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SPECIAL ISSUE:
California Agriculture: A Mid-Decade Appraisal

Editors' Note

We are pleased to present a special and longer issue to readers of *ARE Update*. We feature three articles that provide an assessment of California agriculture at the midpoint of the first decade in the new millennium. We believe that such an assessment is timely, given the concerns that have been expressed by various commentators in light of the challenges posed by increasing globalization of markets, tensions at the interface of agriculture and the environment, and the recent failures of some prominent California agribusiness firms.

The papers in this special issue also illustrate the power and essence of economic analysis. Economics aims to sort out the essential processes from the noise of currents affairs and random events. This issue suggests that in spite of perceived weaknesses and pressure, California agriculture is on solid footing. It is sustainable and likely to grow and prosper. We are fortunate to have favorable conditions in our state, including unique human capital and research capacity that contribute to keeping California agriculture on the cutting edge.

Our lead article by Warren Johnston and Alex McCalla provides a broad assessment of the future of California agriculture as we move forward in the 21st Century. Johnston and McCalla identify the 20 most important historical factors influencing California agriculture from 1769-2000. They then proceed to provide an assessment of the changes that will play key roles influencing the state's agricultural economy moving forward. Although the authors identify some key challenges facing the state, they conclude that, given the abundance of its natural and human resources and demonstrated resilience, California agriculture can persevere and thrive in the 21st Century.

Our second article by Shermain Hardesty focuses specifically upon the role of cooperatives in California's agricultural future. Recent failures of some prominent cooperatives have raised doubts about cooperatives as a viable business form in the 21st Century. Hardesty concludes that, although some aspects of traditional cooperative structures have challenged their ability to survive in the current economic climate, new structures and concepts are emerging that can help to insure the future of cooperatives as a key element of California agriculture.

Finally, Steve Blank provides a profitability report card for California agriculture for the period from 1960-2002, comparing California's profitability to that of the other 49 states. California passes this test with high honors, ranking fourth among states in average return on assets at 7.7 percent. Blank breaks down the data to examine the factors that characterize the leading and lagging states in terms of profitability. He concludes from this assessment that California's rates of return are likely to remain high relative to the remainder of U.S. agriculture.

Also in this issue.....

In the next issue.....

Pesticide Use and Air Quality in the San Joaquin Valley
by Rachael Goodhue and Kiara Groves

ARE Faculty Profiles

Alex F. McCalla and Warren E. Johnston

Warren Johnston and Alex McCalla, professors emeriti in Agricultural and Resource Economics (ARE) at UC Davis, are among the world's leading scholars and commentators on agricultural issues in California, the U.S. and the world. Johnston and McCalla agreed to put their more than 80 years in combined experience to work in assessing the future of California agriculture as we move forward in the new millennium. Their analysis and conclusions are available in the new Giannini Foundation publication, "Whither California Agriculture: Up, Down, or Out? Some Thoughts about the Future." A short summary of their work is featured as the lead article in this issue of *ARE Update*.

Alex F. McCalla and Warren E. Johnston
Emeriti Professors
UC Davis

Warren Johnston was raised on a diversified crop and livestock ranch just 15 miles from the UC Davis campus, where he completed his B.S. degree in 1959. Following completion of his Ph.D. degree at North Carolina State University, Johnston returned to Davis in 1963 as a member of the faculty and has served with distinction ever since. Professor Johnston served as chair of ARE from 1981-87, a time when its prominence as one of the leading agricultural and resource economics programs in the world was established and solidified. Although Warren retired officially in 1994, he has continued to serve on a recall basis, teaching a graduate seminar and pursuing research and professional interests.

Johnston's wide-ranging research program has emphasized issues relating to the structure of commercial agriculture and has often emphasized issues at the interface between agriculture and resource policy and management. Specific examples include his work on land markets and farm real estate appraisal, economies of farm size, energy use in agriculture and the economics of aquaculture. The American Agricultural Economics Association (AAEA) recognized Johnston's career accomplishments when it bestowed upon him its highest honor, the designation of Fellow.

Alex McCalla received both his bachelors and masters degrees from the University of Alberta. After completing a Ph.D. at the University of Minnesota, he accepted a faculty appointment in 1966 at UC Davis, serving until early retirement in 1994. At Davis, he was Dean of the College of Agricultural and Environmental Sciences and Associate Director of the Agricultural Experiment Station (1970-1975), as well as founding Dean of the Graduate School of Management (1979-1981). His administrative contributions extended to the Consultative Group on International Agricultural Research (CGIAR), where he was chair of the Technical Advisory Committee (TAC), and to the International Agricultural Trade Research Consortium (IATRC), where he was a founding co-convener and served three times as its chair.

A leading authority on international agricultural trade, rural development and world food policy, McCalla joined the World Bank in 1994 as Director of Agriculture and Natural Resources, its most senior agricultural position. During his term, McCalla worked to revitalize the Bank's agricultural lending portfolio by leading the development of a new Rural Strategy. Alex returned to UC Davis in 2000 bringing his extensive international experience and expertise back to the classroom for the benefit of a new generation of students.

McCalla is also a Fellow of the AAEA and of the Canadian Agricultural Economics Society. He was one of the 60 individuals honored by the Inter-American Institute for Cooperation on Agriculture for contributions to the progress of agriculture in the Americas during the last 60 years.

California Agriculture in the 21st Century

by
Warren Johnston and Alex McCalla

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.

