

# **The California Seed Industry: A Measure of Economic Activity and Contribution to California Agriculture**

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## Executive Summary

Seed industry activities have been a recorded part of California agriculture for the past three decades. Using multiple sources of data that estimate various parameters of seed production and sales this report accurately represents the economic size of California's seed industry. Using data from the California County Agricultural Commissioners' Annual Crop Reports and from the most recent U.S. Agriculture Census, this report examines the evolution of seed crop production in California and places it in the context of U.S. seed production. Exclusive primary data collected for this report provide information on the revenues generated from wholesale seed sales and expenses in California by California seed companies. Furthermore these data are compared to figures estimated from the International Seed Federation and display California seed companies' wholesale seed sales in the context of global and U.S. domestic seed sales.

California seed companies generated \$2.9 billion in gross revenue from seed sales worldwide in 2008. This represents about 7.9 percent of all global sales. U.S. seed sales by California seed companies in 2008 totaled \$1.1 billion or about 13 percent of all U.S. seed sales. The majority of seed sales revenue for California seed companies comes from the sale of field crop seeds and vegetable seed. These two categories of

seed account for 76 percent of global seed sales revenue for California seed companies in 2008. The remaining 24 percent of revenue is generated from the sale of turf and flower seeds. Through the business of producing and selling seed California seed companies spent approximately \$207 million in California in 2008. The highest proportion of expenditures, 51 percent, went toward the production of seed, this was followed by expenditures in marketing and sale of seed, research and development and regulatory compliance.

When considering the production of raw seed about 55 percent of the field crops seed and 31 percent of vegetable seed sold by California seed companies in 2008 was grown in California. According to 2007 U.S. Agriculture Census data California accounted for 43.5 percent of the vegetable seed and 37.7 percent of the flower seed produced in the United State. When examining California County Agricultural Commissioners' Annual Crop Reports, California has been growing seed for the past 30 years. From 1970 through 2008 the annual farm value of seed production in California ranged between \$200 million and \$300 million. For the 20 year period of 1980 to 2000, the harvested acres of seed crops in California ranged between 250,000 and 350,000 acres annually. Since 2001, seed crop acreage in California has dropped to a range of 200,000 to 300,000 acres.

The location of seed crop production in California has shifted over the past 30 years. During most of the 1980's and early 1990's a majority of seed production was in Southern California counties such as Fresno, Imperial and Kings Counties. From 1990 to 2008, seed production started to shift slightly to include counties in the North Central section of the state. Colusa, Yolo, Sutter and Glenn Counties emerged as important seed crop producing areas of California. For the most part, the shift in seed production to North Central California came primarily from the production of vegetable seed crops and some field seed crops occurring in Yolo County.

When considering the importance of seed as an agricultural input to California farmers, data show that California crops grown from seed account for a sizeable share of agricultural cash receipts, and the majority of crop receipts. In 2008, agricultural cash receipts in California from crops produced from seed amounted to \$14.7 billion, which was equal to 37 percent of the \$39.1 billion in total agriculture production value in California and 57

percent of all crop receipts. The value of crop production in California translates into California farmers being important customers to seed companies. Revenue from wholesale seed sales in California grew each year from 2006 through 2008, with an average value of \$442 million. In 2008, seed sales in California were worth \$480.7 million, or approximately 5.7 percent of the \$8.5 billion generated from all seed sales in the United States. California-based seed companies accounted for \$295.2 million or 61.4 percent of wholesale seed sales revenue in California in 2008.

The information presented in this report serves as evidence of the importance of California as a supplier of raw seed to U.S. and global agriculture. Furthermore, the activities of seed companies in California are a significant source of revenue generation for the State. Finally, this report documents the important role of California seed companies in supplying a vital input to the multi-billion dollar agricultural economy of California.

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## Introduction

The goal of this report is to document the economic importance and role of the California seed industry for agriculture and the overall economy of California. Seeds are a big business and a major part of agriculture. In 2008, the International Seed Federation (ISF) estimated the value of global commercial seed sales at \$36.5 billion. The value of seed sold to agricultural producers within the United States was an estimated \$8.5 billion or approximately 23 percent of global seed market value (ISF 2008). When placed in the context of U.S. agriculture as a whole, this estimate suggests that seed production value in 2008 is equal to approximately 4.7 percent of the \$181.1 billion in total cash receipts from all crops produced in the United States and 2.6 percent of the \$324.2 billion total value of all 2008 U.S. agricultural production (USDA ERS). In addition to the value that seed production creates for U.S. agriculture as an output, it also is a leading input with respect to other crops in the United States. In 2008, farm sector cash receipts from the sale of crops produced from seed in the U.S. totaled \$164.3 billion, accounting for close to 51 percent of the value of all U.S. farm production in 2008 (USDA ERS). These figures indicate the significant economic role of the seed industry in United States agriculture when examined as an output crop and as an input to other commodity crops.

Given the importance of the seed industry, the lack of information regarding the production and marketing of seed is noteworthy. Unlike most agricultural commodities, where production and sales data are readily available and historical market trends can be easily monitored, data and information available about seed crops is close to nonexistent. This lack of information is possibly an outgrowth of a time when many farmers produced their own seed on the farm, or of structural barriers within the seed industry that prevent data from being publicly available.

Recently, two studies have been conducted on the U.S. seed industry in an effort to better understand its structure and value. In 2004, the USDA conducted an analysis of the U.S. seed industry (Fernandez-Cornejo, 2004) that offers a historical view of the seed industry and its evolving structure during the 20<sup>th</sup> century. The study also examines the impact of seed technology changes on crop yield and production, focusing primarily on the main field crops of corn, soybeans, wheat and cotton. A more recent study by Roucan-Kane and Gray (2008) examines the economic highlights of the United States seed industry and estimates the size of the United States and global seed industries, investments in seed technology and seed industry productivity. Similar to the USDA report, the analysis from Roucan-Kane and Gray focuses primarily on seed industry activity as it pertains to the four main field crops of corn, soybeans, wheat and cotton.

Both studies are important sources of information with regards to the U.S. seed industry and the evolution of seed productivity and development. Unfortunately, the focus on the main field crops is less relevant to the California seed industry. Like much of California agriculture, the

California seed industry is diverse and complex in comparison to the seed industry in the rest of the United States.

In 2001 Anderson, Butler and Bradford examined the California seed industry and documented the size of firms and the concentration of seed related business activities. Using survey data that was collected from a sample of California Seed Association members, they concluded that the California seed industry was dominated by a few “large” and “very large firms” (Anderson, Butler and Bradford 2001). They also examined research and development, seed production, seed processing and sales and distribution. For each of these categories, they estimated the concentration of firms that participate in each level of the seed supply chain in California. In addition, they analyzed the jobs created by the California seed industry and expenditures on human resources. Overall, the study by Anderson, Butler and Bradford provides a good basis from which to further analyze the California seed industry. Although Anderson, Butler and Bradford used data from the county Agricultural Commissioners' annual crop reports, one goal was to more extensively examine the historical production of seed in California and better understand where in California seed production takes place.

The California seed industry produces and markets a wide variety of seed within four main categories: field crop, vegetable, turf, and flower seed. The importance of seed crops in California is evidenced by the inclusion of seed crop production data in the annual crop reports generated by the county Agricultural Commissioners within the state. These reports provide an important historical record of seed crops in California. However, seed production data only reflect one component of the total value created by the California seed industry. Data on the marketing and sales of seed products and services from the California seed industry is lacking.

Seed industry professionals and agricultural experts express a sense that the California seed industry contributes importantly to the overall agricultural economy of the state. Yet, a lack of objective data on the size and economic role of the industry proves a hindrance. To build on the Anderson, Butler and Bradford report, with respect to the measure of gross revenues the seed industry brings into California, I conducted an economic survey of seed industry participants both within and outside the California Seed Association. Accomplishment of this objective involves analyses of two data sources.

The first Chapter presents historical data on production of seed crops in California from 1980 through the harvest of 2007. The value and harvested acres of seed crops is analyzed using data available from California Agricultural Commissioners' Annual Crop Reports and the evolution of seed production in California since 1980, focusing on the value and harvested acres of seed crops in the state. Chapter 1 identifies the geographic distribution of seed production in California by category and shows the time path over which seed production shifted across counties. Following chapters examine the sale of seed within the state of California and the importance of seed sales to California agriculture. I then analyze data from my 2009 survey of the California seed industry. I document the gross revenues generated by California based seed companies, the investments of the seed industry in California and the influence of the California seed industry on the United States and global seed markets.

## **Chapter 1: Seed Production in California**

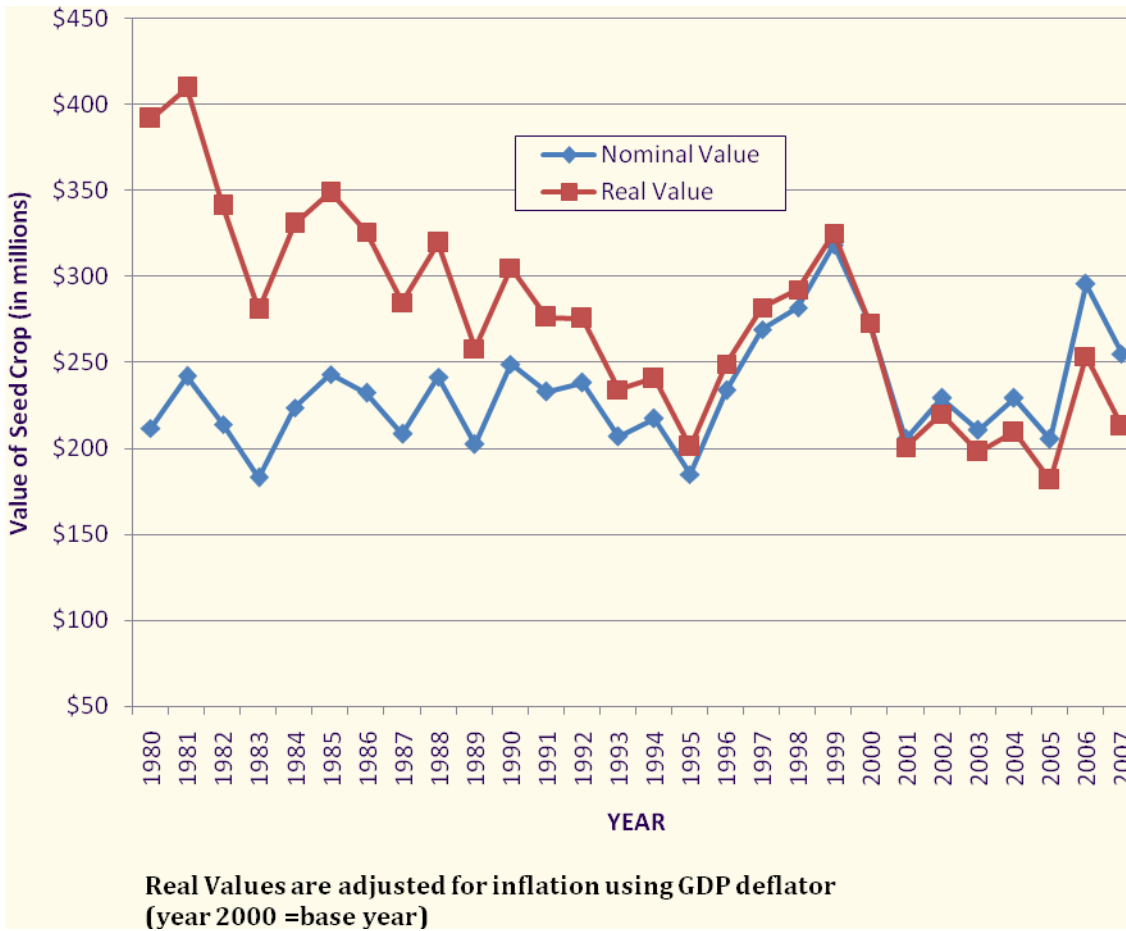
The production of seed crops in California is documented by the state's county Agricultural Commissioners in their annual crop reports. Harvested acreage and value of farm production numbers are collected by the Agricultural Commissioners using a combination of voluntary survey response, regulatory compliance documentation and information provided by the seed industry (various California county Agricultural Commissioner offices, phone conversations, September 10, 2009). The multiple sources of seed crop information provide a relatively accurate measure of seed production activity in each county. Hence I expect that the data accounts for close to 100 percent of seed production in each county.

Using commissioners' reports, Chapter 1 examines the history of seed crop production in California from 1980 to 2007. A discussion on the number of harvested acres California producers dedicate annually to seed production and the value of the seed crops produced is included. I compare the production values and harvested acres of seed crops to all of California agriculture to document the share of seed production in California agriculture. Using data from the 2007 USDA Census of Agriculture, I compare California seed production with that in other states. In addition, seed production at the county level and by category of seed is presented to demonstrate how the various aspects of seed production have evolved in California since 1980. More detail regarding the source of the Agricultural Commissioners' data and the methods I used to organize the data is provided in Appendix A.

### **1.1. California Seed Crop Value and Harvested Acres**

The annual value of the California seed crop, ignoring inflation, has remained relatively stable over the past three decades. From 1980 to 1995, California's seed crop ranged in value from a low of \$186 million in 1983 to a high of \$250 million in 1990, with an average annual value of \$226 million. Between 1995 and 1999, the annual value of California's seed crop increased an average of 15 percent each year. The 1999 seed crop was the most valuable of the past 27 years, bringing just over \$324 million to state producers. Since the year 2000, values have remained relatively stable at around \$200 million. Using 2000 as a base year and adjusting for inflation, Figure 1.1 demonstrates that the adjusted value of the California seed crop decreased from 1980 to 1995 at an average rate of four percent a year. Since 1995, real values have paralleled nominal values.

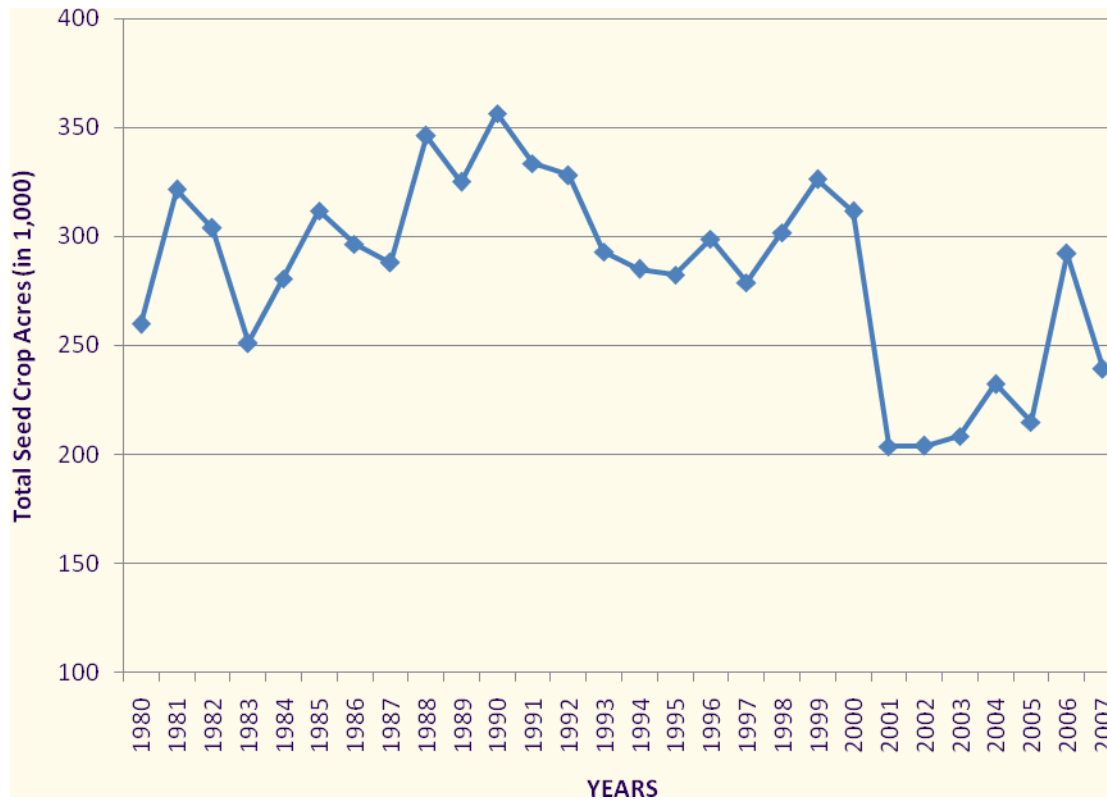
**Figure 1.1. Real and Nominal Value of California Seed Crop, 1980-2007**



Aggregate seed production in California is reflected in number of harvested acres of seed crops across the state. California seed crop acreage has experienced three distinct periods of growth and decline over the past three decades (Figure 1.2).

During the first period, from 1980 to 1990, annual harvested acres of seed crops in California fluctuated from year to year while experiencing a general upward trend. During this period, the average number of annual harvested acres was 310,510 acres, and acreage changed at an average annual rate of four percent. The number of harvested acres during this ten year period ranged from a low of 258,924 acres in 1983 to a high of 361,665 acres in 1990. Acreage for seed production reached a peak in 1990.

**Figure 1.2. Total Annual Harvested Acres of all California Seed Crops, 1980-2007**



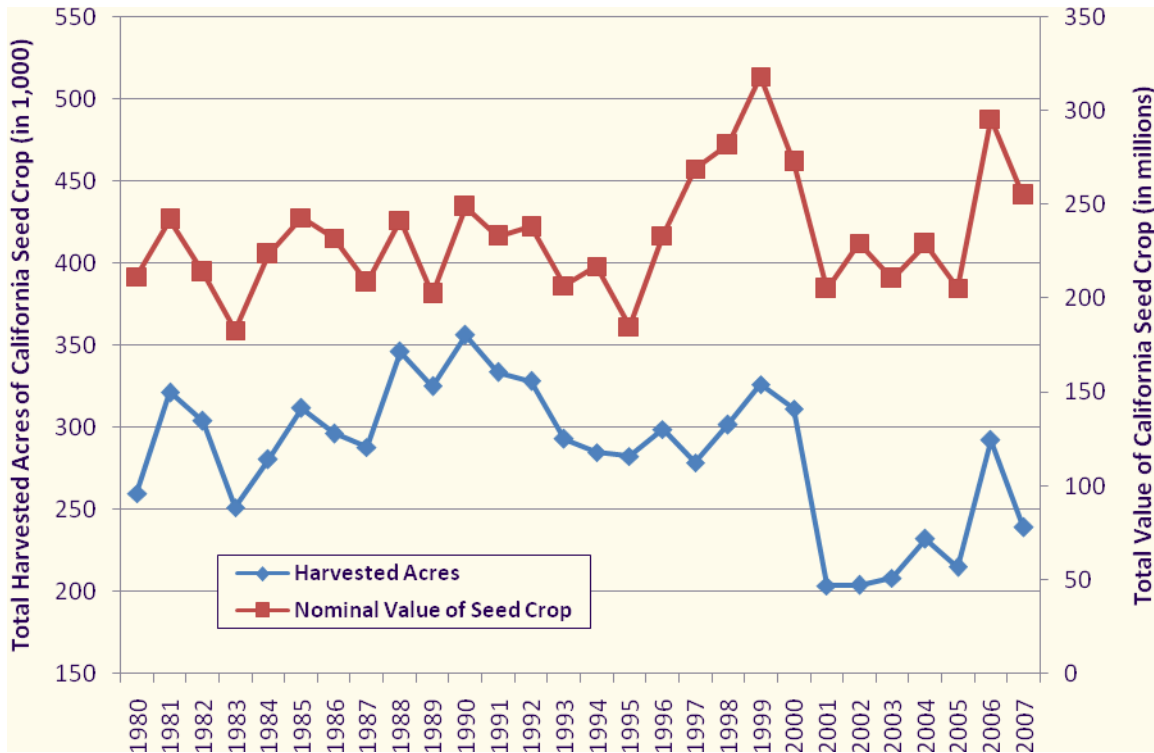
The next period, 1991 to 2000, is highlighted by an early decline in harvested acres followed by a relatively flat period and ending with a slight resurgence. Starting in 1991 and continuing until 1995, seed acreage in California declined every year at an average rate of five percent. Harvested seed acres increased 17 percent from 1997 to 1999 before declining in 2000. The overall average seed acreage for 1991 to 2000 was 307,797 acres with an annual decline in seed acreage of one percent.

The final distinct period, from 2001 to 2007, started with a 35 percent decline in harvested seed acreage in 2001. The 2001 growing season saw the lowest use of land for seed production in the past 28 years (203,601 acres). Since this dramatic drop, seed acreage in the state has made a slight recovery, but the annual average of 232,219 harvested seed acres from 2001 to 2007 is still 25 percent below the 1991 to 2000 average.

Combining the information on seed crop value with harvested acres shows that California producers' decision to plant and harvest seed crops has been, in part, determined by the price received (Figure 1.3). As indicated previously, from 1980 to 1990, the nominal value of California's annual seed crop changed very little and the annual value increased at an average rate of two percent. During this same period, the annual number of harvested acres of

California seed crops also increased, but at a slightly higher rate of three percent per year. The next ten years, 1991 to 2000, saw parallel changes to seed crop value and harvested acres. From 1991 to 2000, seed crop values fluctuated greatly, but had an average rate of increase of 1.8 percent while harvested acres declined at an average rate of one percent.

**Figure 1.3. Annual Value of California Seed Crop vs. Harvested Acres of California Seed Crop, 1980-2007**



The importance of the seed crop to overall California crop production is demonstrated in the proportion of annual acreage dedicated to seed production. For the past 28 years, seed crops have accounted for between 2.3 percent and 4.3 percent of all crop harvested acreage in California (Table 1.1). From 1980 to 1991, the percent of California crop acres planted for seed production grew steadily from 2.7 percent in 1980 to the 1991 high of 4.3 percent. From 1991 to 2007, the share of California crop acres dedicated to seed production followed a similar pattern to that of total seed crop harvested acres (Figure 1.4).



