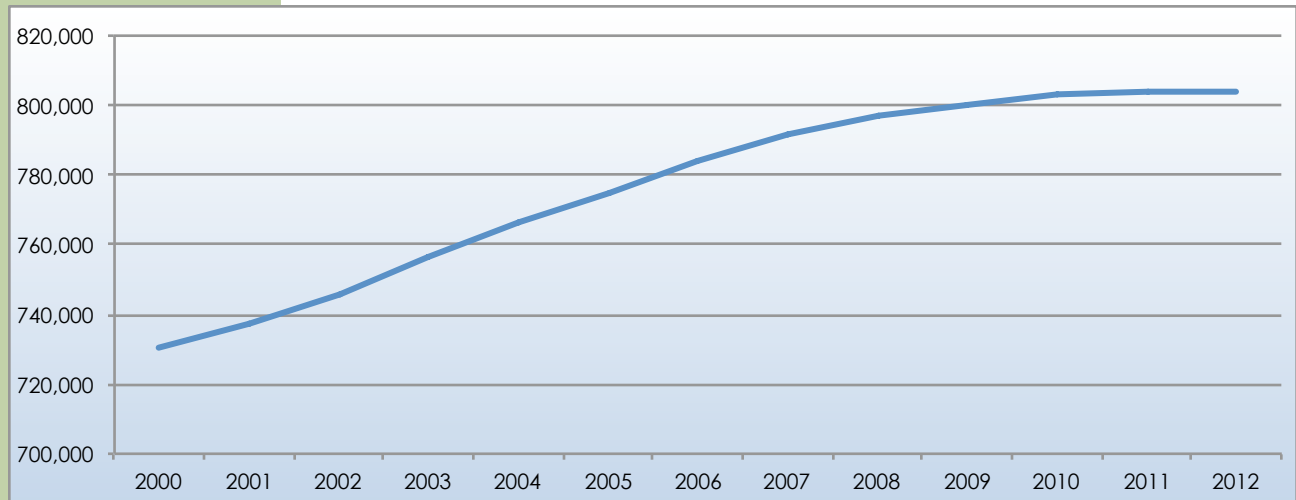


- Urban Areas > 2,500 Pop
- Sacramento Valley Dominant Counties
- Mountain Valley Dominant Counties
- 13-County Study Area
- County Boundaries
- State Boundaries
- Freeways
- Major Roads

## 1.2 Demographics

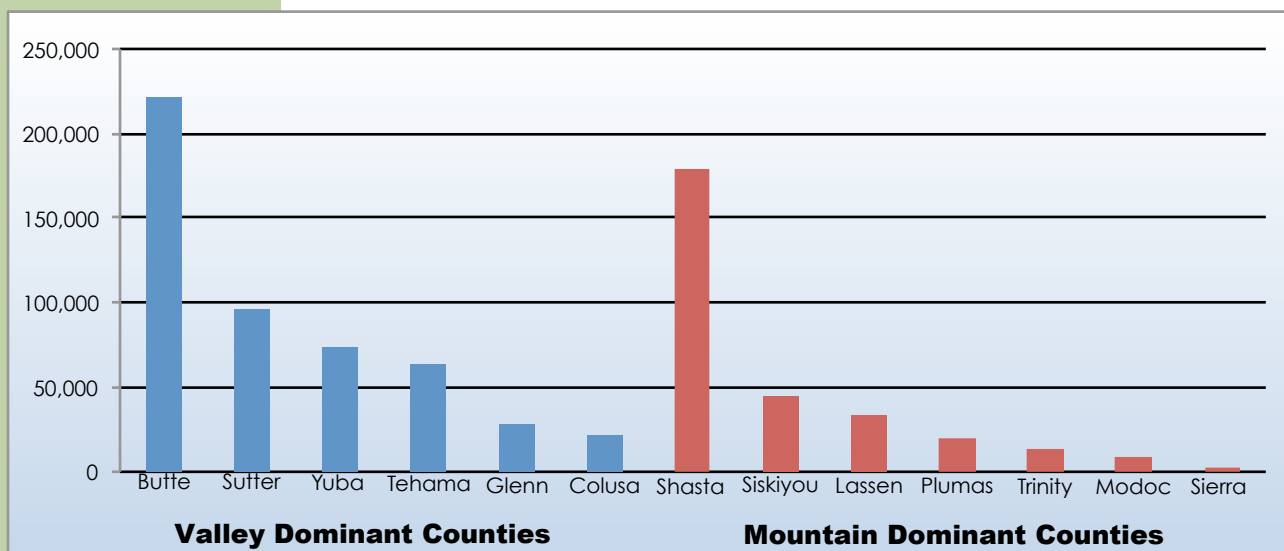
The total population in Northeastern California had been steadily increasing between 2000 and 2010 (10% increase), but has leveled off (Figure 2). This is likely in response to the economic decline that was experienced nationally during the 2007-2009 recession. It is expected that the population is likely to begin expanding once again.

**Figure 2: Northeastern California Population (2000-2012)**



The population in the valley dominant counties is much larger than that in the mountain dominant counties (63% compared to 37%). However, Figure 3 shows how both the valley and mountain dominant regions have a single county that provides the majority of its population base (Butte County for the valley and Shasta for the mountain). Although the counties in the mountain dominated region tend to be larger in size compared to the state average, this region contains 3 of the 5 least populated counties in the entire state (Sierra, Modoc, and Trinity).

