The Economic Impact of Rising Input Prices on California Agriculture

By Dr. Karen Klonsky

Abstract

The recent rises in production costs pose new challenges to farmers. However, price increases are not proportionate across input categories with the most dramatic increases in energy and energy-intensive inputs such as fertilizer. Consequently, the relative impact of rising input costs on different subsectors of agriculture depends on the input-intensity of the production system. Operating costs were examined for five crops in California, prunes, winegrapes, processing tomatoes, alfalfa hay and dry beans over the period 2001 to 2008. For all commodities, the increase in operating costs was greater from 2007 to 2008 than the average annual increase from 2001 to 2007. The increase in costs was greatest for alfalfa and processing tomatoes with relatively high levels of fuel and fertilizer inputs, and lowest for wine grape production which is labor intensive.

Introduction

The recent rise in production costs poses new challenges to farmers. However, price increases are not proportionate across input categories with the most dramatic increases occurring in energy and energy-intensive inputs such as fertilizer. Following years of stable prices, nominal fuel and fertilizer prices paid by U.S. farmers more than tripled between 2001 and 2008 (NASS). Over the same period, the prices paid for pesticides show an increase of only 10 percent, farm labor wages average an increase of 20 percent and farm machinery 33 percent. Consequently, the relative impact of rising input costs on different subsectors of agriculture depends on the input-intensity of the production system. For example, if fuel is only 2 percent of production costs, then a 50 percent increase in fuel costs will result in only a one percent increase in production costs. But for another commodity where fuel is 20 percent of production costs the same increase in fuel prices means a 10 percent increase in total costs of production.

Inevitably, technological adjustments will take place in the form of input substitution and increased adoption of farming methods such as legume rotations to fix nitrogen, reduced tillage, deficit irrigation, solar powered irrigation pumps, improved fertilizer monitoring and precision fertilizer applications using GPS. Other new technologies will undoubtedly arise. Structural changes will include shifts in the total acreage of crops grown and crop location. The objective of this study is to increase understanding of the relative and absolute variation in the impacts of rising input prices on the cost of production across California commodities. The findings are important to anticipating the development and adoption of new technologies as well as possible structural changes in California agriculture.

Karen Klonsky is a Specialist in Cooperative Extension in the Department of Agricultural and Resource Economics at the University of California, Davis. She received her Ph.D. in agricultural economics from Michigan State University.

Background

Operating costs for agricultural production consist of labor, materials, fuel, lube and repairs on equipment, custom operations and interest on operating costs. Labor may be paid on an hourly, monthly or piece rate basis. The full cost of labor includes wages plus the employer's share of federal and state payroll taxes, workers compensation insurance and other possible benefits such as use of a pickup truck or housing. Materials include inputs such as seed, fertilizer, pesticides and water. Repairs on equipment include the annual repairs to tractors, implements, ATVs and trucks allocated to the commodities produced on the farm. Interest on all of these costs may be the interest paid on an operating loan, the opportunity cost of cash tied up in the crop before harvest for farmers who self finance or a combination of the two.

While operating costs vary across farms, across regions and across commodities, examining aggregated prices paid by farmers are instructive in identifying general trends. The Index of Prices Paid by Farmers, calculated by the National Agricultural Statistics Service, reveals the relative change in a set of prices between a designated base year and all other years for all agricultural producers in the United States. The base year is assigned the value of 100. For example, if the base year price is $2.00 and the comparison year price is $2.20 then the index number for the comparison year is 110 (a 10 percent increase over the base year). Index numbers allow for aggregation of numerous prices within a cost category (e.g., fertilizer) to observe trends in prices within that category over time and comparison of relative prices between categories (e.g., fertilizer versus pesticides).

Fuel

The recent increases in gasoline and diesel prices per gallon represent the largest increase in farm input costs on a percentage basis. U.S. and California diesel wholesale prices increased from under $2.00 a gallon in January 2007 to $3.99 per gallon in July 2008 (U.S. Department of Energy). But a longer term inspection of the data shows prices trending upward since 2002 (Figure 1). The argument can be made that agriculture has already been adjusting to rising fuel costs with technological innovations such as reduced tillage although additional adjustments may be needed in the near future.