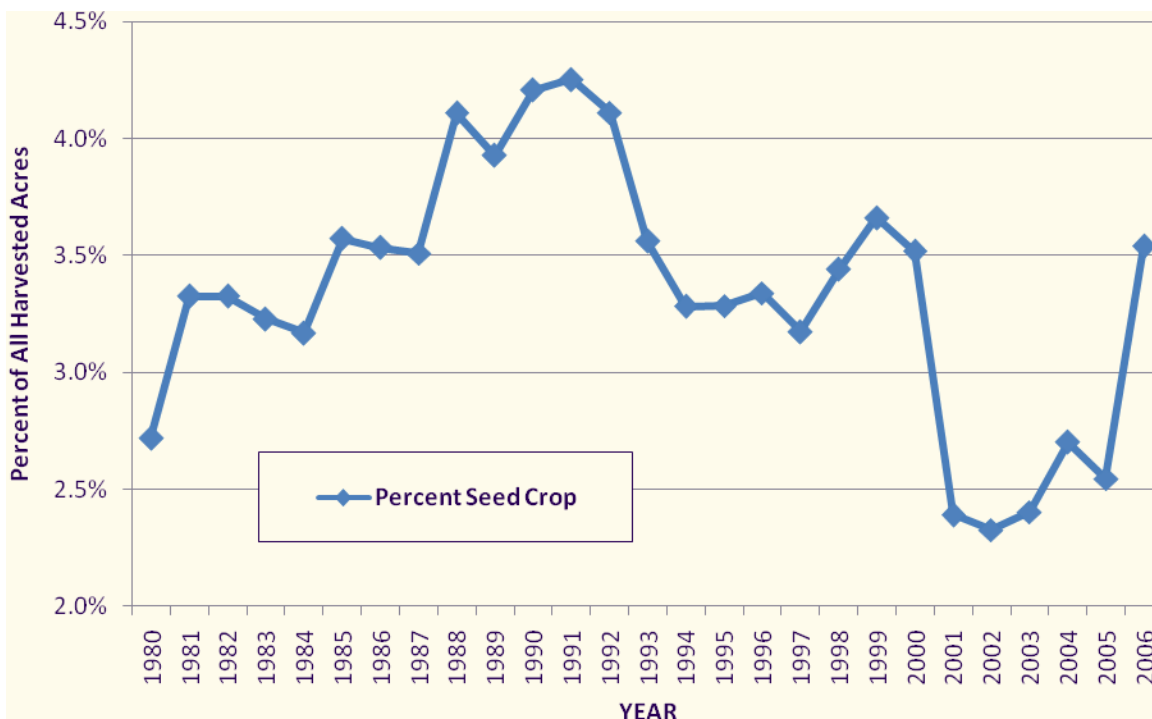
**Table 1.1. Percent of Annual California Crop Acreage and Field Crop Acreage Dedicated to Seed Production, 1980-2006**

Year	Seed Crop	Field Crops <sup>1</sup>	All Crops Acres <sup>1</sup>	Percent of Field Crops	Percent of All Crops
	In 10,000 acres			Percent	
1980	25.99	687.65	955.71	3.8	2.7
1981	32.14	702.50	966.40	4.6	3.3
1982	30.38	637.50	913.52	4.8	3.3
1983	25.11	497.05	777.73	5.1	3.2
1984	28.06	594.70	885.43	4.7	3.2
1985	31.18	578.80	872.98	5.4	3.6
1986	29.64	543.55	838.52	5.5	3.5
1987	28.81	514.71	820.86	5.6	3.5
1988	34.60	530.81	842.28	6.5	4.1
1989	32.51	513.59	827.63	6.3	3.9
1990	35.63	525.65	846.80	6.8	4.2
1991	33.35	474.05	784.37	7.0	4.3
1992	32.81	490.74	797.81	6.7	4.1
1993	29.30	495.45	822.79	5.9	3.6
1994	28.49	525.87	868.02	5.4	3.3
1995	28.24	521.51	859.78	5.4	3.3
1996	29.89	540.44	895.06	5.5	3.3
1997	27.88	531.66	878.09	5.2	3.2
1998	30.18	516.92	877.67	5.8	3.4
1999	32.63	513.84	890.92	6.3	3.7
2000	31.14	510.26	885.41	6.1	3.5
2001	20.36	479.61	851.54	4.2	2.4
2002	20.40	490.30	877.26	4.2	2.3
2003	20.85	494.17	867.79	4.2	2.4
2004	23.23	487.43	860.06	4.8	2.7
2005	21.49	467.65	844.12	4.6	2.5
2006	29.21	446.37	824.99	6.5	3.5

<sup>1</sup>Field crop acreage and all crop acreage from USDA NASS California Field Office, *Principal Crops Harvested Acres in California, 1950-Present*.

A more accurate representation is made by comparing seed acreage with other California field crops' acreage. As Table 1.1 indicates, the proportional share of seed crop harvested acres to field crop harvested acres in California ranges from 3.8 percent in 1980 to a high of seven percent in 1991. Furthermore, the number of acres for all crops and for field crops in California remains relatively stable over the 28 year period, indicating that shifts in seed crop acreage are not linked to changes in crop acreage in California (Figure 1.4).

**Figure 1.4. Percent of All California Crop Harvested Acres Dedicated to Seed Production, 1980-2006**



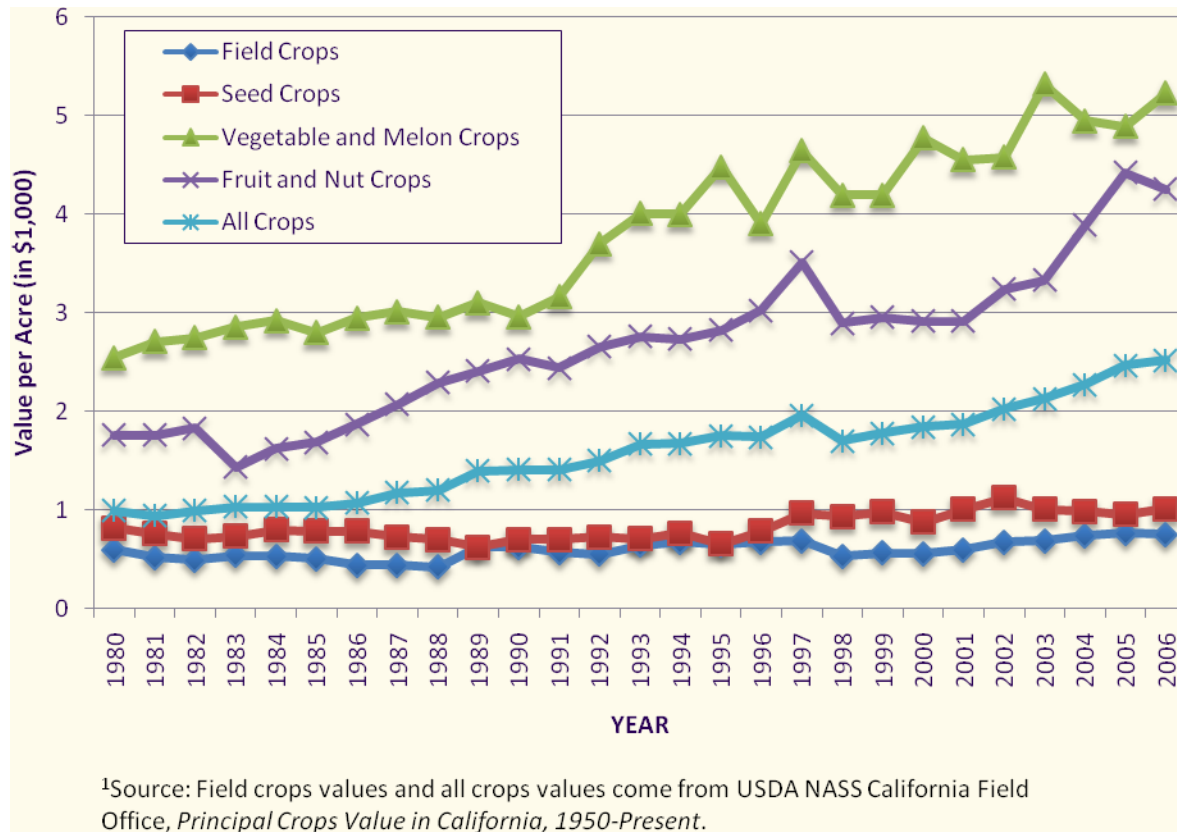
Comparing the annual seed crop value with the value of other California field crops and with all California crops in general provides insight into the contribution seed production makes to California's overall agricultural economy. As indicated in Table 1.2, seed crop production accounts for one to three percent of all crop value in California annually. From 1980 to 1990, seed crops accounted for an average of 2.34 percent of the value of all California-produced crops. During this same period, an average of 7.5 percent of the value of field crops in California came from seed production. During the next ten years, from 1991 to 2001, the contribution of seeds to California crop values dropped to an average of 1.66 percent. However, as a share of field crop values, seed crop values increased to eight percent. From 2002 to 2006, seed crop values have averaged 1.2 percent of all California crop values and 6.8 percent of field crop values.

**Table 1.2. Percent of Annual California Crop Value and Field Crop Value Attributed to the Production of Seeds, 1980-2006**

Year	Seed Crop Value	Field Crops Value <sup>1</sup>	All Crops Value <sup>1</sup>	Percent of Field Crop Value	Percent of All Crops Value
	In \$ million			Percent	
1980	392	4,076	9,497	5.19	2.23
1981	409	3,598	9,048	6.73	2.68
1982	341	3,142	9,039	6.81	2.37
1983	280	2,663	8,001	6.87	2.29
1984	330	3,129	9,113	7.15	2.45
1985	349	2,912	8,948	8.35	2.72
1986	326	2,374	8,941	9.78	2.60
1987	285	2,256	9,605	9.24	2.17
1988	319	2,206	10,075	10.95	2.40
1989	258	3,174	11,532	6.38	1.76
1990	305	3,247	11,890	7.67	2.09
1991	276	2,678	11,045	8.70	2.11
1992	276	2,694	11,955	8.84	1.99
1993	234	3,165	13,715	6.54	1.51
1994	241	3,510	14,530	6.19	1.49
1995	201	3,339	15,025	5.54	1.23
1996	249	3,597	15,544	6.49	1.50
1997	282	3,611	17,203	7.45	1.56
1998	292	2,715	14,931	10.38	1.89
1999	325	2,877	15,815	11.06	2.01
2000	273	2,816	16,266	9.69	1.68
2001	200	2,859	15,881	7.18	1.29
2002	220	3,269	17,744	7.01	1.29
2003	198	3,386	18,415	6.22	1.14
2004	209	3,577	19,462	6.41	1.18
2005	182	3,560	20,823	5.77	0.99
2006	253	3,338	20,748	8.86	1.43

<sup>1</sup>Source: Field crops values and all crops values come from USDA NASS California Field Office, *Principal Crops Value in California, 1950-Present*.

**Figure 1.5. Annual Values per Acre for California Crops<sup>1</sup>, 1980-2006**



Another comparison that helps to define the role of seed production in California agriculture is value per acre. In Figure 1.5, the value per acre of seed crops is compared with the average value per acre for field crops, vegetable and melon crops, fruit and nut crops and the average value per acre for all crops combined. When compared to field crops, seed crop values per harvested acre have been relatively high for most of the past three decades. This is not true when compared to vegetable and melon crops or fruit and nut crops. From 1980 to 1990, the value for all field crops in California averaged \$517 per acre, while California's seed crop averaged 42 percent higher at \$737 per acre (Table 1.3). The highest difference in value occurred in 1986 when seed values were 87 percent above field crop averages. When comparing seed crops with the average value per acre for all crops between 1980 and 1990, seed crops were 34 percent lower in value per acre. The high average for all crops is due to the influence of vegetable and melon crops, which averaged \$2,867 per acre from 1980 to 1990, and fruit and nut crops, which averaged \$1,932 per acre over the same period.

**Table 1.3. Values per Acres of California Crops, 1980-2006**

Year	Seed Crop Value	Field Crops Value <sup>1</sup>	Fruits and Nuts <sup>1</sup>	Vegetables and Melons <sup>1</sup>	All Crops <sup>1</sup>
	Dollars per Acre				
1980	814	593	1,757	2,545	994
1981	753	512	1,759	2,703	936
1982	704	493	1,829	2,745	989
1983	728	536	1,430	2,857	1,029
1984	797	526	1,621	2,922	1,029
1985	780	503	1,686	2,795	1,025
1986	783	437	1,869	2,946	1,066
1987	723	438	2,072	3,010	1,170
1988	698	416	2,291	2,953	1,196
1989	623	618	2,409	3,099	1,393
1990	698	618	2,530	2,960	1,404
1991	699	565	2,440	3,160	1,408
1992	726	549	2,656	3,702	1,498
1993	706	639	2,757	4,007	1,667
1994	762	667	2,731	3,999	1,674
1995	655	640	2,823	4,481	1,748
1996	781	666	3,024	3,904	1,737
1997	965	679	3,509	4,644	1,959
1998	934	525	2,895	4,195	1,701
1999	975	560	2,951	4,194	1,775
2000	876	552	2,912	4,769	1,837
2001	1,008	596	2,915	4,552	1,865
2002	1,123	667	3,243	4,584	2,023
2003	1,010	685	3,327	5,321	2,122
2004	986	734	3,895	4,950	2,263
2005	955	761	4,422	4,889	2,467
2006	1,012	748	4,252	5,230	2,515

<sup>1</sup>Source: Value per acre for field crops, fruits and nuts, vegetables and melons and all crops calculated using data from USDA NASS California Field Office, *Principal Crops Value in California, 1950-Present*.

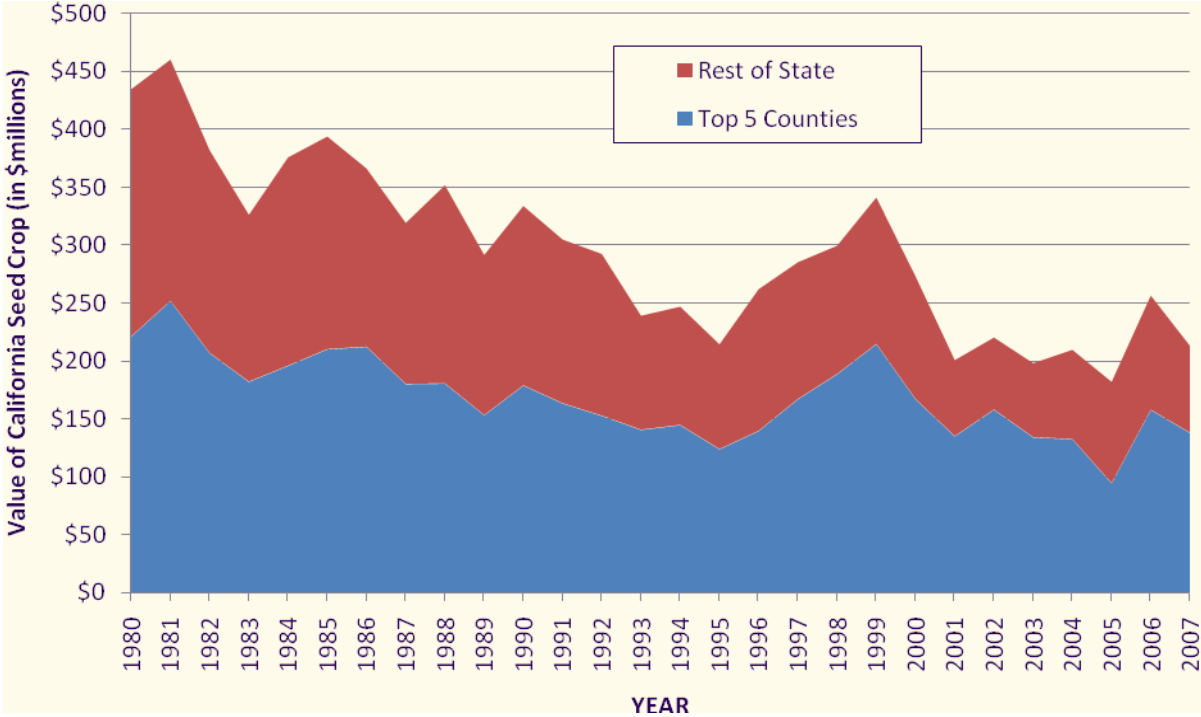
Starting in 1989, overall field crop averages increased, while seed crop value per acre remained stable. In 1989, seed crop average value was one percent above field crop values per acre and in 1995 it was two percent higher. Although Figure 1.5 indicates a convergence between field crop values and seed crop values during the period from 1989 to 1996, seed values still averaged 12 percent above the value per acre for all field crops. In 1997, seed crop value per acre increased while average field crop values remained steady. This resulted in seed crops having a 30 percent greater value per acre compared to field crops, a difference that continued through the later part of the 1990s to 2006. Over this time period, seed crop value per acre averaged 35 percent higher than the value per acre for California field crops.

For close to three decades from 1980 to 2006, the value per acre for seeds has remained at a steady level above the average value per acre for all field crops, however, the overall change in value per acre has been relatively small for seeds. From 1980 to 2006, the value per acre for seed crops increased in nominal terms by 24 percent and field crops increased in value per acre by 26 percent and vegetable and melon crops increased in value per acre by 105 percent and fruit and nut crops increased by 142 percent.

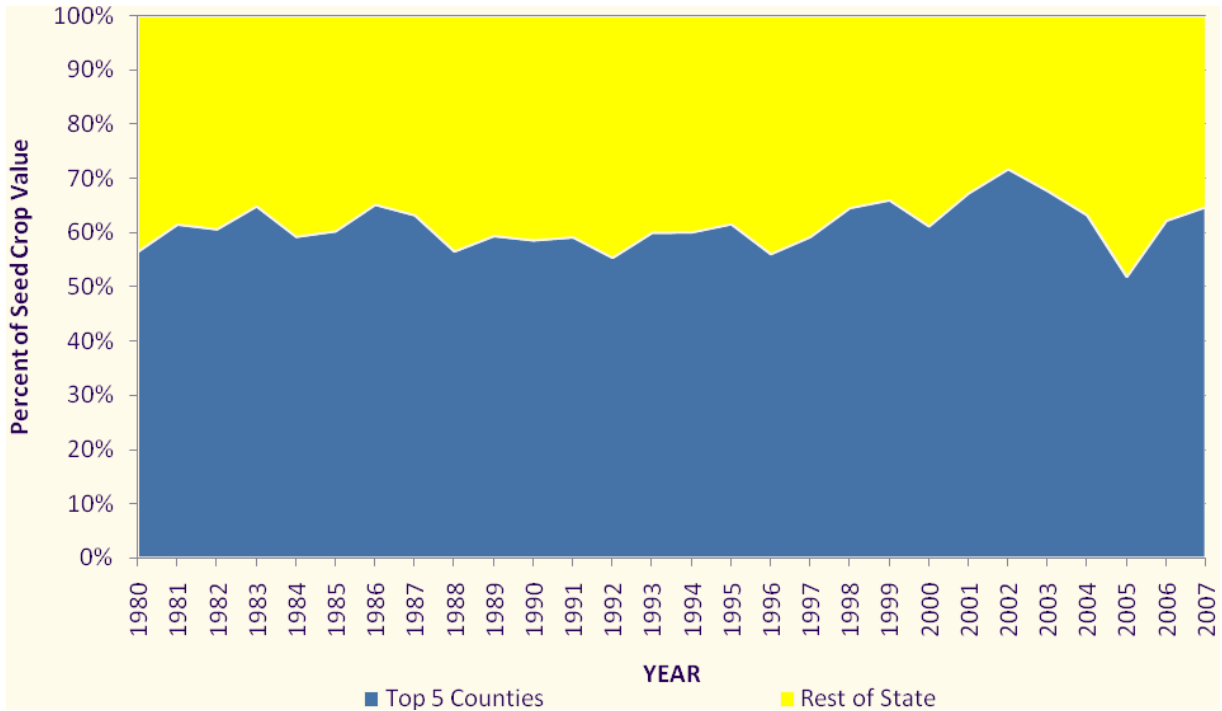
## **1.2. County Level Seed Production and Value**

The Agricultural Commissioners' annual crop reports reveal that seed production is a statewide activity with production distributed throughout California from 1980 to 2007. Crop reports from the last three decades show that 36 of the 58 California counties have reported some level of seed production. That being said, a majority of annual seed crop value comes from the top five seed-producing counties. The proportion of seed crop value attributable to the top five producing counties has remained relatively stable from 1980 to 2007. In 1980, the top five counties accounted for just over \$221 million of the total crop value of \$391.5 million (Figure 1.6), equivalent to 56 percent of total crop value (Figure 1.7). From 1980 to 1989, 61 percent of the California seed crop value came from the top five seed production counties. From 1990 to 1999, this average dropped to 60 percent of total seed crop value. Between 2000 and 2007, the proportion of total seed value attributed to the top five counties increased to an average of 64 percent (Figure 1.7).

**Figure 1.6. Total Annual Value of California Seed Crop by Top 5 Seed Producing Counties and Rest of State, 1980-2007**



**Figure 1.7. Percent Share of Annual Value of California Seed Crop by Top Five Seed Producing Counties, 1980-2007**



Although the share of California seed crop value attributable to the top five California counties has changed slightly from 1980 to 2007, the counties that are grouped into the top five have changed over the years (Table 1.4). From 1980 to 1990, Fresno, Imperial and Kings Counties consistently produced the largest share of total value for seed crops in California. For nine of the ten years, Fresno County was the largest seed producing county, with 1989 being the odd year out. During this ten-year period, Fresno County averaged 18.6 percent of the total value of the California seed crop, with the next highest contributor being Imperial County at an average of 13.6 percent of seed crop value.



