

California Agriculture in the 21st Century

by

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This article is based on the new Giannini Foundation Special Report 04-1, which evaluates the state of California agriculture at the beginning of the 21st Century. Major portions of the report include a stylized history of California agriculture, the identification of 20 important historical drivers influencing its evolution from 1769 to 2000, and an assessment of changes likely to influence the future of California agriculture.

The turn of the millennium was marked by hard times for many active in California agriculture. Farmers, ranchers and others viewed the appearance of low prices (seemingly across the board), reduced export markets, more stringent environmental regulations and declining farm incomes as ominous signs of an industry in severe trouble. What does the future hold for California agriculture? Is it as bleak as it has at times appeared? These sorts of questions are central concerns to producers and agribusinesses alike as we now move forward in the 21st Century.

Dynamic change is a constant characteristic of California agriculture over its brief history of about 235 years. Changes in the structure and performance of the entire industry are the result of perpetual states of transition and adjustment. Consequently, California agriculture at the end of the 20th Century was vastly different than it was at its beginning in the late 18th Century. Extensive, resource-based livestock ranches and grain farms in a sparsely populated state dominated early commercial agriculture. Today's intensive, specialized, technologically advanced agricultural industry is embedded in a rich, urban state of 35 million people.

Yet, despite a seemingly long documented history of adjustments to changing conditions, widespread anxiety permeated many sectors of the industry. There were perceptions of much greater uncertainty, more variability in product prices and input costs, difficulties in access to resources and markets, and, ultimately, about profitability and sustainable futures for California's farmers and ranchers. What might the future hold in the 21st Century? Will California agriculture continue its tradition of perpetual adjustment so as to weather yet another stormy period?

In a recent Giannini Foundation Special Report, we examine the historical development of California agriculture and identify major drivers contributing to its historical growth and changing character. We then consider changes that might play out over the next 50 years and offer our prognosis for the future for California agriculture.

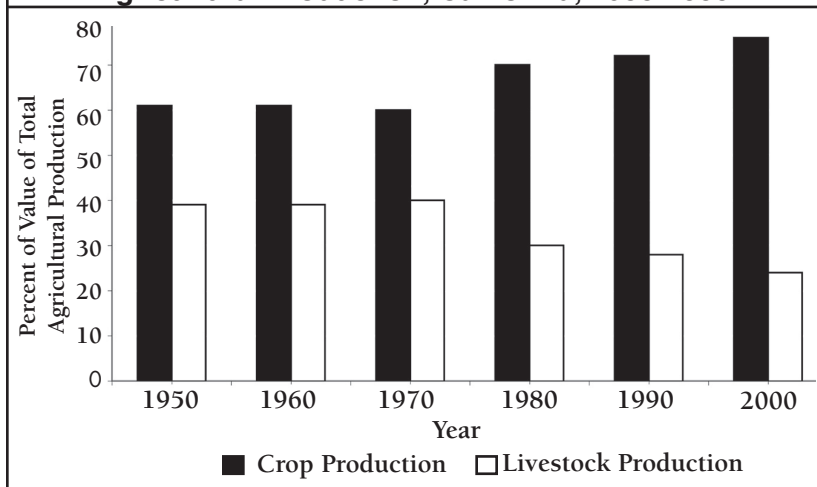
Drivers of California Agriculture

Our analysis suggests a set of 18 long-standing factors (drivers) that influenced the development of the state's agriculture over most of its history. We add two more for the future. Table 1 identifies each driver. When

Table 1. Historical Drivers of California Agriculture

Long-Standing Drivers	Historical Drivers, 1769-2000	Problematic Drivers, 2000-2050
BIO-PHYSICAL	Climate, Soils, Water Development, Widening Suite of Products	Water Development
TECHNOLOGY AND INPUTS	Biological, Mechanical, Adaptive Pest Management, Transportation, Processing and Storage Technology	
ACCESS TO INPUTS	Capital, Labor	Capital, Labor
HUMAN CAPITAL	Production Management, Adaptive and Risk Management, Marketing and Institutional Innovation	Marketing and Institutional Innovation
DEMAND FACTORS	Population Growth, Economic Growth/Rising Incomes	
PUBLIC INVESTMENTS	Infrastructure; Research, Education and Extension	Infrastructure; Research, Education and Extension
Recent Entrants	Regulation, Resource Competition	Regulation, Resource Competition