Fertilizer

Through the 90s fertilizer prices remained fairly constant (Figure 2). Prices began their ascent in 2003 doubling by 2007 with a dramatic increase by mid 2008 to levels three times that of 2003. Nitrogen, phosphorous and potassium prices have each followed these same price patterns. Most nitrogen fertilizers are produced from ammonia. The production of ammonia entails the energy-intensive reaction of nitrogen and hydrogen, requiring extremely high temperatures. Natural gas serves as the source of hydrogen in U.S. plants. Therefore, it is not surprising that the price of nitrogen has risen in parallel with overall energy prices. Phosphate fertilizers are produced from a few major natural deposits in the world (North America, North Africa and the former Soviet Union) and processed into fertilizers. Potassium is found throughout the world with the majority of potassium production is from underground deposits. Increased world demand for fertilizer, notably from China, along with increased shipping costs, has spurred the increase in fertilizer prices.

Pesticides

Pesticides include herbicides, fungicides, insecticides and miticides. Changes in pesticide prices are more complex than for fertilizers in part due to the wide range of materials included in this category and also because of the complex process for bringing new materials to the retail market. Pesticide manufacturers pull patents as soon as they think they have a material with commercial potential. Then they must go through the process of developing and registering the pesticide with both EPA and Cal-EPA which requires years of testing. By the time a pesticide is commercially produced and sold, the manufacturer only has a few years before the pesticide goes off patent and can recover its years of investments. This results in relatively high prices during the initial period of commercial availability. After the pesticide is off patent, generic versions may be manufactured and sold by other companies at substantially lower prices. The combination of a competitive marketplace for pesticides, the entry of new products, introduction of generic versions of older pesticides and the development of pesticide resistance results in volatility in absolute prices and relative prices across substitute materials.

The aggregated flatness in pesticide prices paid by farmers over the past fifteen years masks the dramatic increases and decreases over time in the prices of individual materials (Figure 2). Also, the materials used, rates and application methods continue to evolve. In short, the changes in pesticide expenditures over time must be calculated on a crop by crop, location by location basis in order to get a realistic picture of the impact on growers.

Labor

The hourly base labor rates increased for each crop over the period of the study at a steady rate. However, the California workers compensation rates have decreased from 2007 to 2008 for agricultural activities, although the rates vary by crop. Consequently, the actual cash expense to growers on an hourly basis did not change much from 2007 to 2008 although wages vary by season and crop. Availability of labor remains the dominant issue in California with respect to labor.

Custom Rates

Custom charges refer to production operations performed by an outside contractor called a custom operator. These arrangements are most common when the production operation requires specialized equipment for operations such as aerial spraying of trees or harvest. Custom rates charged to different farmers for the same custom operation vary depending on the size of the farm, location of the farm (i.e., distance from other farms or the home base of the custom operator), size of the crop, difficulty of moving equipment in and out of the field, orchard, or vineyard and other factors.

Interest Rates

Operating loans to farmers are short term loans covering production and harvest expenses with draws typically on a monthly basis. Collateral for operating loans usually consists of a first lien on crops to be produced. The repayment terms and interest rates vary by lender, by operator and by the collateral securing the loan. The interest rates for loans are adjusted periodically based on the lending institutions cost of borrowing. The prime interest rate in the U.S. peaked in the early 80s trending downwards ever since (Figure 3). The relatively low interest rates in recent years has contributed to the expansion of high-value crops in California (i.e., fruits and vegetables) in favor of low-value field crops where soil and climatic conditions permit. It remains to be seen how the recent and dramatic tightening of the credit market will play out in agriculture.

Land Values

As reported by USDA, farm real estate includes land and buildings on farms. U.S. real estate values more than doubled from 2001 and 2008 (an increase of 122 percent). In 2008 farm real estate values reached record levels posting an 8.8 percent increase over 2007 values for a national average of $2,550 per acre. California posted a one year gain of 8.3 percent with a $6,500 average value per acre, by far the highest of any state (USDA 2008). These increases are particularly notable at a time when declines in commercial and residential real estate values are also historic resulting in a slowdown in real estate development. Record high crop prices coupled with continued low interest rates and tax incentives all play a role in continued rising values. Accordingly, cropland cash rent has also continued to rise with a national average increase of 13 percent from 2007 to 2008 and an increase of 6 percent in California. Again, California leads the nation with the highest average cash rent for cropland at $320 per acre compared to $96 for the entire U.S.

Land values in California vary greatly by region and crop grown. The high and low values of agricultural land by crop and region are published annually by the California Chapter of the American Society of Farm Managers and Rural Appraisers. The values for the crops and locations included in this study are shown in Table 1. Land values for perennial crops include both the land and the value of the trees or vines. The land values increased for all crops over the period 2001 to 2006 (the most recent values available) with the exception of winegrapes in the northern San Joaquin Valley following an oversupply and decrease in value of winegrapes from this area. Interestingly, the high value for land increased at a greater rate than the low values. Land values for field crops and vegetables more than doubled in the Northern Mountain Region, Sacramento Valley and the Southern San Joaquin Valley while the land values for prune orchards in the Sacramento Valley increased at a more modest 14 to 31 percent. The Crush District #11 vineyards actually decreased in value by 7 to 18 percent.

