

THE FOOD CHAIN CLUSTER

Integrating the Food Chain in Solano & Yolo Counties to Create Economic Opportunity and Jobs



MAY 2011

Prepared by

COLLABORATIVE ECONOMICS

Doug Henton

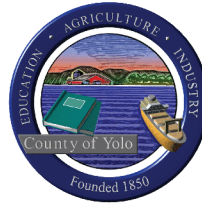
John Melville

Tracey Grose

Tiffany Furrell

Amy Kishimura

Bridget Gibbons



On behalf of the Boards of Supervisors for Solano and Yolo Counties, it is our pleasure to present an in-depth examination of the \$2.5 billion food chain cluster that represents about 10% of the total economic output of our region.

“The Food Chain Cluster: Integrating the Food Chain in Solano and Yolo Counties to Create Economic Opportunity and Jobs” report examines the full spectrum of activity that our fertile agriculture brings to the economy of our two counties and provides us insight into opportunities to expand the job-creation potential of this vital sector of our economy.

One of the key discoveries from these recent efforts is how intertwined our counties have become. We share one of the most fertile agricultural regions in the world, the crucial transportation infrastructure including interstate highways, airports, rail systems and the port to get our local commodities to the world marketplace, the leading university in agriculture research, and a commitment to maintaining our land in active and profitable farming operations. This report chronicles that relationship and provides us with a starting point to expand our shared regional industry cluster.

This food chain cluster study represents the beginning of what we hope will be many shared endeavors by our counties. In the coming year, we will conduct a joint economic summit to define the strategies available to exploit the opportunities and overcome the challenges identified in this report. In order for these efforts to be successful, we must enlist the partnership of many different segments of our communities – farmers, manufacturers, entrepreneurs and venture capitalist in the private sector and the public sector’s elected officials and staffs of the cities, counties, and regional boards.

We encourage you to be part of this new collaborative to preserve our rich agricultural tradition by expanding its economic footprint in our two counties and create a wider array of jobs and career opportunities. Join us for the summit; we need your ideas to develop strategies that make this industry, and our economy, grow.

Sincerely,

Handwritten signature of Michael J. Reegan.

Michael J. Reegan
Solano County Chair
Board of Supervisors

Handwritten signature of Matt Rexroad.

Matt Rexroad
Yolo County Chair
Board of Supervisors

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EXECUTIVE SUMMARY

The Food Chain, with its diverse set of industries, plays an important role in the vitality of the Solano and Yolo County region. Activities associated with the Food Chain span agriculture support and production, food processing, packaging and distribution as well as markets for waste byproducts. Innovation is taking place in every segment as consumer demand changes and technological advances open up new opportunities. There is potential for establishing new connections between agricultural products, packaging and processing facilities, and local food manufacturing to extract the most value from products and services in the region. Branding, marketing, and examining distribution networks will facilitate economic growth in this area. Solano and Yolo Counties are actively working through these challenges by producing futures studies and adopting measures in their general plans.

Identifying key deficiencies that inhibit expansion and development of specific markets will create a comprehensive and well-designed Food Chain within Solano and Yolo Counties. Working together to develop a Food Chain cluster network, the two counties can build upon one another's respective strengths in the value chain and collectively determine areas for improvement and emerging demand. This synergy will expand the Food Chain locally to provide a self-sustaining and economically prosperous system.

Food Chain activities are highly concentrated in the region and represent 10 percent of total economic output. Statewide, these activities account for only 6 percent of total output. This report highlights the strengths and weaknesses within the Food Chain and how innovation in each segment can support the creation of new markets for regional products and new job opportunities for its residents.

THE FOOD CHAIN CONTRIBUTES SIGNIFICANTLY TO THE ECONOMIC VITALITY OF THE REGION IN TERMS OF ECONOMIC OUTPUT, EMPLOYMENT, AND BUSINESS GROWTH

- Generating \$2.5 billion in 2009, Food Chain activities represent 10 percent of total Solano and Yolo regional output. Distribution accounted for nearly one third of Food Chain output and has tripled in value since 1990.
- Agricultural Support is larger in employment than any of the other segments in the region, and it is the only segment reporting growth in each of the past 3 years. Employment in this segment is primarily in Services and represents 27 percent of total Food Chain employment in the region.
- There is a diverse range of occupations and earnings potential within the Food Chain. Between 2001 and 2008, Food Chain earnings

increased by 12 percent, and the highest average annual earnings of \$52,722 were reported in Processing. However, a better connection to local education programs at the secondary and post-secondary level will be required in order to provide the necessary workforce for continued success of the region's Food Chain.

- The region's Food Chain consists of a vibrant landscape of local, small businesses. Regional earnings of small businesses (with no employees) and small farm owners are exceeding the state average. Total annual farm proprietor income (income from sole proprietorships and partnerships, excluding the income received by corporate farms) increased 21 percent in the region between 1999 and 2008 but dropped 7 percent statewide. Nonemployers in agriculture earned roughly \$3,000 more than nonemployers in California.

THE REGION BENEFITS FROM MANY NATURAL ASSETS THAT SUPPORT THE PRODUCTION OF HIGH-VALUE CROPS, AND THE REGION'S ADVANTAGEOUS LOCATION AT THE CENTER OF A MEGA REGION SUPPORTS THE PROCESS AND DISTRIBUTION OF FOODS AND BEVERAGES

- The region's natural assets include prime agricultural land, stable and abundant water resources, and strong winds that power wind farm turbines. The region also benefits from its convenient access to surrounding metropolitan areas, major national highway systems, rail, airports, and seaports.
- Increasing values of agricultural land discourages the expansion of lower valued crops in the region. The net loss of agricultural land in Solano County has decreased 76 percent since the 2002 to 2004 period. Policy efforts in both counties seek to ensure that existing agricultural lands remain viable for agricultural production.
- Two top crops in both Solano and Yolo Counties, almonds and walnuts, are currently experiencing rising demand locally, nationally and internationally.

INNOVATION ACROSS THE REGION'S FOOD CHAIN IS IMPROVING PROCESS AND RESOURCE EFFICIENCIES AS WELL AS FOOD QUALITY

- Organic farming in Solano and Yolo Counties represents 10 percent of total farming operations in the region, but in California as a whole, organics account for only 6 percent.
- The influence of agriculture biotechnology is most prevalent in seed biotechnology research and production, and 7 of the 10 top seed producers in the world are located in the region. The University of California at Davis Seed Biotechnology Center also provides valuable research opportunities and graduates to fill new jobs in the field.
- Farms and businesses in the region are adopting renewable energy systems including wind, solar, and biomass.

THE REGION IS FERTILE WITH OPPORTUNITIES FOR GROWTH ACROSS THE FOOD CHAIN

- Farmers markets and other forms of Community Supported Agriculture (CSA) present an opportunity for the counties to make the most of local agricultural production, specifically organic products. The growing demand for local and sustainable products aligns favorably with the resources in the region.
- The addition of livestock processing facilities and other intermediate processing facilities will help maintain the diversity of activities in all segments of the Food Chain in the region. This will create new markets, jobs, and output value in the local Food Chain.
- Growing global demand for high-value products such as almonds will create more consistency of demand as products are sent to multiple and diverse markets across the world.
- The above opportunities are representative examples of how exploration of local agricultural products and their potential to move through various segments of the value chain can create added value in the region.

THE FOOD CHAIN AS A CLUSTER OF OPPORTUNITY

The Food Chain is composed of various industries that contribute greatly to the productivity and vitality of Solano and Yolo Counties. These industries and associated activities are categorized into the following segments of the Food Chain: agriculture support and production, food processing, packaging and distribution, and markets for waste byproducts. A key driver of Food Chain productivity is innovation. Innovation responds to changing consumer demand and technological advances that open up new opportunities in every segment of the Food Chain. Food Chain activities are prominent in the region and represent 10 percent of total economic output. By comparison, these activities account for only 6 percent of total output statewide. This report highlights the strengths and weaknesses within the Food Chain and how innovation and expanding Food Chain operations locally can support the creation of new markets for regional products and new job opportunities for its residents.

FOOD CHAIN CLUSTER

The Food Chain in Solano and Yolo Counties is a dynamic system of multi-faceted components and interactive processes that are driving competition and boosting the region's competitiveness in the global food market. Central to the region's Food Chain Vital Cycle is the role of innovation. The Food Chain encompasses all activities from agricultural support and production to distribution. The segments of the Food Chain consist of 1) Agricultural Support Products and Services, 2) Agricultural and Livestock Production, 3) Food Processing and Packaging, 4) Distribution of Food and Beverages, and 5) New Markets for Waste Byproducts. (This is broader than the Advanced Food & Beverage Manufacturing Cluster presented in the Solano County Index in 2010, which focused on crop production, animal processing, and manufacturing.)

The dynamics of the Food Chain Vital Cycle are five segments linked together by the varied processes that begin in the field and result in food products arriving in the hands of consumers. Central to this cycle is the element of innovation that infuses the cycle at each segment with new products, new processes, new materials, and increased efficiencies. Finally, the vital role of consumer demand cannot be overlooked in this system: innovation is both the product and the driver of consumer demand. Consumer demand is driven by the demands for quality, convenience, variety and by the perception and/or reality of reduced environmental impact.

Technological advance taking place in each segment is driving the Food Chain Vital Cycle. Advances are boosting process and resource efficiencies, improving product quality and safety, and creating new products and markets. In Agricultural Support Products and Services, advances in biotechnology are improving efficiencies through the creation of pest and drought resistant seeds and seed coatings that allow for multiple plantings. Applied advances in sustainable farming practices are reducing fertilizer

and pesticide use in Agricultural and Livestock Production. New uses for byproducts are being leveraged, for example, harnessing nutrients from wastewater to produce fuel for production activities. Diagnostic testing and high-speed mechanization are both improving the quality and quantity of food products. In Distribution, electronic data interchange is vastly shortening the time lag between production and consumption thereby improving food quality.