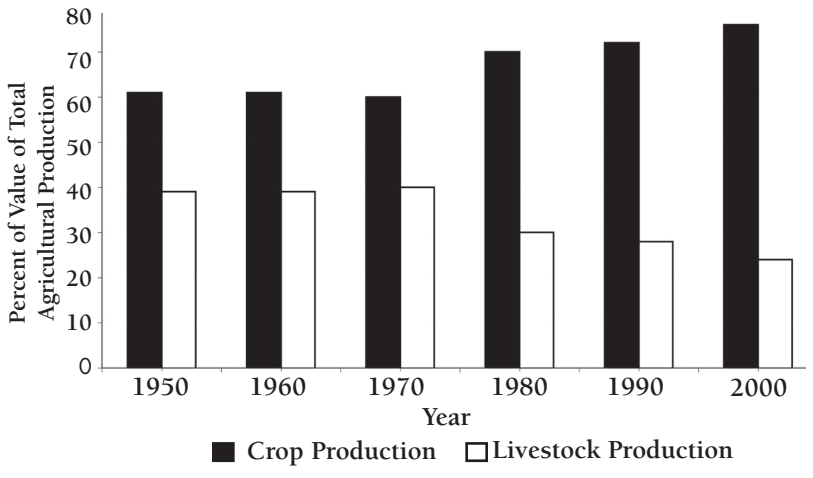
Drivers of California Agriculture

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.

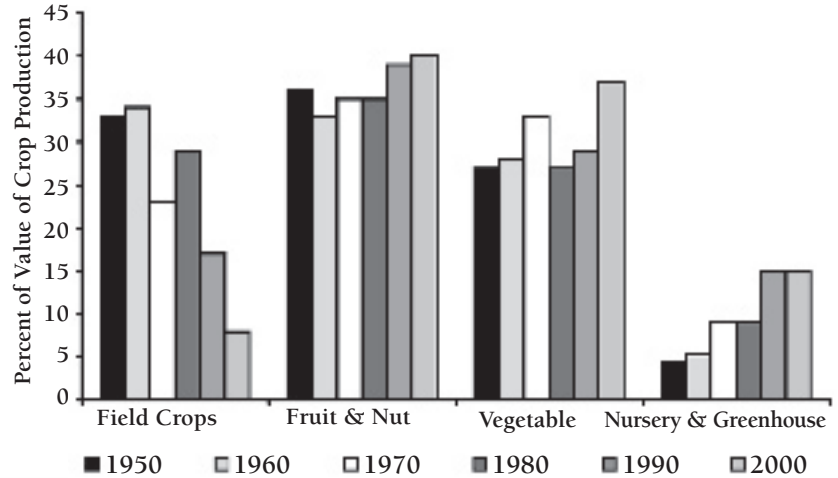
Recent Change in Production

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.

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



The Dynamics of California Agriculture

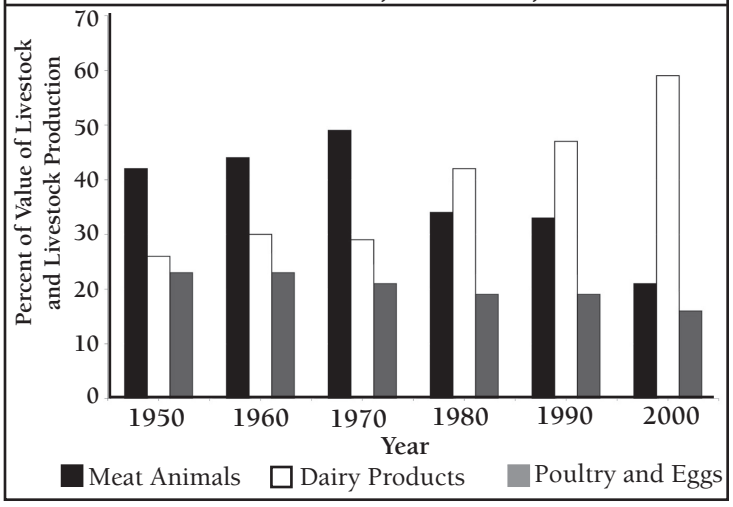
California agriculture is different than the stereotypical U.S. agriculture. It is frequently argued that agriculture in the U.S. has basically been "supply-driven," with historical roots in small homesteaders intent on feeding themselves and, later, marketing surpluses as productivity increased. Early 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.

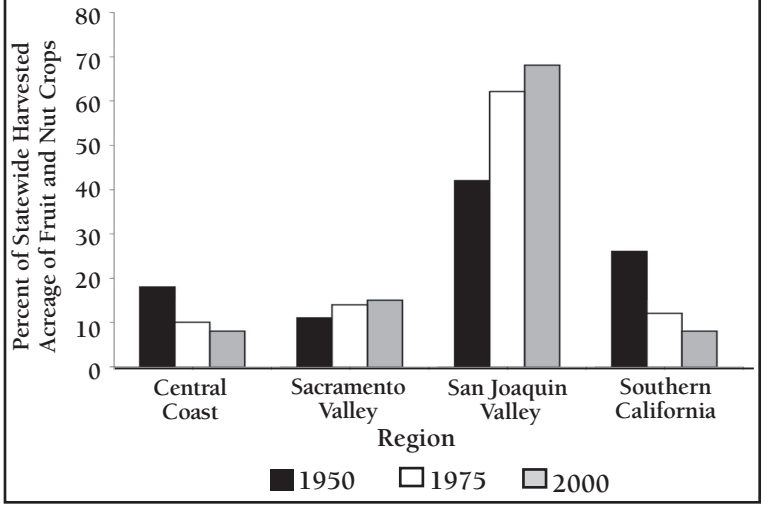
Figure 3. Relative Shares of Livestock and Livestock Products, California, 1950-2000



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

Figure 4. Fruit and Nut Crops, Share of Harvested Acreage by Major Agricultural Production Region, 1950, 1975 and 2000



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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Positioning California's Agricultural Cooperatives for the Future

by

Shermain Hardesty

Questions have been raised regarding the future of cooperatives in California. Although the cooperative principles can constrain cooperatives, various cooperatives have implemented innovative structures to ensure their viability.