Procedures and Data

The costs of production and resource use for California's diverse agriculture vary considerably. In order to study the range of impacts of rising input prices on crop production in California, case studies were developed for prune and winegrape perennial crops, alfalfa hay (high value) and blackeye beans (low value) field crops and processing tomato vegetable crops. Costs of production and resource use were calculated for three years, 2001, 2007 and 2008 for each of the crops to analyze the changes in operating costs and the relative importance of input categories across commodities. The case study development relied on group interviews of successful, commercial farmers for each crop. Each farmer group developed a hypothetical farm size and rotation scheme where applicable representative of a commercial farm in their area and following best management practices as defined by the group. The calendars of farming operations, equipment use, materials and application rates, application methods and labor hours by farming operation were all ascertained during group interviews.

The materials, equipment, and hours per acre per operation were all updated from 2001 and 2007 but were identical in the 2007 and 2008 studies. In other words, the cost differences between 2007 and 2008 contain solely the changes in input prices and not a change in inputs while the differences between 2001 and 2007 contain differences in input prices as well as differences in materials and equipment used.

Farm labor wages and benefits were obtained from the farmer groups. Workers' compensation rates used to calculate mandated employer insurance payments for employees were obtained from the California State Fund Resources Board. Federal and state payroll taxes were also included. The hours per acre for each farming operation were also obtained from the farmer groups. The custom rates for pesticide applications and harvest were obtained directly from custom operators in the area. Prices for material and equipment were obtained from local input suppliers.

Fuel use was determined using equations developed by the American Society of Agricultural Engineers (ASAE) based on the maximum power takeoff (PTO) horsepower and fuel type. Fuel prices are for on farm delivery which includes local sales tax. Repair costs are also calculated from ASAE equations based on purchase price, annual hours of use and total hours of life for each piece of equipment. The per acre fuel, lube and repair cost for each operation is calculated by multiplying the total hourly cost by the hours per acre for each operation. The total is the sum over all operations. Similarly, the total fuel use is calculated by multiplying the fuel use per hour by the hours per acre for each operation and then adding together the fuel use from each operation.

Interest on operating capital was charged monthly up until the month of harvest. The rates used were obtained from the local Farm Credit Services office for production loans in January of each year. Annual nominal rates of 10.51, 10.00, and 6.75 percent were used for 2001, 2007 and 2008 respectively. The average annual percent change in operating costs was calculated for each commodity and each input category over the period from 2001 to 2007. The percent change in operating costs was also calculated comparing 2008 costs to 2007 costs.

Results

For all commodities, the average annual increase in costs from 2001 to 2007 had a narrow range of 3 to 7 percent with processing tomatoes at 7 percent and all other crops at 3 or 4 percent (Table 2). The percentage increase in total operating costs from 2007 to 2008 was greater than the average annual increase from 2001 to 2007 for all crops except winegrapes. For the remaining crops, the increase in total operating costs ranged from 8 percent for beans to 39 percent for alfalfa hay.

As expected, the annual percent change in fuel costs was greater from 2007 to 2008 than the average annual percent change from 2001 to 2007 for all crops (Table 2). The average annual percentage increases from 2001 to 2007 ranged from 12 percent for processing tomatoes to 28 percent for winegrapes while the annual increase from 2007 to 2008 ranged from 46 percent for dry beans to 64 percent for prunes. The 2001 to 2007 increases reflect differences in the equipment complex and farming operations. From 2007 to 2008 the equipment and operations were unchanged. The difference in the increase in fuel costs across crops reflects the different proportions of diesel and gasoline.

Dry bean production does not include any fertilizer applications as beans are nitrogen fixing plants. For the other crops, fertilizer expenditures showed a similar pattern as for fuel use. The annual percent change from 2001 to 2007 ranged from 6 percent to 8 percent while the annual percent change from 2007 to 2008 ranged from 33 percent for winegrapes to 183 percent for alfalfa. While fertilizer expenditures increased substantially for all commodities over the past year, the range in the percent increase was much greater than for fuel expenditure indicating the lack of uniformity in the increase in prices across fertilizer materials. Surprisingly, the percentage increase in fertilizer costs from 2007 to 2008 was greater than the percent increase in fuel costs for tomatoes and alfalfa and lower for winegrapes and prunes. On an absolute basis the greatest increase was for processing tomatoes, up $141 per acre from 2007 to 2008 compared to $60 per acre from 2001 to 2007.