**Table 1.4. Top Five Seed Producing Counties in California as Measured by Percent of Total Annual California Seed Crop Value, 1980-2007**

Year	Rank 1		Rank 2		Rank 3		Rank 4		Rank 5	
	County	%	County	%	County	%	County	%	County	%
1980	Fresno	20.6	Imperial	12.1	Kings	11.2	Sutter	6.4	Glenn	6.2
1981	Fresno	19.3	Imperial	15.0	Kings	14.2	Colusa	7.2	S. Barbara	5.7
1982	Fresno	18.9	Kings	16.9	Imperial	10.7	Colusa	8.2	Sutter	6.0
1983	Fresno	21.5	Imperial	11.2	Kings	10.0	Colusa	8.0	Sutter	5.5
1984	Fresno	20.7	Kings	11.9	Imperial	8.7	Colusa	7.1	Sutter	6.7
1985	Fresno	16.6	Imperial	15.5	Kings	11.4	Colusa	7.6	Sutter	5.0
1986	Fresno	20.3	Imperial	18.5	Kings	11.2	Colusa	7.2	S. Barbara	5.2
1987	Fresno	18.2	Imperial	16.6	Kings	9.9	Colusa	9.1	S. Barbara	4.6
1988	Fresno	18.7	Imperial	13.0	Kings	10.6	Colusa	7.3	Yolo	5.2
1989	Imperial	17.7	Kings	16.2	Colusa	11.0	Fresno	8.7	Yolo	5.7
1990	Fresno	21.3	Kings	11.8	Imperial	10.8	Colusa	10.3	Yolo	4.4
1991	Fresno	17.0	Imperial	14.1	Kings	12.1	Colusa	11.7	S. Barbara	3.6
1992	Imperial	14.0	Fresno	13.0	Colusa	12.9	Kings	10.0	Yolo	5.3
1993	Colusa	16.7	Fresno	16.7	Imperial	15.1	Kings	6.2	Yolo	5.2
1994	Fresno	17.7	Colusa	14.6	Imperial	13.4	Yolo	8.1	Kings	6.4
1995	Fresno	16.2	Colusa	15.3	Imperial	13.7	Kings	9.1	Glenn	7.3
1996	Imperial	13.7	Colusa	13.1	Fresno	12.0	Kings	8.8	Yolo	8.4
1997	Imperial	18.5	Colusa	15.3	Yolo	10.6	Fresno	9.0	Glenn	5.8
1998	Imperial	26.7	Colusa	12.4	Fresno	11.5	Yolo	7.3	Kings	6.6
1999	Imperial	22.7	Fresno	13.6	Colusa	11.8	Kings	9.5	Yolo	8.4
2000	Imperial	18.0	Colusa	14.4	Fresno	12.9	Sutter	8.6	Yolo	7.3
2001	Fresno	20.9	Imperial	18.5	Colusa	13.2	Yolo	8.3	Sutter	6.4
2002	Fresno	26.6	Imperial	23.3	Colusa	9.5	Yolo	6.5	Sutter	5.8
2003	Imperial	20.0	Fresno	17.8	Colusa	15.3	Yolo	8.5	Sutter	6.1
2004	Imperial	19.1	Colusa	18.1	Yolo	9.3	Sutter	8.3	Fresno	8.3
2005	Colusa	15.5	Yolo	10.4	Fresno	9.5	Imperial	9.4	Sutter	7.0
2006	Imperial	24.5	Yolo	12.3	Colusa	10.8	Fresno	8.5	Glenn	6.2
2007	Imperial	18.7	Yolo	18.0	Colusa	12.1	Fresno	9.8	Sutter	6.2

From 1991 to 2000, Fresno County was not as dominant in seed production, only serving as the top county for three of the ten years. Furthermore, Fresno County's average contribution to California's annual seed value fell to a ten year average of 14 percent. The top seed-producing county for seven of the ten years from 1991 to 2000 was Imperial County. Imperial County produced an annual average of 17 percent of total California seed crop value during this ten year period. Colusa County also became an important contributor to overall seed crop production during this time. From 1980 to 1990, Colusa County averaged 7.8 percent of total seed crop value. From 1991 to 2000, this average increased to 13.8 percent of state value. The increasing presence of Colusa County as one of the state's leading seed producing counties coincided with the declining importance of Kings County. From 1980 to 1989, Kings County was consistently one of the top three seed production counties with an average share of 12.3 percent of California seed crop value. The decade of the 1990s saw this share of value drop for Kings County to an average of eight percent of total seed crop value.

In recent history of California seed production, Imperial County has maintained its position as the leading producer of seed. From 2001 to 2007, Imperial County accounted for an average of just over 19 percent of seed crop value. Colusa County continued its presence as a top seed-producing county during this time. In 2005, Colusa County produced the largest seed crop by value in the state with a harvest worth \$28.2 million, which represented 15.5 percent of the total value of California seed crop. In addition, Yolo County has become a more important producer of seed in California. Starting in 2000, Yolo County has steadily increased its share of seed crop value from 7.3 percent to a high of 18 percent in 2007. In contrast, Kings County fell out of the top five completely in 2000 and has not regained its position as a major producer of seed crops as of 2007. Fresno County has also sustained further declines in share of value. In 2001 and 2002, Fresno regained the top spot among seed production counties. In 2001, Fresno County accounted for 20.9 percent of total crop value and in 2002 this increased to 26.6 percent of seed crop value. The 2002 share was the largest share of California seed crop value produced by Fresno County in the past three decades. In 2003, Fresno County slipped behind Imperial County in seed crop value, but still accounted for 17 percent of the state total. For the past four years, the share of value attributable to Fresno County has declined to nine percent of total value.

The role that seed production plays in the agricultural economy of the top seed-producing counties is examined in Table 1.5. Although Fresno County has historically been the leading seed crop producer in California, the proportion of Fresno County's annual agricultural production value attributed to seed crops is rather small. From 1990 to 2007, seed crops accounted for between 0.4 percent and 1.8 percent of total value (Table 1.5). This is in contrast to Colusa County where seed production from 1990 to 2007 earned between 6.4 and 12.9 percent of the total Colusa County agriculture production value. Seed production is growing in importance for Yolo County agriculture as well. Starting in 2001 at five percent of total value, the proportional annual share of Yolo County agricultural value attributed to seed crops has increased steadily, reaching a maximum share in 2007 of 10.1 percent.

**Table 1.5. Share of Total Agricultural Production Value Attributed to Seed Crops for Top Seed Producing Counties<sup>1</sup> in California, 1990-2007**

	Yolo	Colusa	Sutter	Imperial	Glenn	S. Barbara	Kings	Fresno
	Percent							
<b>1990</b>	4.6	12.3	2.7	2.6	3.8	1.9	3.8	1.8
<b>1991</b>	3.4	12.5	2.2	3.5	3.8	1.7	3.8	1.5
<b>1992</b>	5.8	12.9	3.3	3.9	4.4	1.7	3.1	1.2
<b>1993</b>	4.6	12.6	3.0	3.1	4.2	1.6	1.5	1.1
<b>1994</b>	5.9	11.1	2.5	3.0	4.2	1.4	1.7	1.3
<b>1995</b>	4.1	9.3	1.8	2.5	5.7	1.1	2.0	1.0
<b>1996</b>	6.3	10.0	2.8	3.4	5.0	1.7	2.3	0.8
<b>1997</b>	8.6	12.7	4.6	4.8	5.7	1.3	1.4	0.7
<b>1998</b>	7.5	11.9	4.3	7.0	6.1	0.9	2.3	1.0
<b>1999</b>	7.8	10.7	4.2	7.0	4.1	1.4	3.3	1.2
<b>2000</b>	6.6	11.4	6.9	5.3	4.8	1.1	2.1	1.0
<b>2001</b>	5.9	9.7	4.9	3.8	3.2	1.2	0.6	1.3
<b>2002</b>	5.0	7.5	4.5	4.5	2.9	0.9	0.5	1.8
<b>2003</b>	5.9	8.9	4.2	3.9	2.7	0.7	0.2	0.9
<b>2004</b>	6.3	11.8	6.4	3.7	2.5	1.2	0.6	0.4
<b>2005</b>	6.4	8.1	4.7	1.5	1.8	1.0	0.6	0.4
<b>2006</b>	9.8	7.5	4.2	5.5	4.9	1.1	1.0	0.5
<b>2007</b>	10.1	6.4	4.2	3.5	1.9	0.9	0.6	0.5

<sup>1</sup> The eight counties listed have each been ranked in the top five for seed production in California at least once in the past 27 years.

**Table 1.6. Top Five Seed Producing Counties in California as Measured by Percent of Total California Seed Crop Harvested Acres, 1980-2007**

Year	Rank 1		Rank 2		Rank 3		Rank 4		Rank 5	
	County	%	County	%	County	%	County	%	County	%
1980	Fresno	25.5	Kings	12.7	Sutter	7.2	Butte	6.7	Imperial	5.8
1981	Fresno	20.2	Imperial	16.4	Kings	13.5	Butte	6.3	Sutter	4.6
1982	Fresno	21.5	Kings	17.2	Imperial	10.2	Sutter	6.5	Butte	6.4
1983	Fresno	25.7	Imperial	12.3	Kings	10.1	Glenn	6.9	Sutter	6.8
1984	Fresno	21.6	Kings	12.1	Sutter	9.6	Imperial	8.3	Glenn	6.7
1985	Fresno	21.7	Kings	13.2	Imperial	11.2	Sutter	6.7	Colusa	6.3
1986	Fresno	25.3	Kings	15.2	Imperial	13.2	Colusa	6.6	Sutter	5.4
1987	Fresno	22.6	Imperial	16.5	Kings	12.0	Colusa	8.3	Sutter	4.3
1988	Fresno	21.6	Imperial	14.0	Kings	8.5	Colusa	6.9	Kern	5.8
1989	Kings	15.2	Imperial	14.0	Kern	11.5	Fresno	10.9	Colusa	8.3
1990	Fresno	20.1	Kings	14.2	Imperial	11.6	Colusa	8.6	Kern	6.8
1991	Fresno	17.9	Imperial	12.1	Kings	11.6	Kern	10.0	Colusa	8.9
1992	Fresno	16.7	Imperial	11.1	Kern	10.9	Kings	9.8	Colusa	9.1
1993	Fresno	18.3	Imperial	12.7	Colusa	11.1	Kern	8.4	Kings	6.8
1994	Fresno	16.5	Imperial	10.9	Colusa	10.8	Yolo	7.9	Kern	7.5
1995	Imperial	15.7	Fresno	14.3	Colusa	11.1	Kern	8.6	Kings	8.5
1996	Imperial	18.1	Fresno	11.8	Colusa	9.4	Kern	9.2	Kings	8.4
1997	Imperial	15.9	Colusa	11.2	Fresno	10.9	Yolo	8.6	Kern	8.5
1998	Imperial	20.1	Fresno	14.4	Kings	10.1	Colusa	9.4	Yolo	7.5
1999	Imperial	23.3	Fresno	15.6	Colusa	9.3	Kings	8.6	Yolo	7.7
2000	Imperial	26.2	Fresno	14.4	Kings	7.9	Colusa	7.8	Kern	7.6
2001	Imperial	31.8	Fresno	10.1	Colusa	8.5	Yolo	8.2	Kern	7.1
2002	Imperial	32.6	Fresno	9.5	Colusa	9.1	Yolo	8.1	Sutter	6.9
2003	Imperial	30.8	Colusa	10.4	Yolo	9.9	Sutter	8.0	Fresno	6.8
2004	Imperial	27.3	Colusa	11.8	Yolo	11.4	Fresno	9.1	Sutter	7.2
2005	Imperial	16.1	Yolo	12.5	Colusa	10.0	Fresno	7.9	Sutter	7.4
2006	Imperial	25.6	Yolo	16.4	Kings	7.5	Colusa	6.7	Sutter	5.8
2007	Imperial	23.6	Yolo	19.5	Fresno	8.1	Colusa	8.0	Sutter	6.8

Comparing the share of harvested seed crop acreage in California shows that Fresno County and Imperial County have frequently accounted for the top proportion of acreage dedicated to seed production (Table 1.6). From 1980 to 1994, Fresno County averaged 20.4 percent of the total harvested acres of seed crops in California. The second highest share during this time period is attributed to Imperial County, which averaged 12 percent of total harvested seed acreage. In 1995, Fresno County and Imperial County switched places and Imperial County has accounted for the largest share of annual harvested seed acreage in California from 1995 through 2007. The average share of California seed crop harvested acres for Imperial County during this 13 year time period was 23.6 percent. Fresno County accounted for 10.6 percent of total harvested acres during this time period. In addition to the change between Fresno County and Imperial County, the decline of seed production in Kings County is also notable.

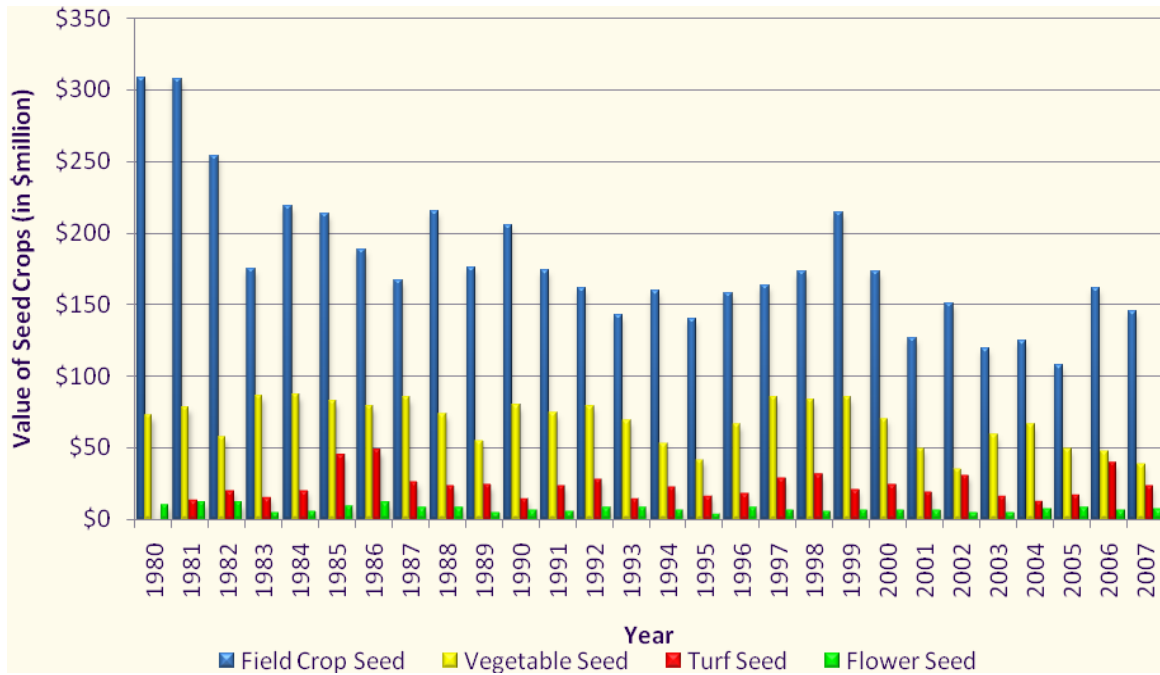
During the 1980-2004 period, Kings County averaged 11.9 percent of total harvested seed crop acreage, only slightly less than Imperial County. From 1995 to 2000, Kings County was in the top five counties for four out of the five years and had an average annual share of 8.4 percent. From 2001 to 2007, Kings County was only represented once in the list of top five counties (in 2006). The average annual share of California seed crop harvested acres for Kings County over the past seven years has dropped to 4.1 percent of total acreage. The decline of Kings County has been countered during this period by the resurgence of Sutter County and the increased seed crop harvested acres attributed to Yolo County and Colusa County. From 1980 to 1987, Sutter County was consistently one of the top five counties dedicating acreage to seed crop production and had an average annual share of 6.4 percent of harvested acres. Beginning in 1988 and throughout the 1990's, Sutter County was absent from the top five while averaging a 5.3 percent share of total harvested seed crop acres. In 2002 and continuing through 2007 Sutter County, once again, was consistently one of the top five counties for acres dedicated to seed production and accounted for just over seven percent of total harvested acres.

### **1.3. Seed Production by Category of Seed**

In this section, the different categories of seeds that make up the annual California seed crop are examined and compared. The annual seed crop is broken down into four distinct categories: field crop seed, vegetable seed, flower seed, and turf seed. The individual seed varieties included in each of the four categories are outlined in Appendix A.

From 1980 to 2007, the biggest contributor to the value of the California seed crop has come from the field crop seed category (Figure 1.8). In fact, during the past three decades, field crop seed has accounted for 57.8 to 78.9 percent of all seed crop value. The average

**Figure 1.8. Real Value of Annual California Seed Crop by Seed Category, 1980-2007 (base year = 2000)**



annual percentage of total seed crop value attributed to field crop seed is 64.5 percent (Table 1.7). The second highest contributor to the value of California’s annual seed crop comes from the production of vegetable seed. On average, vegetable seed production in California contributes close to 25 percent of the seed crop value. The remaining two seed categories, flower seed and turf seed, although consistent contributors to seed crop value, are both relatively small in comparison with field crop seed and vegetable seed. Flower seed, on an annual basis, accounts for an average of 2.5 percent of value and turf seed contributes 8.4 percent of seed crop value annually.

**Table 1.7. California Seed Crop Value by Seed Category, 1980-2007**

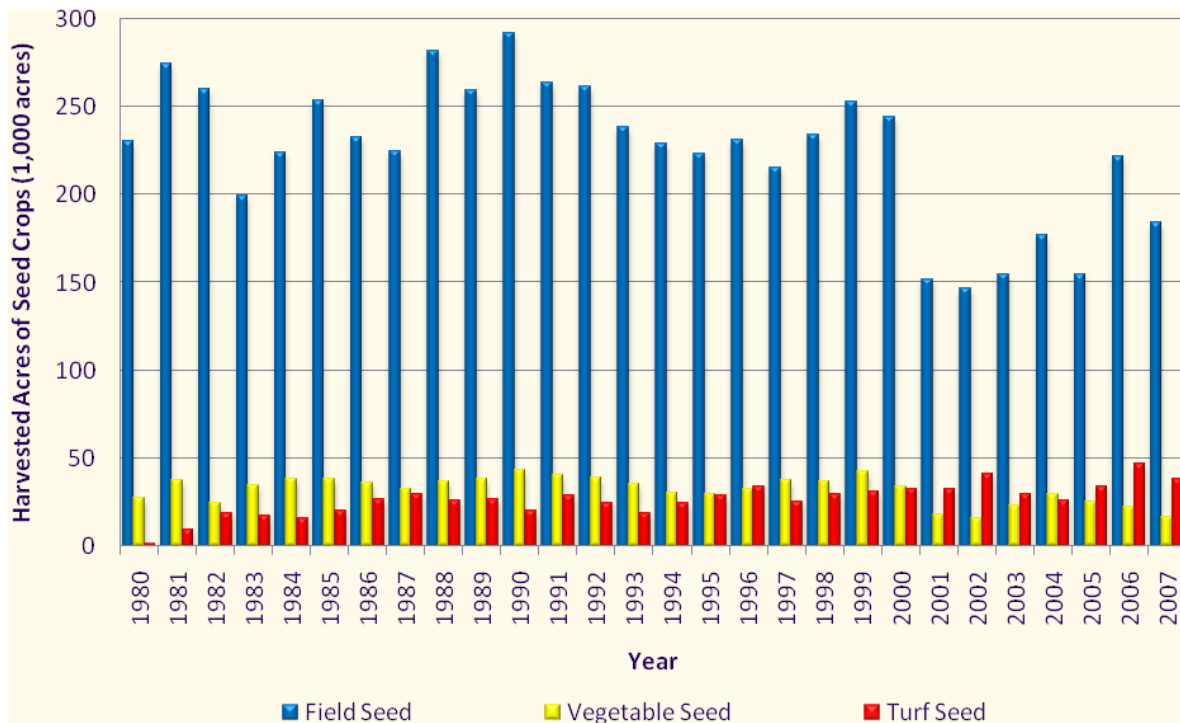
Year	Field Crop Seed		Vegetable Seed		Turf Seed		Flower Seed	
	Value	% of	Value	% of	Value	% of	Value	% of
1980	308.7	78.9	72.2	18.4	1.2	0.3	9.5	2.4
1981	307.4	75.1	77.7	19.0	12.8	3.1	11.6	2.8
1982	253.5	74.3	56.9	16.7	19.8	5.8	10.9	3.2
1983	174.9	62.4	86.1	30.7	15.2	5.4	4.2	1.5
1984	218.9	66.2	86.6	26.2	19.6	5.9	5.4	1.6
1985	213.1	61.1	82.3	23.6	44.8	12.8	8.5	2.5
1986	188.3	57.8	78.6	24.1	47.8	14.7	10.9	3.4
1987	166.6	58.5	84.5	29.7	25.9	9.1	7.7	2.7
1988	214.8	67.3	73.3	23.0	22.8	7.1	8.2	2.6
1989	175.8	68.2	54.1	21.0	23.6	9.1	4.4	1.7
1990	205.3	67.3	79.1	25.9	14.3	4.7	6.3	2.1
1991	173.6	62.9	73.9	26.8	23.1	8.4	5.4	2.0
1992	161.4	58.6	78.8	28.6	27.8	10.1	7.5	2.7
1993	143.0	61.1	68.9	29.4	14.2	6.1	8.0	3.4
1994	159.2	66.2	52.8	21.9	22.2	9.2	6.5	2.7
1995	140.0	69.8	41.4	20.6	16.3	8.1	3.1	1.5
1996	157.5	63.3	66.2	26.6	17.4	7.0	7.7	3.1
1997	163.5	58.0	84.8	30.1	28.0	10.0	5.6	2.0
1998	172.9	59.2	83.1	28.5	31.1	10.6	5.1	1.7
1999	213.9	65.7	84.7	26.0	20.7	6.4	6.1	1.9
2000	173.1	63.4	69.9	25.6	24.1	8.9	5.8	2.1
2001	126.4	63.1	49.2	24.6	18.8	9.4	5.9	3.0
2002	150.3	68.3	34.5	15.7	30.6	13.9	4.6	2.1
2003	119.3	60.3	58.6	29.6	15.8	8.0	4.1	2.1
2004	124.3	59.4	65.6	31.3	12.6	6.0	6.9	3.3
2005	107.7	59.3	48.8	26.9	16.9	9.3	8.2	4.5
2006	161.5	63.7	47.2	18.6	38.8	15.3	6.0	2.4
2007	145.0	68.2	38.0	17.9	23.2	10.9	6.6	3.1

From 1980 to 2007, the trends in value for each of the seed categories have been somewhat flat, with the exception of field crop seed. In the beginning of the 1980s, the real value in field crop seed declined. Adjusting for inflation and using year 2000 base values, the average annual

value of field crop seed from 1980 to 1984 was \$252.7 million. From 1985 to 1989, the average real value of field crop declined to \$191.7 million, which represents a decline of 24 percent from the first part of the decade. The decline in real value of field crop seed production in California continued during the 1990s. From 1990 to 2000, the average annual value of field crop seeds was \$169 million, an 11.8 percent decline from the 1985 to 1989 average. Recent history has shown a further decline in the real value of field seed crops in California. From 2001 through 2007, field seed crops averaged an annual value of \$138.4 million, 18.1 percent below the previous decade's average. By comparison, vegetable seed, flower seed, and turf seed crops experienced variations in real crop value from year to year, but overall values remained relatively stable for the past three decades.

Harvested acres by category also indicate that field crop seeds are the dominant category of seed crop in California (Figure 1.9). From 1980 to 2007, field crop seeds account for an average of 78.9 percent of total annual seed crop harvested acres. Vegetable seed crops had the second highest average share of seed acreage at 11.1 percent of annual harvested acres for seed crops in California. The final seed category included in Figure 1.9, turf seed, averaged an annual share of 9.6 percent of harvested seed acres from 1980 to 2007. The annual harvested acreage dedicated to flower seed production is unknown as the data provided on this subject are too scarce to provide an accurate analysis.