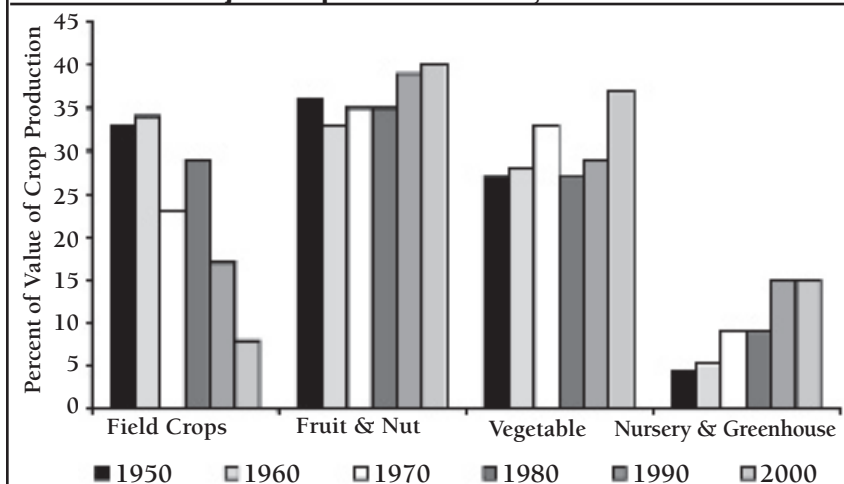
Figure 1. Crop and Livestock, Shares of Total Agricultural Production, California, 1950-2000



compared to contributions occurring in the late 20th Century, six of the 18 long-standing historical drivers will likely provide relatively smaller contributions to the future growth and development as the industry moves forward. Reduced contributions for the 21st Century are expected for 1) water development, 2) access to labor, 3) access to capital for many in the industry, 4) producer cooperatives and marketing orders, 5) reduced public investments in infrastructure, and 6) investments in research, education and extension. In addition, the two new factors (increasing regulation and heightened resource competition) will, in a relative sense, adversely affect California's agriculture in future years.

Nearly all of the eight downgraded drivers have one thing in common. They are directly or indirectly influenced by public policy.

Figure 2. Relative Shares of the Production of Major Crops in California, 1950 - 2000



Recent Change in Production

The last half of the 20th Century witnessed dramatic changes in the character of California agriculture, as it continued the transition from extensive livestock and field crops to the premier specialty-crop producer in the nation and the world. The share of the value of agricultural product sales coming from plant sources rose at the expense of animal products because of increases in intensive crops (trees, vines, vegetables and nursery crops). By 2000, three-quarters of the value of California production came from plant production and only one-quarter from livestock products (Figure 1). This is much higher than

the U.S. average of roughly 50/50 and significantly different from European agriculture, where animal products generate approximately two-thirds of sales.

Furthermore, significant change occurred within both the plant and livestock production categories. Figure 2 shows the share of intensive crops (fruit and nuts, vegetables, nursery and greenhouse) rising from 67 to 92 percent at the expense of sharp decline in the contribution of field crop sales (only eight percent in 2000). Within the livestock sector, the share of sales from dairy products more than doubled—from 26 in 1950 to 59 percent in 2000, while that of meat animals declined from nearly 50 percent in 1970 to only 21 percent in 2000 (Figure 3).

Changes also included a reconfiguration of statewide production reflecting: 1) progressively increasing demands for California products for domestic and export

markets; 2) withdrawal of land from agricultural production because of population growth in temperate Southern California and Central Coast regions; 3) growth in higher-valued perennial and vegetable production, displacing field crop production in interior areas; and 4) shifts within the Central Valley induced by surface-water deliveries, especially in the San Joaquin Valley. From 1950-2000, the San Joaquin Valley's statewide share of major commodity production rose from 42 to 68 percent for fruit and nut crops (Figure 4), and from 40 to 74 percent for dairy products.