The rate of increase in pesticide costs varied across crops due to the nature of pesticide pricing and the continual change in pesticide use patterns for any individual crop. The pesticide expense increased from 2001 to 2007 and again from 2007 to 2008 for all crops except processing tomatoes which actually saw a decrease in pesticide expenditure from 2001 to 2007 and for winegrapes that saw a decrease from 2007 to 2008. The decrease in cost for processing tomatoes is attributable to the use of a fumigant in 2001 but not in 2007 or 2008 and a more expensive suite of herbicides used in 2001 than the other years. The decrease in pesticide costs from 2007 to

2008 for winegrapes reflects a decrease in the prices of the specific herbicides and insecticides used despite a doubling in the price of dusting sulfur. The average annual rate of increase from 2001 to 2007 was greater than for the change from 2007 to 2008 for all crops except processing tomatoes and winegrapes.

The custom harvest operations for prunes and winegrapes entail mechanical harvest of the fruit and hauling from the orchard or vineyard to the dryer or winery, respectively. The custom operators provide all labor, materials and equipment including the trucks, drivers and gasoline for hauling the fruit. It would be expected that custom rates should increase with the price of fuel, particularly the cost of hauling. However, prices collected from local operators revealed that the custom harvest rates increased by 14 percent for winegrapes and 8 percent for prunes from 2007 to 2008. For both, most of the increase was attributable to the actual harvest and very little to hauling. This result may be due to custom operators expecting the fuel cost increases to be temporary, an uneasiness passing on the entire increase in fuel costs to long-time customers, a reflection of lower grape and prune prices received by growers in 2008 and/or the competitive nature of the custom harvest business.

Custom harvest costs for dry beans that include cutting, threshing, raking and weighing beans, represent almost half of operating costs (Table 3). From 2001 to 2007 these costs only increased slightly, one percent per year. Between 2007 and 2008 the field level harvest costs increased by 17 percent while the charges from the California Dry Bean Board, Blackeye Council and storage did not change. Hauling charges include a fuel surcharge which varies widely over time and by custom operator. In this study, a conservative 10 percent increase in hauling was assumed. The net result is a 14 percent increase in harvest, hauling and storage.

On the whole, the average annual increase in total operating costs from 2001 to 2007 showed a narrow range of 3 to 7 percent. Winegrapes and alfalfa showed a 3 percent increase per year, dry beans and prunes 4 percent and processing tomatoes 7 percent. The annual increases in total operating costs for winegrapes were low because of the labor intensive nature of production. Processing tomatoes posted the highest increase over this period primarily due to the relatively high number of field operations requiring large scale equipment amplifying the fuel, lube and repair cost increases over the period.

The range of results in the percent change from 2007 to 2008 was more varied than from 2001 to 2007. For the perennial fruit crops, prunes increased in cost by 10 percent but winegrapes only by one percent. This difference can be explained by the relatively low fertilizer requirements for winegrapes and to a lesser extent the decrease in pesticide expenditures for winegrapes. Looking at the high value field crops, processing tomatoes increased in cost by 17 percent in just one year due to significant increases in fuel, pesticide and fertilizer costs. These categories combined climbed from one fourth of operating costs to a third of operating costs (Table 3). Alfalfa operating costs increased by the greatest amount, 33 percent, primarily due to the increase in fertilizer costs that jumped from 10 percent of operating costs to 21 percent. In 2007, alfalfa and processing tomatoes recorded the highest percentage of operating costs in the fertilizer and fuel categories of all of the crops. In other words, the high value field crops utilize proportionately more fertilizer and fuel than the perennial crops which are more labor intensive primarily due to pruning. Consequently, the recent increase in fuel and fertilizer prices has hit high - value field crop growers harder than growers of orchard trees and vines. In contrast, the relatively low-value field crop, beans, increased only 8 percent in total costs. This is explained by observing that bean production requires no fertilizer and that fuel is only 9 percent of total operating costs. Three fourths of the cost increase for beans is attributable to custom harvest, which increased by 14 percent from 2007 to 2008.

Discussion

The relative impact of the recent, dramatic increases in fuel and fertilizer costs on overall production costs varies by commodity. As expected, winegrapes, the most labor-intensive crop included in this study, is the least impacted by the changes in input prices, even with the advent of mechanical harvesting of grapes. Interestingly, the total operating cost for prunes shows an increase of 10 percent compared to only one percent for winegrapes from 2007 to 2008. The difference lies in the higher dollar expenditure on fertilizer for prunes versus winegrapes ($227 per acre versus $72 per acre in 2008) and the 58 percent increase in fertilizer expenditure realized in prunes. Nonetheless, prunes show a lower overall increase in operating costs than any of the field crops studied with the notable exception of dry beans. This result is attributable to the fact that dry beans do not require any fertilizer application in production.