**Figure 1.9. Annual Harvested Acres of California Seed Crop by Seed Category, 1980-2007**





General trends in harvested acres for field crop seed and vegetable seed show a similar pattern from 1980 to 2007 (Table 1.8). For the first 21 years of this period, harvested acreage remained relatively stable. From 1980 to 2000, harvested field crop seed acreage ranged from 199,498 acres in 1983 to 291,783 acres in 1990, and annual harvested acreage for field crop seeds averaged 244,234 acres. For vegetable seed crops, the range of harvested acres was between 24,684 acres in 1982 and 43,105 acres in 1990 with an annual average of 35,449 acres. The average annual rate of change for harvested acres of vegetable seed crops was 2.4 percent during this period.

Beginning in 2001, harvested acreage decreased for both field crop seeds and vegetable seeds. From 2001 to 2007, field crop seed harvested acres ranged from 146,620 acres in 2002 to a high of 221,819 in 2006. The average annual harvested acres for field crop seed from 2001 to 2007 was 170,035 acres, 30.4 percent lower than the average acreage from 1980 through 2000. Vegetable seed crops harvested acreage ranged from 16,124 acres in 2002 to 29,364 acres in 2004. Annual average of harvested acres for vegetable seed crops from 2001 to 2007 was 21,529 acres, a decline of 39.2 percent from the previous period.

In contrast to field crop seed and vegetable seed, turf seed crop harvested acreage has experienced a consistent rising trend. From 1980 to 2007, annual turf seed crop harvested acreage has increased at a rate of 8.64 percent per year. In 1980, turf seed harvested acreage in California was reported as 1,615 acres. In 2006 the harvested acres of turf seed crops reached 46,941 acres, a 28 year high. This is an increase of 2,807 percent in turf seed acreage from 1980 to 2006.

#### **1.4 Field Crop Seed Production**

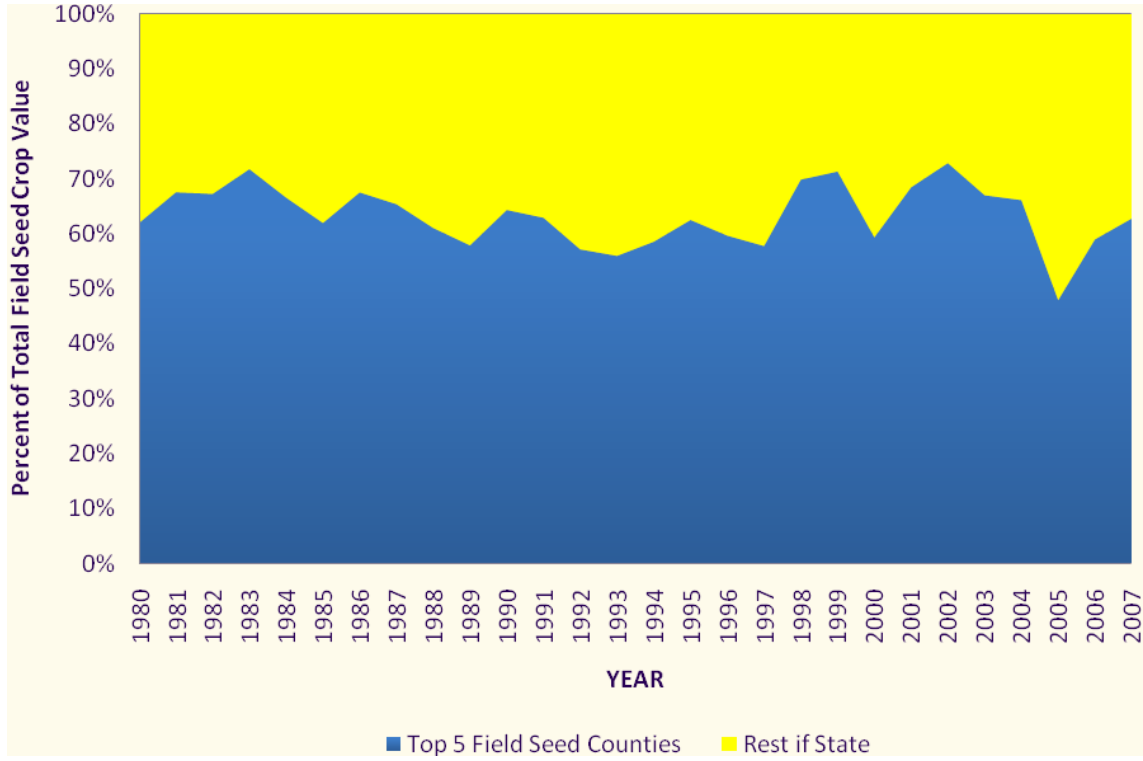
Field crop seeds have the highest value of the four seed categories produced in California. Therefore, it is not surprising that the top field crop seed-producing counties in California are the same counties that account for the majority of total seed crop production. From 1980 to 2007, an average of 63.3 percent of the total annual value of California field crop seed production came from the top five field crop seed-producing counties of Fresno, Imperial, Colusa, Yolo, and Kings (Figure 1.10). As with total seed production, the greatest value in field crop seed production has traditionally come from Fresno County (Figure 1.11). For 20 of the 28 years between 1980 and 2007, Fresno County was the top field crop seed-producing county in California. Recently, Imperial County and Yolo County have begun to challenge Fresno County as the top field crop seed-producing county. Since 2003, Imperial County has been the top annual producer for three years. . Yolo County first claimed the top spot in 2005 with 13 percent of the total real value of field crop seed production. This was followed in 2007 when Yolo County became the largest producer, with 21.5 percent of the real value of field crop seed in California (Table 1.9).

**Table 1.8. California Seed Crop Harvested Acres by Seed Category, 1980-2007**

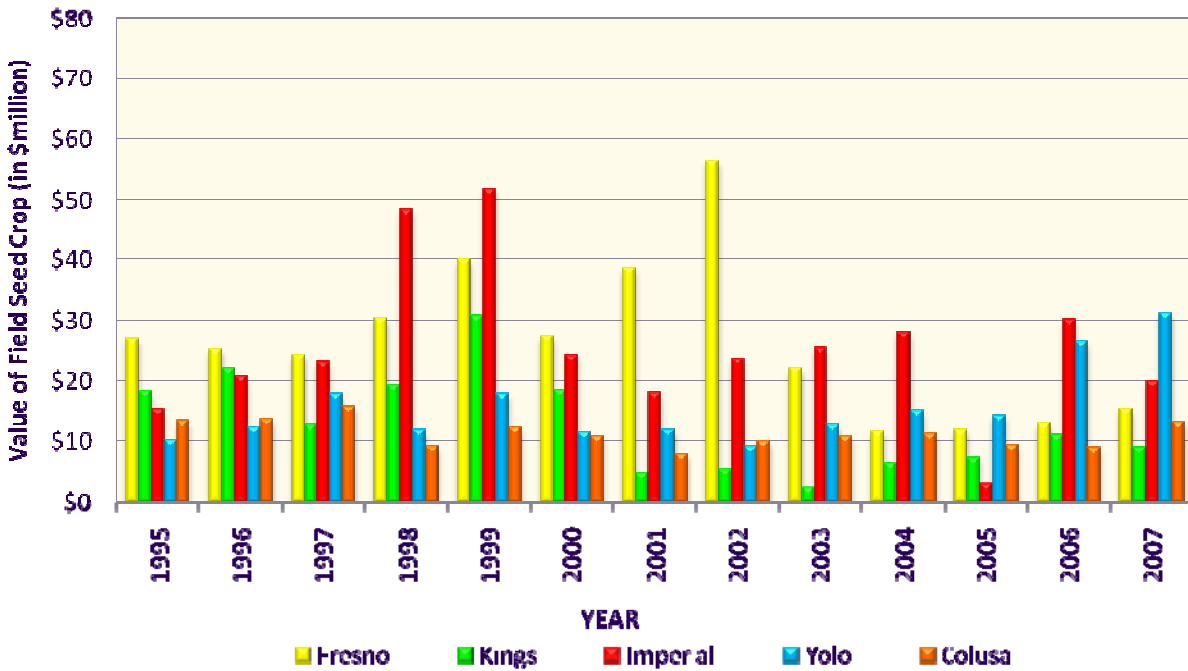
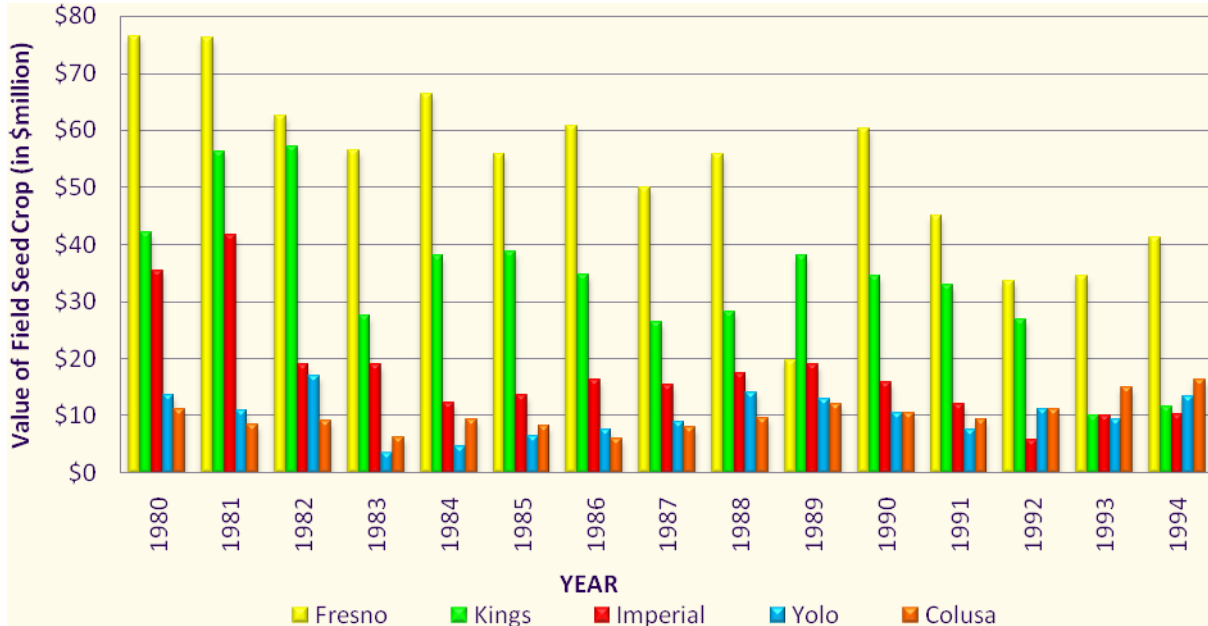
Year	Field Seed		Vegetable Seed		Turf Seed		Flower Seed	
	Acres	% of	Acres	% of	Acres	% of	Acres <sup>1</sup>	% of
1980	274.7	85.5	37.2	11.6	9.5	3.0	-	-
1981	260.1	85.6	24.7	8.1	18.9	6.2	-	-
1982	199.5	79.5	34.4	13.7	17.2	6.9	-	-
1983	224.1	79.9	38.4	13.7	16.0	5.7	2.1	0.7
1984	253.8	81.4	38.1	12.2	19.9	6.4	-	-
1985	232.9	78.6	35.9	12.1	26.3	8.9	1.2	0.4
1986	225.0	78.1	32.6	11.3	29.5	10.2	1.1	0.4
1987	282.1	81.5	37.0	10.7	26.0	7.5	1.0	0.3
1988	259.8	79.9	38.3	11.8	26.3	8.1	0.7	0.2
1989	291.8	81.9	43.1	12.1	20.5	5.8	0.9	0.3
1990	263.6	79.0	40.1	12.0	28.7	8.6	1.2	0.4
1991	261.9	79.8	38.7	11.8	24.4	7.5	3.0	0.9
1992	238.7	81.5	35.1	12.0	18.5	6.3	0.7	0.3
1993	228.8	80.3	30.2	10.6	24.4	8.6	1.5	0.5
1994	223.4	79.1	29.4	10.4	29.1	10.3	0.6	0.2
1995	231.4	77.4	32.7	10.9	33.6	11.2	1.1	0.4
1996	215.1	77.2	37.2	13.4	25.4	9.1	1.0	0.4
1997	234.5	77.7	37.1	12.3	29.2	9.7	1.0	0.3
1998	253.1	77.2	42.8	13.1	30.9	9.4	0.9	0.3
1999	244.1	78.4	33.8	10.8	32.7	10.5	0.9	0.3
2000	151.6	74.5	18.3	9.0	32.8	16.1	0.9	0.4
2001	146.6	71.9	16.1	7.9	41.3	20.2	-	-
2002	154.8	74.2	23.2	11.1	29.9	14.3	0.7	0.3
2003	176.7	76.1	29.4	12.6	25.6	11.0	0.6	0.3
2004	154.7	72.0	25.0	11.6	34.1	15.9	1.1	0.5
2005	221.8	75.9	22.5	7.7	46.9	16.1	0.9	0.3
2006	184.0	76.9	16.3	6.8	38.1	15.9	1.0	0.4
2007	274.7	85.5	37.2	11.6	9.5	3.0	-	-

<sup>1</sup> Flower seed acreage is not consistently reported in the annual crop reports.

**Figure 10. Percent of Annual Field Crop Seed Value for Top 5 Field Crop Seed-Producing Counties, 1980-2007**



**Figure 1.11. Annual Real Value of Field Crop Seed for top Five Producing Counties, 1980-2007 (base year=2000)**



**Table 1.9. Percent of Annual Field Crop Seed Real Value Attributed to Top 5 Field Crop Seed-Producing Counties, 1980-2007**

Year	Rank 1		Rank 2		Rank 3		Rank 4		Rank 5	
	County	%	County	%	County	%	County	%	County	%
1980	Fresno	24.7	Kings	13.6	Imperial	11.5	Sutter	6.1	Glenn	6.0
1981	Fresno	24.8	Kings	18.3	Imperial	13.5	Butte	5.9	Sutter	5.0
1982	Fresno	24.6	Kings	22.6	Imperial	7.5	Yolo	6.7	Sutter	5.8
1983	Fresno	32.3	Kings	15.7	Imperial	10.8	Glenn	7.1	Kern	5.9
1984	Fresno	30.3	Kings	17.4	Kern	7.7	Imperial	5.6	Sutter	5.5
1985	Fresno	26.2	Kings	18.2	Imperial	6.4	Kern	5.6	Glenn	5.5
1986	Fresno	32.2	Kings	18.5	Imperial	8.7	Monterey	4.1	Yolo	4.0
1987	Fresno	30.0	Kings	15.9	Imperial	9.2	Yolo	5.4	Colusa	4.8
1988	Fresno	25.9	Kings	13.1	Imperial	8.1	Kern	7.3	Yolo	6.5
1989	Kings	21.6	Fresno	11.2	Imperial	10.8	Yolo	7.3	Colusa	6.8
1990	Fresno	29.4	Kings	16.8	Imperial	7.7	Solano	5.3	Yolo	5.1
1991	Fresno	26.0	Kings	18.9	Imperial	6.9	Kern	5.7	Colusa	5.4
1992	Fresno	20.8	Kings	16.6	Yolo	7.0	Colusa	6.9	Kern	5.9
1993	Fresno	24.2	Colusa	10.5	Glenn	7.1	Imperial	7.1	Kings	7.1
1994	Fresno	26.0	Colusa	10.3	Yolo	8.4	Kings	7.2	Glenn	6.7
1995	Fresno	19.3	Kings	13.0	Imperial	10.8	Glenn	9.7	Colusa	9.6
1996	Fresno	16.1	Kings	13.9	Imperial	13.1	Colusa	8.6	Yolo	7.9
1997	Fresno	14.9	Imperial	14.1	Yolo	10.8	Colusa	9.6	Glenn	8.4
1998	Imperial	28.0	Fresno	17.6	Kings	11.1	Yolo	6.9	Glenn	6.3
1999	Imperial	24.2	Fresno	18.7	Kings	14.4	Yolo	8.3	Colusa	5.7
2000	Fresno	15.9	Imperial	14.1	Sutter	11.3	Kings	10.6	Glenn	7.4
2001	Fresno	30.6	Imperial	14.3	Yolo	9.5	Sutter	7.9	Colusa	6.2
2002	Fresno	37.6	Imperial	15.8	Sutter	6.7	Colusa	6.7	Yolo	6.1
2003	Imperial	21.4	Fresno	18.4	Yolo	10.8	Colusa	9.1	Sutter	7.3
2004	Imperial	23.5	Yolo	12.6	Sutter	10.7	Fresno	9.8	Colusa	9.5
2005	Yolo	13.1	Fresno	11.0	Colusa	8.6	Sutter	7.8	Solano	7.3
2006	Imperial	18.7	Yolo	16.5	Glenn	8.8	Fresno	8.0	Kings	6.9
2007	Yolo	21.5	Imperial	13.7	Fresno	10.5	Colusa	9.0	Sutter	8.0

In the 2007 USDA Census of Agriculture, measures of field crop seed production were combined with grass seed production. Specifically, harvested acreage and number of individual farms involved in field crop and grass seed production were collected (Table 1.10). For California, census data confirm that Imperial County is a major producer of field crop seed in California. Imperial County reported the greatest concentration of individual farms and harvested acres in field and grass seed production in the state. Of the 176 farms listed as producing field and grass seed crops, Imperial County accounted for 104, or just less than 60 percent of the total. In addition, almost 80 percent of the documented 68,948 harvested acres of field and grass seed crop was located in Imperial County. Counter to the Agricultural Commissioners' data, the census data indicate that Kings and Sacramento Counties are among the top five contributors to the production of field crop and grass seed. Furthermore, Sutter County and Colusa County are recorded as being less significant producers of field crop and grass seed.

**Table 1.10. Field and Grass Seed Crop Farms and Acres of Production in California by County, 2007**

County	Number of Farms	Percent Total	Harvested Acres	Percent of Total
<b>Imperial</b>	104	59.1	54,293	78.7
<b>Kings</b>	5	2.8	5,779	8.4
<b>Fresno</b>	20	11.4	3,287	4.8
<b>Sacramento</b>	7	4.0	2,880	4.2
<b>Yolo</b>	5	2.8	465	0.7
<b>Lassen</b>	4	2.3	377	0.5
<b>Glenn</b>	4	2.3	367	0.5
<b>Kern</b>	7	4.0	367	0.5
<b>Sutter</b>	4	2.3	305	0.4
<b>Modoc</b>	5	2.8	65	0.1
<b>Sum of Others</b>	11	6.3	763	1.1
<b>California Total</b>	176	100	68,948	100

Source: USDA 2007 Census of Agriculture

Note: Value of field crop seed production is not included in census data.

Field crop seed production accounts for the majority of seed crop value in Fresno County, Yolo County, and Kings County. From 1980 to 2007, field crop seed value averaged 75 percent of all seed crop value produced in Yolo County. In Fresno County, this average was 88 percent and for Kings County field crop seed production averaged 95 percent of all seed production value from 1980 to 2007. For Colusa and Imperial Counties, field crop seed accounts for less than 50 percent of the annual value of seed production. In Imperial County, field crop seeds averaged 47 percent of annual seed crop value from 1980 to 2007. During the same period, Colusa

County earned 37 percent of its total annual seed crop value from the production of field crop seeds (Table 1.11).

**Table 1.11. Percent of Annual Seed Production Value Attributed to Field Crop Seed for Top 5 Field Crop Seed-Producing Counties in California, 1980-2007**

Year	Colusa	Fresno	Imperial	Kings	Yolo
	Percent				
1980	100	95	75	96	100
1981	29	97	68	97	100
1982	33	97	52	99	100
1983	28	93	61	98	52
1984	40	97	43	97	60
1985	31	96	25	98	73
1986	25	92	27	96	81
1987	31	97	33	94	81
1988	41	93	42	83	84
1989	42	88	42	91	88
1990	33	93	48	96	78
1991	29	96	31	98	82
1992	31	93	15	97	77
1993	39	88	29	69	77
1994	47	97	32	75	69
1995	44	83	55	100	78
1996	42	85	60	100	59
1997	36	96	44	100	59
1998	25	90	62	100	55
1999	32	90	70	100	66
2000	28	78	50	100	57
2001	30	92	49	90	72
2002	48	96	46	100	63
2003	36	62	64	100	76
2004	30	67	70	100	77
2005	33	69	18	100	75
2006	33	60	49	100	86

Comparing field and seed crop production in California with the rest of the country, 2007 census data show California to be the fifth largest producer, as measured by the number of individual farms and harvested acres (Table 1.12). Of the 6,038 farms listed as producing field and grass seed crops, California accounted for 176 or 2.9 percent of the total. When comparing the number of harvested acres, California harvested 68,948 acres or 5.8 percent of the U.S. total. Both of these figures place California fifth in the U.S. behind Idaho, Washington, Missouri and Oregon.

**Table 1.12. Field and Grass Seed Crop Farms and Acres of Production in the U.S. by State, 2007**

State	Number of Farms	Percent Total	Harvested Acres	Percent of Total
Oregon	1,258	20.8	556,876	47.2
Missouri	1,884	31.2	176,138	14.9
Washington	284	4.7	81,081	6.9
Idaho	311	5.2	70,933	6.0
California	176	2.9	68,948	5.8
Minnesota	146	2.4	43,585	3.7
Montana	147	2.4	31,008	2.6
Arizona	88	1.5	19,275	1.6
Kansas	161	2.7	15,667	1.3
Florida	99	1.6	14,264	1.2
Sum of Others	1,484	24.6	100,951	8.6
U.S. Total	6,038	100	1,178,726	100

Source: USDA 2007 *Census of Agriculture*

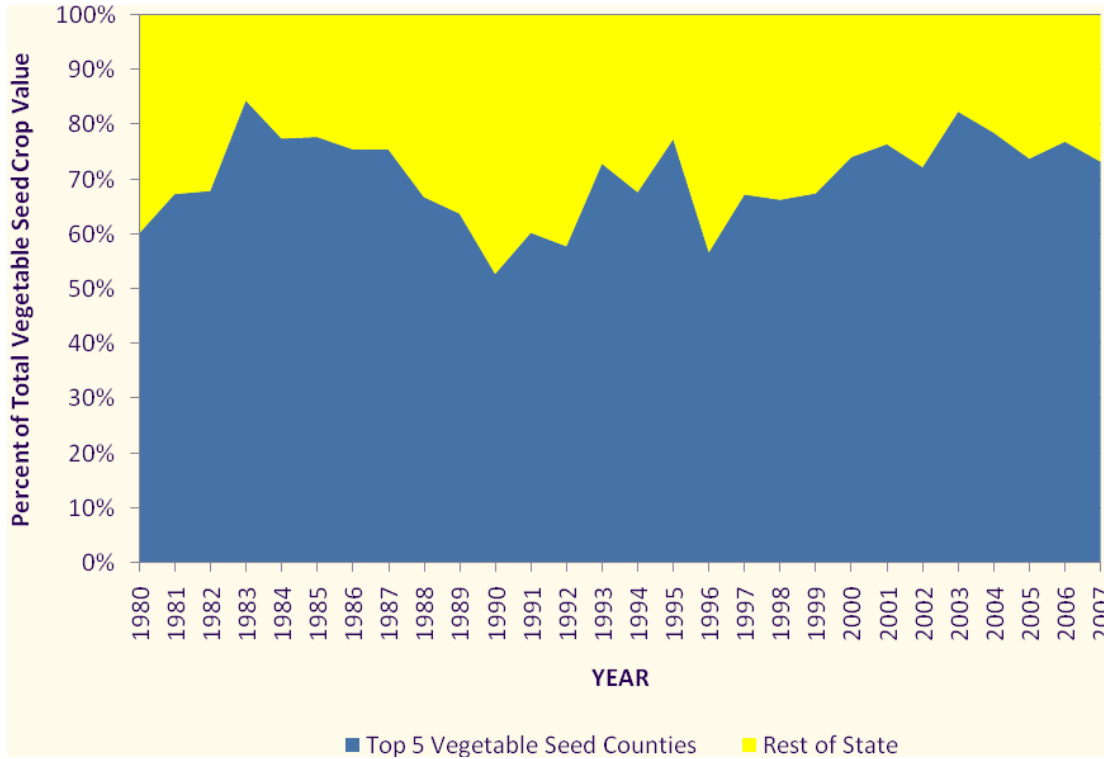
Note: Value of field crop seed production is not included in census data.