TECHNOLOGICAL INNOVATION DRIVING EACH SEGMENT



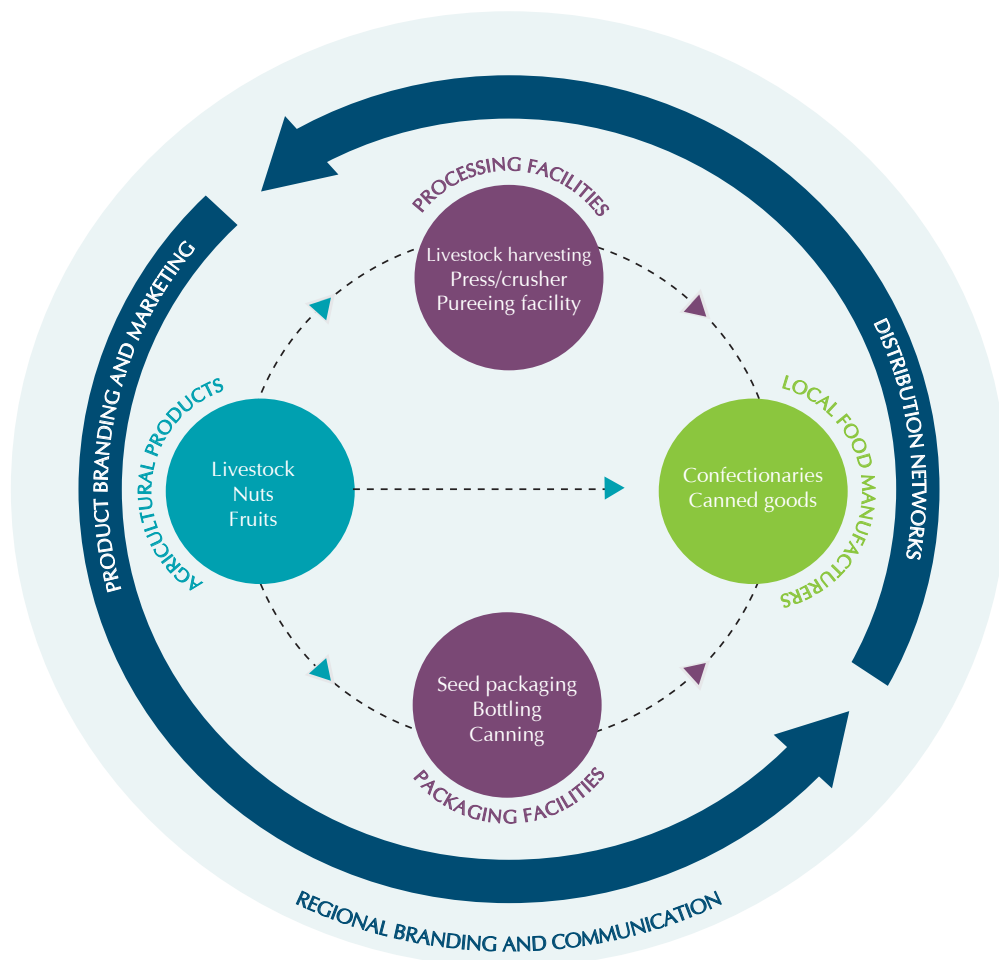
EXPANDING FOOD CHAIN OPERATIONS LOCALLY

Increasing the number of times a product is churned within the region's Food Chain will add value, create job opportunities, and potentially reduce transportation costs required for production. Looking at the full scope of Food Chain operations will show to what extent services, infrastructure, workforce, and other necessary components are lacking and reveal areas for expansion and development. For example, Solano County has a high concentration of consumer products, while Yolo County specializes in commodities. Utilizing resources across both counties can help fill the gaps in market production processes, such as processing facilities, to capitalize on local providers of goods and services.

Taking advantage of local input resources adds value to the local Food Chain and helps to maintain demand for products within the region. If processing plants establish themselves in the

region, there will be well-founded reason to cultivate the support and agricultural crops around that processor, thereby creating a sustainable and local industry. In many circumstances, secondary processing or packaging may be necessary to prepare raw materials for use in a local firm's production. Such a situation presents the opportunity for new firms and markets, which will better connect the segments of the Food Chain and increase the churn of products in the system.

In order to establish these crucial connections collaboration between counties is necessary. Additionally, creating regional branding and maintaining communication between players in each segment of the Food Chain in both counties will be necessary to identify additional uses of agricultural products and services and keep added value within the region.



Pacific International Rice Mills, LLC

Founded in 1954, Pacific International Rice Mills (PIRMI) is owned by Anheuser Busch and is the oldest operating rice mill in the state. The mill provides high quality, natural rice products to brewers, grocers, and wholesale producers in domestic and international markets. PIRMI has operations spanning nearly all components of the Food Chain Vital Cycle. Mill facilities located in Woodland, California were renovated in 2008, when millions of dollars were invested in the plant to increase efficiency and productivity. Operations at the PIRMI mill cover a wide array of production processes, from storage, grain drying, and milling, to packaging, shipping, and distribution. Additionally, the facility houses by-product processing machinery, to reduce waste created in processing operations. These by-products are used in livestock feed and as a soil additive for agricultural fields in the area. PIRMI also biomasses over 65,000 tons of rice hulls per year for energy production. The company uses rice from the greater Sacramento and San Joaquin Valley regions, which supports local farmers and is environmentally friendly, as it reduces emissions and resource use associated with transportation.

ECONOMIC IMPACT

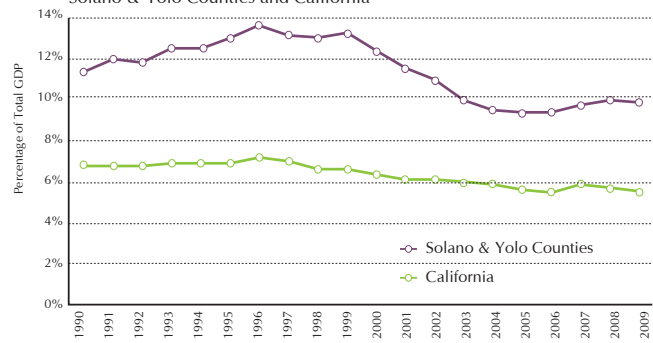
Generating \$2.5 billion in 2009, the Food Chain represents 10 percent of the total economic output of Solano and Yolo Counties. Solano County generated \$1.0 billion in Food Chain output, and \$1.5 billion is attributed to Yolo County. Exploring new opportunities and further developing industries unique to the region in all segments of the Food Chain will lead to continued economic growth and prosperity in this sector. Tracking small business growth, employment growth, and occupational mix help to tell the story about the region's progress and where potential for growth exists.

The economic activity related to the Food Chain generates a sizeable share of the region's economy. Although dropping from its peak of 13.6 percent in 1996, the Food Chain accounted for 10 percent of the combined GDP of Solano and Yolo Counties in 2009. In comparison, California's Food Chain industries represented less than 6 percent of the state's total GDP (\$101.6 billion).

Generating \$872 million in 2009, Distribution accounted for the largest portion of Food Chain output. The region's GDP in Distribution increased by almost three times since 1990, faster than any other segment. In 2009, Support generated \$670 million in the region's economic output, while Processing and Agriculture/Production accounted for \$500 million and \$426 million respectively.

PERCENTAGE OF TOTAL ECONOMIC OUTPUT

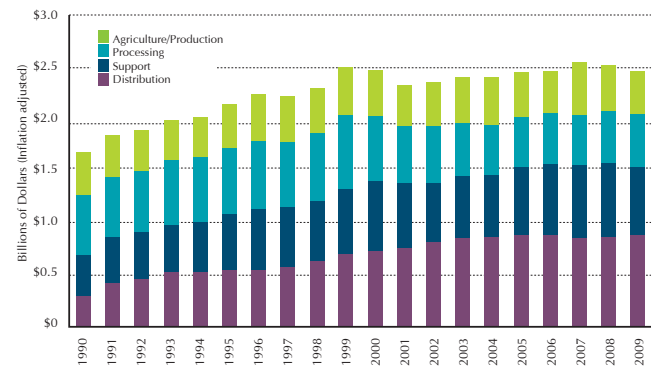
Generated by the Food Chain
Solano & Yolo Counties and California



NOTE: The GDP for Agriculture/Production segment is based on a more inclusive definition than the Food Chain Production segment.
Data Source: Moody's Economy.com
Analysis: Collaborative Economics

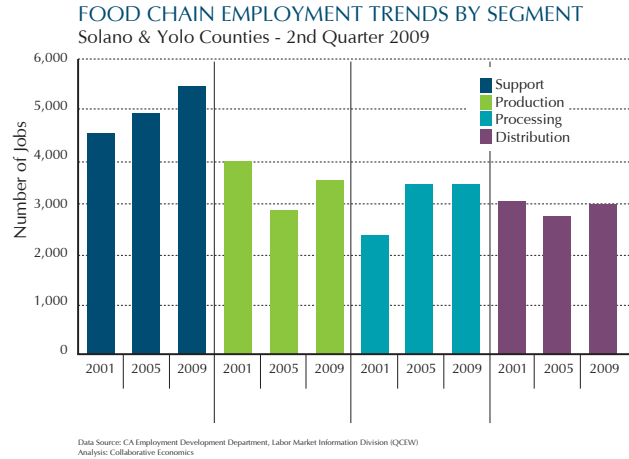
ECONOMIC OUTPUT OF FOOD CHAIN

Gross Domestic Product by Segment
Solano & Yolo Counties

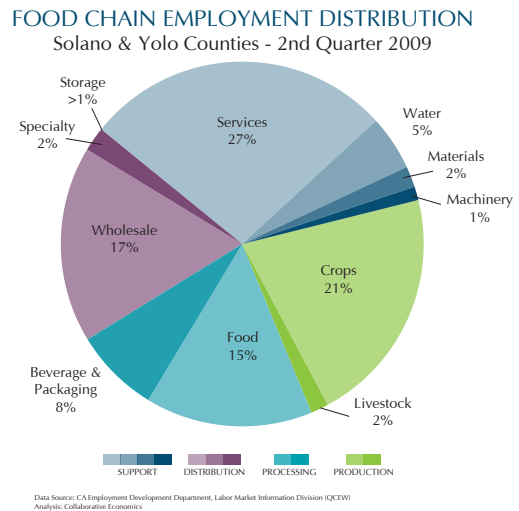


NOTE: The GDP for Agriculture/Production segment is based on a more inclusive definition than the Food Chain Production segment.
Data Source: Moody's Economy.com
Analysis: Collaborative Economics

Employment is for the most part evenly distributed across the segments of the Food Chain and growing fastest in agriculture support activities. Total Food Chain employment increased by 11 percent between 2001 and 2009, while Processing had the largest percentage increase (43%) during that period. At the same time, the segments of Production and Distribution declined in employment by 10 percent and 2 percent respectively. In the second quarter of 2009, the Support segment increased by 21 percent since 2001.