At a time when rising fuel costs are recanted daily in the media, it cannot be overemphasized that for some crops, the accompanying

increase in fertilizer impacts the costs to produce some commodities even more than rising fuel prices. Most notably, processing tomatoes saw a 95 percent increase in fertilizer expenditures and alfalfa a 183 percent increase from 2007 to 2008. This result may be slightly overstated because the study assumes that the fertilizer regime from 2007 to 2008 was unchanged while in practice growers adjust their fertilizer choices in response to current market prices. Nonetheless, even with high fuel prices, fertilizer expenditures for tomatoes equal those for fuel and are almost double fuel expenditures for alfalfa.

This study assumed custom harvest for prunes, winegrapes and beans and grower owned harvest equipment for processing tomatoes and alfalfa. It should be noted that custom harvest is widespread for tomatoes and alfalfa production and that some growers may exclusively rely on custom harvest while still others use a combination of their own equipment and custom harvest. For the alfalfa example in this study, harvest costs are roughly one third of total operating costs and fuel expenditures comprise roughly one third of harvest costs in 2008. Therefore, the increase of 44 percent in fuel costs contributed to a 15 percent increase in harvest costs. From 2007 to 2008 alfalfa harvest costs rose by 18 percent overall with the last 3 percent of the increase attributable to lube and repair costs. The 18 percent increase in harvest costs for alfalfa growers owning their own equipment is comparable to the 14 percent increase in custom harvest charges realized by dry bean producers.

For processing tomatoes, harvest is much more labor intensive than for alfalfa, or any other field crop for that matter, with one third of harvest costs going to labor. From 2007 to 2008 harvest costs rose by 11 percent, lower than the 14 percent custom charge increase seen in dry beans and the 18 percent increase in alfalfa harvest costs. This was expected due to the labor intensive characteristic of tomato harvest. However, the comparable increase in harvest costs, regardless of whether or not the harvest is performed by a custom operator, implies that custom harvest costs reflect the changes in their operating costs and that the study results are not biased by the choice of custom versus grower owned harvest equipment in the individual crop studies.

Taking all input costs into consideration, perennial crops appear to weather the increase in fuel and fertilizer costs better than field crops. The difference in impact of rising fuel costs between perennial crops and field crops results in part because the size of tractors used in vineyard and orchard situations is limited by the spacing of the tree or vine rows and utilize far less fuel per acre than the 4WD tractors used in field crop production. Among the field crops, the higher value crops requiring more field operations and more fertilizer appear to be the most vulnerable to current trends in input costs.

An analysis of operating costs alone is not adequate for predicting changes in the future cropping patterns in California agriculture. Arguably, the prices received for commodities are a key component of cropping choices. Further, energy prices impact agriculture in several ways beyond production costs. The post harvest components of delivering food products to markets include processing, storage, and transporting. The costs of doing business at each of these stages in the supply chain are also impacted by rising fuel and energy costs and for many commodities to a larger extent than production agriculture itself (Roland-Holst and Zilberman 2006). Further, as with the farm production costs, the impact of rising energy costs on post-harvest activities is not uniform across commodities. Many of these costs will inevitably be passed on to growers and dampen the positive impact of any price increases on the bottom line. With small profit margins, even a relatively small percentage increase in costs will result in a much greater percentage decrease in profit. Even if costs are passed on to consumers, demand may decrease negatively impacting farmers.

References

American Society of Agricultural Engineers (2003). *American Society of Agricultural Engineers Standards Yearbook,* 41st edition. Russell H.Hahn and Evelyn E. Rosentreter (ed.). St. Joseph, Missouri.

Buchner, R., Edstron, J., Krueger, W., Olson, W., Reil, W., Klonsky, K., et al. (2001). Sample costs to establish a prune orchard and produce prunes in the Sacramento Valley. Dept. of Agricultural and Resource Economics, University of California, Davis.

California Chapter of the American Society of Farm Managers and Rural Appraisers (2008). *Trends in land and lease values 2008*. California Chapter ASFMRA.

Department of Energy, Energy Information Administration (2008, July 31). Petroleum Navigator. Retrieved from http://tonto.eia.doe.gov/dnav/pet/hist/a203650062m.htm.

Frate, C., Klonsky, K., & De Moura, R. (2001 & 2008). Sample costs to produce blackeye beans in the San Joaquin Valley. Dept. of Agricultural and Resource Economics, University of California, Davis.