Recent issues of *ARE Update* featured articles evaluating the failures of two California marketing cooperatives, Tri Valley Growers (TVG) and Rice Growers Association (RGA). Along with Blue Anchor's dissolution and Calavo's conversion, these combined events have created doubts about the future of cooperatives in California agriculture.

Restructured forms of cooperatives are emerging. For example, leaders of nontraditional cooperatives have acquired outside equity investors to overcome capital constraints, while others have sourced nonmember product to provide competitive product lines.

Economic Role of Cooperatives

Cooperatives were created in U.S. agriculture to serve the needs of the farmers and ranchers who own and control them. Processing and marketing cooperatives played a very strong role in California as growers sought economies of scale and market power, particularly during the 1920s.

By 1989, California led the nation in business volume conducted by all types of agricultural cooperatives, with 92 percent of the business attributable to marketing cooperatives (Table 1). In 1995, it ranked second for business volume conducted by all of its agricultural cooperatives, and still led the nation in the gross sales of its marketing cooperatives. By 2001, the total volume dropped by 16 percent to $8 billion, with much of the decrease in the fruit and vegetable sector. California then ranked fourth in the business volume of all of its agricultural cooperatives, with Minnesota and Wisconsin overtaking California in the business volume of marketing cooperatives.

To assess the future of cooperatives in California agriculture, brief background information is first presented about the economic role of cooperatives. Then, the weaknesses inherent in the cooperative structure are reviewed, followed by examples of how various agricultural cooperatives have overcome these weaknesses.

Economies of Scale

One of the classic economic justifications for forming a cooperative is to obtain economies of scale. In a processing business, fixed costs of management, plant and equipment, and selling, general, and administration costs can be spread over greater volumes. Many processing and marketing cooperatives achieve economies of scale unattainable by the individual producer through the vertically integrated activities they provide for their members.

Service cooperatives can also provide such economies of scale, as illustrated by Wine Service Cooperative. Headquartered in St. Helena, CA, the cooperative was formed in 1972 by a small group of boutique wineries. It has expanded its storage capacity twice, and now has 39 members and a waiting list. The cooperative provides storage and shipping services, as well as inventory control and government reporting services. Similar cooperative ventures focused on special services such as cotton ginning, prune drying, citrus packing and storage, are continuing to provide California producers with economies of scale.

Countervailing Market Power

The Capper-Volstead Act allows agricultural producers to set prices together, as long as they do not unduly enhance market prices. NuCal Foods was created in 1996 as a federation of two large egg cooperatives, Nulaid Foods and Cal Eggs. The cooperative markets and distributes only shell eggs and the majority of its products are marketed to retail grocery chains and box stores. With their 80 percent market share of the Northern California market, NuCal Foods' producer members have utilized their cooperative structure to protect their marketing margins from the concentrated market power of their grocery store customers.

Bargaining cooperatives were established for numerous commodities during the first half of the 20th Century to provide market power for large groups of producers. More recently, Marketing Agencies In Common (MAC) have been formed to create countervailing market power. MACs are a group of marketing cooperatives, often with some individual producers, who market products under a common agreement. The California Citrus Growers Association (CCGA) was formed in 2003 as a MAC when the major grower cooperatives and independent shippers elected to collaborate.

Table 1. California Cooperatives' Gross Business Volumes

	1989	1995	2001
Products Marketed	$7,249,017,000	$8,705,309,000	$7,165,107,000
Dry Beans & Peas	$53,215,000	$120,504,000	$21,543,000
Cotton	$618,189,000	$635,298,000	$419,924,000
Dairy	$1,959,019,000	$2,791,553,000	$2,748,360,000
Fruits & Vegetables	$3,277,924,000	$3,846,187,000	$2,877,242,000
Nuts	$640,636,000	$618,904,000	$719,236,000
Poultry	$48,426,000	$41,882,000	$30,601,000
Rice	$233,841,000	$230,729,000	$158,104,000
Miscellaneous	$158,701,000	$247,692,000	$64,834,000
Farm Supplies	$485,631,000	$460,794,000	$443,786,000
Services	$105,382,000	$399,299,000	$408,582,000
TOTAL	$7,840,029,000	$9,565,402,000	$8,017,475,000

The voluntary association now represents approximately 85 percent of the fresh market production of navel oranges in California. The CCGA's functions currently include managing product flows similarly to internally established prorates among the cooperative members, sharing information and establishing quality standards. Thus far, grower prices have been consistently above the four-year average.

Marketing the Cooperative

The cooperative identity can provide a different type of market power; cooperatives can exploit the fact that they are acquiring raw product directly from their producer-members as a marketing advantage. In a 2003 nationwide survey, 69 percent of the consumers responded that they were more likely to purchase food produced by a farmer-owned cooperative, and 64 percent agreed that food produced by a farmer-owned cooperative was of better quality than food produced by other types of companies.