### 1.5. Vegetable Seed Production

Vegetable seed production in California is slightly more concentrated than field seed production. On average, the top five vegetable seed-producing counties have accounted for 70.4 percent of the annual value of production from 1980 to 2007 compared to 63.3 percent for field crop seeds (Figure 1.12).



**Figure 1.12. Percent of Annual Vegetable Seed Crop Value for Top 5 Vegetable Seed-Producing Counties, 1980-2007**



The major area of vegetable seed production in California changed somewhat from the early 1980s to 2007. From 1980 to 1988, Ventura County was a major producer of vegetable seeds in California, responsible for an average of 28.8 percent of the total value in vegetable seed production in California. Starting in 1989, Ventura County had no production of vegetable seed and this trend continued through 2007. The one county which remained a major producer of vegetable seed from 1970 to 2007 is Colusa County. Colusa County has been the top producer of vegetable seeds for 21 of the past 28 years. Over this time period, Colusa County has averaged 31 percent of the total annual value of vegetable seed production in California. Other top vegetable seed-producing counties are Imperial County, Fresno County, Sutter County and San Joaquin County (Table 1.11).

**Table 1.13. Percent of Annual Vegetable Seed Crop Value Attributed to Top 5 Vegetable Seed Producing Counties, 1980-2007**

Year	Rank 1		Rank 2		Rank 3		Rank 4		Rank 5	
	County	%	County	%	County	%	County	%	County	%
1980	Siskiyou	19.7	Imperial	16.6	Sutter	8.6	Ventura	7.6	Glenn	7.6
1981	Colusa	27.2	Siskiyou	14.7	Imperial	12.4	Ventura	7.2	Sutter	5.7
1982	Colusa	32.9	Ventura	12.8	Sutter	9.7	Siskiyou	8.2	S. Barbara	4.3
1983	Ventura	46.1	Colusa	18.8	Sutter	11.4	Fresno	4.6	S. Clara	3.6
1984	Ventura	41.6	Colusa	16.1	Sutter	11.6	Siskiyou	4.4	S. Benito	3.8
1985	Ventura	38.7	Colusa	22.3	Sutter	9.1	Siskiyou	4.1	S. Joaquin	3.6
1986	Ventura	32.9	Colusa	22.4	Sutter	8.5	Fresno	6.8	S. Benito	5
1987	Ventura	31.9	Colusa	21.1	Imperial	12.2	Monterey	5.5	Glenn	4.9
1988	Ventura	30	Colusa	18.7	Imperial	8.1	Fresno	5.5	S. Barbara	4.5
1989	Colusa	30.4	Imperial	16.6	Kings	7	Fresno	5	Kern	4.8
1990	Colusa	26.3	Imperial	12.6	Fresno	6	S. Clara	4.1	Monterey	3.8
1991	Colusa	31.1	Imperial	20.2	S. Clara	3.2	Sutter	3	S. Joaquin	2.9
1992	Colusa	31.1	Imperial	14	Sutter	5.6	S. Clara	3.9	S. Joaquin	3.3
1993	Colusa	34.9	Imperial	20.4	Fresno	6.6	S. Joaquin	6	Sutter	4.9
1994	Colusa	35.5	Imperial	16.1	S. Joaquin	5.8	Sutter	5.6	S. Barbara	4.7
1995	Colusa	42	Fresno	13.2	Imperial	11.6	S. Joaquin	5.5	S. Clara	5.2
1996	Colusa	28.9	Imperial	9.2	Yolo	7.1	Fresno	6.7	S. Joaquin	4.9
1997	Colusa	32.4	Imperial	12.3	S. Joaquin	8	Yolo	7.7	Sutter	6.8
1998	Colusa	32.5	S. Joaquin	10.6	Imperial	9.5	Monterey	7.6	Yolo	6.1
1999	Colusa	30.9	S. Joaquin	11.5	Imperial	9.4	Sutter	8.3	Yolo	7.4
2000	Colusa	40.7	Fresno	10.8	Imperial	9.1	S. Joaquin	8	Sutter	5.6
2001	Colusa	37.7	S. Joaquin	14.2	Imperial	10.6	Kern	7.3	Fresno	6.6
2002	Colusa	31.4	S. Joaquin	17.4	Kern	8.5	Yolo	7.6	Sutter	7.4
2003	Colusa	33	Fresno	22.6	S. Joaquin	11	Kern	10.1	Sutter	5.6
2004	Colusa	40.7	Kern	15	Fresno	8.7	Sutter	7.2	S. Joaquin	6.9
2005	Colusa	38.7	Fresno	11	Sutter	8.8	Yolo	8.5	Imperial	6.8
2006	Colusa	38.9	Fresno	18.4	Imperial	7.7	S. Barbara	6.5	S. Joaquin	5.4
2007	Colusa	33.2	Fresno	14.9	Imperial	9.9	S. Barbara	7.7	S. Joaquin	7.6

The production of vegetable seed in Colusa County constitutes a major portion of the value of seed production for the county itself (Table 1.12). From 1990 to 2007, vegetable seeds have accounted for 64.1 percent of the average \$32 million value of Colusa County's annual seed crop. Vegetable seed production is also important for the neighboring counties of Sutter and Glenn County. Since 1990, vegetable seed crops have accounted for 29.3 percent of the seed crop value in Sutter County and 16.8 percent of seed crop value in Glenn County. Together, these three northern Central California counties were responsible for 43 percent of the vegetable seed production in California from 1990 to 2007.

**Table 1.14. Percent of Seed Crop Value Attributed to Vegetable Seed Production for Top Vegetable Seed-Producing Counties, 1980-2007**

	Colusa	Imperial	Sutter	Fresno	San Joaquin	Siskiyou	Glenn	Yolo
	Percent							
<b>1990</b>	66.5	30.2	35.1	7.3	26.4	56.8	19.3	8.0
<b>1991</b>	71.1	38.4	31.1	4.1	39.3	51.4	17.0	5.9
<b>1992</b>	68.8	28.5	39.9	6.7	48.2	50.6	19.8	5.8
<b>1993</b>	61.5	39.9	34.7	11.7	49.0	69.4	14.4	5.4
<b>1994</b>	53.3	26.4	32.0	2.9	45.9	67.4	10.9	7.4
<b>1995</b>	56.4	17.5	27.7	16.8	51.4	44.9	6.7	6.8
<b>1996</b>	58.5	17.8	25.9	14.8	65.9	69.3	18.2	22.7
<b>1997</b>	63.7	20.1	43.7	3.7	72.6	50.5	16.5	21.9
<b>1998</b>	74.6	10.1	37.9	9.6	88.7	20.9	21.2	23.4
<b>1999</b>	68.0	10.8	47.5	9.8	81.7	64.2	34.4	23.0
<b>2000</b>	72.4	12.9	16.6	21.5	72.9	38.2	5.9	18.2
<b>2001</b>	70.3	14.1	21.5	7.8	90.4	0.0	28.4	14.7
<b>2002</b>	51.9	3.6	20.2	3.6	78.6	43.9	15.7	18.2
<b>2003</b>	64.1	4.8	27.4	37.7	81.6	45.6	24.6	11.9
<b>2004</b>	70.4	6.6	27.2	32.9	75.0	41.9	27.9	20.7
<b>2005</b>	67.0	19.4	34.0	31.2	62.9	41.9	0.0	21.9
<b>2006</b>	67.3	5.8	13.4	40.3	89.9	14.4	8.7	7.3
<b>2007</b>	49.0	9.4	11.9	27.2	84.5	5.7	12.4	5.0

The 2007 USDA *Census of Agriculture* further documents Colusa County as the largest vegetable seed-producing county in the state. Of the over \$43 million in vegetable seed crop value documented in the census, Colusa County accounted for close to \$8.3 million or 19.1 percent of the state total (Table 1.15). Joining Colusa County as top vegetable seed producers in North Central California are Yolo and Glenn Counties. Yolo County documented the highest number of individual farms in California that produce vegetable seed crops and the second highest production value at over \$5.7 million. The presence of Glenn County in the top three indicates the importance of the north Central Valley of California as a primary vegetable seed-producing location in the state.

**Table 1.15. Vegetable Seed Farms and Value of Production in California by County, 2007**

County	Number of Farms	Percent Total	Value of Production	Percent of Total
Colusa	10	8.4	8,294,117	19.1
Yolo	14	11.8	5,703,125	13.1
Glenn	8	6.7	3,420,555	7.9
Monterey	8	6.7	2,462,464	5.7
Fresno	11	9.2	1,846,180	4.3
Kern	5	4.2	661,878	1.5
San Benito	9	7.6	441,000	1.0
Butte	5	4.2	404,640	0.9
Tulare	7	5.9	292,026	0.7
Kings	5	4.2	234,088	0.5
Sum of Others	37	31.1	19,639,150	45.3
California Total	119	100	43,399,223	100

Source: USDA 2007 Census of Agriculture

California registered 119 individual farms that produced a total value of close to \$44 million in vegetable seed in 2007. The value of vegetable seed production in California was the largest in the United States in 2007. Of the \$99.6 million in vegetable seed production value documented by the 2007 *Census of Agriculture*, 43.5 percent came from California. The next highest producing state was Idaho with 18.9 percent of U.S. vegetable seed crop value (Table 1.16).

**Table 1.16. Vegetable Seed Farms and Value of Production in the U.S. by State, 2007**

State	Number of Farms	Percent Total	Value of Production	Percent of Total
California	119	10.8	43,399,223	43.5
Idaho	143	13.0	18,798,271	18.9
Washington	135	12.3	17,659,900	17.7
Oregon	138	12.6	14,698,520	14.7
Arizona	11	1.0	1,728,140	1.7
Colorado	29	2.6	834,503	0.8
New York	37	3.4	323,756	0.3
Illinois	17	1.5	300,777	0.3
New Mexico	13	1.2	137,417	0.1
Georgia	6	0.5	133,000	0.1
Sum of Others	449	40.9	1,680,983	1.7
<b>U.S. Total</b>	<b>1,097</b>	<b>100</b>	<b>99,694,490</b>	<b>100</b>

Source: USDA 2007 Census of Agriculture

### **1.6. Turf and Flower Seed Production**

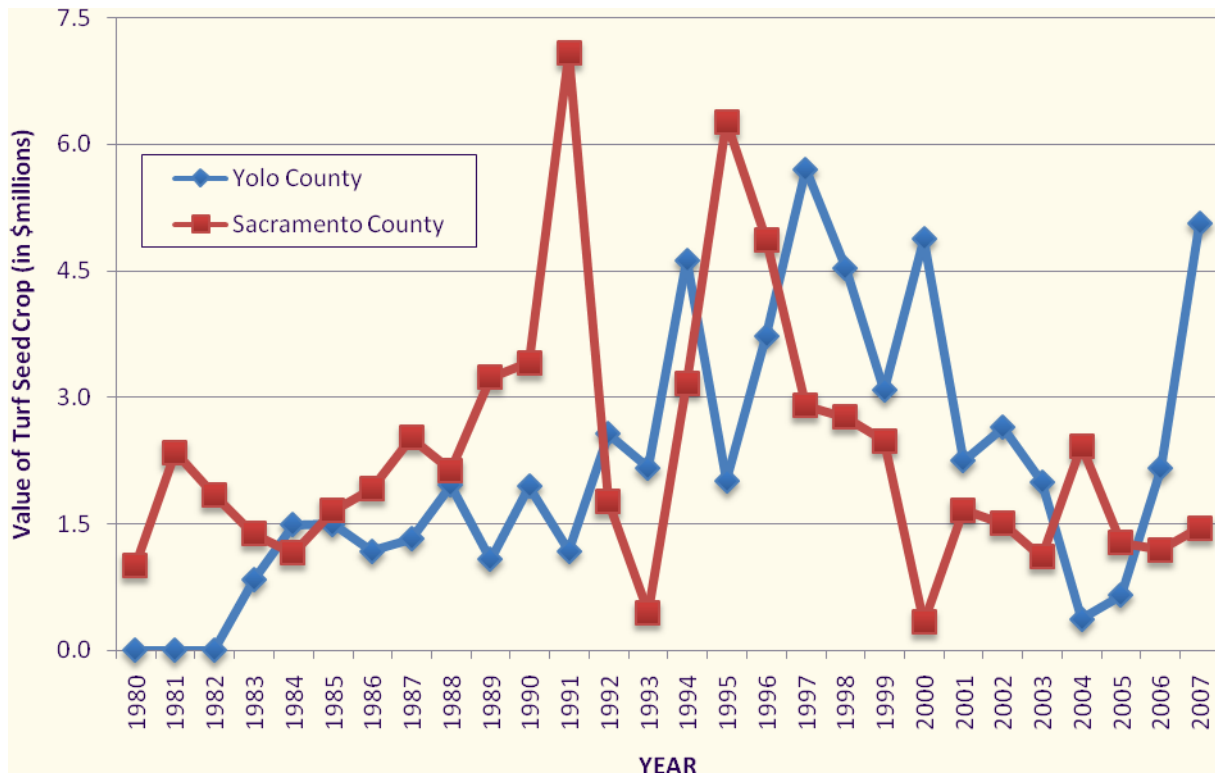
Few counties report annual production of turf seed crops. From 1980 to 2007, only seven California counties, including Imperial, Yolo, Sacramento, Riverside, San Joaquin, Glenn, and Sutter, have been listed as producing turf seed crops. From 1980 to 2007, Imperial, Sacramento and Yolo counties accounted for an average of 94.6 percent of the total value of the California turf seed crop (Table 1.13). For the past 26 years, the largest annual producer of turf seed crops in California has been Imperial County. During this time, Imperial County has accounted for an average of 72.5 percent of the annual value of turf seed produced in the state.

**Table 1.17. Percent of Annual Turf Seed Value Attributed to Top 5 Turf Seed-Producing Counties, 1980-2007**

Year	Rank 1		Rank 2		Rank 3		Rank 4	
	County	%	County	%	County	%	County	%
1980	Sacramento	86.8	Glenn	8.4	Sutter	4.8	-	-
1981	Imperial	80.5	Sacramento	18.4	Riverside	1.0	Sutter	0.2
1982	Imperial	88.6	Sacramento	9.4	Glenn	1.1	Riverside	0.7
1983	Imperial	79.7	Sacramento	8.9	Yolo	5.4	Riverside	2.5
1984	Imperial	83.7	Yolo	7.6	Sacramento	5.9	Riverside	2.5
1985	Imperial	90.5	Sacramento	3.7	Yolo	3.4	Riverside	2.4
1986	Imperial	92.0	Sacramento	4.0	Yolo	2.5	Riverside	1.4
1987	Imperial	83.1	Sacramento	9.7	Yolo	5.1	Riverside	2.0
1988	Imperial	78.9	Sacramento	9.4	Yolo	8.6	Glenn	1.8
1989	Imperial	75.0	Sacramento	13.7	Yolo	4.6	Glenn	1.8
1990	Imperial	50.0	Sacramento	23.9	Yolo	13.6	San Joaquin	4.5
1991	Imperial	51.9	Sacramento	30.6	Yolo	5.1	San Joaquin	3.4
1992	Imperial	78.6	Yolo	9.2	Sacramento	6.3	San Joaquin	3.2
1993	Imperial	77.9	Yolo	15.2	Sacramento	3.2	San Joaquin	1.5
1994	Imperial	60.6	Yolo	20.9	Sacramento	14.3	San Joaquin	1.6
1995	Imperial	46.1	Sacramento	38.5	Yolo	12.4	San Joaquin	1.7
1996	Imperial	42.7	Sacramento	28.0	Yolo	21.4	Riverside	3.0
1997	Imperial	66.7	Yolo	20.4	Sacramento	10.3	Riverside	1.2
1998	Imperial	70.2	Yolo	14.6	Sacramento	8.9	Riverside	1.3
1999	Imperial	68.5	Yolo	14.9	Sacramento	12.0	Riverside	1.8
2000	Imperial	76.4	Yolo	20.2	Riverside	2.0	Sacramento	1.4
2001	Imperial	73.3	Yolo	11.9	Sacramento	8.8	Riverside	5.9
2002	Imperial	84.0	Yolo	8.6	Sacramento	4.9	Riverside	2.4
2003	Imperial	77.0	Yolo	12.6	Sacramento	7.0	Riverside	3.3
2004	Imperial	75.0	Sacramento	19.3	Yolo	3.0	Riverside	0.2
2005	Imperial	63.6	Sacramento	7.6	Yolo	3.9	-	-
2006	Imperial	72.6	Yolo	5.6	Sacramento	3.1	-	-
2007	Imperial	70.0	Yolo	21.8	Sacramento	6.2	-	-

The distinction of being the second highest turf seed-producing county in California has interchanged over the years between Sacramento County and Yolo County. From 1980 to 1990, Sacramento County was the second largest producer, accounting for an average of 17.6 percent of the total value of California’s turf seed crop. Sacramento County continued as a major turf seed producer during this time period, with a steady increase from 1984 to 1991, at which time the county’s highest value turf seed crop was recorded (Figure 1.13). During this same time period, Yolo County also steadily increased turf seed production value and was the third highest producer, although it only accounted for an average of 4.6 percent of value. The 1992 crop saw a shift between Yolo County and Sacramento County. This change was due to a

**Figure 1.13. Annual Value of Turf Seed Crop for Yolo and Sacramento Counties, 1980-2007**



dramatic drop in the value of turf seed production in Sacramento County and continued steady growth in turf seed production in Yolo County. As a result, from 1991 to 2000, Yolo County was the second highest producing county for seven out of ten years. Sacramento County claimed the second spot the other three years. From 2001 to 2007, Yolo County experienced fluctuations in turf seed production. Early declines in turf seed production value, starting in 2001, culminated in 2004 with a crop value at just over \$372,000. The 2004 crop represents the lowest recorded value in turf seed for Yolo County since 1982. Since 2004, production values increased, reaching a ten year high in 2007 of \$5.06 million. During this period, Yolo County still out-produced Sacramento County for all years except 2004 and 2005.

Turf seed production in Imperial County and Sacramento County constitutes a large portion of the annual value of seed crops. For Imperial County, turf seed production accounts for an average of 33.8 percent of the total value of seed crop production. From 1981 to 2007, the share of turf seed value out of total seed crop value in Imperial county has ranged from 9.9 percent in 1981 to 70.9 percent in 2005 (Table 1.14).



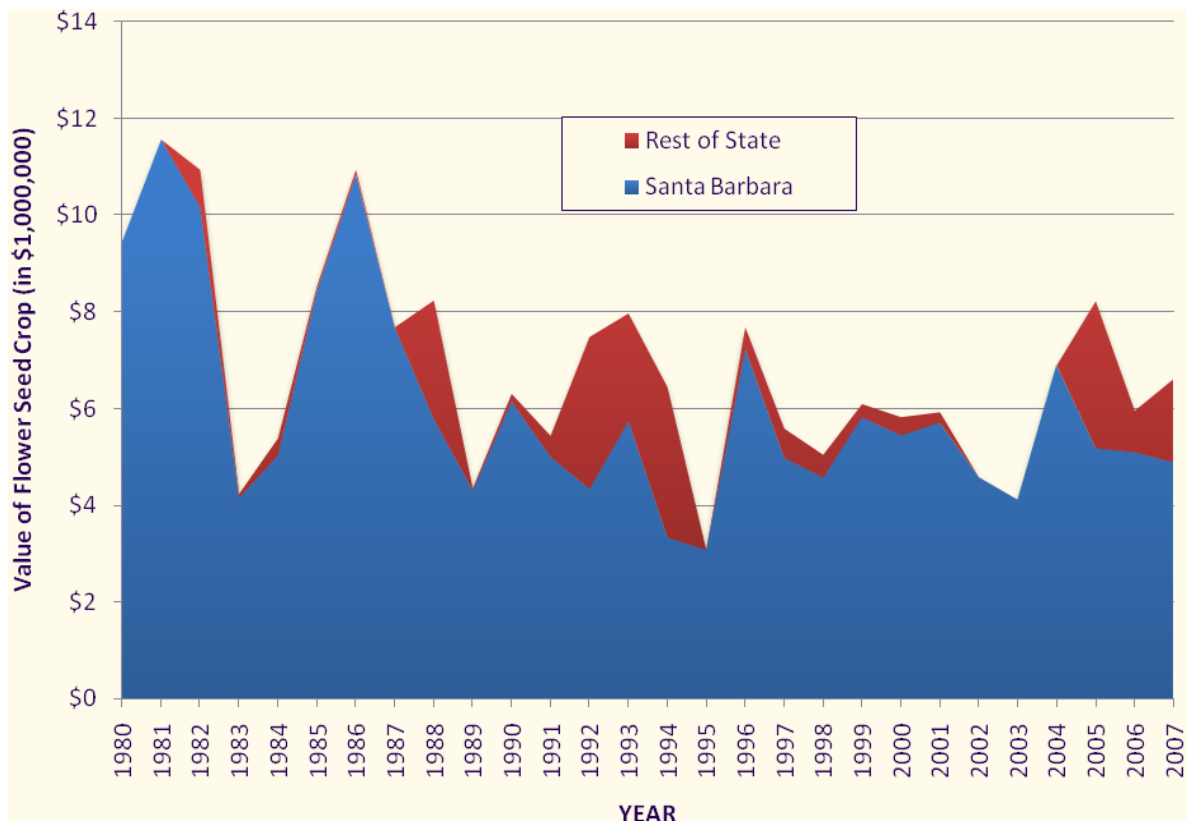
**Table 1.18. Percent of Annual Seed Production Value Attributed to Turf Seed for Top Three Turf Seed-Producing Counties in California, 1980-2007**

Year	Imperial County	Yolo County	Sacramento County
	Percent		
1980	0.0	0.0	5.8
1981	9.9	0.0	14.2
1982	29.9	0.0	19.5
1983	25.7	8.2	17.0
1984	38.7	13.0	12.1
1985	52.2	11.8	22.4
1986	52.0	9.0	22.6
1987	33.4	8.8	32.3
1988	32.9	8.9	32.9
1989	30.4	5.8	38.2
1990	17.7	11.7	43.5
1991	26.1	10.6	60.6
1992	48.9	15.1	29.4
1993	27.8	15.7	8.0
1994	37.8	21.6	33.4
1995	25.2	14.0	54.7
1996	20.4	16.8	48.0
1997	34.2	18.2	38.2
1998	27.0	20.4	48.6
1999	18.8	11.1	37.2
2000	37.5	24.4	10.9
2001	38.1	13.8	35.8
2002	52.3	19.1	43.3
2003	32.7	12.6	32.2
2004	25.7	2.1	49.1
2005	70.9	3.9	40.8
2006	53.0	8.1	53.6
2007	48.9	15.9	60.8

In Sacramento County, 33.7 percent of the annual value of seed production comes from turf seed crops on average. Although turf seed production has grown in Yolo County over the past three decades, turf seed crop values account for an 11.4 percent share of seed production value.