Miyao, G., Klonsky, K., & Livingston, P. (2001 & 2008). Sample costs to produce processing tomatoes in the Sacramento Valley. Dept. of Agricultural and Resource Economics, University of California, Davis.

Niederholzer, F., Krueger, W., Buchner, R., Klonsky, K., & DeMoura, R. (2007). Sample costs to establish a prune orchard and produce prunes in the Sacramento Valley. Dept. of Agricultural and Resource Economics, University of California.

Orloff, S., Klonsky, K., & Livingston, P. (2001 & 2007). Sample costs to establish and produce alfalfa hay in the intermountain region. Dept. of Agricultural and Resource Economics, University of California, Davis.

Reece, M. For frmers a precarious balance between debt and riches. Retrieved August 17, 2008 from http://www.flathearbeacon.com/main/print/for_farmers_ a_ precarious_ balance_ between _debt_ and_ riches.

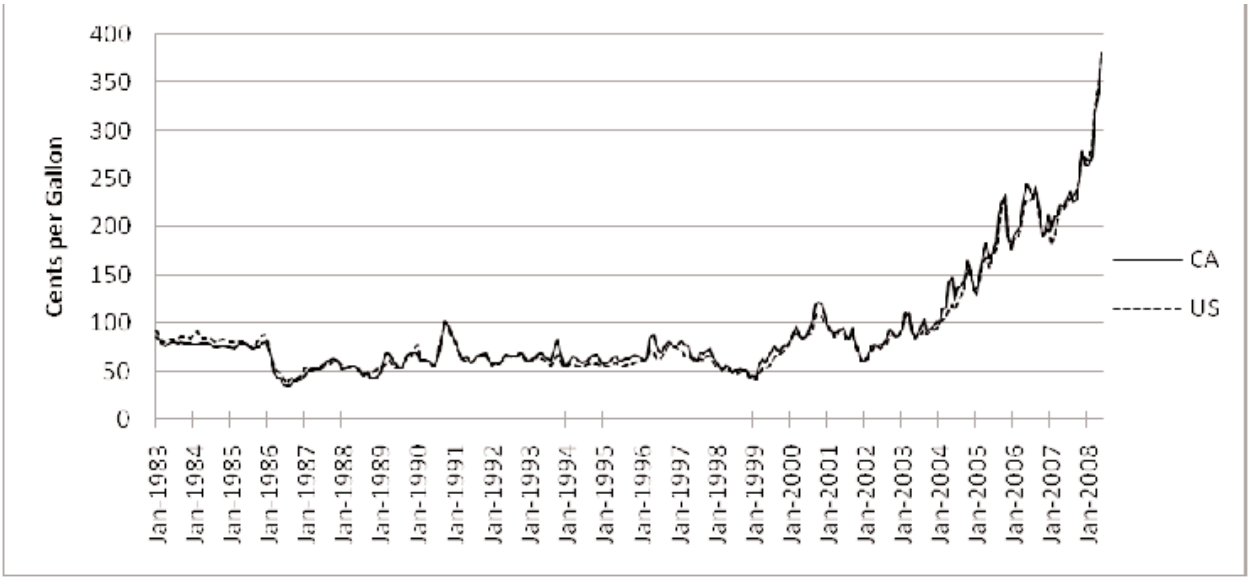
Roland – Host, D., & Zilberman, D. (2006). How vulnerable is California agriculture to higher energy prices? Update (9:5), University of California Giannini Foundation, Davis.

Verdegaal, P., Klonsky, , & DeMoura, D. (2001 & 2008). Sample costs to establish a vineyard and produce wine grapes – Crush District 11. Dept. of Agricultural and Resource Economics, University of California, Davis.

U.S. Department of Agriculture, National Agricultural Statistical Service (2008, August). Land values and cash rents 2008 Summary. USDA/NASS, Washington D.C.

Williams, J., DeLano, F., & Aller, T. (2001). The economic impact of higher oil prices on farm production costs in Kansas. *Journal of the American Society of Farm Managers and Rural Appraisers*, p. 32 – 38.

Figure 1. U.S. and CA diesel wholesale prices, 1983 - 2008



Source, Energy Information Administration, US Dept. of Energy,
http://tonto.eia.doe.gov/dnav/pet/hist/a203650062m.htm, release date 7/31/08.