The cooperative identity may be an ideal positioning for organic food products. Organic Valley/CROPP is a marketing cooperative formed in 1988 with seven members in Wisconsin. Its membership has grown to the present 622 farmer members in seventeen states, including California. It markets dairy, juice, eggs and meat products. Between 1998 and 2003, its sales rose from $15 million to $122 million.

Organic Valley differentiates itself by promoting its cooperative structure, using the slogan "a cooperative of small organic family farms." Its milk cartons feature profiles of local producers and it also provides grocery stores with large storyboards featuring some of its members.

Addressing Traditional Weaknesses of Cooperatives

While the cooperative form of business can provide several economic benefits, weaknesses associated with traditional applications of the cooperative principles have challenged agricultural cooperatives' ability to survive in today's highly competitive economic environment. Three basic principles define the essence of a cooperative enterprise:

- user-owned—the cooperative is owned by the people who use it
- user-benefit—the benefits generated by the cooperative accrue to its users on the basis of their use
- user-control—the cooperative is controlled by the people who use it

The User-Owned Principle: Weakness and Solutions

The user-owned principle has limited cooperatives' access to capital. Cooperatives typically do not seek capital from certain sources, such as outside investors. Their ability to raise additional capital from their producer-members is constrained, due to the portfolio and horizon problems. The portfolio problem arises because producer-members are required to invest capital in an industry in which they already have significant investment in production capacity. The horizon problem occurs because, traditionally, cooperatives' residual earnings are contractually tied to their producer-members' current transactions, rather than to their investment. Since members are unable to recognize appreciation in their equity investment, they exert pressure on their cooperative to maximize current returns rather than investing for higher future returns.

Organic Valley/CROPP has dealt with its equity capital limitations by utilizing two capital conserving strategies: 1) it contracts with other firms to process virtually all of its members' products; and 2) its products are marketed nationally through a grassroots program. In 2002, the cooperative generated $126 million in sales with assets totaling approximately $8 million. Organic Valley/CROPP maintains numerous longterm co-packing agreements with manufacturers located in specific market areas to minimize its capital investment in plant and equipment while also reducing its storage and shipping costs. Its members' equity capital has been invested in grassroots marketing programs that do not require large expenditures.

A new cooperative structure known as of New Generation Cooperatives (NGCs) facilitates the acquisition of equity capital. NGCs differ from traditional cooperatives in four ways.

- They require members to purchase delivery rights, creating a two-way obligation between a member and the cooperative for a specific amount of farm product each year.
- NGCs have a closed membership, in contrast to many traditional cooperatives that typically accept new members on a continual basis.
- The investment that NGCs require in delivery rights is typically higher than what traditional cooperatives would require from new members.
- Delivery rights are marketable. Prices fluctuate according to the cooperative's performance and earning potential.

While many NGCs were formed and failed in the 1990s, several have been quite successful. Iowa Turkey Growers Cooperative/West Liberty Foods had sales in excess of $200 million in 2002. Its three plants process turkey, pork, chicken and beef into products for retail and food service customers and co-pack branded meats for bigger companies like Hormel and Sara Lee. Mountain View Harvest, a wheat processing NGC formed by 227 winter wheat growers, invested a total of $5 million to purchase Gerard's French Bakery, a wholesale bakery of fresh and frozen products near Denver.

Joint ventures can be considered a nontraditional source of financing. They may be the only way a cooperative can afford to own part of an expensive facility or market a new product nationally. Co-packing agreements, such as those utilized extensively by Organic Valley/CROPP, are joint ventures; they reduce upfront capital requirements and decrease the risk associated with new products.

Naturipe, the oldest and largest strawberry marketing cooperative in the U.S., expanded its market access by joining forces with Global Berry Farms, LLC (GBF). GBF's other partners are MBG/Michigan Blueberry Growers Association (another cooperative), and Hortifrut (a privately held company based in Chile). GBF is reshaping the berry category by offering year-round supplies of strawberries, blueberries, raspberries and blackberries. By marketing 100 percent of their production through GBF, Naturipe's members have a more secure and broader customer base.

The User-Benefit Principle: Weakness and Solutions

Like the user-financed principle, the user-benefit principle has also constrained agricultural cooperatives. Marketing cooperatives often are organized to serve as a home for their members' products, with the earnings distributed to users in proportion to their current patronage. The resulting business impact is a focus on current returns, limited product offerings, underinvestment in intangibles and perpetuation of excess supplies of member product.

This "open" structure can cause a cooperative to have large fluctuations in its delivery volumes and processing requirements. Pacific Coast Producers (PCP) is a marketing cooperative that processes tomatoes, peaches, pears, grapes and apricots. As a co-packer, part of its success is attributable to the strict cost controls it employs to minimize excess capacity. PCP must carefully project its annual sales volumes and pack product accordingly. Through its long-established "base tonnage" allocations, members have volume restrictions for each product they deliver. Members who are reducing their deliveries sell part or all of their base tonnage to new or existing members.

Focusing on processing and marketing member deliveries can cause a cooperative to have a limited product line and/or seasonal product availability. Members have been known to be resentful when their cooperative sources nonmember product to maintain a year-round presence in the marketplace or other commodities to broaden the product line, both of which are critical for developing a strong brand.