The segment of the Food Chain with the largest portion of jobs is Support (35%), followed by Production (23%), Processing (23%), and Distribution (19%). Each of the four segments consists of multiple subsegments. Production in Crops accounts for 21 percent. Food, in the segment Processing, represents 15 percent. Wholesale, in the Distribution segment, represents 17 percent of the region’s total Food Chain employment.



Guittard Chocolates

Established in 1868, Guittard Chocolates is the oldest family-owned chocolate company in the United States. The company headquarters are located in Burlingame, and the processing plant is located in Fairfield. The majority of inputs for the chocolate factory come from local sources. Sugar, powdered milk, and whey are all purchased from Bay Area suppliers. Similarly, machinery used at the factory comes primarily from local makers. Guittard Chocolates caters its production to the growing needs of customers who are also local chocolate producers. The market for their chocolate exceeds their current production capacity. In the future, the company plans to relocate its headquarters from Burlingame to Fairfield and to increase its workforce from the 13 employees currently in Fairfield to more than 100. This expansion will help Guittard meet the growing local demand for their products, as well as meet national growth in the demand for premium chocolate.

Food Chain earnings increased by 12 percent between 2001 and 2008; however, earnings growth varied by segment. Annual average earnings growth was strongest in Support with wages rising 23 percent over the period. Earnings grew 13 percent in Production, 11 percent in Processing, and 7 percent in Distribution.

In 2008, Processing reported the highest average earnings at \$52,722. Following closely, earnings in Distribution averaged \$46,762, Support and Production followed with average earnings in 2008 of \$39,189 and \$34,792, respectively.

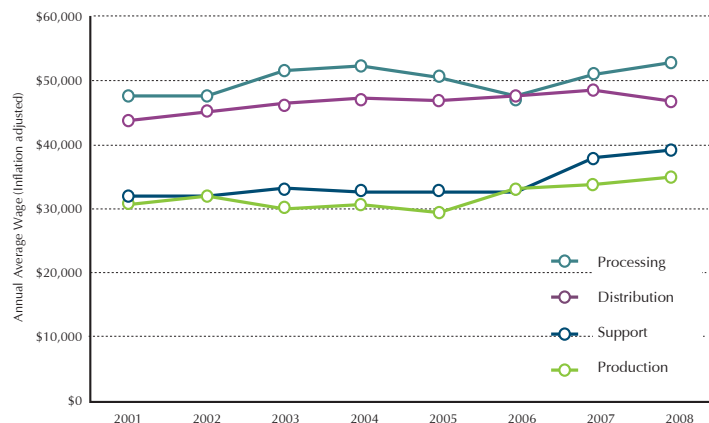
A wide range of job opportunity exists in the Food Chain. Occupations associated with these areas of business activity represent an array of fields, levels of training, and earnings potential. In every segment, training and requirements vary from on-the-job training to graduate degrees. For example, in Distribution, jobs range from machinists to logisticians. Additionally, with changes in agriculture technology, there is a growing need for horticulturalists and chemical engineers.

The two-county region offers a variety of training opportunities related to the Food Chain that is ever evolving to meet the demand. Solano and Yolo Counties offer opportunities for residents of all ages to learn about farms and agriculture. There are farm programs for schoolchildren as well as adult educational opportunities at community colleges and the University of California at Davis. The two-county region provides the educational infrastructure at each level of schooling to produce the workforce required by the expanding Food Chain. These include the following:

- Schoolchildren have the opportunity to learn academic skills in a farm-based setting at Loma Vista Farm. Since 1974, Loma Vista Farm has taught children about plants and animals through hands-on activities in an outdoor classroom. Another program for schoolchildren is the Center for Land Based Farming located on the Farm on Putah Creek. On 40 acres of land, the Farm on Putah Creek allows visitors to participate in educational field trips and observe demonstration projects. High school students

EARNINGS GROWTH IN FOOD CHAIN

Annual Average Earnings by Segment
Solano & Yolo Counties



Data Source: California Employment Development Department, Labor Market Information Division (QCEW)
Analysis: Collaborative Economics

are also given the opportunity to participate in the Student and Landowner Education and Watershed Stewardship (SLEWS) program.

- High school students attending Dixon High have the opportunity to develop agricultural interests through coursework and participation in agriculture programs. Supervised Agriculture Experience Programs (SAEP) currently involve approximately 100 students in local agriculture projects ranging from assisting local farmers to internships at U.C. Davis. Students gain practical experience in a variety of agricultural fields and some of these internships and partnerships lead to employment opportunities. Comprehensive courses in Agricultural Earth Science and Agricultural Biology spark interest in agricultural fields. These classes provide guest speakers from U.C. Davis and Chico State University. Additionally, a Dixon High farm for enhanced agricultural education is planned for the future.
- At Rio Vista High School in Solano County students have access to courses in Agriculture Biology, Agriculture Earth Science, Agriculture Science, Floriculture, and Agriculture Mechanics. There is a Future Farmers of America (FFA) chapter at Rio Vista High where students develop leadership and public speaking skills to assist them in agriculture advocacy and work in the community.
- The majority of high schools in Yolo County have agriculture departments covering a variety of subjects. Woodland Senior High, Woodland

Pioneer High, Winters High, and Davis Senior High all support agricultural education. Classes ranging from Agricultural Mechanics, Animal Science, Agricultural Biology, Environmental Science, and Future Farmers of America (FFA) programs are offered at these schools.

- Solano Community College provides agriculture classes through the Horticulture program, since the school no longer offers Agricultural Business Classes.
- The University of California, Davis offers many degrees and programs through the College

of Agricultural and Environmental Sciences. Specific agricultural departments include Animal Science, Biological & Agricultural Engineering, Nematology, Entomology, Plant Pathology, Plant Sciences, and Viticulture & Enology. Other related Environmental Social Science fields include Land, Air & Water Resources and Agricultural & Resource Economics. Additionally, numerous centers and institutes dealing with a diverse set of agricultural fields are associated with the university.

EXAMPLES OF OCCUPATIONS IN THE FOOD CHAIN

Segment	Occupation Title	2009 Annual Median Wage	Education & Training
Distribution	Farmworkers & Laborers, Crop, Nursery, & Greenhouse	\$19,000	Short-Term On-the-Job Training
	Shipping, Receiving, & Traffic Clerks	\$28,900	Short-Term On-the-Job Training
	Truck Drivers, Heavy & Tractor-Trailer	\$40,000	Moderate-Term On-the-Job Training
	Computer Operators	\$45,600	Moderate-Term On-the-Job Training
	Transportation, Storage, & Distribution Managers	\$92,600	Work Experience
	Bus & Truck Mechanics & Diesel Engine Specialists	\$53,000	Post-Secondary Vocational Education
	Computer Support Specialists	\$55,100	Associate Degree
	Network Systems & Data Communications Analysts	\$65,000	Bachelor's Degree
	Logisticians	\$74,600	Bachelor's Degree
Processing	Market Research Analysts	\$63,900	Master's Degree
	Food Batchmakers	\$30,800	Short-Term On-the-Job Training
	Food Cooking Machine Operators & Tenders	\$39,500	Short-Term On-the-Job Training
	Team Assemblers	\$23,900	Moderate-Term On-the-Job Training
	Mixing & Blending Machine Setters, Operators, & Tenders	\$31,900	Moderate-Term On-the-Job Training
	Butchers & Meat Cutters	\$38,800	Long-Term On-the-Job Training
	Chefs & Head Cooks	\$37,900	Post-Secondary Vocational Education
	Chemical Technicians	\$45,300	Associate Degree
	Network Systems & Data Communications Analysts	\$65,000	Bachelor's Degree
Production	Industrial Production Managers	\$97,900	Bachelor's Degree
	Marketing Managers	\$96,700	Work Experience, Plus a Bachelor's or Higher
	Weighers, Measurers, Checkers, & Samplers, Recordkeeping	\$22,200	Short-Term On-the-Job Training
	Laborers & Freight, Stock, & Material Movers, Hand	\$24,500	Short-Term On-the-Job Training
	Industrial Truck & Tractor Operators	\$30,100	Short-Term On-the-Job Training
	Separating, Filtering, Machine Setters, Operators, & Tenders	\$46,300	Moderate-Term On-the-Job Training
	Maintenance & Repair Workers, General	\$43,300	Long-Term On-the-Job Training
	Industrial Machinery Mechanics	\$61,100	Long-Term On-the-Job Training
	First-Line Supervisors/Managers of Production & Operating Workers	\$63,200	Work Experience
Support	Farm Equipment Mechanics	\$45,800	Post-Secondary Vocational Education
	Sales Managers	\$65,700	Work Experience, Plus a Bachelor's or Higher
	General & Operations Managers	\$95,700	Work Experience, Plus a Bachelor's or Higher
	Packers & Packagers, Hand	\$19,200	Short-Term On-the-Job Training
	Inspectors, Testers, Sorters, Samplers, & Weighers	\$43,000	Moderate-Term On-the-Job Training
	Machinists	\$50,400	Long-Term On-the-Job Training
	First-Line Sup/Mgrs of Helpers, Laborers, & Material Movers, Hand	\$46,500	Work Experience
	Electrical & Electronics Repairers, Commercial & Industrial Equipment	\$74,200	Post-Secondary Vocational Education
	Veterinary Technologists & Technicians	\$31,300	Associate Degree
	Mechanical Engineers	\$82,600	Bachelor's Degree
	Construction Managers	\$94,300	Bachelor's Degree
	Purchasing Managers	\$100,900	Work Experience, Plus a Bachelor's or Higher
	Operations Research Analysts	\$95,000	Master's Degree