Flower seed production in California currently occurs primarily in Santa Barbara County (Figure 1.14). Santa Barbara County has accounted for 89 percent of the total value of all flower seed production in California from 1980 to 2007. During this time, the counties of San Luis Obispo, Kings, Orange, San Mateo, Santa Clara and Riverside have periodically recorded annual crops of flower seed, but this production has not been consistent.

**Figure 1.14. Annual Value of Flower Seed Crop in Santa Barbara County and Rest of California, 1980-2007**



The 2007 USDA *Census of Agriculture* reported on the production of flower seed in the United States and by state. In total, 491 U.S. producers harvested flower seed crops worth close to \$36 million (Table 1.19). California flower seed production accounted for over \$13.5 million or 37.7 percent of this reported value, making California the largest single flower seed-producing state in the United States.

**Table 1.19. Flower Seed Farms and Value of Production in the U.S. by State, 2007**

State	Number of Farms	Percent Total	Value of Production (\$)	Percent of Total
California	29	5.9	13,557,218	37.7
Oregon	46	9.4	3,416,865	9.5
Iowa	25	5.1	3,000,858	8.3
Wisconsin	28	5.7	1,718,916	4.8
Minnesota	17	3.5	805,440	2.2
Oklahoma	7	1.4	713,300	2.0
Colorado	18	3.7	509,608	1.4
Arizona	3	0.6	417,000	1.2
Washington	22	4.5	315,594	0.9
Missouri	17	3.5	315,160	0.9
Sum of Others	260	53.0	11,225,399	31.2
U.S. Total	491	100	35,995,358	100

Source: USDA 2007 Census of Agriculture

Within California, the largest proportion of individual farms producing flower seed for sale was reported in San Diego County, which had five individual farms (Table 1.20). In addition, Monterey and Santa Barbara counties have a large percentage of flower seed producers. Although census data indicate that flower seed production is vibrant along the coast of California, it is also noteworthy that flower seed production is documented in many counties throughout the various areas of California.

**Table 1.20. Flower Seed Farms in California by County, 2007**

<b>County</b>	<b>Number of Farms</b>	<b>Percent Total</b>
San Diego	5	17.2
Monterey	3	10.3
Santa Barbara	3	10.3
Yolo	3	10.3
Fresno	2	6.9
Shasta	2	6.9
Lake	1	3.4
Lassen	1	3.4
Los Angeles	1	3.4
Marin	1	3.4
Orange	1	3.4
San Benito	1	3.4
Santa Clara	1	3.4
Sonoma	1	3.4
Tulare	1	3.4
Tuolumne	1	3.4
Yuba	1	3.4
California	29	100

Source: USDA 2007 *Census of Agriculture*

Note: Value of flower seed production by county was withheld to avoid disclosing data for individual farms.

## Chapter 2: Seed Sales in California

This chapter uses various sources of information to describe the sale of seed in California. The first part of this section uses information from the California Department of Food and Agriculture (CDFA) Seed Services Program to understand the scope of the California seed market. The annual revenues from the sale of seed in California and the importance of California-based seed companies is examined. As stated in the introduction, seed is a unique commodity in agriculture in that it can be viewed as an output of agricultural production and as an important input to the production of other agricultural commodity crops. This section examines the importance of seed sales in California with respect to annual cash receipts from crops grown from seed.

### 2.1. Buying and Selling Seed in California

State law in California requires market participants to be authorized to sell agricultural seed, which includes field crop seed and turf seed, or vegetable seed. In 2008, the CDFA Seed Services Program listed a total of 684 firms that were authorized to sell seed (Table 2.1). The 684 authorized firms can be divided into the following groups:

- 1) **Seed labelers:** Any firm whose name and address appears on the label pertaining to, or attached to, a container of agricultural or vegetable seed for sale and distribution within California. Seed labelers represent the seed companies that are responsible for paying an assessment on the value of seed sold in California. In 2008, a total of 374 individual seed-labeling firms were authorized to sell seed in California.
- 2) **Seed dealers:** Any firm that sells seed labeled by another firm. Seed dealers are not labelers and therefore are not responsible for paying an assessment on the seed they sell. In 2008, there were 124 seed dealers authorized to sell seed in California.
- 3) **Seed labelers (Doing Business As (DBA)):** Non-independent subsidiaries of seed-labeling firms. In 2008, there were 146 subsidiary firms authorized to label and sell seed in California.
- 4) **Seed dealers (Doing Business As (DBA)):** Non-independent subsidiaries of seed dealers. In 2008, there were 40 subsidiary dealer firms authorized to sell seed in California.

**Table 21. Category of Firm Types Authorized to Sell Seed in California**

Type of Firm	Number of Authorized Firms		
	2006	2007	2008
Seed Labeler	356	360	374
Seed Dealer	126	108	124
Seed Labeler (DBA)	109	138	146
Seed Dealer (DBA)	31	38	40
<b>Total</b>	<b>622</b>	<b>644</b>	<b>684</b>

Source: California Department of Food and Agriculture Seed Services Program

California state regulations require seed labelers to report annual value of seed sold, either directly by the company or through seed dealers in the state. The reported values are subdivided into three seed categories identified as agricultural seed, vegetable seed and lawn seed. The CDFA Seed Services Program does not collect sales value information for flower seed. Agricultural seed is identified as any domesticated grass or cereal, and any legume or other plant which is grown as cover crop, forage crop, fiber crop, field crop and mixtures of such seeds. Vegetable seed is the seed of any crop which is, or may be, grown in gardens or on truck farms and which is generally known and sold under the name of vegetable seed. Turf seed is seed sold as lawn seed.

The total reported value is used to calculate an annual assessment that each seed labeling company is required to pay as part of the seed sale authorization process. The values provided by this annual reporting provide an accurate measure of a major portion of the seed market in California. Examining the values reported to CDFA Seed Services Program over the past three years show that the overall size of the California seed market is growing (Table 2.2). In 2006, \$402.5 million of seed was sold in California. In 2007, the seed market value grew in California by approximately ten percent to \$442 million. This market expansion continued through 2008, with a total value of \$480.7 million and reflects an increase of 8.6 percent from the previous year. Over this same three year period, the number of authorized seed-labeling firms also increased, but not as steadily. In 2007, there were 355 seed-labeling firms authorized in California, a decrease of one from 2006. The number of seed-labeling firms in the California market increased to 374 in 2008.

**Table 22. California Seed Sales and Seed Labeling Firms, 2006-2008**

	2006	2007	2008
<b>Value of All Sales <sup>1</sup>(\$million)</b>	402.5	442.0	480.7
<b>Number of Seed Labeling Firms</b>	356	355	374

Source: California Department of Food and Agriculture Seed Services Program

<sup>1</sup> Does not include flower seed.

According to the International Seed Federation, the United States domestic sale of commercial seed had an estimated value of \$8.5 billion in 2008. Comparing this to the \$480.7 million in seed sales in California in 2008, the California seed market accounted for an estimated six percent of U.S domestic commercial seed sales value. The International Seed Federation estimates that the value of global seed sales for 2008 was \$36.5 billion, meaning the California market accounted for 1.3 percent of the global seed market in 2008 (Table 2.3).

**Table 23. Estimated Value of 2008 Domestic Seed Sales for Selected Countries (continued on next page)**

Country	Value of Domestic Seed Sales (\$million)	Country	Value of Domestic Seed Sales (\$million)
USA	8,500	Morocco	140
China	4,000	Egypt	140
France	2,150	Bulgaria	120
Brazil	2,000	Chile	120
India	1,500	Serbia	120
Japan	1,500	Nigeria	120
Germany	1,500	Slovakia	110
Italy	1,000	New Zealand	100
Argentina	950	Switzerland	90
Canada	550	Paraguay	80
Russian Federation	500	Portugal	80
Spain	450	Ireland	80
Australia	400	Algeria	70
Korea	400	Uruguay	70
United Kingdom	400	Kenya	60
Mexico	350	Iran	55
Poland	350	Israel	50
Turkey	350	Tunisia	45

Taiwan	300	Colombia	40
South Africa	300	Bolivia	40
Hungary	300	Slovenia	40
Netherlands	300	Zimbabwe	30
Czech Republic	300	Peru	30
Denmark	250	Libya	25
Bangladesh	250	Saudi Arabia	20
Greece	240	Zambia	20
Sweden	240	Ecuador	15
Romania	220	Tanzania	15
Belgium	190	Malawi	10
Finland	160	Uganda	10
Austria	150	Dominican Republic	7
TOTAL FOR COUNTRIES LISTED		32,002	
ESTIMATED WORLD TOTAL		36,500	

Source: International Seed Federation (2008)

Analysis of reported sales value from seed-labeling firms by location of company headquarters offers a means to compare California seed companies to out-of-state competitors. For this portion of the report, those seed-labeling firms that are headquartered in California represent the California seed industry. Over the three years examined, the number of seed-labeling firms headquartered in California did not change dramatically (Table 2.4). In 2006, 201, or 56 percent of the 356 seed companies authorized to label seed in California were headquartered in California. This number dropped by two percent in 2007 to 197 firms but increased to 205 firms in 2008. The increase of eight seed-labeling firms headquartered in California reflects 42 percent of the additional 18 firms authorized to label and sell seed in the 2008 California seed market. Aggregate seed sales values by state indicate that California seed companies account for about 60 percent of overall seed sales value in the California market.

**Table 24. Presence of California Seed Companies in the California Seed Market<sup>1</sup>**

	<b>2006</b>	<b>2007</b>	<b>2008</b>
<b>Value of Sales (\$million)</b>	239.5	272.5	295.2
Percent Total	59	62	61
<b>Number of Seed Labeling Firms</b>	201	197	205
Percent Total	56	55	55

Source: California Department of Food and Agriculture Seed Services Program

<sup>1</sup> Does not include flower seed.



Examining the grouping of authorized seed labelers by the location of their headquarters shows that the largest level of competition in 2008 from outside California came from Oregon. Accounting for seed sale value of \$31.64 million, seed-labeling firms from Oregon had a 6.6 percent share of the California seed market (Table 2.5). In 2006 and 2007, seed-labeling firms from Idaho provided the highest competition with over ten percent share of total seed sale value reported. Aside from the shift in rank between Idaho and Oregon, the other competitive states remained relatively stable over the three seasons reported. The Midwest states of Iowa and Minnesota each accounted for around five to six percent of seed sales value. Rounding out the top five competitors to the California seed industry is Arizona, which experienced a rise in market share from 1.6 percent in 2007 to 3.1 percent in 2008.

**Table 25. Value and Percent of Total California Seed Sales by State, 2006-2008**

State	2006		2007		2008	
	Seed Sales (\$million)	Percent Total	Seed Sales (\$million)	Percent Total	Seed Sales (\$million)	Percent Total
California	239.46	59.5	272.55	61.7	295.22	61.4
Oregon	11.48	2.9	12.40	2.8	31.64	6.6
Minnesota	27.03	6.7	26.81	6.1	28.77	6.0
Iowa	23.51	5.8	23.90	5.4	28.38	5.9
Idaho	41.08	10.2	45.68	10.3	25.19	5.2
Arizona	6.88	1.7	6.89	1.6	14.81	3.1
Indiana	11.41	2.8	13.30	3.0	11.56	2.4
Ohio	11.66	2.9	8.98	2.0	9.28	1.9
Colorado	1.66	0.4	4.30	1.0	6.52	1.4
Missouri	4.70	1.2	4.37	1.0	5.77	1.2
Sum of Others <sup>1</sup>	23.63	5.9	22.86	5.2	23.52	4.9
<b>Totals</b>	<b>402.49</b>	<b>100.0</b>	<b>442.04</b>	<b>100.0</b>	<b>480.67</b>	<b>100.0</b>

Source: California Department of Food and Agriculture Seed Services Program

<sup>1</sup>This group includes 26 other states plus the countries of Taiwan, Japan, Canada and the European Union.

## 2.2. California Seed Market Categories

Agricultural seed as defined by the CDFA Seed Services Program is equivalent to the combined categories of field crop seed and turf seed used in this report. Accordingly, field crop seed and turf seed sales account for between 30 to 40 percent of total seed sales value in California (Table 2.6). Similar to the total California seed market, field crop seed and turf seed sales values have increased in each of the last three years. From 2006 to 2007, field crop seed

and turf seed sales sale values increased \$5.75 million or 4.4 percent. The increase from 2007 to 2008 was more dramatic, as the sale of field crop seeds in California totaled \$195.85 million, an increase of 44.3 percent from the previous year. The majority of field crop and turf seed sales are attributed to the California seed industry, with an average market share of 55.8 percent over the three years observed. The largest out-of-state competition for field and turf seeds in California comes from Iowa and Indiana. Iowa-based seed labelers account for an average of 16.6 percent of the California field crop and turf seed market while Indiana seed labelers average eight percent market share from 2006 through 2008. In 2006 and 2007, Idaho accounted for only one percent of total field crop seed sales in California with an average of \$1.3 million in sales value. In 2008, the value of field crop seed sales from Idaho seed labelers increased to \$15.38 million for a market share of 7.9 percent.

**Table 26. Value and Percent of Field Crop Seed Sales in California by State, 2006-2008**

State	2006		2007		2008	
	Seed Sales (\$million)	Percent Total	Seed Sales (\$million)	Percent Total	Seed Sales (\$million)	Percent Total
California	71.63	55.1	78.32	57.7	106.66	54.5
Iowa	23.35	18.0	23.66	17.4	28.27	14.4
Indiana	10.90	8.4	13.29	9.8	11.55	5.9
Idaho	1.24	1.0	1.36	1.0	15.38	7.9
Mississippi	6.42	4.9	4.89	3.6	2.92	1.5
Arizona	1.33	1.0	1.88	1.4	8.53	4.4
Oregon	4.00	3.1	2.99	2.2	4.52	2.3
Minnesota	2.54	2.0	2.61	1.9	2.80	1.4
Wisconsin	1.65	1.3	1.87	1.4	3.48	1.8
Missouri	0.00	0.0	0.00	0.0	5.57	2.8
Sum of Others <sup>1</sup>	6.90	5.3	4.85	3.6	6.16	3.1
<b>Totals</b>	<b>129.97</b>	<b>100.0</b>	<b>135.72</b>	<b>100.0</b>	<b>195.85</b>	<b>100.0</b>

Source: California Department of Food and Agriculture Seed Services Program

<sup>1</sup>This group includes 17 other states plus Canada.

Vegetable seeds are the largest generator of value for the California seed market (Table 2.7). From 2006 to 2008, vegetable seed sales accounted for an average of 53.4 percent of the value of the California seed market. The California seed industry dominates the sale of vegetable seeds in California with an annual average market share of 72 percent over the three year period. Vegetable seed sales generate the greatest proportion of value for the California seed

industry as well. From 2006 to 2008, the sale of vegetable seed accounted for an average of 62.6 percent of annual sales by the California seed industry. Competition in vegetable seed sales comes primarily from seed labelers in Minnesota with an average market share of 10.7 percent from 2006 to 2008. Seed labelers from Idaho represent the next most significant out-of-state competitor for vegetable seed sales with an average market share of 8.9 percent. Idaho seed labelers recently experienced a dramatic decline in vegetable seed sales value with revenues dropping from \$37.3 million in 2007 to \$890,000 in 2008.

**Table 27. Value and Percent of Vegetable Seed Sales in California by State, 2006-2008**

State	2006		2007		2008	
	Seed Sales (\$million)	Percent Total	Seed Sales (\$million)	Percent Total	Seed Sales (\$million)	Percent Total
California	154.46	69.2	176.52	68.1	174.12	78.6
Minnesota	24.49	11.0	24.18	9.3	25.97	11.7
Idaho	26.46	11.9	37.34	14.4	0.89	0.4
Missouri	4.65	2.1	4.37	1.7	0.08	0.0
Colorado	0.49	0.2	3.91	1.5	4.38	2.0
Kentucky	0.00	0.0	2.74	1.1	3.28	1.5
Arizona	2.13	1.0	1.81	0.7	1.98	0.9
Washington	2.72	1.2	1.69	0.7	1.12	0.5
Pennsylvania	1.60	0.7	2.03	0.8	1.78	0.8
Oregon	1.14	0.5	1.13	0.4	1.73	0.8
Sum of Others <sup>1</sup>	4.96	2.2	3.66	1.4	6.20	2.8
<b>Totals</b>	<b>223.11</b>	<b>100.0</b>	<b>259.39</b>	<b>100.0</b>	<b>221.52</b>	<b>100.0</b>

Source: California Department of Food and Agriculture Seed Services Program

<sup>1</sup>This group includes 16 other states plus the countries of Taiwan, Japan and the European Union.

The smallest proportion of value in the California seed market comes from the sale of turf seed (Table 2.8). The sale of turf seed in California generated an average of \$53.8 million over the three year period observed. This amounts to 12.1 percent of the value of the California seed market. Turf seed also faces the most competition from out-of-state seed labelers. California seed labelers account for an average of 29.8 percent of the turf seed market in California. The three biggest competitors for turf seed market share come from seed labelers in Oregon, Ohio, and Idaho. In 2008, Oregon seed labelers gained a large increase in market share for turf seed sold in California. Sales value of turf seed labeled by firms in Oregon went from \$8.3 million in 2007 to \$25.4 million in 2008, an increase of 207 percent in one year. The increase in sales also

propelled Oregon seed labelers from a 17.6 percent market share to a 39 percent share of the California turf seed market.

**Table 28. Value and Percent of Turf Seed Sales in California by State, 2006-2008**

State	2006		2007		2008	
	Seed Sales (\$million)	Percent Total	Seed Sales (\$million)	Percent Total	Seed Sales (\$million)	Percent Total
California	13.36	27.0	17.70	37.7	16.04	24.6
Oregon	6.33	12.8	8.28	17.6	25.39	39.0
Ohio	11.61	23.5	8.93	19.0	9.21	14.2
Idaho	13.38	27.1	6.99	14.9	8.92	13.7
Arizona	3.42	6.9	3.21	6.8	4.49	6.9
Michigan	0.45	0.9	0.82	1.8	0.00	0.0
Indiana	0.51	1.0	0.00	0.0	0.01	0.0
Kentucky	0.00	0.0	0.29	0.6	0.19	0.3
Washington	0.05	0.1	0.00	0.0	0.33	0.5
Iowa	0.06	0.1	0.21	0.4	0.09	0.1
Sum of Others <sup>1</sup>	0.25	0.5	0.51	1.1	0.41	0.6
<b>Totals</b>	<b>49.42</b>	<b>100.0</b>	<b>46.93</b>	<b>100.0</b>	<b>65.08</b>	<b>100.0</b>

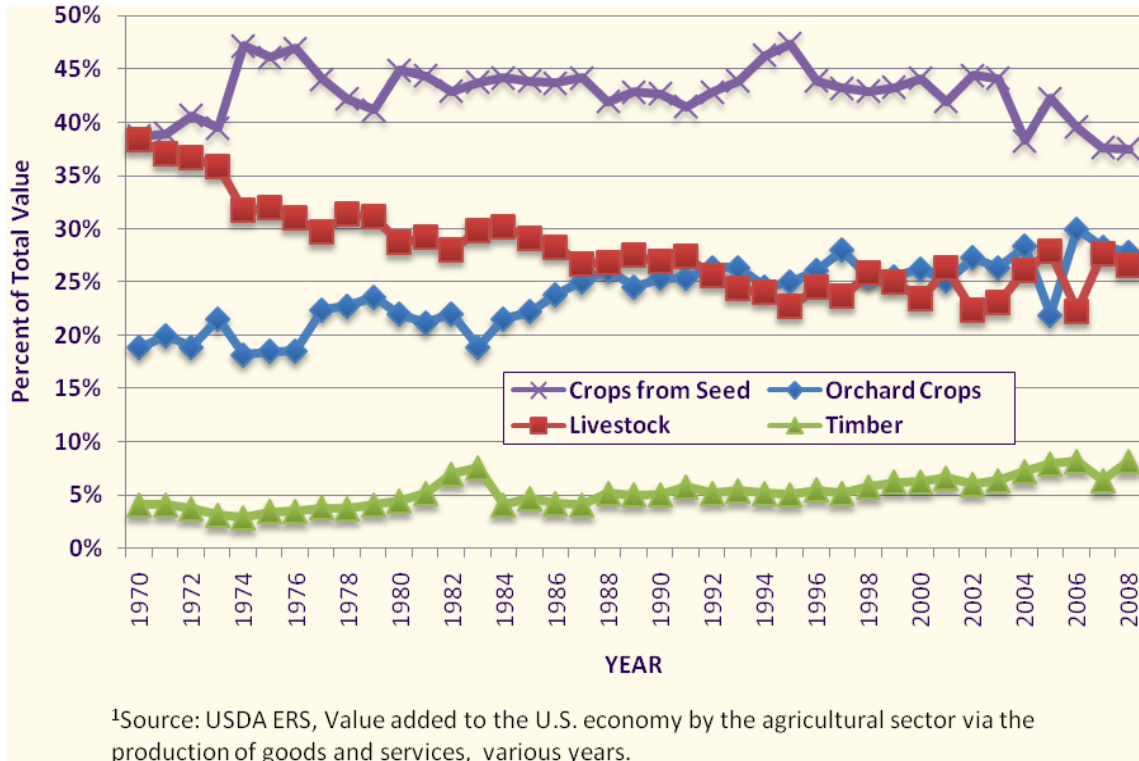
Source: California Department of Food and Agriculture Seed Services Program

<sup>1</sup>This group includes 13 other states plus Canada.