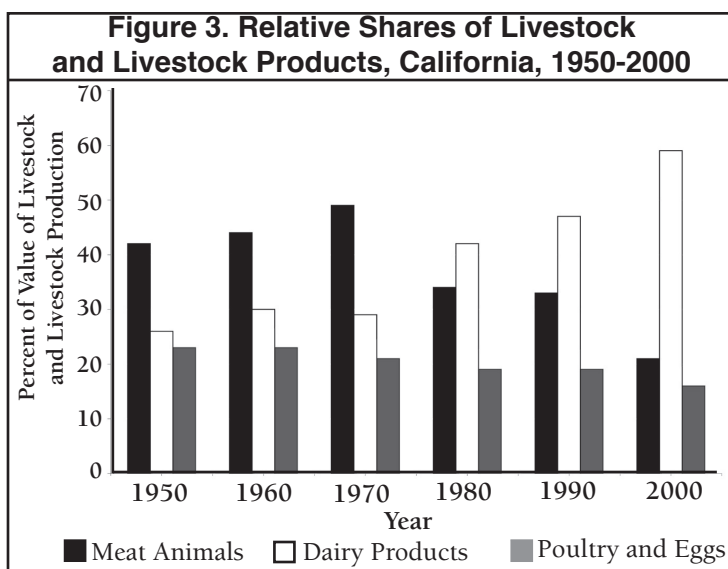
The Dynamics of California Agriculture

California agriculture is different than the stereotypical U.S. agriculture. It is frequently argued that agriculture in the U.S. has basically been “supply-driven,” with historical roots in small homesteaders intent on feeding themselves and, later, marketing surpluses as productivity increased. Early on, California started with large farms, ranches and “rancheros,” producing much more than could be consumed locally. California farmers produced to meet someone else’s demand—including hides and tallow for the East Coast and Europe, meat for miners and their suppliers, wheat for export, and nuts and dried fruits for the East and Europe.

California agriculture has increasingly become more diversified—200 crops in 1970 and 350 in 2000. A reduced focus on basic crops meant that California agriculture is less influenced by, or dependent upon, U.S. farm programs. California’s share of the value of total U.S. production exceeded 13 percent in 2000, while its share of federal direct payments was only three percent. A dominant focus on meeting changing product demands, coupled with the range of total products possible, means that California agriculture can be opportunistic. However, in order to be so, it has to be constantly adapting to survive and thrive.

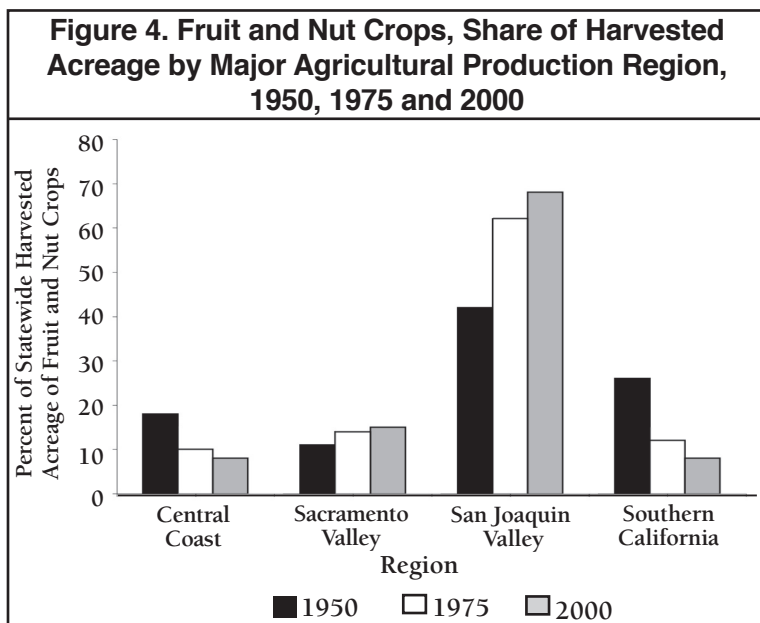
Constantly adjusting to changing opportunities has meant that California agriculture has a perpetual thirst for new technology—better and cheaper is always a potential market advantage. Being a long distance from markets, for both outputs and inputs, placed an extra premium on efficiency and adaptivity. As California grew, its agriculture also adjusted to meet growing domestic “in-state” demands, benefiting greatly from being in the middle of a rapidly growing and a rich “domestic” market with 35 million local customers.