Data Source: CA Employment Development Department, Labor Market Information Division (OES); U.S. Bureau of Labor Statistics (OES)
 Analysis: Collaborative Economics

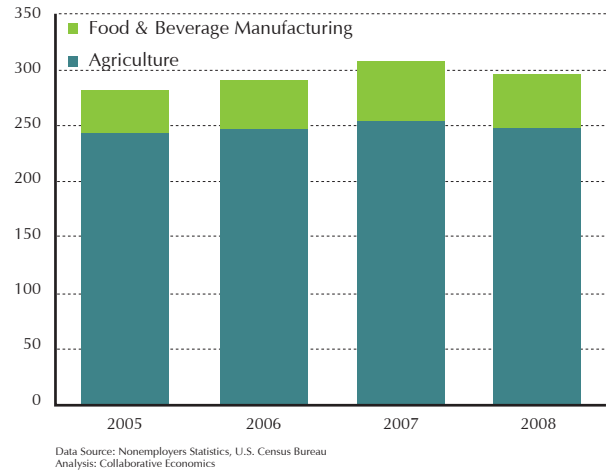
Small businesses without employees are growing in number across the Food Chain. Referred to as “nonemployers,” these companies with no employees are owned and operated by a single person or co-owners. These firms and small businesses are increasingly important as today’s global economy demands flexibility and agility. Smaller enterprises with highly skilled talent, and good access to the internet and transportation infrastructure can succeed in local and global markets.

In Solano and Yolo Counties, there were 297 nonemployers in 2008 in Agriculture and Food & Beverage Manufacturing. This represents a 5 percent increase since 2005 and a drop of 4 percent since 2007. These nonemployer firms account for less than 1 percent of all nonemployers in the two-county region (31,984).

Across all industries, nonemployer firms in the region have lower receipts on average per firm than statewide. However, Solano and Yolo Counties’ nonemployers in Agriculture earned roughly \$3,000 more annually than the nonemployers in California.

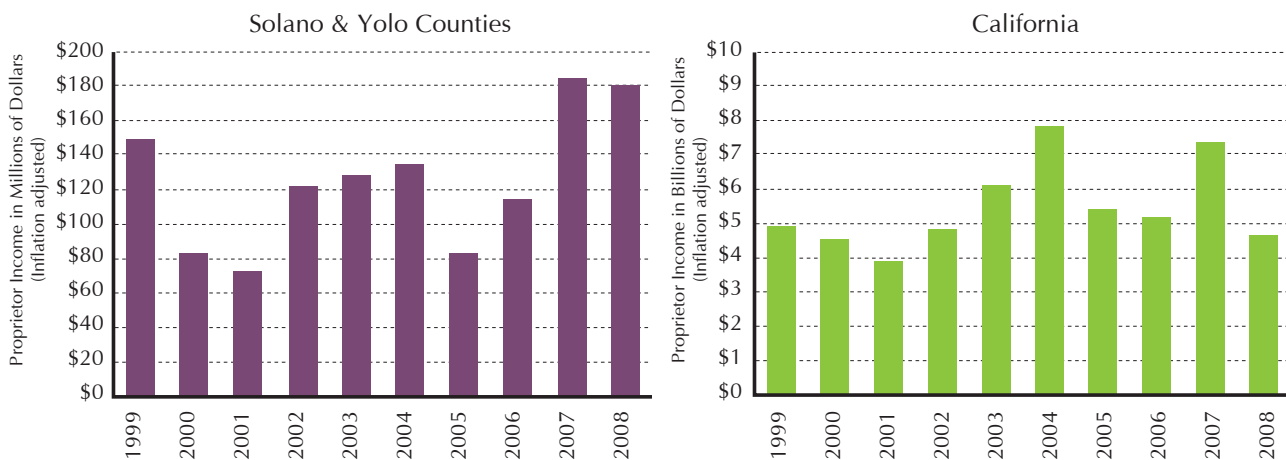
The region’s small farm owners play an important role in the Food Chain locally and statewide, and incomes are rising. Farm proprietors are defined as sole proprietors (owner of a business) or partnerships that operate farms (excluding corporate farms). (Farm proprietors can have paid employees while nonemployers cannot.) In 2008, Solano and Yolo Counties’ farm proprietor income represented 4 percent of California’s total farm proprietor income. (In comparison, the region’s non-farm proprietor income represented 1 percent of the state total.) Further, total annual farm proprietor income increased 21 percent in the region and declined 7 percent statewide between 1999 and 2008 (income from sole proprietorships and partnerships, excluding the income received by corporate farms).

NUMBER OF NONEMPLOYERS IN AGRICULTURE AND FOOD & BEVERAGE MANUFACTURING Solano & Yolo Counties



TOTAL RECEIPTS PER FIRM IN 2008 (Inflation adjusted)		
	Solano & Yolo Counties	California
Agriculture	\$57,994	\$54,312
Food & Beverage Manufacturing	\$54,182	\$72,061
Total Economy	\$41,362	\$50,994

TOTAL ANNUAL FARM PROPRIETOR INCOME



Data Source: U.S. Bureau of Economic Analysis
Analysis: Collaborative Economics

ASSETS AND INNOVATION

Innovation is taking place across the Food Chain, and there is strong evidence of this in Solano and Yolo Counties. The region enjoys many natural and built assets that support its Food Chain Vital Cycle, and investing in innovation now will keep it prospering. These advances allow operations to run more efficiently and utilize regional assets to their fullest productivity. Location, agriculture land, expansion of renewable energy resource use, sustainable agriculture practices, and biotechnology are valuable characteristics of the region as well as areas for growth and development.

REGIONAL ASSETS

Solano and Yolo are adjacent counties located between two of California's main metropolitan areas – Sacramento and San Francisco. The vicinity to Sacramento and San Francisco and the convenient connection to major highway systems are assets to the agricultural and commercial firms in the region. Both counties encompass expansive areas of prime agricultural land. The abundant farmland is complemented by the availability of water resources and research opportunities at neighboring universities. Additionally, valuable processing facilities such as Campbell, Jelly Belly, and Sunsweet serve as dependable consumers of the inputs produced in the region.

INFRASTRUCTURE FOR TRANSPORT

Transportation is vital to the distribution of goods and services and represents a regional strength. Solano and Yolo Counties are well connected to surrounding regions by major interstate highways, state routes, railways, seaports, and domestic and international airports in San Francisco, Oakland, and Sacramento. Smaller airports include the Nut Tree Airport and Rio Vista Airport in Solano County and the Watts Woodland Airport, U.C. Davis University Airport, and the Yolo County Airport in Yolo County. The major interstates serving the region are interstates 5, 80, 505, 680, and 780. The Union Pacific Railroad and the ports at Benicia and West Sacramento provide additional methods of transportation. These infrastructure options allow

for easy transport of the region's products to local, regional, and national markets.

WATER AND WASTEWATER

The availability and quality of water resources and the management of wastewater are integral to the success of Food Chain activities, especially the viability of agricultural production. Although water sources vary in the region, Solano County contains an ample water supply to support the needs of local farms and firms. In particular, ground water supplies are stable. Additionally, Lake Berryessa is a high quality and abundant source of water to the region.¹

Wastewater treatment plants in the region provide a valuable service, processing impure and contaminated water after urban use and producing water that can be safely deposited into water storage or used directly for irrigation and other purposes. For example, the Fairfield-Suisun Water District uses grey wastewater to irrigate and grow turf. Recent expansion of the City of Fairfield water treatment plant increased the capacity to 57 million gallons of water per day. This amounts to 10 million gallons per day in excess capacity in 2010. Excess capacity ensures sufficient supplies of water for business and residential use. However, developing reuse plans for excess capacity at other treatment plants would further enhance the region's available water resources.

CHANGING CROP MIX

Many factors including current market values, market projections, land values, and soil and climate conditions determine the crop mixes within Solano and Yolo Counties. The type of crops grown is determined in large part by the cost of agricultural land in the region. The market value of agricultural land in the region has increased due to the purchasing of parcels for rural home sites. The counties are attempting to discourage the purchase of agriculturally zoned land for residential uses by increasing the minimum parcel size required for purchases. For the most productive agriculture land, purchased lots must be either 40 or 80 square acres, depending on the agricultural zone.² Unfortunately, this mechanism has done little to dampen the infiltration of rural home sites and corresponding increases in agricultural land prices in the region. As a result, high valued crops prevail in the region, especially in areas with landscape assets and access to transportation.

The table shows the top ten highest valued crops in Solano and Yolo Counties over the past three years as well as the value, total acreage, and value per acre in the most recent year, 2009.

Mariani

Mariani, located in Vacaville, California, specializes in the production of dried fruits. Mariani dried fruits are sold internationally and nationally as a packaged consumer product and in bulk to be used as an input for other products. Operated by four generations of the Mariani Family, this company takes advantage of the agricultural resources available in Solano County. Locally grown prunes and grapes are two major commodities used in their line of dried fruit products. In addition to having access to high quality fruit inputs, Mariani benefits from the transportation infrastructure in Solano County, which provides easy product dissemination. Mariani, representing the processing segment of the Food Chain, demonstrates how local production inputs travel from one segment of the Food Chain to the next, generating new industries and sustaining jobs within the region.