The CDFA Seed Services Program does not collect market information on the sale of flower seed in California. Also lacking is information on the sale of flower seed outside the state of California by the California seed industry. In order to address these gaps in information, survey data were collected from industry members. The next section in this chapter will present the analysis of these data.

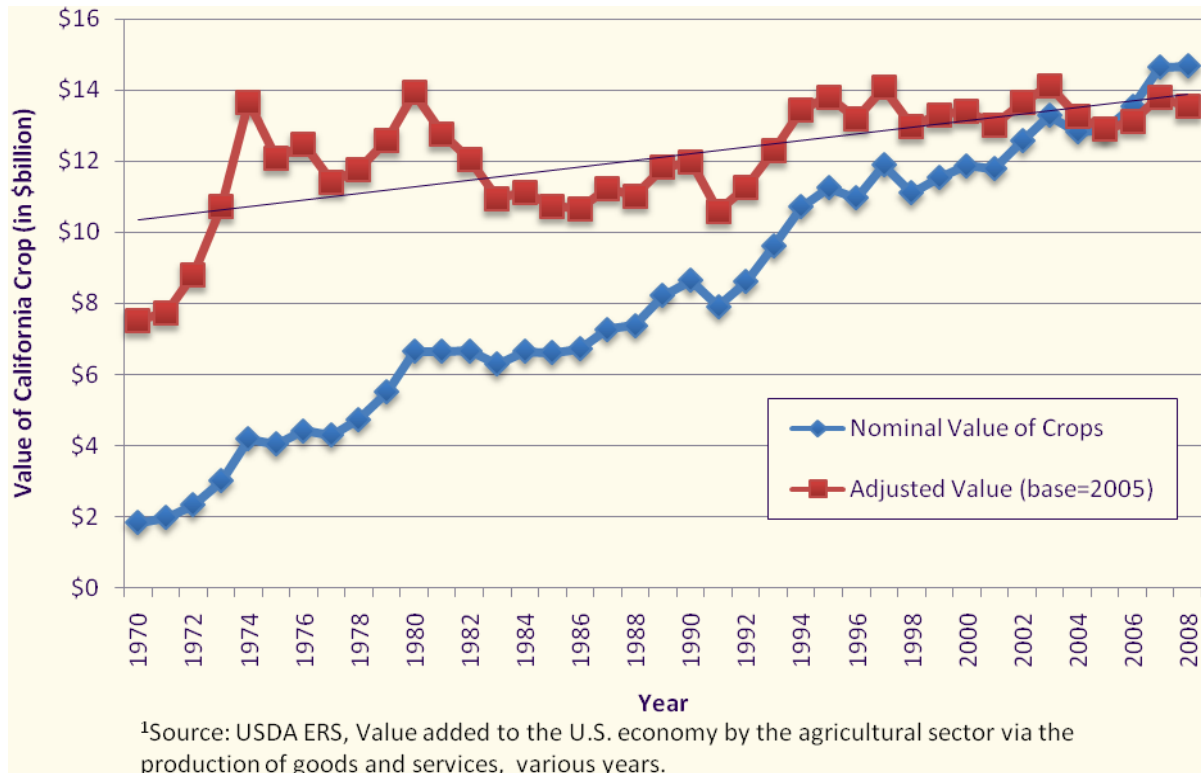
The \$480.7 million in revenue generated for the seed industry in 2008 by the sale of seeds in California reflect the output value of seed. As stated previously, seed is a unique agricultural commodity in that it also serves as a vital input in the production of various commodities. Since 1970, crops produced from seed have constituted the largest portion of agricultural production value in California (figure 2.1). During this time period, the annual value of crops produced from seed in California have accounted for an average of 43 percent of all agricultural production value in the state.

**Figure 2.1. Percent of Annual Value of California Agricultural Production  
by Category<sup>1</sup>, 1970-2008**



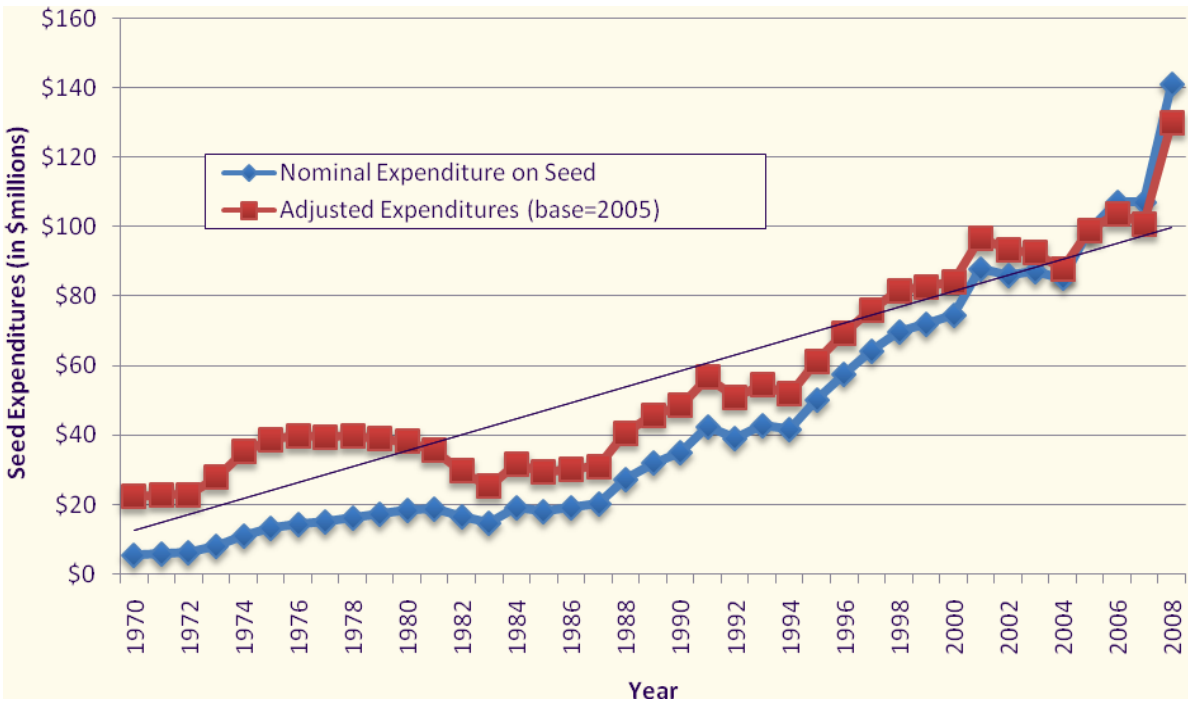
In 2008, farm cash receipts from crops produced from seed in California totaled an estimated \$14.7 billion, which was equal to 37 percent of the \$39.1 billion in total agricultural production value in California (USDA ERS). The value of cash receipts for farm production of crops produced from seed has continued to rise at a steady rate since 1970 (figure 2.2).

**Figure 2.2. Nominal and Adjusted Annual Value of California Crops Produced from Seed<sup>1</sup>, 1970-2008**

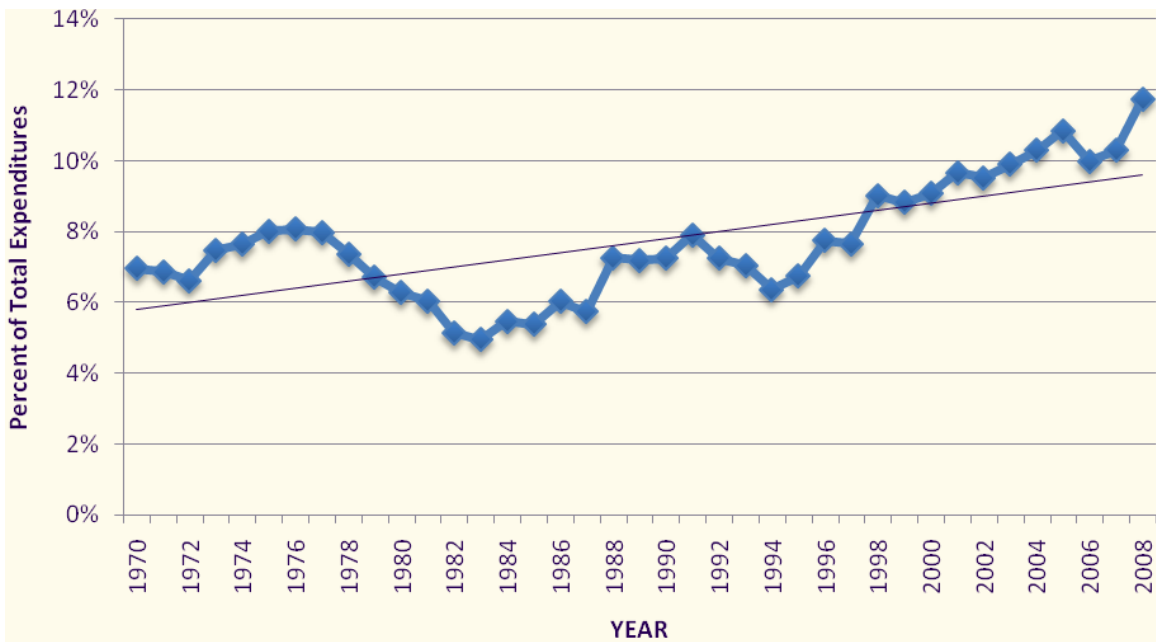


In addition, total farm expenditures on seed have increased at a slightly faster rate from 1970 to 2008 (figure 2.3). In 1970, California producers purchased approximately \$54 million in seed. By 1990, this expenditure had increased to \$351 million and by 2008 expenditure on seed for crop production reached \$1.4 billion (USDA ERS).

**Figure 2.3. Nominal and Adjusted Annual Expenditure on Seed in California, 1970-2008<sup>1</sup> (base year=2005)**



**Figure 2.4. Percent of Total Purchased Input Expenditures Attributed to Seed in California, 1970-2008<sup>1</sup>**



<sup>1</sup>Source: USDA ERS, Value added to the U.S. economy by the agricultural sector via the production of goods and services, various years.

The increase in seed expenditures has increased at a quicker rate than expenditures on other production inputs. In 1970, seed expenditures accounted for approximately seven percent of total agricultural production input expenditures in California (figure 2.4). By 1983, seed expenditures dropped to around five percent of total input costs for California farmers. Since the early 1980s, costs related to the purchase of seed have increased relative to other expenditures, resulting in 2008 seed expenditures totaling approximately 12 percent of total production input costs (USDA ERS).



## Chapter 3: The California Seed Industry Survey

This chapter examines results from a survey administered to seed companies that are headquartered in California and that sell seed. The data from this survey in conjunction with information provided by the CDFA Seed Services Program is used to estimate economic activities of the California seed industry. The California seed industry consists of many companies involved in different aspects of the seed supply chain, including research and development, seed production, seed processing and finishing, and marketing. It is our assumption that the gross revenues generated from the sale of seed reflect the aggregate value of all elements of the seed supply chain.

### 3.1. Seed Survey

In order to better understand the economic contribution of the California seed industry, a survey was administered to participants within the industry. In February 2009, survey packets were mailed to 261 firms that conduct business related to seed sales in California. Building upon the previous definition of the California seed industry, surveys were mailed to the 205 authorized seed labelers headquartered in California in 2008. In addition, surveys were sent to 19 seed technology firms based in California. The final 37 surveys were sent to out-of-state seed labelers (Table 3.1). Each survey packet contained a cover letter explaining the purpose of the study, a copy of the survey with a clarification guide, and a self-addressed stamped return envelope (Appendix B). For the purpose of maintaining confidentiality, completed surveys were addressed to the Certified Public Accountant for the California Seed Association. Survey respondents were only identified by a code number which was removed by the CPA prior to forwarding data for analysis. Final survey collection was completed on June 15, 2009.

**Table 3.1. Survey Participants**

Category of Seed Industry Firms	Recipients		Respondents	
	Number	% Total	Number	% Total
<b>Seed Labelers Headquartered In California</b>	205	79	37	18
<b>Out of State Seed labelers</b>	37	14	0	0
<b>Seed Technology Companies</b>	19	7	1	5
<b>Total Surveys Mailed</b>	261	100	38	14

From the 261 surveys mailed, 38 surveys were returned for a response rate of 14 percent. All returned surveys were from seed-labeling firms headquartered in California. One survey was returned from the group of seed technology companies. Although the information provided by

the 37 responding companies is valuable, the low response rate places limits on the ability of this report to identify detailed characteristics of the California seed industry.

Survey respondents were asked to provide gross revenues from seed sold in California for 2006, 2007 and 2008. Firms within the respondent pool averaged a 56.4 percent share of annual industry gross revenues from 2006 to 2008 (Table 3.2).

**Table 3.2. Aggregate Revenue and Share of Total Sales by Survey Respondents of Seed Sales in California, 2006-2008**

	<b>Gross Revenues from California Seed Sales<sup>1</sup></b>		
	<b>(\$million)</b>		
	<b>2006</b>	<b>2007</b>	<b>2008</b>
<b>Respondents' Seed Sales Revenue</b>	146.8	152.1	153.4
<b>Total Revenue from Seed Sales reported by CDFA Seed Services Program</b>	239.5	272.5	295.2
<b>Respondent Pool Share of Total</b>	61.3%	55.8%	52.0%

<sup>1</sup>Seed sales gross revenue figures do not include the sale of flower seed.

The remainder of this chapter presents the results from the survey response data. This data, in combination with the information provided by the CDFA Seed Services Program, is used to analyze the economic size of the seed industry in California. Although detailed characteristics of the seed industry are not presented, the information provided by the survey respondents allows for a general estimate of what the seed industry contributes to the California agricultural economy.

### 3.2. Seed Sales Gross Revenue

In addition to gross revenues from seed sales in California, respondents were asked to record the gross revenues from seed sales in the U.S. domestic market and worldwide markets for the years 2006, 2007 and 2008 (Table 3.3).

**Table 3.3. Estimated Total Gross Revenue Earned by California Seed Companies from Sales in California, U.S., and World Wide, 2006-2008**

	2006	2007	2008
<b>World Wide</b> <sup>1</sup>	Gross Revenue from Seed Sales in \$million		
	2,265	2,672	2,887
<b>U.S.</b> <sup>2</sup>	825	963	1,106
<b>California</b>	252	288	309

<sup>1</sup> Worldwide seed sales include California and U.S. seed sales.

<sup>2</sup> U.S. seed sales include California seed sales.

For 2006, 2007 and 2008, gross revenue from seed sales increased in each successive year. In 2006, the California seed industry recorded estimated total gross revenues of \$2.265 billion from all seed sales worldwide. The next year this amount increased by 18 percent to \$2.672 billion and in 2008 total seed sales generated \$2.887 billion, an increase of 8 percent. U.S. domestic seed sales during this time period experienced growth as well. Gross revenues from United States seed sales increased 16.7 percent from 2006 to 2007. In 2008, United States seed sales generated over \$1 billion in gross revenues and increased 14.8 percent from the previous year. In addition, seed sales in California, which include the sale of flower seed, earned California seed companies \$252 million in 2006, \$288 million in 2007 and \$309 million in 2008. From 2006 to 2008, gross revenues increased a total of 22.6 percent.

Comparing gross revenues generated from the sale of seed in California to seed sales in the U.S. and world markets demonstrate the importance of California seed sales to California seed companies. The levels of gross revenue generated in California from seed sales were equivalent to 11 percent of total worldwide seed sales, on average, over the three year period. When compared to seed sales in the United States, seed sold in California earned an average of 30 percent of total United States seed sale gross revenues for California companies (Table 3.4).

**Table 3.4. California Sales as a Share of United States and World Wide Seed Sales of California Seed Companies, 2006-2008**

	2006	2007	2008
<b>World Wide</b>	Percent		
	11.1	10.8	10.7
United States	30.6	29.9	27.9

Using gross revenue estimates from California seed companies, we place the California seed industry within the context of the global, United States and California seed markets (Table 3.5). Using the estimates from the International Seed Federation, seed sales revenue generated by California seed companies accounted for 7.9 percent of global seed sales in 2008. When compared to estimates for United States domestic seed sales, California seed companies were responsible for 13 percent of United States seed sales revenue. For seed sales in California, the reported gross revenues from California-based seed companies in 2008 represented 61.3 percent of the total revenues.

**Table 3.5. California Seed Companies' Share of Total World Wide, United States, and California Seed Sales in 2008.**

	Global Market	U.S. Market	California Market
	\$million		
<b>Gross Revenue generated by California Seed Companies</b>	2,887	1,106	295 <sup>3</sup>
<b>Total Market Value</b>	36,500 <sup>1</sup>	8,500 <sup>1</sup>	481 <sup>2</sup>
<b>California Seed Companies</b>	7.9	13.0	61.3

<sup>1</sup> Global and domestic market values from International Seed Federation.

<sup>2</sup> California market value is estimated from CDFA Seed Services Program and does not include flower seed sales.

<sup>3</sup> For comparative purposes, this estimate does not include revenue from the sale of flower seed.

Respondents also indicate that 75 percent of gross revenues from seed sales by the California seed industry come from the wholesale sale of seed. The other quarter of seed sales revenue is generated from retail sales. According to survey data, nearly zero percent of seed sales revenue was generated from the licensing of seed.

### 3.3. Seed Industry Expenses

By doing business in California, seed companies contribute to the California economy through the domestic outlays of their operations. From 2006 to 2008, expenses paid in California by all seed companies are estimated to be between \$147.9 million and \$207.3 million (Table 3.6).

Overall, expenditures increased by 40.2 percent over the past three years. The largest increase in expenditures is attributed to the production of seed and seed crops. From 2006 to 2008, seed production expenses increased 47.4 percent. Costs associated with regulatory compliance had the second highest percentage increase with a 43.3 percent change. Research and development expenditures increased by 41.2 percent which was the third highest cost increase over the three years examined.

**Table 3.6. Labor and Capital Expenditures by Category for Seed Industry in California, 2006-2008**

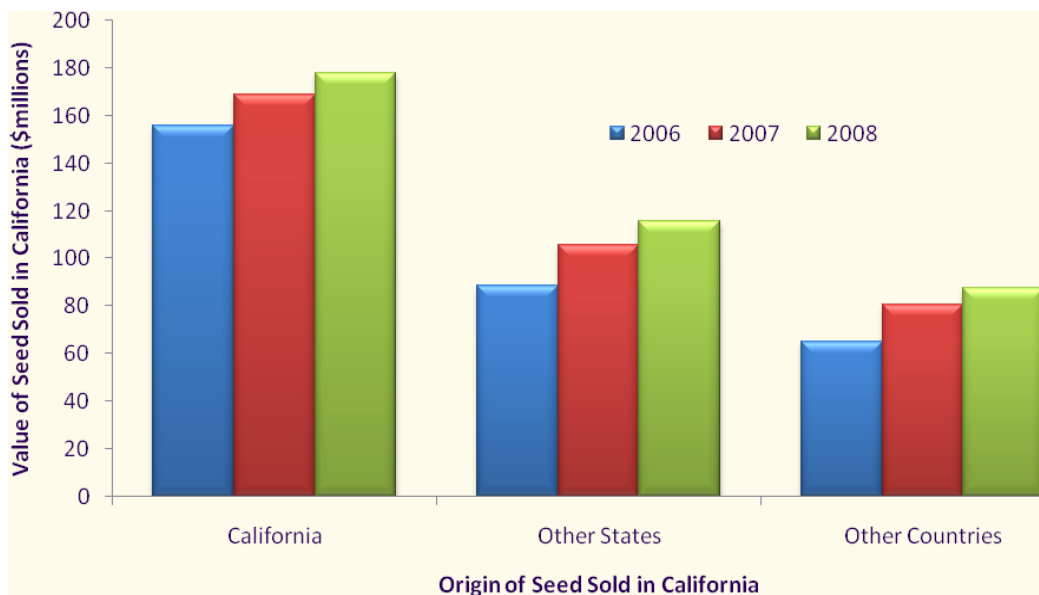
	<b>2006</b>	<b>2007</b>	<b>2008</b>
	Expenditures in \$millions		
<b>Research &amp; Development</b>	19.6	22.5	27.6
<b>Seed Production</b>	71.1	90.6	104.9
<b>Marketing and Sales</b>	54.1	65.6	70.4
<b>Regulatory Compliance</b>	3.1	3.8	4.4
<b>TOTAL</b>	147.9	182.5	207.3
	<b>2006</b>	<b>2007</b>	<b>2008</b>
	Percent of Total Expenditure		
<b>Research &amp; Development</b>	13	12	13
<b>Seed Production</b>	48	50	51
<b>Marketing and Sales</b>	37	36	34
<b>Regulatory Compliance</b>	2	2	2
<b>TOTAL</b>	100	100	100

The highest proportion of total expenses is spent in the production of seed. For each of the three years recorded, approximately half of the resources invested by the seed industry in California were dedicated to the production of seed crops. Marketing and sales of seed products accounted for the second highest proportion of expenditures in California. In 2006, marketing and sales costs for the seed industry were estimated at \$54.1 million or 37 percent of total expenditures. This expenditure increased the next two years reaching \$70.4 million in 2008 but declined in proportion to total costs accounting for 34 percent of total expenditures in 2008. Research and development expenditures increased by more than 20 percent over the three-year period but maintained a proportion of total expenses at 13 percent. The lowest category of expenses is attributed to regulatory compliance. For the three years observed, the seed industry in California spent an average of \$3.8 million per year meeting regulatory requirements. This accounts for approximately two percent of total annual expenditures.

### 3.4. Supply of Seed to California

The sale of seed in California generated an average annual gross revenue of \$288 million for the California seed industry from 2006 to 2008. The origin of the seed that supplies the California market helps to explain the importance of California seed production to the seed industry. Survey respondents were asked to estimate the proportion of the seed they sold that was produced in California, produced in other states around the United States and in other countries. Using these results, combined with the annual gross revenue generated from seed sales in California, it is possible to estimate the value of California seed production sold in California as well as the value of seed imported from other states and other countries (Figure 3.1).