**Figure 3: Northeastern California Population by County (2012)**

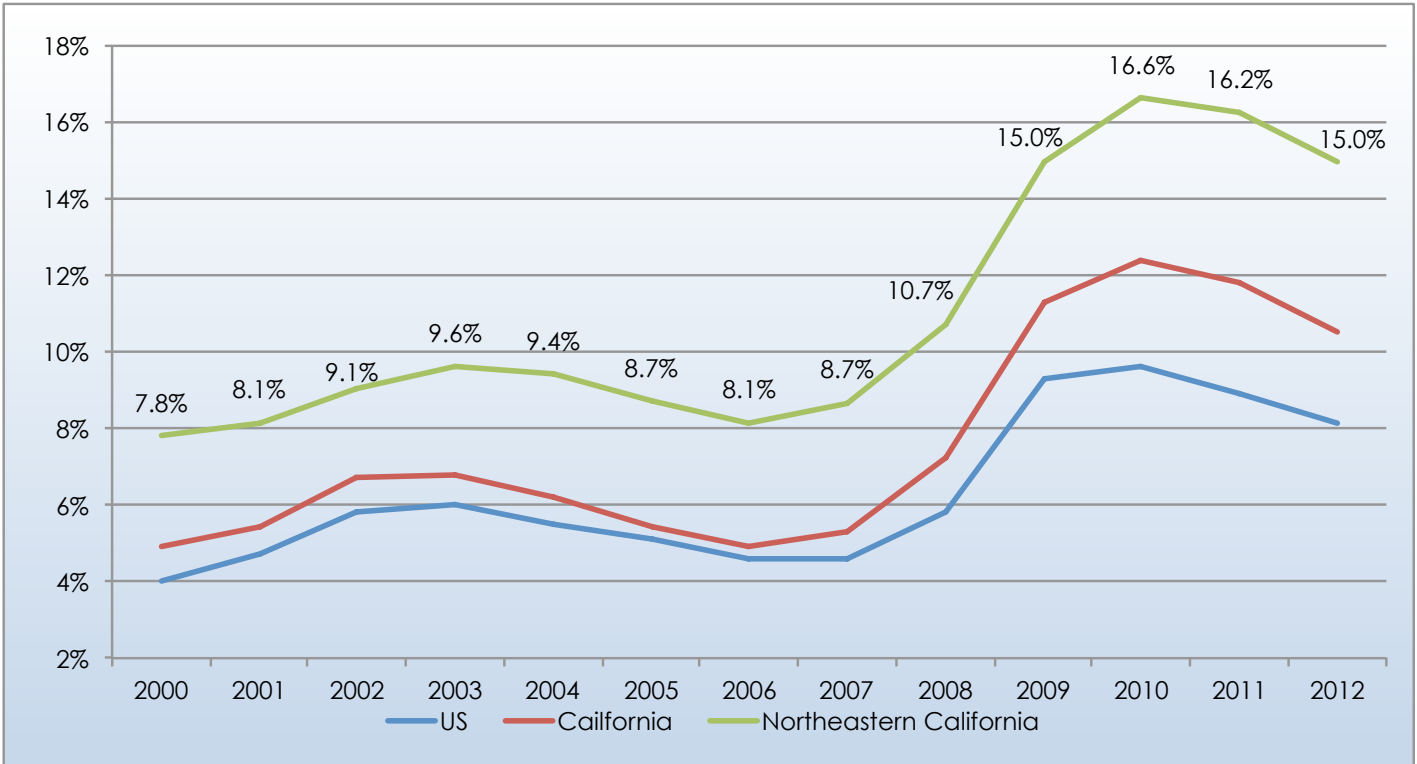




Unemployment rates in Northeastern California have followed a similar path as those of the nation and state (Figure 4). However, the region's unemployment is significantly higher than both the state and national averages (4.5% higher than the state and 6.9% higher than the U.S. in 2012). Unemployment rates in the valley and mountain regions are much more similar to each other (typically within 1%), but the mountain dominant

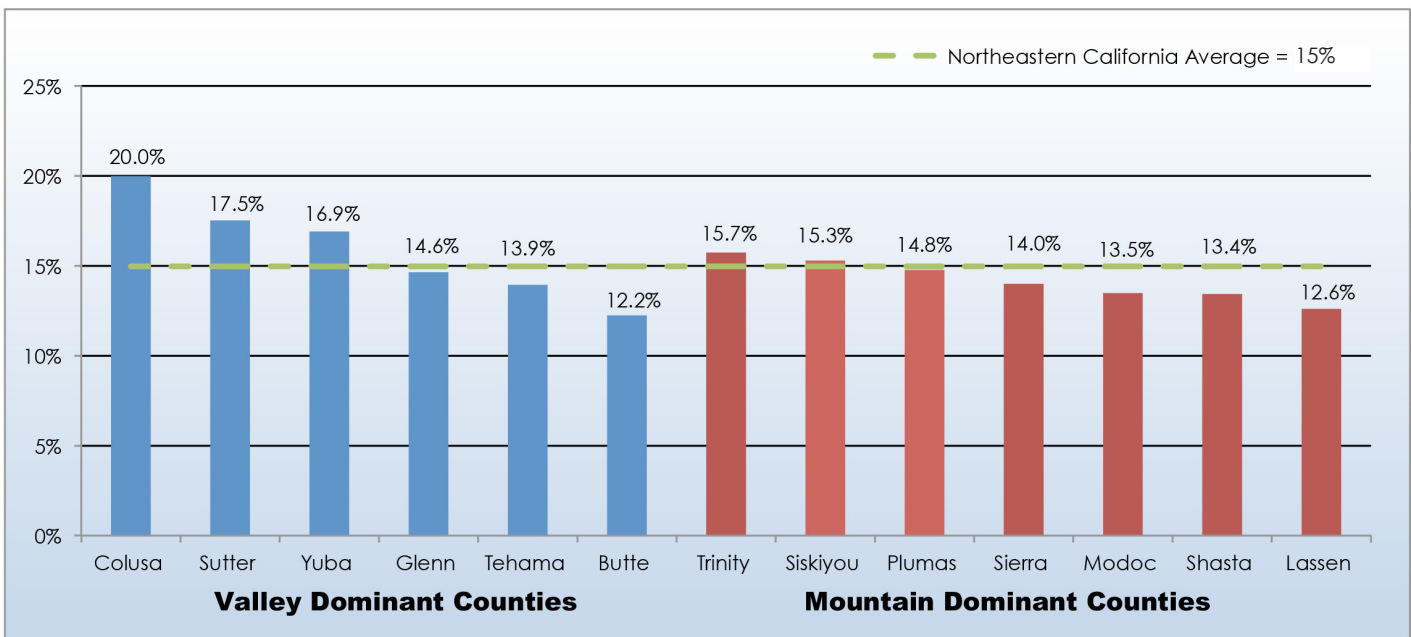
counties tend to be slightly lower. Figure 5 shows Colusa County having the highest unemployment rate in the study area (20%) and Butte County having the lowest (12.2%). Although rates are declining in Northeastern California, they are still quite elevated and the region appears to be lagging behind the rest of the country and state as we recover from the recession that ended in 2009.