With increasing globalization in recent years, Sunkist Growers has been facing more competition in Japan and other key markets from citrus growers in the Southern Hemisphere. After much resistance from members concerned about competition from fruit imported or handled by their own cooperative, Sunkist's board approved a new marketing strategy in July 2003. The cooperative is handling lemons and grapefruit from

contra-seasonal producers South Africa and Chile to leverage its well-known brand into markets in Japan and Hong Kong. Sunkist had to respond to its customers' demand for a single, year-round supply of citrus; otherwise it would have risked losing its position as the fresh citrus market leader. Similarly, Diamond of California broadened its culinary nut offerings by purchasing and packaging almonds, pecans and other nuts to complement its members' walnuts. In 2004, Diamond launched the Emerald brand with fourteen new snack products featuring a variety of nuts.

The User-Control Principle: Weakness and Solutions

Cooperatives are controlled or governed by their producer members. Economists have determined that this cooperative principle can cause the "principal agent" problem, in which the principals (producer members) lack the business expertise to provide adequate control of their agent (management).

Keeling (*ARE Update* Jan/Feb. 2004) attributed the failure of the Rice Growers Association partially to its lax board governance, concluding that "…the board of directors was passive and ill-equipped to scrutinize the business decisions it was charged with overseeing." Similarly, USDA's cooperative specialists recently documented several factors compromising the effectiveness of cooperative boards, including the inability of producer-directors to deal with contemporary business issues. The USDA specialists concluded that cooperative education is an investment but that too many cooperative leaders and advisers consider it only a cost that must be cut whenever times get tight. Some cooperatives do maintain active education programs for their board members. While some education is conducted in-house, cooperatives often send their board members to programs on key topics such as cooperative finance, strategic planning, and governance and management evaluation. Several invite experts to board meetings for presentations.

Outside directors can also strengthen the boards of agricultural cooperatives by providing a broader perspective. Welch's is a wholly owned subsidiary of the cooperative, National Grape, which uses a two-board structure. The National Grape board elects Welch's board of directors, consisting of four National Grape directors, two executive officers of Welch's and four outside professionals. CHS, the nation's largest agricultural cooperative, has structured subsidiaries for its numerous joint ventures involving value-added products with investor-owned firms. There are no producer-members on the boards of these subsidiaries; they consist of CHS management and executive officers of its joint venture partners. The board of the Global Berry Farms joint venture consists of two representatives from each of the two cooperatives (the CEO and a producer board member), two senior management representatives from Hortifrut and a public member.

Concluding Comments

Cooperatives in California play a significant role in California agriculture generating over $8 billion in business volume in 2001. The future looks bright for California's supply and service cooperatives that remain focused on their key services. Marketing-associations-in-common and information-sharing cooperatives can effectively create countervailing power for producers facing the highly consolidated grocery industry. The cooperative identity can also be used as a powerful marketing strategy.

While the traditional application of the cooperative principles can constrain cooperatives' success, agricultural marketing cooperatives are continually innovating to ensure their futures. They are utilizing a variety of financing alternatives, including joint ventures and the new generation structure. Some cooperatives require delivery rights to minimize their excess capacity and others source nonmember product to expand product lines and year-round market presence. Furthermore, well-trained producer directors and the appointment of outside directors should greatly enhance their viability.

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California Agriculture's Profit Performance

by
Steven C. Blank

California's farmers and ranchers, on average, have done well in the past and the state's production agriculture sector has characteristics that lead to a positive outlook for the future.

The profit performance of California agriculture will ultimately determine its future role in the national economy. This may be even more apparent when considering the viability of agriculture within other states to give context to California's performance. To remain viable, agriculture in each location must offer a rate of return on investments that is both competitive relative to those from alternative investments and sufficient in absolute dollars to cover producers' financial obligations. California's agricultural sector has led the nation in total sales each year for over half a century, indicating that farmers and ranchers in California are doing many things right. But what has been their reward?

This article examines California agriculture's profitability over time and places it into context by comparing it with the performance of other states and the national average. Economic theory suggests that in the long run input markets adjust to approximately equalize agriculture's marginal rates of return over locations. However, in the short run, agriculture's marginal rates of return may not equalize across states or regions due to factor immobility, and factor and output price distortions. Differences in the general level of profitability across states suggest that factor markets have not fully adjusted and that factor and commodity price distortions persist. Furthermore, differences in marginal rates of return in global commodity markets indicate that factor price equalization and factor endowment convergence have yet to fully integrate all commodity markets. This means that the relative profitability of agriculture in each location identifies agricultural sectors most likely to prosper or decline under the pressure of current global economic conditions. The empirical results reported here show that California's farmers and ranchers, on average, have done well in the past and that the state's production agriculture sector has characteristics that lead to a positive outlook for the future.

Summary of Research Methods

Profitability of the agricultural sectors of each state was assessed using returns on assets data from the USDA Economic Research Service's (ERS) Web site www.ers.usda.gov/data/FarmBalanceSheet/Fbsdmu.htm. State-level annual data from 1960 to 2002 were used. A "safety-first" criterion was used with the data to evaluate the level of risk facing agricultural producers. Next, the two main sources of returns to farm and ranch owner-operators, income from current operations and capital gains, were examined to determine their affect on profit patterns and the long-run viability of production agriculture. Finally, locations where production agriculture is most likely to prosper or decline were identified by comparing the most profitable five states and the five least profitable states.