TOP TEN CROPS IN SOLANO COUNTY IN 2009						
Crop	Rank in Crop Value			Total Value	Total Acreage	Value per Acre
	2009	2008	2007			
Tomatoes, Processing	1	3	3	\$39,432,400	12,000	\$3,286
Nursery Products	2	1	1	\$33,499,400	1,223	\$27,391
Walnuts	3	5	5	\$21,077,600	8,027	\$2,626
Alfalfa	4	2	2	\$20,433,100	31,438	\$650
Cattle & Calves	5	4	4	\$19,810,100	-----	-----
Grapes, Wine	6	7	7	\$12,181,600	3,731	\$3,265
Sunflower Seed, Certified	7	9	12	\$10,801,900	7,628	\$1,416
Milk, Market	8	6	6	\$10,175,100	-----	-----
Almonds	9	13	8	\$7,698,300	3,322	\$2,317
Sheep	10	11	10	\$6,387,400	-----	-----

Data source: Solano County Crop and Livestock Report (2008, 2009)

TOP TEN CROPS IN YOLO COUNTY IN 2009						
Crop	Rank in Crop Value			Total Value	Total Acreage	Value per Acre
	2009	2008	2007			
Tomatoes, Processing	1	1	1	\$127,751,504	37,881	\$3,372
Grapes, Wine	2	4	3	\$56,423,575	13,187	\$4,279
Rice	3	3	4	\$53,479,094	36,593	\$1,461
Seed Crops, All	4	5	5	\$33,424,720	25,574	\$1,307
Hay, Alfalfa	5	2	2	\$29,979,014	49,450	\$606
Almonds	6	6	6	\$24,987,486	12,080	\$2,069
Organic Production	7	7	7	\$22,824,388	5,774	\$3,953
Walnuts	8	9	8	\$19,158,440	9,635	\$1,988
Cattle & Calves	9	10	9	\$12,827,640	-----	-----
Wheat	10	8	10	\$11,680,137	28,062	\$416

Data source: Yolo County Agricultural Crop Report (2007, 2008, 2009)

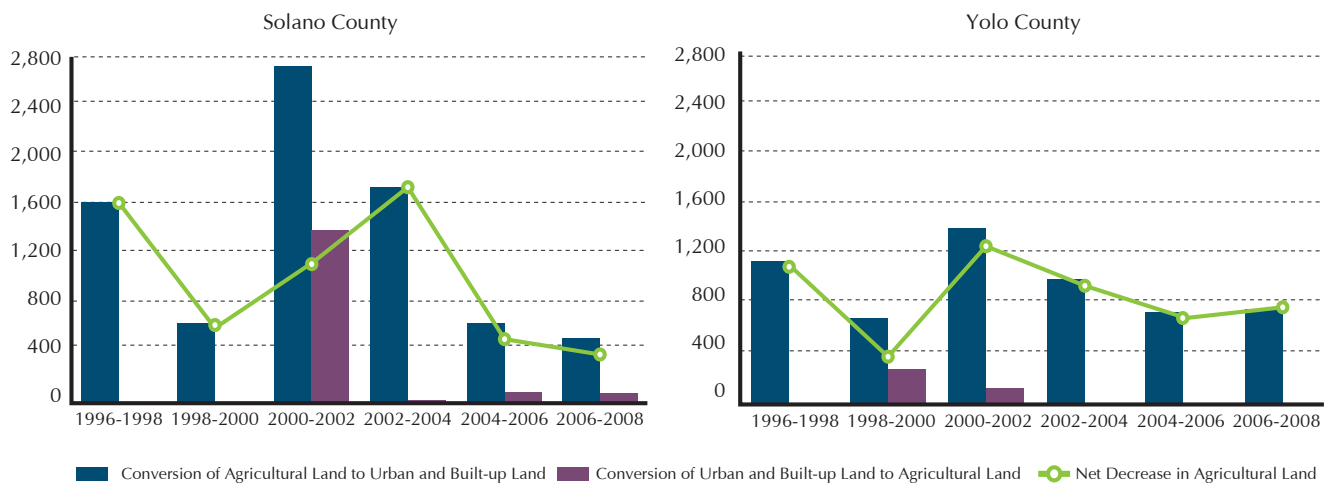
PROTECTING FARMLAND

The Williamson Act, also known as the California Land Conservation Act of 1995, is meant to encourage voluntary conservation of land, particularly farmland, in California. A property tax break is allotted to participants in exchange for abstaining from development of open-space and farmland for a ten-year period. This tax break discourages landowners from pursuing commercial or residential development of their land.³ The act

plays a vital role in farmland conservation within Yolo County, as about 60 percent of all land in Yolo County is enrolled in the Williamson Act. According to Solano County, 80 percent of all open space and agriculture land in the region is protected from residential and commercial development.⁴ Unfortunately, recent elimination of subvention funds that formerly compensated counties for lost tax revenue from program participants leaves the counties with additional expenses.

CONVERSION OF AGRICULTURAL LAND AND URBAN & BUILT-UP LAND

Number of Acres Converted



Data Source: CA Department of Conservation, State Farmland Mapping and Monitoring Program
 Analysis: Collaborative Economics

Over the period of 2006 – 2008, Solano County reported a net loss of 422 acres of agricultural land. During these three years, 496 acres of agricultural land were converted to urban & built-up land while only 74 acres were returned to agricultural land. The rate of conversions was highest during the 2000 - 2002 period resulting in a net loss of 1,235 acres of farmland. The greatest net loss of agricultural land, 1,731 acres, was in the 2002 - 2004. Since then, the net loss of agricultural land has decreased 76 percent. Policy efforts in both counties seek to ensure that existing agricultural lands remain viable for agricultural production.

During the period 2006-2008 in Yolo County, 787 acres of agricultural land were converted to urban & built-up land and no urban & built-up land was converted to agricultural land. Conversions of agricultural land to urban & built-up land

experienced a recent high of 1,404 acres in the period 2000-2002. In the period 1998-2000, a recent high of 286 acres of urban & built-up land was converted back to agricultural land. The conversion of agricultural land to urban & built-up land decreased 44 percent since the period 2000-2002 and the net loss of agricultural land decreased 18 percent since the 2002-2004 period.

STRENGTHS AND WEAKNESSES IN THE REGION

Although the region possesses numerous natural and built resources, there are some key shortcomings, which inhibit the Food Chain from expanding and meeting its full potential. The following table lists a few strengths and weaknesses in the Solano and Yolo Counties.

STRENGTHS	WEAKNESSES (Existing and Potential)
Education infrastructure for Food Chain related occupations; elementary, high school, and post-secondary education	Lack of chilling capacity
Productive agricultural land	Regulatory issues ⁵
Availability of water resources	Costs of operation: energy, land, etc.
Seed research and biotechnology presence	Potential for deterioration of transportation infrastructure if maintenance and expansion do not occur
Established food processing facilities	Lack of slaughtering facilities and other essential processors
Diverse and widespread infrastructure for transport	

INNOVATION IS KEY TO THE SUCCESS OF THE REGION'S FOOD CHAIN

Innovation plays an essential role in growing the vitality of the region's Food Chain operations. Developing sustainable methods of production and processing, employing new business models, and mobilizing scientific and technological breakthroughs can create new niche markets within the region's Food Chain. Presently, firms and farms in Solano and Yolo Counties are exploring new methods and technologies in alternative energy, organic farming, and agricultural biotechnology. Advances in these areas increase efficiency in production, improve competitiveness, create opportunities for branding and marketing, and reduce adverse impacts on land, water, and air resources in the region.

RENEWABLE ENERGY AND RESOURCE EFFICIENCY

Companies and landowners in Solano and Yolo Counties are finding innovative ways to carry out everyday business operations while producing clean energy through wind farms, use of biomass, and recycling wastewater.⁶ Examples of these efforts include the following:

The **Shiloh Wind Farm Project** located in the Montezuma Hills of Solano County represents an innovative way to utilize farmland for crop production, livestock grazing, and clean energy generation. Farmland operations are minimally affected by the presence of energy production, as less than 2 percent of the farm's land is occupied by turbines.⁷ In some cases, leasing land to wind farm developers brings in more income than more traditional farm operations. Turbine installation also relieves farmland conversion pressures from development advocates while taking advantage of Solano County's prime location for harnessing wind for power generation. Solano County's proximity to larger cities ensures a buyer for energy produced.

A recent study on the economic impacts of the Shiloh III wind generation project points out several key advantages for Solano County throughout the construction and operating phases of the project. During the construction phase, Solano County is projected to receive \$85.4 million in revenues by local businesses, governments, and households. An additional 487 full-time equivalent jobs will come from the construction phase. Over the 20-year lifetime of the project, \$84 million in revenues will be generated and approximately 726 employee-years. In addition to using agricultural land in a productive and less invasive manner, the project will provide a strong economic stimulus for the county.⁸

Anheuser Busch has also found innovative ways of harnessing renewable resources and transforming waste products into energy to run the company's operations. A 6-acre photovoltaic solar array project located adjacent to the factory provides energy.⁹ In addition, fuel is generated from nutrients found in the factory's wastewater in a system called a Bio-Energy Recovery System (BERS).

Salad Cosmo, based in Dixon, uses its wastewater for field irrigation. Compostable products are also used to fertilize the fields. In addition to using sustainable practices in the farming process, Salad Cosmo also uses recyclable packaging for the products they sell to markets and major grocery retailers.