**Figure 4: Unemployment Rates (2000-2012)**



Source: California Employment Department, Labor Market Information Division

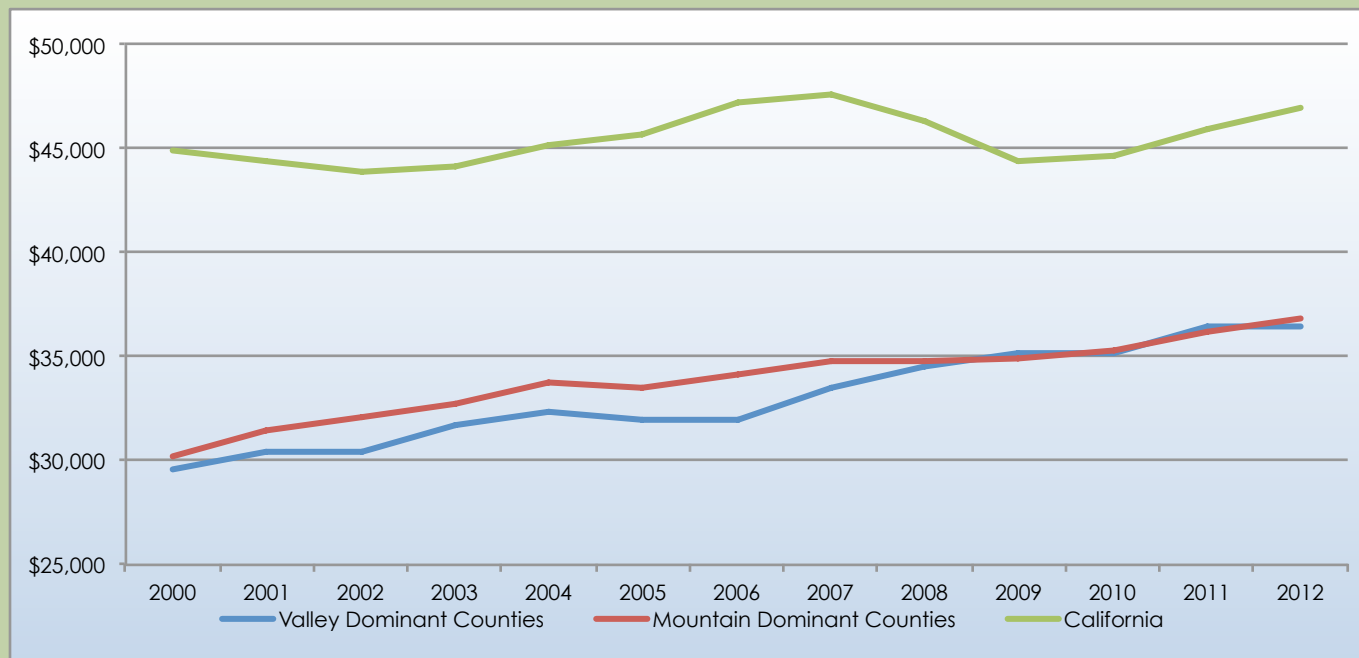
**Figure 5: Unemployment Rate by County (2012)**



Inflation adjusted (real) per capita personal income has increased by over 20% in the region between 2000 and 2012. Specifically, there has been a 23% increase in the valley counties and a 22% increase in the mountain dominant counties, while the state only experienced a 4.5% increase. Although the state average is approximately \$10,000 dollars higher than that of Northeastern California, the region benefits from a lower cost of living. The average California per capita personal income experienced a sharp decline after the country's financial crisis in 2007. However, per capita income in both the valley and mountain dominant counties didn't decrease during this period. In fact, the

valley dominant counties experienced some of its highest rates of growth during the period when the state experienced its biggest declines. One of the biggest differences between Northeastern California and the rest of California is that agriculture plays a more significant role in Northeastern California's overall economy (see Section 3). As such, it is believed that the success of the agricultural industry is one of the things that prevented a decline in per capita income during this period. Although Northeastern California is experiencing higher rates of unemployment and below average income, a strong agricultural industry is critical to the overall success of our region's economy.

**Figure 6: Inflation Adjusted Per Capita Personal Income (2000-2012)**



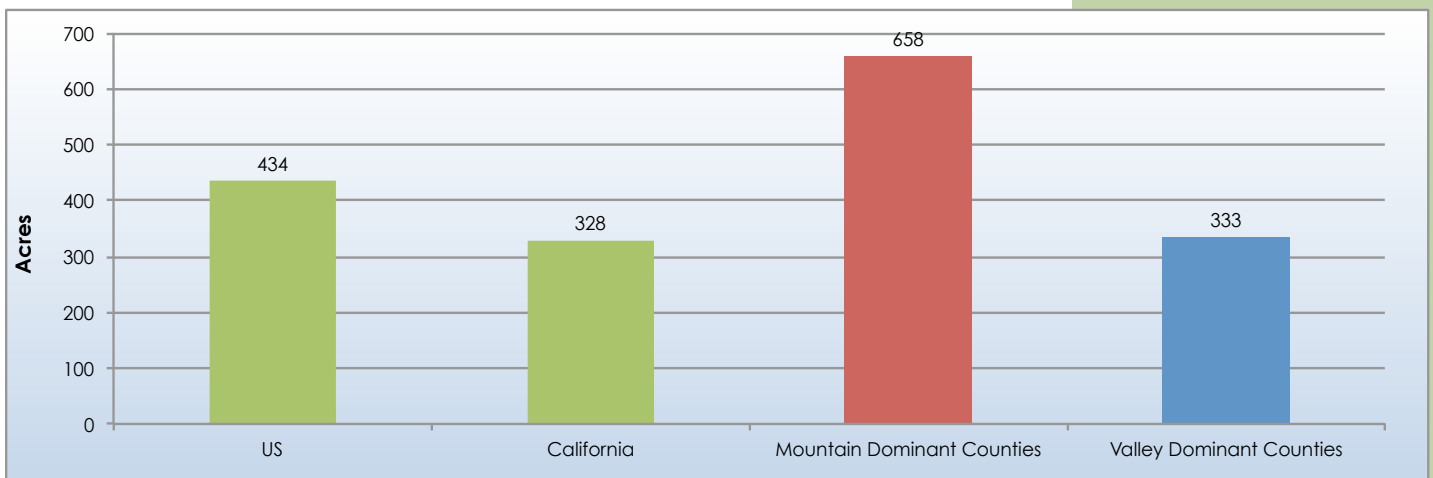
Source: U.S. Bureau of Economic Analysis Regional Economic Profiles (CA30) and California Department of Finance.

## 1.3 Land Use and Farms

According to the County Agricultural Commissioners' reports, Northeastern California had approximately 6.5 million acres of land in agricultural production during 2012. Approximately 3 million acres (46%) was in the valley dominant counties and approximately 3.5 million acres (54%) was in the mountain dominant counties. Most of the cropland is located in the valley dominant counties with grazing becoming more common as we move into the foothills and mountains. However, cropland is also found in several mountain valleys that are spread out across the higher elevations.

The County Agricultural Commissioners' reports do not include the total number of farms or average farm size. According to the 2012 USDA Census of Agriculture, there were 8,045 farms in the valley dominant counties and 3,794 farms within the mountain dominant counties. However, the average farm size in the mountain dominant counties was approximately twice as large as the valley dominant farms (Figure 7). The typical farm in the mountain dominant counties is over a square mile in size due to large amounts of land for livestock. In the valley dominant counties you have a warmer climate, deep, nutrient rich soils that are well suited for fruit and nut production along with heavy clay soils for rice production. Valley dominant counties are typically able to produce more value with less land because of the higher profit margins that can be available for fruit and nut crops.