The constant adjustment to meet the changing demands of affluent consumers has had consequences for the nature of California agriculture. The share of annual crops has fallen precipitously while production of perennial crops (nuts, fruits, grapes, nursery crops, ornamentals) has increased substantially. The result is that a rising share of California agriculture is on longer, multi-year production cycles, with dozens of crop and livestock “commodity cycles” going on simultaneously.



Being demand driven, California agriculture also operates in numerous niche markets, many of which are “thin” markets with higher levels of price variability. Booms and busts, the result of thin markets combined with multi-year production cycles, lead to constant market instability. Rapid adjustments are endemic.

California agriculture, with a large number of production and niche-market options, has historically had to be nimble, quick, and able to meet changing environments, exploit opportunities and be competitive in domestic and foreign markets. The history of adjustments and adaptive change to changing futures has been remarkable, but not painless. For example, California beat Europe out of domestic and foreign markets for nuts and dried fruits at the turn of the



20th Century; it now dominates the world markets for almonds, going from a marginal exporter to 80 percent of world markets in less than 20 years; it saved the processing tomato industry by radically altering the tomato and how it was harvested; it established an export pistachio industry within a few years after initiating commercial production; it has gone from being an ignoble producer of jug, sweet and fortified wines to a world-class quality wine producer. Most of the time, California agriculture has emerged from severe challenges as a greatly different, but stronger sector. We cannot find evidence from history that this picture will change materially in the next 25 to 50 years.

A comparison with U.S. agriculture leads to favorable conclusions for California agriculture. California agriculture is growing more rapidly than U.S. agriculture, is more flexible in selecting production alternatives, is more responsive to market-driven demand signals and is significantly less vulnerable to federal budget cuts.

U.S. agriculture has long been guided in the direction of high-volume, low-cost production of basic commodities. In contrast, California seems well positioned to respond quickly to demands for specialty crops as consumers become wealthier and production techniques become more precise. Globalization plus increased ethnic diversity in California and the U.S., opens additional niche-market possibilities. Growth in global population and, in particular, rising incomes in developing countries provide additional opportunity for high-quality specialty crop exports. Our agroecological heritage, plus demand diversity, will be a distinct, continuing advantage for California agriculture.

Population continues to grow in our most important markets. Population growth will be substantial in domestic markets since by 2040, it is expected that there will be an additional 24 million people in California and about 80 million more elsewhere in the United States. An additional 2.8 billion people will increase export growth, with the majority residing in developing countries with growing incomes.

California agriculture has always been vulnerable to external market developments precisely because it is demand-driven. Global economic events potentially cause significant changes in prices. However, lower trade barriers and freely functioning financial markets should increase international market stability compared to a world of protection and controlled financial flows. While there is no strong evidence that global markets are becoming less stable, it is possible that, as individual countries liberalize, domestic price instability might

increase, presenting additional challenges to farmers, growers and ranchers.

Bottom-Bottom Line

What about the future of California agriculture? While there are no sure predictors, we can draw upon our understanding of the forces that have shaped the past to reflect on the future. History suggests that California agriculture has generally flourished even as it was being buffeted by what seemed at the time to be “disaster after disaster.” So far, it has always emerged from each crisis by rapidly adjusting and changing. California agriculture is very different than it was a decade ago, 50 years ago, a century ago. It is bigger, more diverse, and very much alive, adjusting, as always, to its ever-dynamic environment. Undoubtedly, California agriculture in 2020 or 2050 will be very different than it is now, but it will still maintain its vitality, though experiencing, as is its fate, chronic and sometimes powerful adjustment pressures. Those forecasting its demise simply do not understand its natural and human assets nor do they acknowledge the dynamic resilience of California agriculture.

This article was adapted from the new Giannini Foundation Special Report 04-1, *Whither California Agriculture: Up, Down, or Out? Some Thoughts about the Future*. This and other Giannini Foundation publications are available in pdf format at <http://giannini.ucop.edu/publications.htm>. Copies of this report may be purchased from University of California Agriculture and Natural Resources Communication Services by telephone at 510-642-2431 or through the ANR Web site at <http://anrcatalog.ucdavis.edu>.

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