Figure 2. Indexes of prices paid by U.S. farmers, 1009-1992 = 100

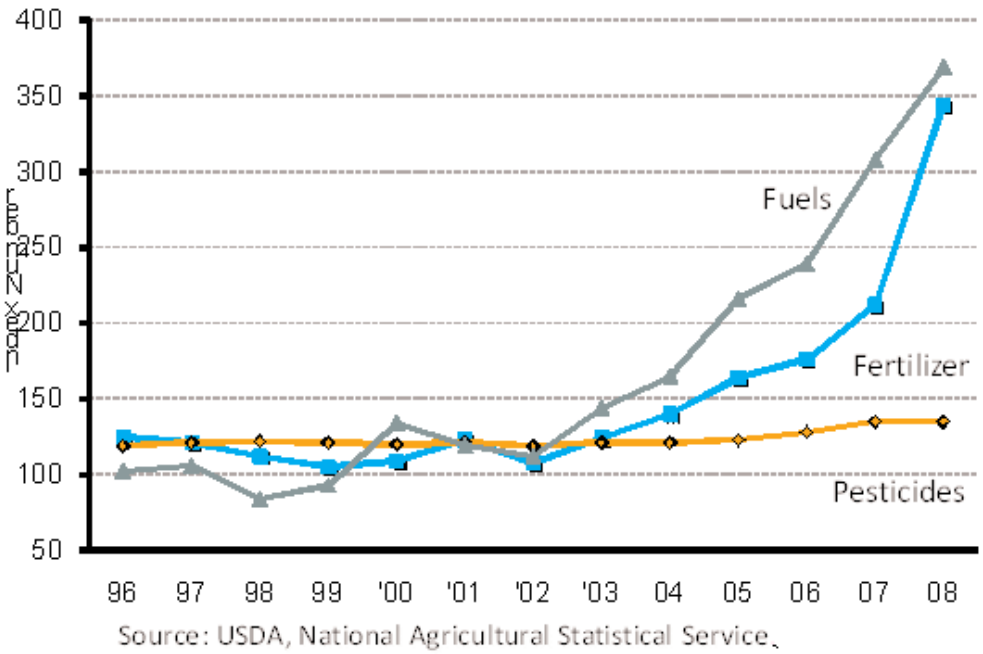


Figure 3. Prime interest rate

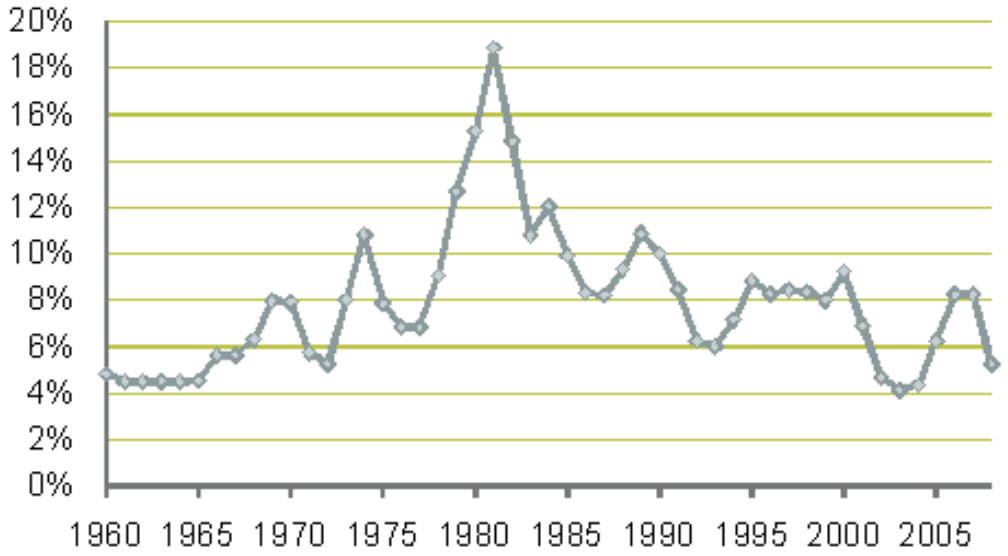


Table 1. California land values by location and crop type, 2001 - 2006

Location	Crop		2001	2002	2003	2004	2005	2006
Northern Mountain	Irrigated Field	low	700	700	1,100	1,200	1,500	1,750
	Crops	high	2,500	2,500	2,500	2,500	4,000	5,000
Sacramento Valley	Prunes	low	3,500	3,000	2,500	2,500	4,000	4,000
		high	6,500	6,000	6,000	6,500	8,500	8,500
Sacramento Valley	Vegetables	low	2,000	3,500	4,000	4,000	3,000	3,500
		high	5,000	4,500	6,500	6,500	15,000	12,500
Southern SJV -Tulare	Cropland	low	2,000	2,300	2,300	2,600	4,500	5,000
		high	5,000	4,500	4,500	5,000	7,500	10,000
No. SJV - district 11	Winegrapes	low	14,000	12,000	8,000	11,000	13,000	13,000
		high	22,000	18,000	15,000	18,000	18,000	18,000

Source: California Chapter of ASFMRA, "Trends in Land and Lease Values – 2008".