Rates of Return and Profitability

The ERS estimates two measures of profitability: the rate of return on assets (ROA) from current income and the total economic rate of return, including capital gains for the farm business sector. The total rate of return on assets is divided into two components: current income as a percentage of assets and unrealized capital gains/losses as a percentage of assets:

$$\text{Total ROA} = \frac{\begin{pmatrix}\text{returns from current income} \\ + \text{ returns from capital gains}\end{pmatrix}}{\text{average value of farm assets}}$$

This study uses total ROA as its primary measure of profits, although both sources of returns are evaluated.

Safety-First Decision Criteria

Safety-first criteria are alternative performance measures and widely used tools for decision-making under risk. Safety-first models create a rank ordering of decision alternatives by placing constraints upon the probability of failing to achieve certain goals of the firm. All safety-first models have some safety threshold or minimum income goal that serves as the basis for performance measurements. Thus, a farmer's objective is to earn at least some designated minimum level of return with at least the desired level of probability.

Empirical applications of safety-first models often use a measure called the "Probability of Loss" (PL),

or "risk of ruin," that incorporates the minimum income goal. The PL indicates the probability (in percentage terms) that a producer will generate a return below some critical level. The PL is found by comparing the expected profitability of an investment to a given profitability threshold, k, and then, based upon the variability of profits (measured by the standard deviation), determining the probability that the threshold will not be reached. The value of k is usually made zero, but it can be made any critical level of return. By making $k = 0$, the PL is the chance of suffering a loss. If some other value is used for k, such as the return needed to cover all financial obligations (or opportunity costs), the estimated PL represents the probability of earning insufficient returns to cover k (i.e., the chance of defaulting on some obligations).

Results

Table 1 shows the average returns on assets earned by agriculture in individual states, regions and the entire United States for the 1960-2002 period. Note, first, the wide range of returns across states. The top five states in terms of profit performance and their total ROA for the entire period are North Carolina 9.3 percent, Florida 8.6 percent, Georgia 8.0 percent, California 7.7 percent, and Vermont 7.6 percent. The five states with the lowest total ROA results are West Virginia -7.6 percent, New Hampshire -2.9 percent, New Mexico -0.4 percent, Oregon 0.3 percent, and Pennsylvania 0.3 percent.

Second, there are some patterns in the relative contributions in returns for the top and bottom states. For the strong-performing states (including California), a majority of total ROA usually comes from current income (profits from agricultural production). Vermont is the only one of those five states to get a bigger contribution from capital gains (i.e., real estate appreciation) than from current income. For Vermont, growth in residential demand for land over the period fueled the nation's highest capital gains to farmland owners. For the least profitable states, the main source of return

Table 1. Avg. Rates of Return by State and Region, 1960-2002

	Return on Assets			St. Dev. of Total ROA
	Current Income	Capital Gains	Total	
	(percent)			
Connecticut	2.00	2.67	4.67	4.40
Delaware	5.07	2.21	7.28	6.52
Maine	-0.21	1.47	1.26	5.89
Maryland	1.58	1.50	3.07	5.29
Massachusetts	0.71	3.44	4.15	4.72
New Hampshire	-4.07	1.21	-2.86	9.16
New Jersey	0.96	2.50	3.46	5.30
New York	-0.18	3.69	3.51	4.32
Pennsylvania	-1.50	1.75	0.25	4.43
Rhode Island	2.38	3.69	6.07	8.25
Vermont	0.98	6.63	7.61	5.97
NORTHEAST	-0.03	2.56	2.54	3.65
Michigan	0.58	2.16	2.74	5.41
Minnesota	2.65	1.76	4.41	8.06
Wisconsin	1.54	2.59	4.13	5.39
LAKE STATES	1.82	2.13	3.95	6.22
Illinois	3.61	0.89	4.51	8.19
Indiana	2.87	0.88	3.75	8.27
Iowa	4.72	0.82	5.54	9.21
Missouri	1.30	0.80	2.09	7.01
Ohio	1.24	2.32	3.56	6.95
CORN BELT	3.13	1.06	4.18	7.83
Kansas	3.51	0.34	3.86	6.90
Nebraska	4.56	0.61	5.17	6.89
North Dakota	3.23	0.65	3.89	7.64
South Dakota	4.43	2.27	6.70	6.61
N. PLAINS	3.97	0.83	4.80	6.57
Kentucky	2.44	2.05	4.49	4.91
North Carolina	8.04	1.24	9.28	6.67
Tennessee	0.05	2.11	2.15	5.04
Virginia	0.64	1.02	1.66	5.30
West Virginia	-5.74	-1.86	-7.60	9.10
APPALACHIAN	2.58	1.45	4.04	4.59
Alabama	4.28	2.34	6.62	5.20
Florida	6.73	1.92	8.64	5.23
Georgia	5.72	2.32	8.04	5.80
South Carolina	3.07	0.25	3.32	5.43
SOUTHEAST	5.50	1.92	7.42	4.48
Arkansas	5.58	-0.73	4.84	6.99
Louisiana	3.95	0.51	4.45	7.30
Mississippi	3.99	0.44	4.42	6.96
DELTA	4.62	-0.02	4.60	6.58
Oklahoma	1.16	0.05	1.21	5.83
Texas	2.07	0.88	2.95	5.18
S. PLAINS	1.87	0.71	2.58	4.92
Arizona	3.88	2.65	6.54	5.91
Colorado	2.85	1.15	4.00	5.96
Idaho	3.74	1.67	5.42	6.09
Montana	2.28	2.07	4.34	7.07
Nevada	1.16	1.99	3.14	6.46
New Mexico	2.87	-3.28	-0.41	7.34
Utah	0.81	0.49	1.30	6.59
Wyoming	1.16	1.83	2.99	6.25
MOUNTAIN	2.67	1.24	3.90	5.51
California	6.41	1.27	7.68	5.57
Oregon	1.17	-0.85	0.32	5.61
Washington	4.77	1.28	6.05	5.94
PACIFIC	5.41	0.97	6.39	4.95
Alaska	-0.06	2.67	2.61	12.49
Hawaii	3.22	1.85	5.07	5.41
U.S. TOTAL	3.04	1.26	4.30	5.26

"ROA" = return on assets. "St. Dev." = standard deviation of the time series.