**Figure 7: Average Farm Size (2012)**



Source: USDA 2012 Census of Agriculture

## Section 2

# Agricultural Production, Expenses and Net Farm Income

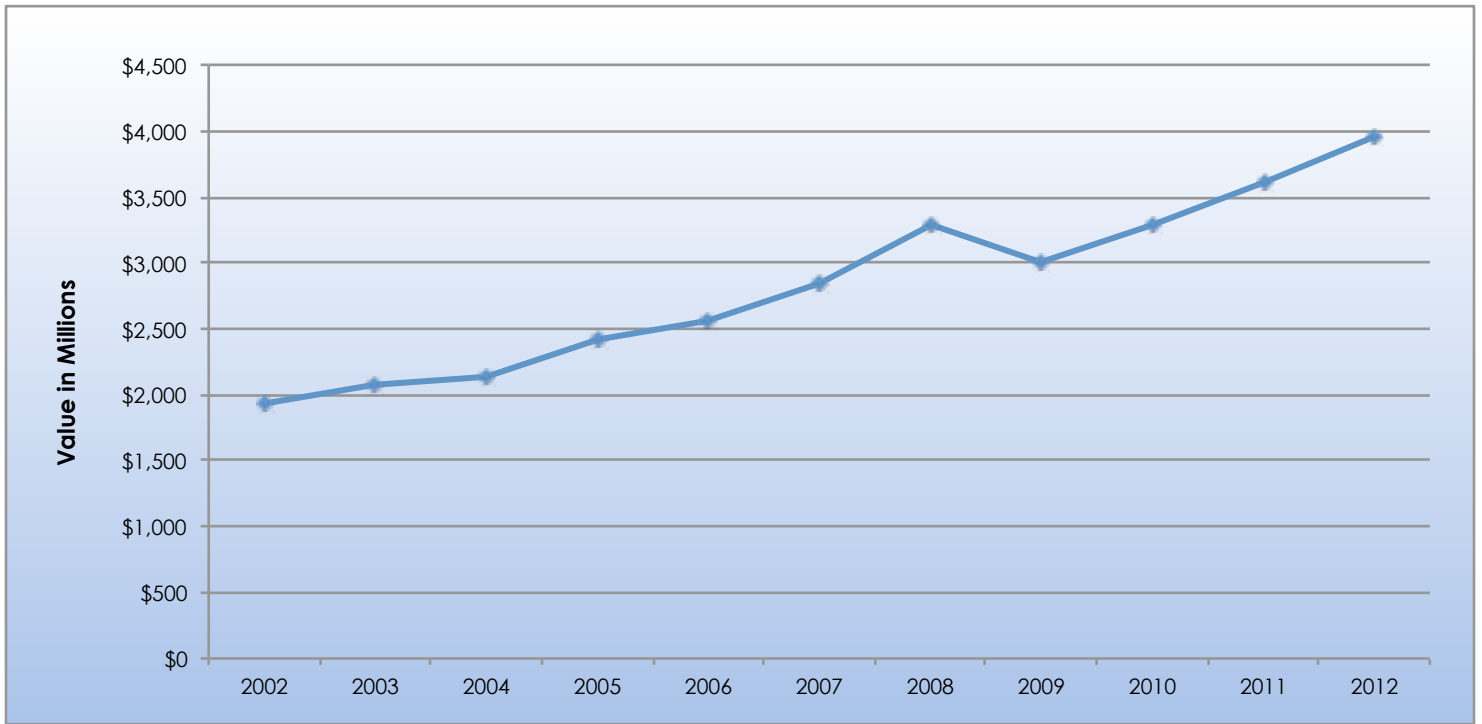


## 2.1 Total Value of Agricultural Production

The total value of agricultural production in Northeastern California has been increasing (Figure 8). In 2012, the total value of agricultural production was nearly \$4 Billion (\$3,966 million). This is slightly more than double the value of agriculture production in 2002 (105% increase) and reflects an increase of nearly 10% from the previous year. As such, this is the highest level of production that has ever occurred in the region. If we compare this to the preliminary state level data from the 2012 Census of Agriculture, Northeastern California would rank 30th in agricultural production if it were its own state (just ahead of Louisiana, Virginia, and Arizona). If we take into account the relatively low population in the region, Northeastern California would rank

the 6th highest state in total value of agricultural production per person. The peak that occurred in 2008 corresponded with a dramatic increase in world food prices that lasted until the 2nd quarter of 2008. Between January 2002 and June 2008, the monthly food commodity price index compiled by the International Monetary Fund increased by 130 percent, over the following 6 months the index dropped by a third. However, world food prices began increasing again in 2010 and by January 2011 the monthly food commodity price index had exceeded the previous peak in 2008. With increasing levels of production and strong commodity prices, agricultural production in Northeastern California appears quite strong.

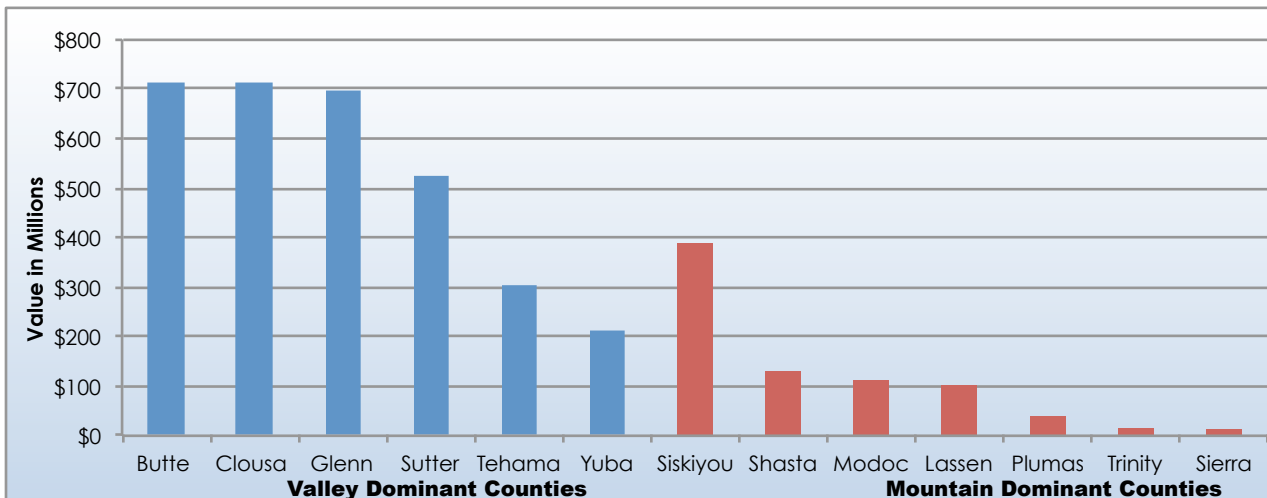
**Figure 8: Total Value of Agricultural Production in Northeastern California (2002-2012)**



Source: California County Agricultural Commissioners' Reports 2012

The value of agricultural production is not distributed evenly between the valley and mountain regions. Eighty percent of the total value of production in 2012 occurred in the valley dominant counties, while only 20% occurred in the mountain dominant counties, even though the valley dominant counties had fewer acres in production (approximately 7% less total acres). Butte County had the highest value of production in 2012, closely followed by Colusa and Glenn counties with Trinity and Sierra counties having the lowest production values (Figure 9).