ORGANIC AND SUSTAINABLE FARMING

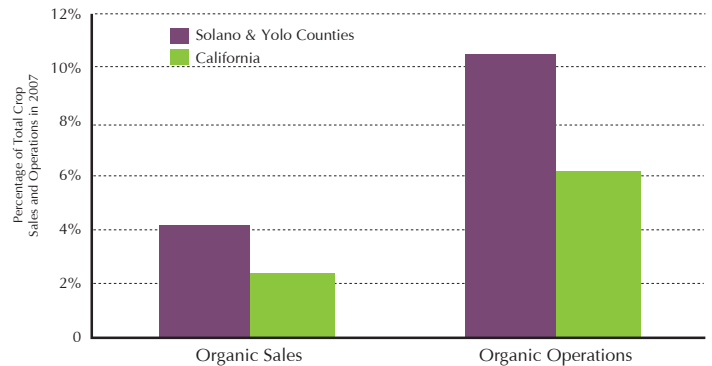
The underlying principles behind production and maintenance operations in organic farming enhance biological diversity, maintain biological and soil nutrient cycles, conserve soil nutrients and water, and minimize the use of synthetic and off-farm inputs for fertilization and pest control. Consequently, organic farming contributes to a balanced ecological system as well as reduced air, soil and water pollution.

California is a leader in organic farming, with products encompassing 16 percent of the total United States organic cropland in 2008 - twice the portion of the second most prominent state in organic cropland.¹⁰ The state's organic producers include many small farms producing for local, high-end restaurants and other particular markets as well as the country's largest organic produce company which farms 26,000 organic acres.¹¹ The rising demand for organic produce reflects growing consumer concerns for perceived safer and healthier foods as well as environmentally sound and ethical production processes. Such is the case with the growing demand for non-genetically altered products and grass-fed, hormone- and antibiotic-free meat, poultry and dairy products. Innovative producers advance these efforts symbiotically. For example, in place of herbicides, some organic growers of grapes hire herds of sheep three times a year to clean and fertilize the vineyards; the sheep in turn, produce organic lamb.¹² Hawks and owls are a part of the natural biodiversity of farmland and also serve as farm pest management, as they are natural predators to rodents. Knowledge of organic and sustainable farming practices is growing, and California universities are making significant contributions toward the development and dissemination of this knowledge.

In addition to the environmental advantages associated with organic farming, organic products have price premiums. According to a report by the U.S. Department of Agriculture, organic grapes and plums have price premiums of approximately 20 percent over conventionally grown counterparts. Corn and tomatoes have price premiums of approximately 10 percent and 15 percent respectively.¹³ In 2008, government spending on organic agriculture was up five fold from the spending in 2002. Contributing to this increase is the 2008 Farm Act, which is a federal program supplying financial support to farmers who wish to convert to organic production.

ORGANIC FARMING

Percentage of Total Crop Sales and Operations
Solano & Yolo Counties and California, 2007



Data Source: National Agricultural Statistics Service, United Department of Agriculture
Analysis: Collaborative Economics

Dixon Ridge Farms

Russ and Kathy Lester are the owners of Dixon Ridge Farms, a family-owned organic walnut farm located in Winters, California with 23 full-time employees. The Ranch was founded in 1979, and became a certified organic premium walnut producer in 1991. In addition to pioneering organic walnut farming methods, Dixon Ridge Farms hopes to be 100 percent energy self sustainable by 2012. A major contributor towards achieving this goal is the use of the BioMax 50, a biogas powered generator utilizing energy produced from walnut shells from the farm's shelling process. Other sustainable practices on the farm include energy efficiency in walnut farming and processing operations, pesticide research and integrated pest management, water and soil conservation, waste management and recycling, and community involvement and education. Dixon Ridge was awarded the state's highest environmental honor in 2008, the Governor's Environmental & Economic Leadership Award, in the category of sustainable practices that reduce the effects of climate change. Dixon Ridge Farm's dedication to sustainability and production of quality organic walnuts attracts buyers in regional and international markets.

Organic crop sales and operations in Solano and Yolo Counties comprise a larger proportion of total crop sales and operations than California as a whole. In 2007, there were 114 organic crop operations in Solano and Yolo Counties, representing 10 percent of total operations in the region. In addition, the organic crop operations in the two-county region represent roughly 4 percent of total organic crop operations in California. In 2007, organic crop sales represented 4 percent of total sales in the region, generating \$24 million (in 2009 inflation adjusted dollars).

BIOTECHNOLOGY RELATED TO AGRICULTURE

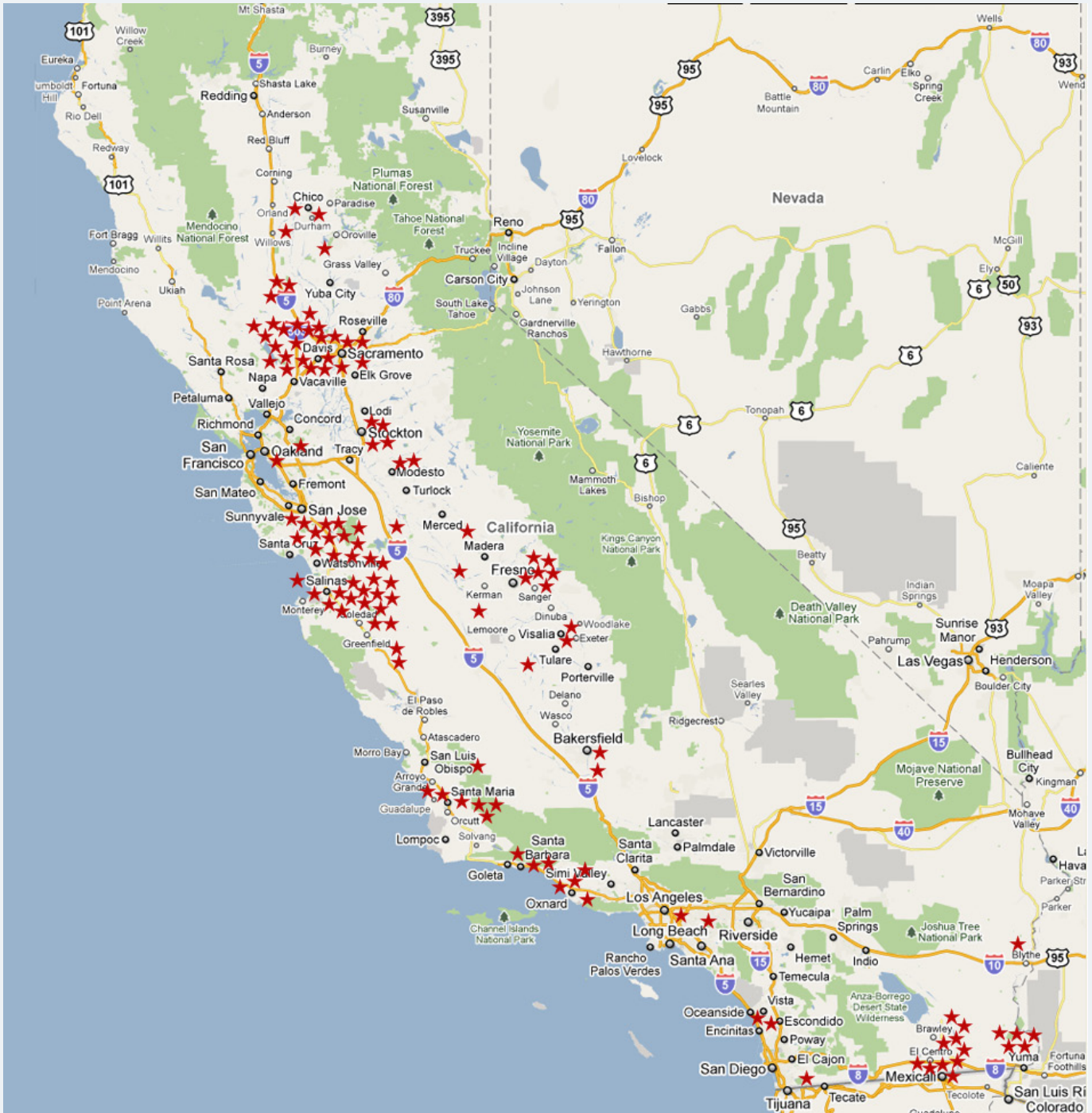
Within the Support segment of the Food Chain, research in biotechnology helps to create plants with higher yields, increased tolerance to environmental stress, improved nutrient value, and reduced use of pesticides, fertilizers, and agricultural chemicals. There is a high concentration of vegetable seed research in the region.

Beyond research, there is a large cohort of seed producers in the region. In 2010, seven of the top ten seed companies in the world are located in the region. The presence of U.C. Davis and the multitude of research activities by the associated Seed Biotechnology Center, afford the region ample opportunities to make valuable connections between industry and university researchers.

Although the area is already dominant in seed production and research, there are many ways to build upon the existing success. Attracting new and innovative seed companies will bring additional technologies and research talent to the region. Establishing improved connections between university and industry researchers will produce a greater breadth of discovery and potential funding for U.C. Davis. Developing programs to inform high school and college students of the career opportunities in seed biotechnology and providing internships and summer jobs will grow the industry locally. Establishing the necessary infrastructure for seed processing, packaging, distribution, and marketing can increase the churn of seed products in the region and extract greater value from the local seed research and development.

APPROXIMATE GEOGRAPHICAL LOCATION OF THE MEMBERS OF THE CALIFORNIA SEED ASSOCIATION 2010

(Based on the CSA membership roster) *



* Prepared by SeedQuest for Seed Central™
This map is not an official document. It does not include all seed and seed related companies present in California.

AGRICULTURAL TOURISM

Agricultural tourism and recreational services include activities such as farm tours, day camps, produce picking, wineries, and farmers markets. The prevalence of agricultural land and food production in the two-county region provides ample opportunity for growth in agricultural tourism and recreational services.