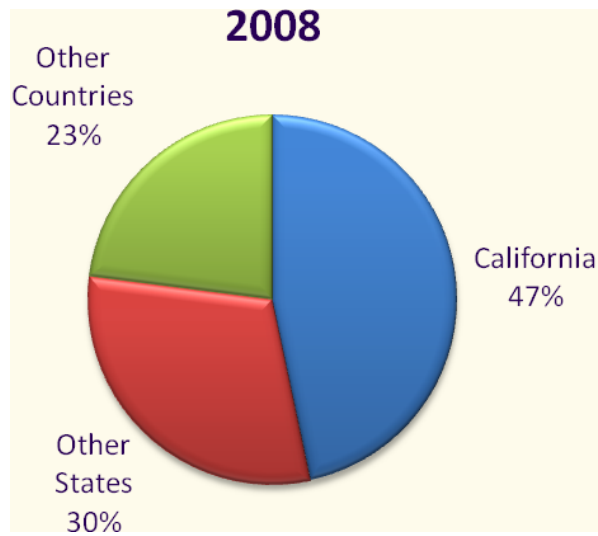
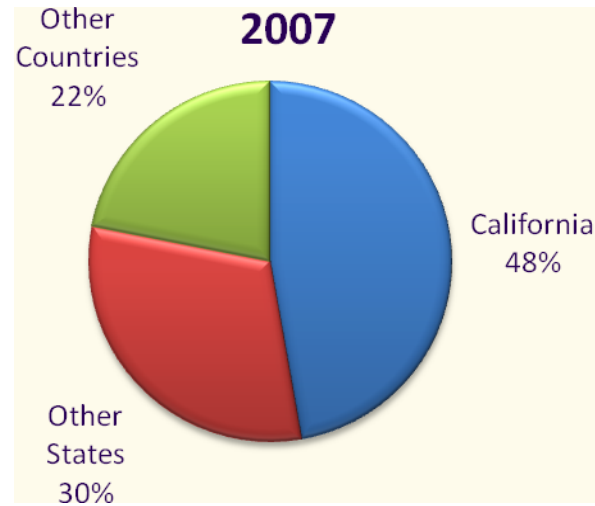
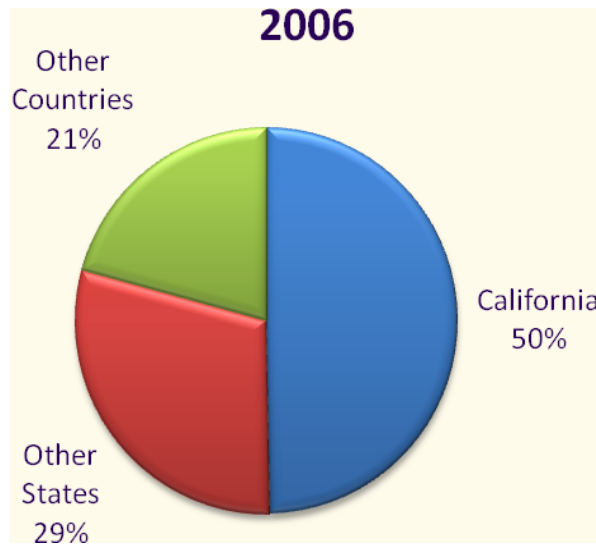
**Figure 3.1. Value of Seed Sold in California by Origin of Seed, 2006-2008**



For the three year period from 2006 to 2008, California-produced seed accounted for roughly 50 percent of the value of seed sales in the state. In 2006, seed produced in California generated an estimated \$167 million in gross revenues from seed sales in the California seed market. This total amounted to 50.3 percent of the \$332 million in total value of seed sales in California. The remainder of the seed sold in California in 2006 came from other states (\$95.1 million) and foreign suppliers (\$69.9 million). From 2006 to 2008, California remained the dominant source of raw seed for the California market, but seed from other states and foreign countries gained a slightly larger share (Figure 3.2). For 2007, California-produced seed

dropped to 48 percent of total seed sales and to 47 percent for 2008. Meanwhile, seed from other states increased to 30 percent of 2007 and 2008 value. Seed from foreign countries increased market share in California from 21 percent of total sales in 2006 to 23 percent in 2008.

**Figure 3.2. Share of Seed Sold in California by Origin**





### 3.5. Seed Sales by Category

The proportion of seed sales attributed to the four categories of seed was also measured. These four categories included field crop seed, vegetable seed, turf seed, and flower seed. Using the measure of seed sales proportions by category and combining this with the gross revenue data provided, it is possible to estimate the proportion of total gross revenue generated for the California seed industry from each category of seed.

When examining the total gross revenue from worldwide seed sales, the highest revenues come from the sale of vegetable seed. This is similar to the previous analysis of the CDFA Seed Services Program data for the California market. From 2006 to 2008, an average of 39 percent of total gross revenues worldwide came from vegetable seed. The next highest valued seed category was field crop seed followed by flower seed and turf seed (Table 3.7).

**Table 3.7. Percent of World Wide Seed Sales Total Gross Revenue by Category**

	2006 (percent)	2007 (percent)	2008 (percent)
<b>Vegetable Seed</b>	38	39	39
<b>Field Crop Seed</b>	35	35	37
<b>Turf Seed</b>	7	9	9
<b>Flower Seed</b>	20	17	15

United States domestic seed sales were also examined (Table 3.8). Unlike worldwide seed sales, vegetable seed sales are not the leading generator of gross revenues for the California seed industry in the U.S. market. The sale of field crop seeds represents the largest segment of the U.S. seed market for California seed companies. In the three year span measured, field crop seeds averaged 67.5 percent of total gross revenues generated from U.S. sales. The sale of turf seed from California accounts for the next highest proportion of revenue with an average of 17.2 percent.

**Table 3.8. Percent of United States Seed Sales by Category**

	2006 (percent)	2007 (percent)	2008 (percent)
<b>Vegetable Seed</b>	10.4	11.2	12.3
<b>Field Crop Seed</b>	69.6	66.0	66.8
<b>Turf Seed</b>	15.5	18.6	17.5
<b>Flower Seed</b>	4.5	4.2	3.5

### 3.6. Value of Seed Produced in California by Category

As stated previously, seed production in California provides a major share of the supply to the markets of the California seed industry. In this section, the value of California seed production by seed category will be examined.

By combining the information on the proportion of seed sales by category along with the share of seed sold that originates in California, it is possible to estimate the gross revenues generated for the California seed industry from the sale of each category of seed produced in the state. This analysis estimates that during the three years observed, field crop seeds produced in California and sold by the California seed industry averaged \$350.2 million (Table 3.9). This result would suggest that field crop seed production in California generates 51 percent of the total value of California-produced seed sold by the industry (Table 3.10).

**Table 29.9. Total Gross Revenue Generated from the Sale of California-Produced Seed by Category, 2006-2008**

	<b>2006</b>	<b>2007</b>	<b>2008</b>
	Gross Revenues in \$millions		
<b>Vegetable Seed</b>	195.8	226.7	235.3
<b>Field Crop Seed</b>	292.8	348.0	409.9
<b>Turf Seed</b>	47.8	63.8	61.9
<b>Flower Seed</b>	59.6	53.2	44.9

**Table 3.10. Share of Total Gross Revenue Generated from Sale of California Produced Seed by Category, 2006-2008**

	<b>2006</b>	<b>2007</b>	<b>2008</b>
	Percent of Gross Revenue		
<b>Vegetable Seed</b>	33	33	31
<b>Field Crop Seed</b>	49	50	55
<b>Turf Seed</b>	8	9	8
<b>Flower Seed</b>	10	8	6

The next highest valued category of seed crop produced in California is vegetable seed which averaged \$219.3 million or 32 percent of annual sales value over the three years observed. Analysis also indicates that the seed categories of field crop, vegetable and turf seed produced in California each experienced an increase in value over the three years observed. From 2006 through 2008, field crop seeds produced in California increased in value by 40 percent. California vegetable seed crops had a 20 percent increase in value and turf seed crops in the state increased almost 30 percent in value. Flower seed production is the one exception to the general increase in seed crop value, with a decrease of 25 percent from 2006 to 2008.

## Chapter 4: Conclusions

The sale of seed in California is regulated by the California Department of Food and Agriculture Seed Services Program. As part of their regulatory duties, the CDFA Seed Services Program authorizes seed companies to label and sell seed in California. All seed in California, with the exception of flower seed, must be labeled and is subject to an assessment by the state on the value of seed sold within the state. The collection of this assessment and the mandatory reporting of seed sales revenue provide a reliable measure for the value of seed sold commercially in California and allows for a comparison of seed sales in California with the rest of the U.S. and world..

For the years 2006, 2007 and 2008, seed sales in California had an average value of \$442 million and grew in each successive year. By 2008, California seed sales were worth \$480.7 million, which is approximately 5.7 percent of the \$8.5 billion value for all seed sales in the United States. Of this \$480.7 million in seed sales, California based seed companies accounted for \$295.2 million or 61.4 percent of the seed sold in California as measured by value.

In each of the past two years, 2007 and 2008, the seed companies headquartered in California have generated over \$2 billion in gross revenue from seed sales in the global seed market. According to figures from the International Seed Federation, sales from firms headquartered in California account for 6.1 percent of global seed sales. With respect to United States domestic seed sales, California seed companies were responsible for 12.6 percent in 2008. Furthermore, California seed companies spent an estimated \$207.3 million doing business in California in 2008. These expenditures went toward activities such as research and development, seed production, marketing and sales, and regulatory compliance.

The majority of California companies' seed sales revenue comes from the sale of field crop seeds and vegetable seed, which account for 76 percent of worldwide seed sales revenue in 2008. The remaining 24 percent of revenue is generated from the sale of turf and flower seeds. Of the estimated \$2.8 billion in global seed sales from California seed companies in 2008, approximately \$752 million of this value was generated from seed produced and processed in California. When examining the seed crop categories individually, 55 percent of the field crops seed sold by the California seed companies in 2008 was produced in California. For vegetable seeds, 31 percent was grown by California producers.

California county agricultural commissioner annual crop reports indicate that seed production has been an important part of California agriculture for the past three decades. From 1970 through 2008, the value of annual seed production in California has ranged between \$200 million and \$300 million. From 1980 to 2000, the harvested acreage of seed crops in California ranged between 250,000 and 350,000 acres annually. Since a dramatic drop in harvested acres in 2001, seed crop acreage has ranged between 200,000 and 300,000 acres.

The location of seed crop production in California has shifted over the past 28 years as well. During most of the 1980s and early 1990s, major seed production was in southern counties such as Fresno, Imperial and Kings. From 1990 to 2008, seed production started to shift slightly to include counties in the north central section of the state. Colusa, Yolo, Sutter and Glenn Counties emerged as important seed-producing areas of California. For the most part, the shift in seed production to north central California came primarily from the production of vegetable seed crops and some field seed crops in Yolo County. The production of vegetable seed crops and flower seed crops in California, as documented in the most recent USDA *Census of Agriculture*, supports the claim of California as the top seed-producing state in the United States as measured by farm value.

Seed production in California contributed an average of 1.45 percent of annual crop production value in California from 1996 to 2006. When compared with the annual value of all field crops produced in California, seed crops averaged eight percent of all field crop value during this same time period. In addition, California agricultural producers commit approximately three percent of annual crop acreage to the production of seed crops.

The value of seed as a sellable output is minor, relative to the value it creates as an agricultural input for crops grown in California. Since 1970, crops produced in California from seed account for the majority of total annual cash receipts for all California produced agricultural commodities. In 2008, agricultural cash receipts in California from crops produced from seed amounted to \$14.7 billion, which was equal to 37 percent of the \$39.1 billion in total agriculture production value in California and 57 percent of all crop receipts.

## References

Anderson, M.A., L.J. Butler, and K.J. Bradford. 2001. An Economic Study of the California Seed Industry. Unpublished report.

California Department of Food and Agriculture, Seed Services Program. Confidential data on seed sales revenue. Various years.

Fernandez-Cornejo, J. 2004. The Seed Industry in U.S. Agriculture: An Exploration of Data and Information of Crop Seed Markets, Regulation, Industry Structure, and Research and Development. *Agriculture Information Bulletin Number 786*. USDA-ERS.

International Seed Federation (ISF). 2008. *Estimated Value of the Domestic Seed Market in Select Countries*. [http://www.worldseed.org/en-us/international\\_seed/seed\\_statistics.html](http://www.worldseed.org/en-us/international_seed/seed_statistics.html).

Roucan-Kane, M. and A. Gray. 2008. *The U.S. Seed Industry: An Exploration of Statistics Highlights the Economic Activity of the U.S. Row Crop Seed Industry*. Center for Food and Agricultural Business. Purdue University.

United States Department of Agriculture, Economic Research Service. State Net Value Added (With Net Farm Income). Various editions.

United States Department of Agriculture, National Agricultural Statistics Service. California County Agricultural Commissioners' Data. Various years.

United States Department of Agriculture, National Agricultural Statistics Service, California Field Office: Historical Data, *"Principal Crops: Harvested Acres in California, 1950-Present."*

United States Department of Agriculture, National Agricultural Statistics Service, California Field Office: Historical Data, *"Principal Crops: Value in California, 1950-Present."*

United States Department of Agriculture, National Agricultural Statistics Service. *2007 Census of Agriculture*. Washington D.C.

## **Appendix A:**

### **Source and Methods of California Agricultural Commissioners' Annual Crop Report Data**

The California county seed data used in the first section of this report originates from the California Agricultural Commissioners' annual crop data published annually by the USDA National Agricultural Statistics Service. It is available to the public from the USDA NASS website.

[http://www.nass.usda.gov/Statistics\\_by\\_State/California/Publications/AgComm/Detail/index.asp](http://www.nass.usda.gov/Statistics_by_State/California/Publications/AgComm/Detail/index.asp)

This data is based on the annual Crop Reports compiled by the California County Agricultural Commissioners. These reports provide the most detailed annual data available on agricultural production by county in California. The data collected by the Agricultural Commissioners and their staffs are compiled from many sources which may vary from county to county. Examples of data sources include growers' surveys, regulatory and inspection data, shipment data, industry assessments, etc.

For this report, the data from each of the annual crop reports available from 1980 through 2007 were sorted and all crops except those identified as seed crops were eliminated. The sorted seed data set was further refined to reflect the harvested acres and value of seed crops produced in California by county for each year. Due to the wide variations across specific seed varieties, data relative to yield per acre, volume production and price per unit of volume were not examined. Value data reflect the value received by growers for each seed crop produced.

The final seed crop data set provided the basis for examining aggregate seed production value and harvested acres by county in California. Aggregate seed data was then organized into four distinct categories of field crop seed, vegetable seed, turf seed, and flower seed. The categorization of seed varieties are defined in Table A.1. The data was used to examine county level farm value and harvested acres for each category of seed produced.

**Table A.1. Count Agricultural Commissioners' Data, Seed Varieties and Categories**

<b>Field Crop Seed</b>	<b>Turf Seed</b>	<b>Flower Seed</b>	<b>Vegetable Seed</b>
Barley, Seed	Seed, Bermuda Grass	Nursery, Flower Seeds	Corn Popcorn Seed
Beans, Seed	Seed, Grass, Unspecified		Corn, Seed
Cotton, Seed, Planting	Seed, Sudan Grass		Peas, Seed
Field Crops, Seed, Misc.			Potatoes, Seed
Oats, Seed			Seed Legumes All Other
Rice, Seed			Seed, Vegetable & Vinecrop
Rye, Seed			
Safflower, Seed, Planting			
Seed, Ladino Clover			
Seed, Alfalfa			
Seed, Clover, Unspecified			
Seed, Other(No Flowers)			
Seed, Vetch			
Sunflower Seed, Planting			
Wheat, Seed			



## **Appendix B:**

### **Sample Survey and Cover Letter**



February 26, 2009

Dear .....

California's seed industry is one of the most vibrant and diverse in the world. Between seed producers and retail customers, a seed changes hands many times before it is planted in the ground. It is this complexity that makes it difficult to accurately represent the importance of this industry to legislators, regulators, and the public. However, a better understanding of the economic value of seed production in California will greatly benefit the industry in its entirety.

For this reason, the California Seed Advisory Board and the California Seed Association are supporting a study to determine the economic importance of California's seed industry. This study is being conducted at UC Davis where the Seed Biotechnology Center and the Agricultural Issues Center are working together to survey the industry and ultimately determine its economic value. The goal of this project is to develop a detailed and accurate economic description of the industry and to gain a better understanding of the important role it plays in adding value to California's overall economy. This information will be especially important as our organizations deal with the many external forces that affect our industry on a daily basis.

In order to be successful in this project, we are aiming to collect the most accurate information possible regarding the economic value of the seed industry. To this end, we are asking your company to fill out the attached survey, to the best of your ability, as completely as possible. The information provided will be treated with *utmost confidentiality*, as we realize it is sensitive information for each company. We have included a pre-addressed return envelope and it would be most helpful if we could receive the information from your company by April 7, 2009. Once the study is complete, a summary of the information compiled in the report will be mailed to each survey respondent.

We have tried to make the survey as simple as possible while obtaining the greatest amount of valuable information. However, we realize that questions or concerns will still arise. If this is the case, please don't hesitate to contact Dr. Bill Matthews at the Agricultural Issues Center at 530-752-1520 or [wamatthews@ucdavis.edu](mailto:wamatthews@ucdavis.edu).

Thank you for your help and support in obtaining information for this study.

Sincerely,

Bill White

President, California Seed Association

President, White Seed Company

Ken Scarlett

Chairman, California Seed Advisory Board

President, Eureka Seeds, Inc.

## The Economic Contribution of the California Seed Industry

This questionnaire is designed to measure the economic significance of the California seed industry. Ultimately, the data from this survey will provide information that will enable more informed decisions to be made by the California Seed Advisory Board, California Seed Association, and California elected and appointed officials with regards to current and future regulations. Overall this research will provide important insight relative to the economic contributions of the seed industry to California.

We understand that completion of this questionnaire will involve the participating business to share potentially sensitive information. To keep the identity of each respondent anonymous, we have taken the following measures:

- 1) To avoid directly identifying the company with the provided information, we are asking that the survey be returned in the pre-addressed envelope to CSA's certified public accountant, Keith Rood. Each survey has been individually numbered to identify the companies that have responded. These numbers will be removed by Mr. Rood before the survey responses are provided to the Agricultural Issues Center at UC Davis.
- 2) Due to the specialization of certain companies with specific crops, we have grouped the seed information to be provided into four categories. These categories will provide us with information that is very important to the study, while keeping the responses as anonymous as possible.

***All information provided will be treated with the utmost confidentiality.***

Please return this completed survey in the pre-addressed envelope by **April 7, 2009**, to:

Mr. Keith Rood, CPA

875 University Way

Sacramento, CA 95825

In order to credit specific California counties with the appropriate economic activity, please provide the primary county of your seed company's operations in California:

County \_\_\_\_\_

Please don't hesitate to contact Bill Matthews at the Agricultural Issues Center at 530-752-1520 or [wamatthews@ucdavis.edu](mailto:wamatthews@ucdavis.edu) if you have any questions regarding this survey.

**SECTION 1: VALUE AND DIVERSITY OF SEED SALES**

To most accurately measure the economic value of the California seed industry we need information on the sale of seeds by your company.

On average, what percent of your total gross revenue comes from...		For the given years, how much <u>TOTAL GROSS REVENUE (INCLUDING TREATMENTS)</u> was generated from...			<u>WORLD WIDE</u> <u>Seed Sales</u> (including California and rest of U.S.A.)	<u>U.S.A.</u> <u>Seed Sales</u> (including California)	<u>CALIFORNIA</u> <u>Seed Sales</u>
Wholesale Seed Sales	%		<b>2006</b>	\$	\$	\$	
Retail Seed Sales	%		<b>2007</b>	\$	\$	\$	
Licensing of Seed	%		<b>2008</b>	\$	\$	\$	
<b>What were your <u>TOTAL EXPENSES IN EACH CATEGORY</u> for <u>CALIFORNIA</u> in..?</b>		<b><u>RESEARCH AND DEVELOPMENT</u></b>	<b><u>PRODUCTION</u></b>	<b><u>SALES/MARKETING*</u></b>	<b><u>REGULATORY COMPLIANCE*</u></b>		
		<b>2006</b>	\$	\$	\$	\$	
		<b>2007</b>	\$	\$	\$	\$	
		<b>2008</b>	\$	\$	\$	\$	
<b>What percentage of TOTAL SEED your company sold in California <u>WAS PRODUCED...?</u></b>				<b>What percentage of TOTAL SEED sold from your California offices <u>WENT TO CUSTOMERS...?</u></b>			
	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	
..in California	%	%	%	..in California	%	%	%

..In Other States	%	%	%	..In Other States	%	%	%
..in Other Countries	%	%	%	..in Other Countries	%	%	%



<b>Of the gross revenue generated for your company from seed sales <u>WHAT PERCENT CAME FROM EACH OF THE BELOW CATEGORIES?</u></b>				<b>For each category of seed your company sold, <u>WHAT PERCENT WAS PRODUCED IN CALIFORNIA?</u></b>			
<b>Category of Seed*</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Category of Seed*</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Vegetable Seed	%	%	%	Vegetable Seed	%	%	%
Field Seed	%	%	%	Field Seed	%	%	%
Turf/Grass Seed	%	%	%	Turf/Grass Seed	%	%	%
Flower Seed	%	%	%	Flower Seed	%	%	%

**\*PLEASE REFER TO THE CLARIFICATION GUIDE FOR DEFINITIONS AND TO DETERMINE WHICH VARIETIES COINCIDE WITH EACH CATEGORY.**

## Clarification Guide

### Section 1 – Value and Diversity of Seed Sales

- **Wholesale and Retail Seed Sales** – Wholesale seeds include all seed being sold to another seed company. Retail seed encompasses all seed being sold to the end user.
- **Total Gross Revenues from seed sales** – List the revenue that your specific company grosses from seed sales at branches of your company located in each of the stated regions
- **Total expenses in each category** – For each category, total expenses includes salaries, benefits, overhead costs associated with each department.
  - **Marketing/Sales:** Include all expenses related to advertising, distribution, sales, delivery and marketing of seed product.
  - **Regulatory Compliance:** Includes all expenses attributed to implementing and reporting events and activities related to the production, sale and transport of seed in California, so as to be in compliance with regulations enforced by governmental agencies or departments including but not limited to CDFA, USDA APHIS, US EPA, CAL EPA and CDPR.
- **Total seed your company sold in California was produced...** – This percentage will include both sales to the end-user as well as wholesale sales. However, we understand that unless the company produced or contracted the seed directly, this information will not be known. If that is the case, please leave this section blank.
- **Category of Seed** – To protect the confidentiality that may be associated with many types of seeds, we have identified four major seed categories which will greatly enhance the quality of the data that is being collected. Please classify your seed as best you can into the following four categories (these same categories will be used again in Sections 2-4). Further seed categorization is shown in Section 4.
  - **Vegetable** – tomato, cucumber, lettuce, spinach, bean, melon, pea, onion, sweet corn, etc.
  - **Field** – alfalfa, wheat, oats, clover, corn, cotton, sorghum, sunflower, etc.
  - **Turf/Grass** – bluegrass, ryegrass, fescue, bentgrass, etc.
  - **Flower** – pansy, petunia, snapdragon, viola, etc.