**Figure 9: Northeastern California Agricultural Production by County (2012)**



Source: California County Agricultural Commissioners' Reports 2012

**Table 1: Northeastern California Top 10 Commodities by Value**

Northeastern California Top 10 Commodities by Value	Total Value	Total Acreage
Rice	\$765,738,000	482,900
Walnuts	\$673,684,000	125,985
Almonds	\$509,635,000	135,980
Cattle	\$225,767,000	N/A
Hay, Alfalfa	\$169,671,000	153,187
Plums, Dried	\$156,760,000	47,683
Nurse Plants, Strawberry	\$151,808,000	N/A
Harvested Timber	\$137,736,000	N/A
Milk, Market, Fluid	\$97,392,000	N/A
Olives	\$84,021,000	21,991
65 Remaining Commodities	\$993,305,600	5,579,413
<b>Total</b>	<b>\$3,965,517,600</b>	<b>6,547,139</b>

Agriculture throughout the study region is diverse, with over 125 different commodities being reported. The highest valued commodity in the Northeastern California region in 2012 was rice with a total value of \$765.7 million, followed by walnuts and almonds (Table 1).

*Source: California County Agricultural Commissioners' Reports 2012*

Since the valley dominant counties contain the majority of agricultural production, the top ten commodities in the valley dominant counties (rice, walnuts, almonds, etc.) look very similar to the entire Northeastern California region (Table 2). However, agricultural production in the mountain dominant counties looks very different. The highest valued commodities in the mountain dominant counties include strawberry, hay, cattle, and timber (Table 3). Although rice, walnuts, and almonds make up approximately 50% of the total value of production in the entire Northeast California region, the diversity of the two regions combined helps the overall economy be more resilient to individual commodity price fluctuations.

**Tables 2 & 3: Valley and Mountain Dominant Counties Top 10 Commodities by Value**

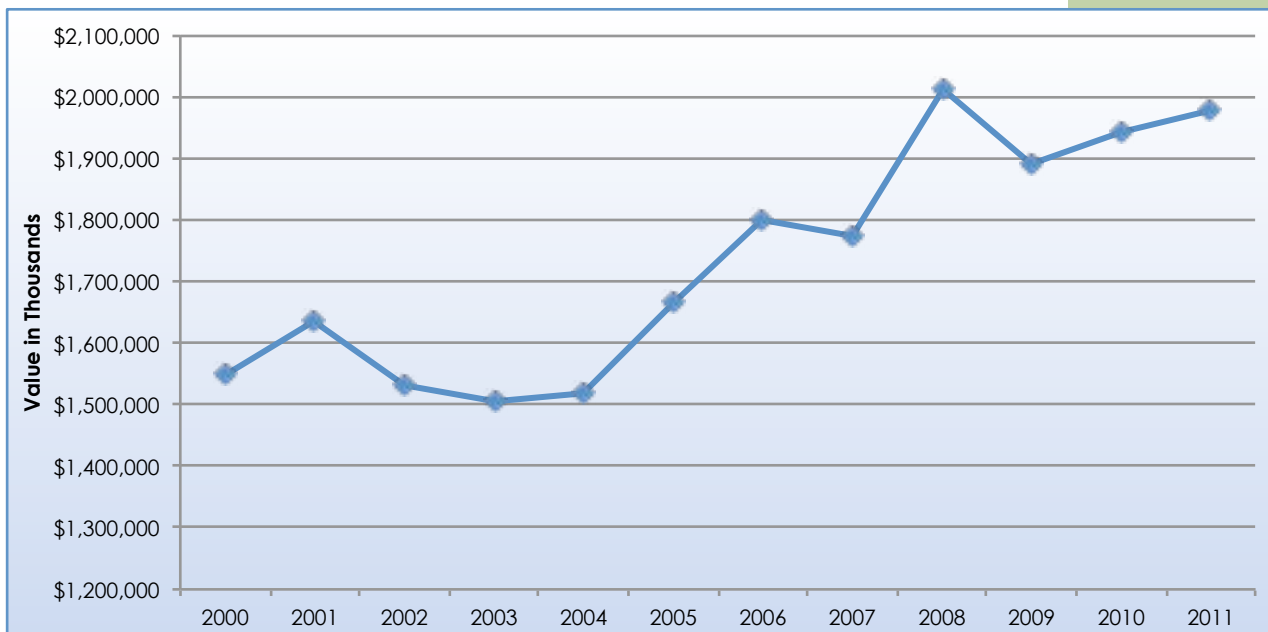
Valley Dominant Counties Top 10 Commodities by Value	Total Value	Total Acres	Mountain Dominant Counties Top 10 Commodities by Value	Total Value	Total Acres
Rice	\$765,738,000	482,900	Nursery Plants, Strawberry	\$151,808,000	N/A
Walnuts	\$671,132,000	125,040	Hay, Alfalfa	\$125,077,000	118,090
Almonds	\$509,635,000	135,980	Cattle	\$117,361,000	N/A
Plums, Dried	\$156,760,000	47,683	Harvested Timber	\$110,835,000	N/A
Cattle	\$108,406,000	N/A	Hay, Other, Unspecified	\$51,599,000	62,900
Milk, Market, Fluid	\$91,613,000	N/A	Nursery Products, Misc.	\$33,764,700	N/A
Olives	\$84,021,000	21,991	Pasture Irrigated	\$26,092,000	232,610
Peaches, Clingstone	\$63,525,000	12,830	Potatoes, All	\$25,474,600	7,632
Tomatoes, Processing	\$62,806,000	21,330	Wheat, All	\$22,164,300	26,110
Seed, Vegetable & Vinecrop	\$52,372,000	18,790	Vegetable, Unspecified	\$17,449,600	5,906
32 Remaining Commodities	\$600,978,200	2,171,686	33 Remaining Commodities	\$116,906,200	3,055,661
<b>Total</b>	<b>\$3,166,986,200</b>	<b>3,038,230</b>	<b>Total</b>	<b>\$798,531,400</b>	<b>3,508,909</b>

*Source: California County Agricultural Commissioners' Reports 2012*

## 2.2 Farm Expenses and Net Farm Income

The total value of agricultural production is important, but it is also important to look at what is happening to farm expenses and net farm income. The Bureau of Economic Analysis (BEA) had been estimating these values up until 2011 (The BEA no longer provides this data due to reduced funding). Although Figure 8 showed a significant increase in the value of agricultural production, Figure 10 shows farm production expenses are increasing as well. Overall, farm production expenses have increased approximately 28% between 2000 and 2011.