Solano and Yolo Counties have experienced an increase in the number of firms in this area during the past decade. In 2002, there were 11 firms in Solano and Yolo Counties. Five years later the number of firms expanded to 33 for the region. During the same period, agricultural tourism and recreational services firms grew by 37 percent from 499 firms in 2002 to 685 firms in 2007.

Total receipts for firms in agricultural tourism and recreational services increased by 11 times between 2002 and 2007 in the Solano and Yolo Counties region. Statewide total receipts increased 4 percent from 2002 to 2007. Data for agricultural tourism and recreational services is collected every five years.

Local farmers markets throughout the two counties are key players in the region’s agricultural tourism and recreational services. These markets provide an end use for agricultural production in the region as well as attract many tourists and travellers along Interstate 80. Currently, there are 8 certified farmers markets in Solano County located in Bencia, Dixon, Fairfield, Vacaville, and Vallejo. Yolo County has four certified farmers markets in Esparto, Davis, Winters, and Woodland.

A movement called community supported agriculture has increased the demand for locally grown and raised products. “Locovores” are concerned with purchasing food from regional producers and are opposed to products that are shipped from thousands of miles away. This results in fresher products, support for the local economy and farmers, and consumption of fewer energy resources associated with transportation of goods. Local Harvest is an online resource where locovores can search for organic and sustainable

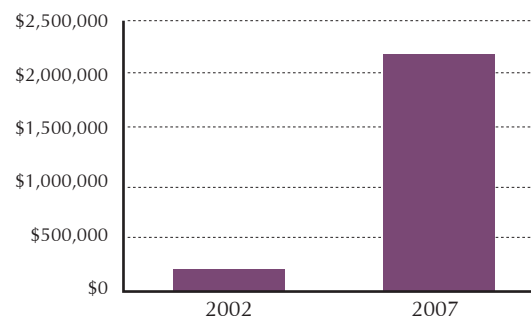
AGRICULTURAL TOURISM & RECREATIONAL SERVICES

Number of Firms in Solano & Yolo Counties



TOTAL RECEIPTS FROM OPERATIONS

Inflation Adjusted



Data Source: U.S. Department of Agriculture, National Agricultural Statistics Service
Analysis: Collaborative Economics

food in their area. Entering a city name or zipcode will reveal specific community supported agriculture programs, farmers markets, farm stands, and food coops in your area.

Solano is capitalizing on the growing demand for local products with the development of the ‘Solano Grown’ label – a project funded by the U.S. Department of Agriculture (www.solanogrown.org). The goals of the project are to create a local label for Solano products, promote the label to residents, increase the purchase of local products, and increase grower participation in direct marketing with workshops and speakers. A key component of the program will be a website to provide biographies of local producers and serve as a connection between locals residents and growers.



OPPORTUNITIES FOR THE FUTURE AND AREAS FOR IMPROVEMENT

The Food Chain is a network of operations, moving products from one stage of processing to another, involving skills from a variety of work fields, resulting in products that are marketable both locally and abroad. Innovation breaks down barriers, improves efficiencies, and creates new value. With the agricultural resources endowed to Solano and Yolo Counties, there are ample opportunities to add value and employment opportunities to the Food Chain by examining where current market trends intersect regional resources and by supporting innovation across the segments of the Food Chain.

LIVESTOCK HARVESTING AND PROCESSING FACILITIES

Livestock production represented roughly 16 percent of the total value of agricultural products in Solano County in 2009. In the same year, cattle and calves ranked 5th in a list of the 21 highest grossing crops in Solano County, while sheep and lambs ranked 10th.¹⁴ For Yolo County in 2009, cattle and calves ranked 9th in the list of top grossing crops and lambs ranked 19th. However, the majority of farmers in Northern California who were surveyed by the Sustainable Agriculture and Research Program at U.C. Davis believe the current production capacity of livestock harvesting and processing facilities is not large enough to meet the demand.¹⁵ The lack of USDA verified slaughterhouses has made it difficult for farmers to sell their products locally. Often times, animals are hauled out of the county or even out of the state to be processed, preventing farmers from taking advantage of local niche markets.

FOOD PRODUCERS AND LOCAL PRODUCTS

A recent survey of the national food supply chain revealed that farms in the Sacramento and Yolo areas market their products directly to customers at a much higher rate than the rest of the United States.¹⁶ Roadside stands, home deliveries, and farmers markets are the most common methods of direct marketing of farm products to consumers. Through these methods, farmers are able to capture a greater portion of retail prices versus traditional

mainstream marketing. Net revenue for each unit sold through direct marketing ranges in revenue values that are equal to mainstream marketing and up to 7 times the value. Additionally, direct marketing feeds into the recent increase in demand for locally produced goods and creates markets for products that are sustainable in the long-run and are less likely to be displaced by outside sources.

INTERNATIONAL MARKETS FOR LOCAL PRODUCTS

Markets for several of the top crops in Solano and Yolo Counties are expanding not only regionally, but also internationally. Consumer demand evolves and new markets emerge, providing opportunities for development in the production and vending

Bridgeway Farms

Located off Interstate 80 in the City of Davis, Bridgeway Farms is a 450-acre farm hoping to capitalize on the burgeoning interest in locally produced agriculture goods. Presently, blackberries and fruits from onsite fruit trees are sold from a stand on the farm. Expansion of the current facilities would include a large farm to showcase fruits, vegetables, cheese, and livestock products all cultivated from small farms within a 50-mile radius. Marketing and branding are essential in establishing the quality characteristics of local produce and how they differ, in a superior way, from mainstream market products.

of local products. Examples of products with sizable international markets are almonds, walnuts, peaches, pears, olive oil, processed tomatoes, and grapes.

For almonds, California is responsible for 100 percent of the commercial production. Two thirds of the production quantity is exported to over 90 countries. The demand for almonds nationally and abroad continues to grow. Marketing efforts emphasizing the health characteristics of almonds has triggered increased use in snacks, confectionary products, and cereals. New uses for almonds ranging from healthy snacks, international cuisines and almond milk expand the demand for almonds.¹⁷ Protein, vitamin A, dietary fiber, and monounsaturated fats - associated with reduced risk of heart disease – are appealing health benefits of almond consumption. As incomes increase in almond importing countries like China, where consumers are also eager to take advantage of almond nutrient value, greater opportunities for market expansion arise. Other factors in favor of growing demand for almonds in China are the weak dollar and sheer size of the Chinese consumer market. Almonds are one of the top ten valued crops Solano and Yolo Counties. Building upon this important regional crop may help the region in capturing more of the growing global market for almonds.

MAINTAINING TRANSPORTATION INFRASTRUCTURE

As the greater Sacramento region grows and attracts new businesses and residents, the existing

infrastructure must be maintained and expanded to accommodate the additional load. Comprehensive transportation infrastructure is an asset and is essential for distributing products to customers and obtaining production inputs. The lack of convenient and well-kept roads, highways, airports, ports, bridges and the like will deter new businesses and industries from establishing in the area. Additionally, existing establishments may flee or close down due to inconvenience and additional costs imposed by a deteriorating infrastructure system.

BUILDING THE REGIONAL FOOD CHAIN AND A CLUSTER NETWORK

In order to build out components of the Food Chain thoughtfully and sustainably, the private and public sectors in Solano and Yolo Counties will need to work together to identify strategic areas for improvement. Incorporating local goods and services will integrate Food Chain operations in the region, creating sustainable markets and diversifying regional production.

Solano and Yolo Counties are actively working through many of the challenges outlined in this report by producing futures studies and adopting measures in their general plans. This report serves as a jumping-off point for continued action and the development of a cluster network between both counties that is focused around Food Chain operations. Collaboration between businesses, industry leaders, and other key players in each county will help expand the scope and prosperity of the region's Food Chain.

Pacific Coast Producers

Although headquartered in Lodi, Pacific Coast Producers (PCP) occupies a processing plant in Woodland. The company was founded on behalf of local growers in 1971, who were struggling due to canneries fleeing the area. The cooperative now includes well over 100 growers who are members. PCP carries out all aspects of the canning process from filling, processing, quality control, and distribution. Products of the cooperative include canned fruits and tomatoes and a variety of food service products. Fruit crops used in production include peaches, pears, apricots, and grapes. Product quality and freshness are hallmark to the company. All tomatoes are harvested from local sources within a 16-mile radius. The time between harvesting and canning tomatoes is less than six hours, maintaining the freshness of the produce.

APPENDIX A

Percentage of Total Economic Output Generated by the Food Chain, Economic Output of the Food Chain: Gross Domestic Product by Segment

Total Gross Domestic Product (GDP) data are from Moody's Economy.com. GDP values are inflation-adjusted and reported in 2009 dollars, using the CPI for the U.S. City Average from the Bureau of Labor Statistics. Solano and Yolo County GDP data has been combined. The GDP for the Agriculture/Production segment is based on a more inclusive definition than the Food Chain Production segment due to the availability of the agriculture industry data. Moody's Economy.com provided GDP data at four-digit industry level to combine into the four Food Chain segments (Distribution, Processing, Production, and Support).

Food Chain Employment Distribution, Food Chain Employment Trends by Segment, Earnings Growth in Food Chain: Annual Average Earnings by Segment

Solano and Yolo County employment data are provided by the California Employment Development Department, Labor Market Information Division. The data set counts jobs in the region and uses data from the Quarterly Census of Wages and Employment program that produces a comprehensive tabulation of employment and wage information for workers covered by State Unemployment Insurance (UI) laws and Federal workers covered by the Unemployment Compensation for Federal Employees (UCFE) program. Employment data exclude members of the armed forces, the self-employed, proprietors, domestic workers, unpaid family workers, and railroad workers covered by the railroad unemployment insurance system. Covered workers may live outside of the Solano and Yolo Counties. Multiple jobholders (i.e. individuals who hold more than one job) may be counted more than once. All food chain industries are included in the analysis. Annual average earnings values are inflation-adjusted and reported in 2009 dollars, using the CPI for the U.S. City Average from the Bureau of Labor Statistics.