Table 2. Costs of production by commodity, input category, and year

		Fertilizer	Pesticides	Fuel	Lube & repair	Labor	Water	Custom harvest	Other custom[1]	Other inputs[2]	Interest	Total
Prunes	2001 $ /acre	105	113	26	22	429	118	1,584	52	123	41	2,613
	2007 $/acre	144	263	53	34	475	115	1,992	74	100	60	3,310
	2008 $/acre	227	267	87	40	501	137	2,151	74	113	46	3,643
	Annual % change 2001-2007	6%	22%	17%	9%	2%	0%	4%	7%	-3%	8%	4%
	% change 2007 - 2008	58%	2%	64%	18%	5%	19%	8%	0%	13%	-23%	10%
Winegrapes	2001 $ /acre	37	101	22	21	946	72	365		47	62	1,673
	2007 $/acre	54	269	59	37	1,041	80	367		36	73	2,016
	2008 $/acre	72	233	88	42	1,026	80	417		33	48	2,039
	Annual % change 2001-2007	8%	28%	28%	13%	2%	2%	0%		-4%	3%	3%
	% change 2007 - 2008	33%	-13%	49%	14%	-1%	0%	14%		-8%	-34%	1%
Processing tomatoes	2001 $ /acre	88	106	108	163	379	92		60	171	50	1,217
	2007 $/acre	148	77	185	185	355	117		187	399	77	1,730
	2008 $/acre	289	104	282	201	344	125		189	418	66	2,018
	Annual % change 2001-2007	11%	-5%	12%	2%	-1%	5%		35%	22%	9%	7%
	% change 2007 - 2008	95%	35%	52%	9%	-3%	7%		1%	5%	-14%	17%
Alfalfa hay	2001 $ /acre	18	27	6	15	43	58		14	10	8	199
	2007 $/acre	24	34	25	37	42	50		14	0	9	235
	2008 $/acre	68	36	36	43	46	58		18	0	8	313
	Annual % change 2001-2007	6%	4%	53%	24%	0%	-2%			-17%	2%	3%
	% change 2007 - 2008	183%	7%	44%	16%	10%	16%		29%	NA	-11%	39%
Dry beans	2001 $ /acre	0	39	21	14	52	107	248	27	20	11	539
	2007 $/acre	0	60	39	16	61	153	259	36	21	14	659
	2008 $/acre	0	63	57	19	61	153	294	36	21	10	714
	Annual % change 2001-2007		9%	14%	2%	3%	7%	1%	6%	1%	5%	4%
	% change 2007 - 2008	NA	5%	46%	19%	0%	0%	14%	0%	0%	-29%	8%

[1] Pesticide applications, fertilizer spreading, and ground preparation

[2] Seed, baling twine, and commodity board charges

Table 3. Contribution of cost categories to total cost by commodity and year (percent of total operating cost)

		Fertilizer	Pesticides	Fuel Lube & repair	Labor	Water	Custom harvest	Other custom[1]	Other inputs[2]	Operating Interest
Prunes										
	2001	4%	4%	1%	1%	16%	5%	61%	2%	5%	2%
	2007	4%	8%	2%	1%	14%	3%	60%	2%	3%	2%
	2008	6%	7%	2%	1%	14%	4%	59%	2%	3%	1%
Winegrapes										
	2001	2%	6%	1%	1%	57%	4%	22%	0%	3%	4%
	2007	3%	13%	3%	2%	52%	4%	18%	0%	2%	4%
	2008	4%	11%	4%	2%	50%	4%	20%	0%	2%	2%
Processing tomatoes										
	2001	7%	9%	9%	13%	31%	8%	0%	5%	14%	4%
	2007	9%	4%	11%	11%	21%	7%	0%	11%	23%	4%
	2008	14%	5%	14%	10%	17%	6%	0%	9%	21%	3%
Alfalfa hay										
	2001	9%	14%	3%	8%	22%	29%	0%	7%	5%	4%
	2007	10%	14%	11%	16%	18%	21%	0%	6%	0%	4%
	2008	22%	12%	12%	14%	15%	19%	0%	6%	0%	3%
Dry beans										
	2001	0%	7%	4%	3%	10%	20%	46%	5%	4%	2%
	2007	0%	9%	6%	2%	9%	23%	39%	5%	3%	2%
	2008	0%	9%	8%	3%	9%	21%	41%	5%	3%	1%

[1/] Pesticide applications, fertilizer spreading, and ground preparation

[2/] Seed, baling twine, and commodity board charges