**Figure 10: Northeastern California Farm Production Expenses (2000-2011)**

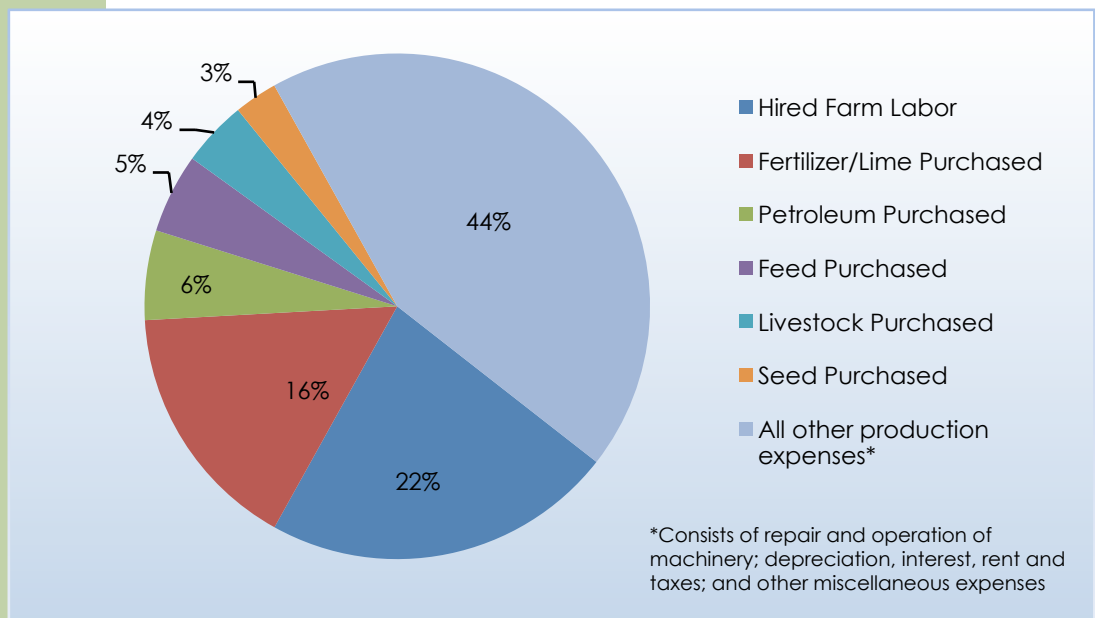


Source: Bureau of Economic Analysis Farm Income and Expenses (CA45)



The distribution of farm production expenses can be seen in Figure 11. The largest portion of farm production expenses is "other production expenses" which includes the repair and operation of machinery, depreciation, interest, rent and taxes, and all other miscellaneous expenses. It is believed that these expenses are largely driven by how capital intensive farming has become over time. The next three largest categories of farm production expense are Hired Farm Labor (22%), Fertilizer/Lime Purchased (16%), and Petroleum Purchased (6%).

**Figure 11: Distribution of Northeastern California Farm Production Expenses (2011)**



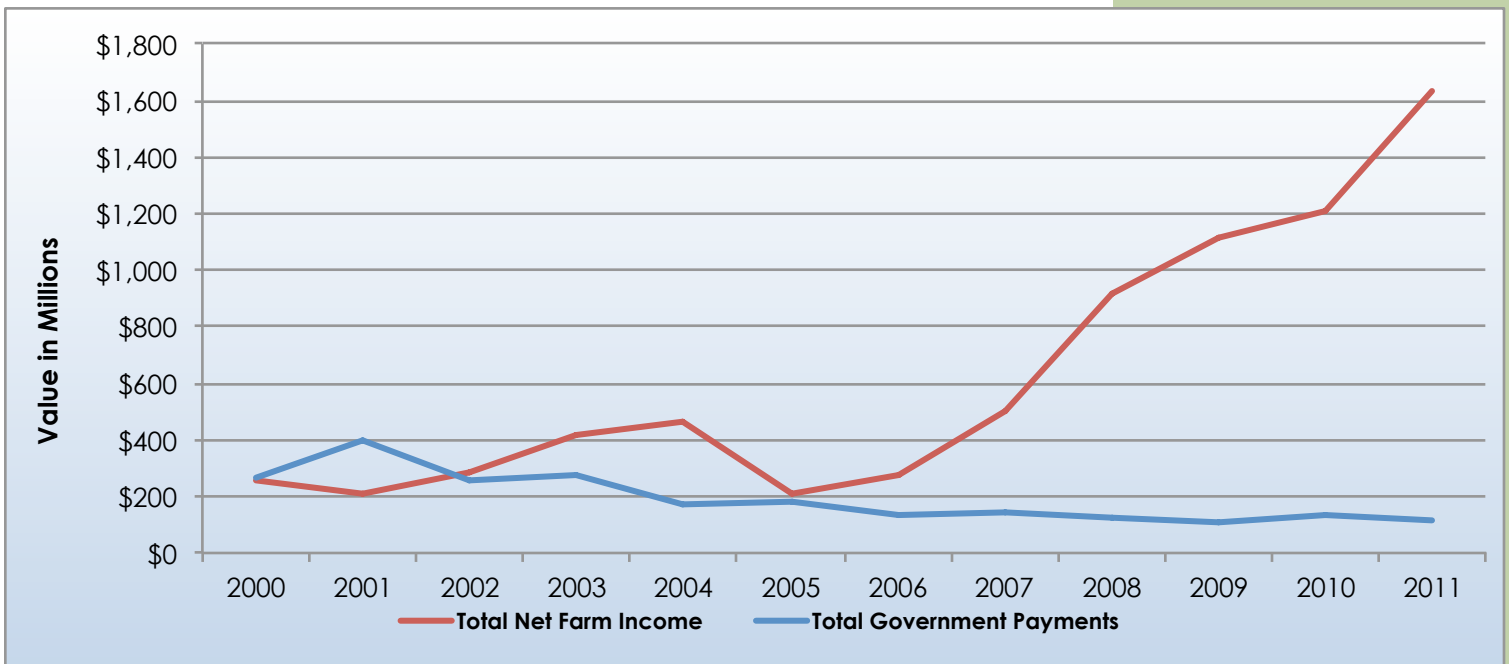
Source: Bureau of Economic Analysis Farm Income and Expenses (CA45)





Since the value of agricultural production has been growing at a faster rate than production expenses, the region has experienced an increase in net farm income (revenues minus expenses). Figure 12 shows how net farm income has increased by over 500% from 2000 to 2011 while total government payments have decreased by more than 50%. Because of different methods of accounting, the net farm income estimated by the BEA is not exactly equal to the difference between the total values of farm production reported in the county crop reports minus the total farm expenses reported by the BEA.

**Figure 12 Northeastern California Net Farm Income and Government Payments (2000-2011)**



Source: Bureau of Economic Analysis Farm Income and Expenses (CA45)

## Section 3

# Total Economic Contribution of Agriculture



### 3.1 Introduction

Agriculture is more than just the value of raw production; it also includes the industries that support agricultural production and various types of processing. In addition, the total economic impact of agriculture is more than just the direct impact of these activities. To measure agriculture's total economic contribution, the indirect and induced impacts of agriculture must also be taken into account. Indirect impacts occur when agricultural sectors purchase goods and services from other related sectors of the economy. For

example, agricultural production will likely have indirect impacts on related sectors like farm equipment and fertilizer sales. Induced impacts measure the effect of personal consumption expenditures by households that receive income from agriculture. As such, induced impacts will capture the regional benefits of spending income from agriculture on a variety of other economic sectors like home improvements, medical services, retail establishments, etc.