Table 2. Summary Data from States with Strong or Weak Returns

	Strong States					Weak States				
	NC	FL	VT	GA	CA	WV	NH	NM	OR	PA
Debt to asset ratio	14.27	16.19	13.74	14.53	20.41	8.81	10.66	12.74	13.47	12.26
Farm Numbers, 2001	56,000	44,000	6,600	50,000	85,000	20,500	3,100	15,000	40,000	59,000
Farms, % drop from 1960 to 2001	73.6	12.0	50.0	55.4	21.3	56.4	55.7	17.6	14.9	44.3
Average farm size, 2001 (ac)	162	232	203	220	315	179	135	2,876	443	130
Value of Production, 2001 ($/ac)	1,061	661	455	565	995	144	422	53	218	634
State Rank	4	9	14	11	5	39	16	48	35	10
Net farm income, 2001 ($/ac)	352	212	102	209	136	13	30	19	15	126
State Rank	3	6	13	7	10	47	37	42	45	11
Net farm income, 2001 ($/farm)	57,163	49,230	20,613	45,971	42,827	2,327	4,062	54,643	6,646	16,416
State Rank	3	5	23	7	8	50	48	4	45	30
Probability of Loss, 1960-2001, k=0(%)	8.5	5.2	10.2	8.7	8.5	79.7	61.0	52.4	47.6	47.2
Probability of Loss, 1960-2001, k=4(%)	21.8	19.2	27.4	24.8	25.5	89.8	76.4	72.6	73.9	79.7
1960-69 ROA from income (%)	5.03	5.16	1.70	4.91	4.58	-3.43	-0.46	2.76	-0.28	-0.81
1960-69 ROA from capital gains (%)	2.35	2.67	10.55	4.37	0.94	-0.35	1.23	-3.04	-1.28	3.67
1970-79 ROA from income (%)	5.31	6.33	2.17	4.31	7.41	-4.69	-3.75	3.00	1.34	-1.27
1970-79 ROA from capital gains (%)	4.44	6.47	9.24	5.24	4.26	3.08	5.30	1.35	3.36	5.41
1980-89 ROA from income (%)	6.05	7.72	2.32	4.94	7.48	-5.78	-3.19	1.87	2.04	-1.13
1980-89 ROA from capital gains (%)	-4.01	-0.83	4.01	-3.52	-2.22	-9.18	0.54	-8.04	-6.72	-2.70
1990-2002 ROA from income (%)	13.96	7.47	-1.52	8.02	6.22	-8.31	-7.67	3.64	1.48	-2.49
1990-2002 ROA from capital gains (%)	1.97	-0.05	3.64	3.00	1.90	-1.18	-1.43	-3.37	0.76	0.87

weakness varies from East to West. The more densely populated eastern states of New Hampshire, West Virginia and Pennsylvania all had negative returns from current income and better results from capital gains (although West Virginia had negative returns from capital gains). New Mexico and Oregon both had negative ROA from capital gains, but positive returns from current income. These results appear to illustrate the "urban influence" on farmland values.

Disaggregating the national average results by source over time (Table 2) leads to two general conclusions. First, as expected, returns from capital gains (which reflect changes in valuations based on expected future income) were much more volatile than actual returns from current income over the 1960-2002 period. Second, the variability of returns, especially from capital gains, was smaller during the 1960s and 1990s, compared to the volatile 1970s and 1980s. Jointly these results show that sources of returns are important in determining the economic prospects of agriculture; nationally, current income has been a less-risky source of returns, making states with adequate income more viable than areas with agricultural sectors relying on capital gains. These results are expanded upon for the strong and weak-performing states later.

The sensitivity of a state's agricultural sector to variance in returns can be indicated by the probability of loss for different levels of total returns. Two rows near the center of Table 2 show the probability that average producers in the strong/weak states would not meet some specified minimum total return, expressed as k. One row (for $k = 0$) shows that average California agricultural producers have a 8.5 percent probability of earning returns that fall below the breakeven point (i.e., zero total returns). The next row shows that average California agricultural producers have a 25.5 percent probability of failing to earn a 4 percent total return, the national average rate of return for agriculture over the 1960-2002 period.

The PL results in Table 2 show that as opportunity costs increase, a significantly higher percentage of agricultural producers must consider diversifying outside of agriculture or leaving the sector entirely. It is very unlikely that a risk-averse producer will be satisfied with the national average 47.6 percent chance of failing to reach a 4 percent total return when less risky nonagricultural investments are available as alternatives. However, California's profit and risk performance is much stronger than the national average, meaning that our state's agricultural sector has much brighter prospects.