Examples of Occupations in Solano's Food Chain

Employment and wage data are from the Occupational Employment Statistics (OES) provided by the U.S. Bureau of Labor Statistics and is the survey dated the May 2009. The OES survey is a semiannual survey, measuring occupational wage rates and employment in nonfarm establishments. The California occupational staffing pattern provided by California Employment Development Department, Labor Market Information Division was used to analyze the occupations in the clusters.

Number of Nonemployers in Agriculture and Food & Beverage Manufacturing, Total Receipts per Firm in 2008

Data for Nonemployers are from the U.S. Census Bureau. Nonemployer Statistics summarizes the number of establishments and sales or receipts of businesses without paid employees that are subject to federal income tax. Most nonemployers are self-employed individuals operating very small unincorporated businesses, which may or may not be the owner's principal source of income. Nonemployers total receipts values are inflation-adjusted and reported in 2009 dollars, using the CPI for the U.S. City Average from the Bureau of Labor Statistics.

Total Annual Farm Proprietor Income

Annual proprietor income is from the U.S. Bureau of Economic Analysis. This component of personal income is the current-production income of sole proprietorships and partnerships and of tax-exempt cooperatives. Proprietors' income excludes dividends and monetary interest received by nonfinancial business and rental incomes received by persons not primarily engaged in the real estate business; these incomes are included in dividends, net interest, and rental income of persons, respectively. Nonfarm Proprietors' Income consists of the income that is received by nonfarm sole proprietorships and partnerships and the income that is received by tax-exempt cooperatives. The national estimates of nonfarm proprietors' income are primarily derived from income tax data. Farm proprietors' income consists of the income that is received by the sole proprietorships and the partnerships that operate farms. It excludes the income that is received by corporate farms. Proprietor income values are inflation-adjusted and reported in 2009 dollars, using the CPI for the U.S. City Average from the Bureau of Labor Statistics.

Top Ten Crops in Solano County and Yolo County in 2009

Data provided by the Solano County 2009 Crop and Livestock Report, the 2008 Solano County Crop and Livestock Report, the Yolo County 2009 Agricultural Crop Report, and the Yolo County 2008 Agricultural Crop Report

Conversion of Agricultural Land and Urban & Built-Up Land

Data is from the State of California Department of Conservation, Farmland Mapping and Monitoring Program (FMMP). The FMMP produces maps and statistical data used for analyzing impacts on California's agricultural resources. Agricultural land includes farmland and grazing land.

Organic Farming: Percentage of Total Crop Sales and Operations

Organic farming data are provided by the United States Department of Agriculture (USDA), National Agricultural Statistics Service. Organic sales and operations data are from the 2007 Agriculture Census.

Agricultural Tourism & Recreational Services

Total Receipts from Operations

Agricultural tourism data are provided by the United States Department of Agriculture (USDA), National Agricultural Statistics Service. Data are from the 2002 and 2007 Agriculture Census. Total receipts from operations values are inflation-adjusted and reported in 2009 dollars, using the CPI for the U.S. City Average from the Bureau of Labor Statistics.

APPENDIX B

FOOD CHAIN INDUSTRY DEFINITION			
Category	Sub Category	NAICS Code	NAICS Title
Distribution	Wholesalers	4244	Grocery and Related Product Merchant Wholesalers
	Wholesalers	4245	Farm Product Raw Material Merchant Wholesalers
	Wholesalers	4248	Beer, Wine, and Distilled Alcoholic Beverage Merchant Wholesalers
	Wholesalers	42491	Farm Supplies Merchant Wholesalers
	Speciality Stores	4452	Specialty Food Stores
	Storage	49313	Farm Product Warehousing and Storage
Processing	Food	3111	Animal Food Manufacturing
	Food	3112	Grain and Oilseed Milling
	Food	3113	Sugar and Confectionery Product Manufacturing
	Food	3114	Fruit and Vegetable Preserving and Specialty Food Manufacturing
	Food	3115	Dairy Product Manufacturing
	Food	3116	Animal Slaughtering and Processing
	Food	3117	Seafood Product Preparation and Packaging
	Food	3118	Bakeries and Tortilla Manufacturing
	Food	3119	Other Food Manufacturing
	Beverage	3121	Beverage Manufacturing
	Packaging	322215	Nonfolding Sanitary Food Container Manufacturing
	Packaging	32616	Plastics Bottle Manufacturing
	Packaging	327213	Glass Container Manufacturing
	Packaging	332115	Crown and Closure Manufacturing
	Packaging	332431	Metal Can Manufacturing
Production	Crops	1111	Oilseed and Grain Farming
	Crops	1112	Vegetable and Melon Farming
	Crops	1113	Fruit and Tree Nut Farming
	Crops	11141	Food Crops Grown Under Cover
	Crops	11193	Sugarcane Farming
	Crops	11194	Hay Farming
	Crops	11199	All Other Crop Farming
	Livestock	1121	Cattle Ranching and Farming
	Livestock	1122	Hog and Pig Farming
	Livestock	1123	Poultry and Egg Production
	Livestock	1124	Sheep and Goat Farming
	Livestock	1125	Animal Aquaculture
	Livestock	1129	Other Animal Production
	Livestock	1141	Fishing
	Livestock	1142	Hunting and Trapping
Support	Services	1151	Support Activities for Crop Production
	Services	1152	Support Activities for Animal Production
	Water	22131	Water Supply and Irrigation Systems
	Water	23711	Water and Sewer Line and Related Structures Construction
	Materials	32192	Wood Container and Pallet Manufacturing
	Materials	3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing
	Materials	33311	Agricultural Implement Manufacturing
	Machinery	333294	Food Product Machinery Manufacturing
	Machinery	333993	Packaging Machinery Manufacturing
	Machinery	42382	Farm and Garden Machinery and Equipment Merchant Wholesalers
	Services	54194	Veterinary Services

ENDNOTES

- 1 "Solano County General Plan 2008." Solano County General Plan. Solano County, 01122008. Web. 10 Aug 2010. <<http://solanocountygeneralplan.net/>>. Maintaining compliance with water quality standards for pollutant levels, and conservation of riparian habitats and aquatic species impacts the availability and use of select surface water resources.
- 2 Richter, Kurt, and Alvin Sokolow. "The Economic Roots of Solano County Agriculture." University of California, Agricultural Issues Center. Agricultural Issues Center, 14902007. Web. 10 Aug 2010. <<http://aic.ucdavis.edu/solano/econroots.pdf>>.
- 3 "Williamson Act Program." CA Gov. State of California, Department of Conservation, n.d. Web. 10 Aug 2010. <<http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx>>.
- 4 "About Solano County." Web. August 18, 2010. <<http://www.co.solano.ca.us/about/default.asp>>
- 5 For more in-depth information regarding regulatory concerns in Solano & Yolo Counties, please see the reports: Sharpening the Focus of Yolo County Land Use Policy <<http://aic.ucdavis.edu/publications/yoloLUPlo.pdf>> and The Future of Solano County Agriculture: What County Government Can Do <<http://aic.ucdavis.edu/solano/4.Recommendations.pdf>>.
- 6 Wind farm developers are working with the Travis Air Force Base and the County to avoid conflicts with radar operations at the base.
- 7 Halverson, Nathan, and. "Solano Deals in Advanced Addiction: Wind Energy." Solano Energy Cluster. Solano County, 21022006. Web. 10 Aug 2010. <<http://solanoenergy.blogspot.com/2009/08/new-windmills-near-delta-fuel-states.html>>.
- 8 Fountain, Robert J, "The Economic Impacts of the Shiloh III Wind Generation Project." Regional Economics Consulting. 9 Sept 2010.
- 9 Laforteza, Natassia. "SunEdison's solar panels provide power for Budweiser brewery." ecoseed.org. N.p., 17042009. Web. 10 Aug 2010. <<http://www.ecoseed.org/en/general-green-news/green-business-news/green-business-news/1627-sunedisons-solar-panels-provide-power-for-budweiser-brewery>>.
- 10 "Organic Production." United States Department of Agriculture, Economic Research Service. Web. 27 Aug 2010. <<http://www.ers.usda.gov/Data/Organic/>>
- 11 Ness, Carol. "Green giants." San Francisco Chronicle, 142/104 (April 30, 2006), A-1.
- 12 Irwin, Heather. "Wooly workers: Sheep help tend the vines." San Francisco Chronicle, 142/108 (May 4, 2006), F-3.
- 13 "Emerging Issues in the U.S. Organic Industry." U.S. Department of Agriculture: Economic Research Service. June 2009
- 14 "Solano County 2009 Crop and Livestock Report." Solano County California. Solano County, 27052010. Web. 10 Aug 2010. <<http://www.co.solano.ca.us/news/displaynews.asp?NewsID=277&targetid=1>>.
- 15 Doran, Morgan, Temra Costa, John Harper, Theresa Becchetti, Stephanie Larson, Shermain Hardesty, and Roger Ingram. 2007. Need assessment for small-scale livestock harvesting and processing facilities in Northern California. Fairfield, CA: Sustainable Agriculture Research and Education Program.
- 16 King, Robert, and. "Comparing the Structure, Size, and Performance of Local and Mainstream Food Supply Chains." Economic Research Service. USDA, 210072010. Web. 10 Aug 2010. <<http://www.ers.usda.gov/publications/err99/>>.
- 17 Boriss, Hayley , and Henrich Brunke. "Commodity Profile: Almonds." Agricultural Marketing Research Center. Agriculture Issues Center, University of California, 01032010. Web. 11 Aug 2010. <http://www.agmrc.org/commodities_products/nuts/almond_profile.cfm>.

Solano Economic Development Corporation
360 Campus Lane, Suite 102
Fairfield, California 94534
(707) 864-1855 Office • (707) 864-6621 Fax

www.solanoedc.org