## 3.2 Methods

The total economic contribution of agriculture was modeled using the Impact Analysis for Planning (IMPLAN) System (MIG, 2014). IMPLAN is a computer package that is used to construct regional economic input-output (I-O) models. Input-output analysis uses a mathematical modeling approach to capture the relationships between various sectors of an economy. The IMPLAN model uses 440 different sectors that are based on the Bureau of Economic Analysis's (BEA) national Input-Output study. These economic sectors are similar to those identified by the 6-digit North American Industry Classification System (NAICS). Following the approach used by English, Popp, and Miller (2013), the 440 sectors in IMPLAN were used to define an overall agriculture sector that was made up of three categories of agriculture: Agricultural Production Industries, Agricultural Processing Industries, and Agricultural Related Industries (See Appendix A Table 1 for specific sectors included in each category). It is important to recognize that agricultural retail (restaurants, grocery stores, etc.) and agricultural input manufactures (fertilizer manufacturing, Farm machinery and equipment manufacturing, etc.) are not included as a direct component of the overall "agriculture" sector, although some of this activity is captured in the indirect and induced effects.

The direct impacts for each agricultural category (Production, Processing, and Related) and the indirect and induced impacts for the entire agriculture industry is reported in terms of Employment, Labor Income, and Value Added. Employment is presented as the number of wage and salary employees, as well as self-employed jobs. Labor income consists of proprietary income (income received by self-employed individuals including private business owners and owner-operators) and wages (includes all worker

salaries, payments, and fringe benefits paid by employers). Value added represents all labor income plus indirect taxes and other property-type income, such as payments for rents, royalties, and dividends. The total value added for the study area is comparable to Gross Regional Product (GRP). Economists generally prefer using value added as the measure for assessing the contribution of a given industry to a region's economy (Olson and Lindall, 2009) since the total value of output can be misleading. The total value of output represents the dollar value of an industry's production and can result in double counting when production, processing, and agriculture related sectors have been included. For example, including both the total value of rice output from farm production and the total value of processed rice cakes would result in double counting of the rice output value (once as a farm output and again as a processed output). Rather we should only look at the value added by the rice producer and the value added to the rice by the processor to provide a better estimate of the total economic contribution of the activity.



### 3.3 Results

Table 4 shows how agriculture is making significant contributions to the economy in terms of employment, wages and value added. The overall agriculture industry provided an estimated 57,005 jobs or 16.0% of total employment in the region (20% of total private sector employment). That is, nearly one in five jobs attributed to agriculture. This includes 38,013 jobs directly within agricultural production, processing, and related sectors and an additional 18,991 jobs through the indirect and induced effects. According to the University of California (UC) Agricultural Issues Center (AIC), agricultural production and closely related processing only represented 6.7% of the state's private sector labor force in 2009. The total value of labor income as a result of the overall agriculture industry was estimated at \$2.7 billion, or 17.2%

of all labor income in the region. According to the UC AIC report, agricultural production and closely related processing only accounted for 6.1% of the state's total labor income in 2009. In terms of total value added, \$4.3 billion was added to the Northeastern Economy as a result of the direct, indirect, and induced effects of the overall agricultural industry. This represents 16.0% of all economic value that was created by the Northeastern California economy in 2012. According to the UC AIC report, agricultural production and closely related processing only accounted for 1.3% of the state's total Gross State Product (GSP). Relative to the state as a whole, the economy of Northeastern California is significantly more dependent upon agriculture in terms of employment, labor income, and value added.

**Table 4: The Contribution of Agriculture to Northeastern California's Economy in 2012**

	Employment		Labor Income		Value Added	
	# Jobs <sup>1</sup>	% NE California Jobs <sup>2</sup>	Million \$	% NE California Labor Income <sup>3</sup>	Million \$	% NE California Value Added <sup>4</sup>
Production <sup>5</sup>	23,727	6.7%	\$1,223	7.7%	\$1,715	6.4%
Processing <sup>5</sup>	8,007	2.3%	\$459	2.9%	\$663	2.5%
Ag Related <sup>5</sup>	6,279	1.8%	\$249	1.6%	\$266	1.0%
<b>Direct Impacts</b>	<b>38,013</b>	<b>10.7%</b>	<b>\$1,930</b>	<b>12.2%</b>	<b>\$2,644</b>	<b>9.9%</b>
<b>Indirect Impacts</b>	<b>7,990</b>	<b>2.2%</b>	<b>\$375</b>	<b>2.4%</b>	<b>\$790</b>	<b>2.9%</b>
<b>Induced Impacts</b>	<b>11,001</b>	<b>3.1%</b>	<b>\$414</b>	<b>2.6%</b>	<b>\$848</b>	<b>3.2%</b>
<b>Total Contribution of Agriculture</b>	<b>57,005</b>	<b>16.0%</b>	<b>\$2,719</b>	<b>17.2%</b>	<b>\$4,282</b>	<b>16.0%</b>

<sup>1</sup> Includes full-time and part-time jobs.

<sup>2</sup> Total number of jobs in Northeastern (NE) California estimated at 355,204.

<sup>3</sup> Total labor income in Northeastern (NE) California estimated at \$15,808 M.

<sup>4</sup> Total value added in Northeastern (NE) California estimated at \$26,789 M.

<sup>5</sup> Appendix A Table 1 defines economic sectors for each category.