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Implications of the Strong/Weak States' Results

Assessing results from the five states with the highest average total returns and the five states with the lowest average returns over the 1960-2002 period is enlightening. To begin, the middle row of Table 2 shows that the average net income per farm in 2001 for each of the ten states was below the U.S. average non-farm household income of $58,208. This illustrates that a farm (or state or region) may, on average, generate good returns while not producing enough income to support a family. Thus, most farm households supplement the farm with off-farm income.

Conversely, New Mexico is an example of how a state with less available off-farm income can adjust. The average value of New Mexico's production, $53 per acre, is very low due to the dominance of livestock grazing in the state's agricultural output. However, the very large average farm/ranch size of 2,876 acres enables New Mexico to generate average net farm income of $54,643.

Income versus capital gains patterns over time show differences between East and West. Of the five weak states, the two western states, New Mexico and Oregon, both had higher average ROA from farm income levels during 1990-2002 than they did during the 1960s. For the three eastern states, ROA from farm income levels went from bad to worse between the two periods. The trend in capital gains was lower between the 1960s and the 1990-2002 period for all the weak states except Oregon. For the five strong states, only California had higher average returns in the 1990-2002 period, compared to the 1960s, from both sources of returns. The three southern strong states all had better ROA from farm income levels in the later period, but lower levels of capital gains. Thus, the source of returns is important when assessing state profit performance.

Finally, farm numbers decreased much more in the East than in the West over the 1960-2002 period. North Carolina, the state with the highest average total returns over the period, decreased its farm numbers by 73.6 percent. This is not due simply to consolidating farms into larger units because North Carolina still has the smallest average farm size (162 acres) of the five strong states. The small average size and high income per acre indicate a significant number of, and contribution by, intensive livestock operations.

Consolidation is occurring across American agriculture, but there may be more potential for further consolidation in the East compared to the West. Consolidation of farms in the central and western sections of the country is difficult because the average farm size is already large. Of the 10 states in Table 2, the three western states are those with the largest average farm sizes. This implies that the high rates of exit from agriculture in eastern states are likely to continue if farmers do not subsidize their incomes using off-farm sources. Off-farm income will continue to slow U.S. and California farm exits. However, off-farm employment is not available to many farmers in sparsely populated sections of the country, putting them at risk.

What Do the Strong/Weak Performing States Have in Common?

In general, the strong-performing states (especially Florida and California) produce crop portfolios that include a significant amount of high-value fruits and vegetables and North Carolina and Georgia have significant intensive livestock industries (e.g., hogs and poultry). Also, contracting is a common practice (especially in Florida, North Carolina, and California) in the markets for many of these commodities. Forward contracting reduces price and income volatility over time, thus reducing producers' risk exposure. That enables more producers to accept the risks inherent

in high-value commodity production.

The weak-performing states had less in common with each other, although most had a higher percentage of their cash receipts coming from livestock grazing, rather than intensive crop and livestock enterprises, compared to the strong states. However, other financial characteristics showed common trends in these states.

Table 3. Comparing the Strong and Weak States

Strong States	Weak States
High-value, intensive crop and livestock	Low-value (e.g., livestock grazing)
Diversified products; contracting	Generally undiversified, bulk products
Large-scale operations	Generally smaller-scale operations
High debt/asset ratios	Low debt/asset ratios
High asset turnover ratios	Low asset turnover ratios

Financial data for the weak-performing states show they have a low operating profit margin and a low asset turnover ratio. New Hampshire, Pennsylvania and West Virginia all had negative operating profit margins in each of the four decades. Also, Oregon and Pennsylvania had generally low asset turnover ratios (i.e., low efficiency in assets use), compared to the strong-performing states, while the turnover ratios were especially low in New Hampshire, New Mexico and West Virginia. The positive operating margins in the two western states indicate that the agricultural sectors there may generate more "normal" total returns once the capital asset markets adjust factor prices downward. In the eastern states, non-agricultural demand for agricultural assets is unlikely to allow factor prices to decline enough for those agricultural sectors to significantly improve their profitability.

A brief list of general observations about differences between the five strong and five weak states (Table 3) indicates that the pressures to earn profits are pushing farmers and ranchers to produce more risky enterprises on larger, more efficient operations. This requires more money so as to maintain a reasonably low debt ratio to maintain a safe level of risk exposure. Obviously, the requirement of a larger scale of operation for technical efficiency means that the current trend of consolidation of small- and medium-scale production operations into large-scale operations is inevitable. In short, profit pressures are causing American agriculture to industrialize.

Concluding Comments

In general, the empirical results show trends in rates of return that are consistent with economic trade and development theories, but there are constraints unique to each state's agriculture. Agricultural income is generally higher in states like California that are able to produce significant amounts of fruit and vegetable crops plus intensive livestock enterprises. Returns are generally lower in areas dominated by livestock grazing, rather than intensive crop and livestock production. This supports other economists' conclusions that geographic areas with different factor endowments (i.e., resources) must expect to generate different rates of return because those regions cannot produce an identical set of goods and the costs of immobile inputs cannot adjust sufficiently to equalize commodity returns. This means that California's rates of return are likely to remain relatively high compared to those for the remainder of American agriculture. Although California's profit-per-farm average of $42,827 in 2001 was below the 2001 U.S. average non-farm household income of $58,208, farm consolidation will be slowed by the state's relative abundance of off-farm income that comes from the close proximity of agricultural and urban centers. Thus, California agriculture's future depends partly on how well our rural-urban interface is managed.

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