# Section 4

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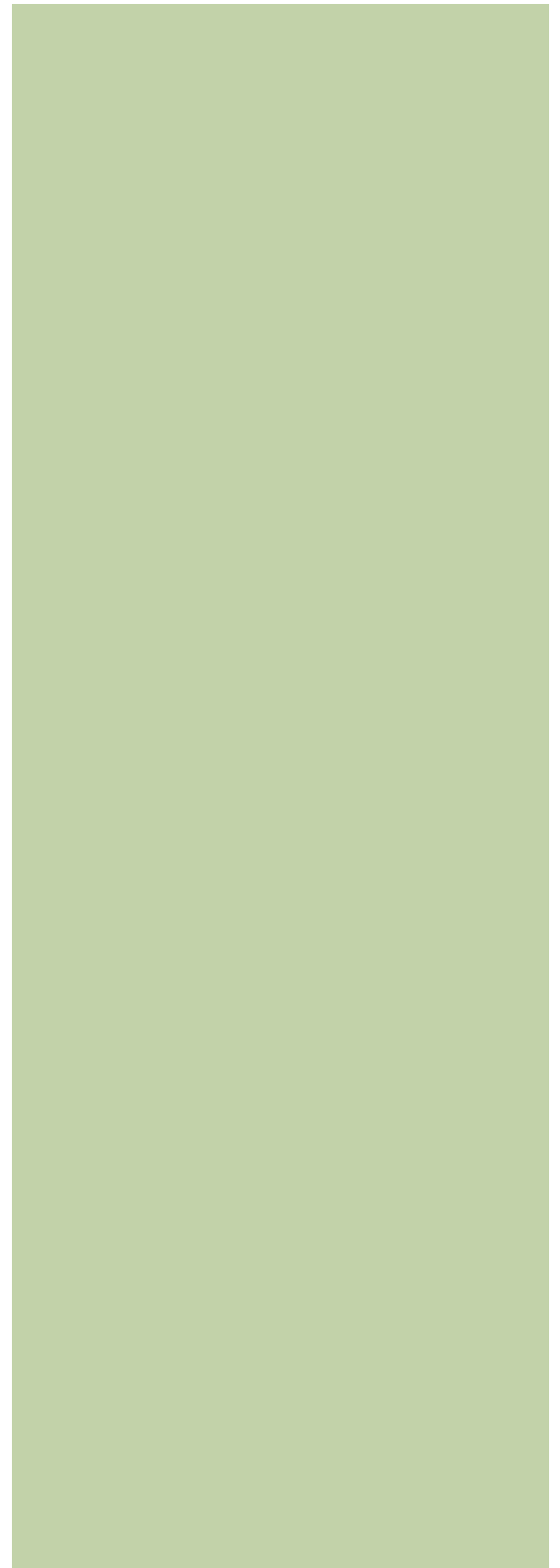
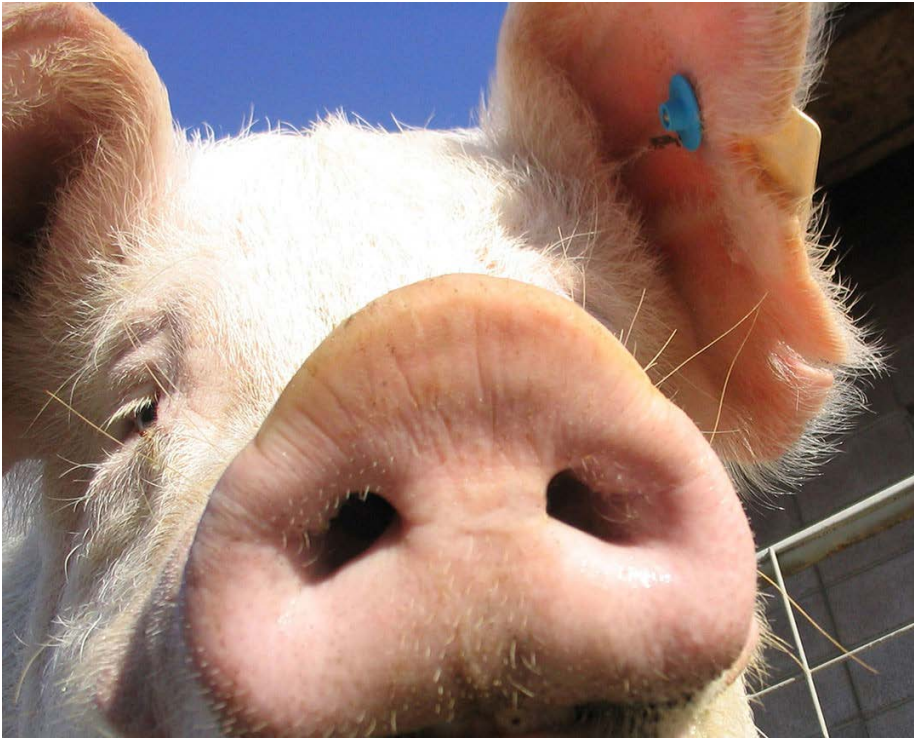
# Appendix A: Description of IMPLAN Sectors

**Table A.1: List of IMPLAN Sectors Defining Agricultural Production, Processing, and Related Industries**

Category	IMPLAN Sector ID	IMPLAN Sector Title
Agricultural Production Industries	1	Oilseed farming
	2	Grain farming
	3	Vegetable and melon farming
	4	Fruit farming
	5	Tree nut farming
	6	Greenhouse, nursery, and floriculture production
	7	Tobacco farming
	8	Cotton farming
	9	Sugarcane and sugar beet farming
	10	All other crop farming
	11	Cattle ranching and farming
	12	Dairy cattle and milk production
	13	Poultry and egg production
	14	Animal production, except cattle and poultry and eggs
	15	Forest nurseries, forest products, and timber tracts
	16	Commercial logging
Agricultural Processing Industries	41	Dog and cat food manufacturing
	42	Other animal food manufacturing
	43	Flour milling and malt manufacturing
	44	Wet corn milling
	45	Soybean and other oilseed processing
	46	Fats and oils refining and blending
	47	Breakfast cereal manufacturing
	48	Sugar cane mills and refining
	49	Beet sugar manufacturing
	50	Chocolate and confectionery manufacturing from cacao beans
	51	Confectionery manufacturing from purchased chocolate
	52	Nonchocolate confectionery manufacturing
	53	Frozen food manufacturing
	54	Fruit and vegetable canning, pickling, and drying
	55	Fluid milk and butter manufacturing
	56	Cheese manufacturing
	57	Dry, condensed, and evaporated dairy product manufacturing
	58	Ice cream and frozen dessert manufacturing
	59	Animal (except poultry) slaughtering, rendering, and processing
	60	Poultry processing
	61	Seafood product preparation and packaging
62	Bread and bakery product manufacturing	
63	Cookie, cracker, and pasta manufacturing	
64	Tortilla manufacturing	
65	Snack food manufacturing	
66	Coffee and tea manufacturing	
67	Flavoring syrup and concentrate manufacturing	
68	Seasoning and dressing manufacturing	
69	All other food manufacturing	
70	Soft drink and ice manufacturing	
71	Breweries	

**Table A.1 continued**

	72	Wineries
	73	Distilleries
	74	Tobacco product manufacturing
	75	Fiber, yarn, and thread mills
	76	Broadwoven fabric mills
	77	Narrow fabric mills and schiffli machine embroidery
	78	Nonwoven fabric mills
	79	Knit fabric mills
	80	Textile and fabric finishing mills
	81	Fabric coating mills
	82	Carpet and rug mills
	83	Curtain and linen mills
	84	Textile bag and canvas mills
	85	All other textile product mills
	86	Apparel knitting mills
	87	Cut and sew apparel contractors
	88	Men's and boys' cut and sew apparel manufacturing
	89	Women's and girls' cut and sew apparel manufacturing
	90	Other cut and sew apparel manufacturing
	91	Apparel accessories and other apparel manufacturing
	92	Leather and hide tanning and finishing
	93	Footwear manufacturing
	94	Other leather and allied product manufacturing
Agricultural	95	Sawmills and wood preservation
Processing	96	Veneer and plywood manufacturing
Industries	97	Engineered wood member and truss manufacturing
(Continued)	98	Reconstituted wood product manufacturing
	99	Wood windows and doors and millwork
	100	Wood container and pallet manufacturing
	101	Manufactured home (mobile home) manufacturing
	102	Prefabricated wood building manufacturing
	103	All other miscellaneous wood product manufacturing
	104	Pulp mills
	105	Paper mills
	106	Paperboard mills
	107	Paperboard container manufacturing
	108	Coated & laminated paper, packaging paper & plastics film manufacturing
	109	All other paper bag and coated and treated paper manufacturing
	110	Stationery product manufacturing
	111	Sanitary paper product manufacturing
	112	All other converted paper product manufacturing
	295	Wood kitchen cabinet and countertop manufacturing
	296	Upholstered household furniture manufacturing
	297	Non-upholstered wood household furniture manufacturing
	300	Office furniture manufacturing
	301	Custom architectural woodwork and millwork manufacturing
Agricultural	17	Fishing
Related	18	Hunting and trapping
Industries	19	Support activities for agriculture and forestry



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