Regulatory Compliance Costs and California Specialty Crop Producers Profitability

Western Agricultural Economics Association
Annual Meeting

Summer, 2009
Mechel S. Paggi (Calif. State Univ., Fresno); Jay E. Noel (Calif. Poly. San Luis Obispo), and Fumiko Yamazaki (Calif. State Univ., Fresno)

Introduction

Regulatory pressure is a source of increasing concern for California producers. Though regulations can have a positive impact on society in terms of cleaner air and water, as well as increased worker safety; they impose multiple costs to farmers in the state. Growers must comply with a myriad of rules, from local, state and federal levels; regardless of the type of farming or ranching. Other states have taken note. For example, at the World Ag Expo in Tulare, California, states such as Texas, South Dakota, Idaho, Iowa and Oregon sponsored booths in the dairy exhibit area, hoping to draw California's capital- and labor-intensive dairies to their "farmer friendly" states. Lower regulatory costs are a key selling point.

Past studies have attempted to quantify the impacts of regulation on California farmers. Johnston and McCalla cite increased regulation as a relatively new driver among 20 major factors affecting the future of California agriculture, but one that will have increasingly negative impacts on the competitiveness of the industry. California producers pay the highest labor costs in the country, which account for approximately 21% of their costs of production (Hurley, 2004). The high minimum wage, relative to other states, coupled with very expensive workers' compensation insurance, liability insurance and health care benefits cost California producers millions more than farmers in states that have lower labor expenses. A preliminary study by the California Farm Bureau notes that recent increases in water quality permits and monitoring fees, air quality permits, chemical use permits and timber harvest permits can range into the thousands of dollars. No less than 25 separate laws at the state and federal levels govern the resource base employed by agriculture (Hurley, 2005).

The complexity and costs associated with the regulatory environment have also been evaluated. Hurley, et al (2006) conducted a survey of 10,000 specialty crop producers in California. There were 1990 completed useable returned. Results from the analysis of the producer's response to the survey questions indicated that the majority of the producers think the California regulatory environment is complex, duplication exists between government agencies that administer and monitor regulatory compliance, that the direct cost of environment regulation compliance has increased, that fees over the last five years have increased substantially (e.g. Burning permits averaged $38 in 1999 and have increased to $129 in 2004 representing a 240 percent increase in costs. Air quality fees have increased 940% from 1999 to 2004. Chemical use fees have increased by 125 %.)

The producers believe that the regulatory environment has affected their ability to effectively manage their farms. Producers have seen a 40% increase in their management time allocated toward regulatory issues. In 1999, producers estimate that they spent 7.31% of their time on regulatory issues, while in 2004 it increased to 10.27%. Nearly five percent of the respondents in the survey produce outside of California. Approximately 74% of this group found the California regulatory environment more restrictive than the other state they are producing in. The study concludes by providing

an estimate of regulatory costs in relation to operating costs. That cost was estimated to be between $2.19 billion to $2.21 billion. The study emphasized that this estimated range was a lower bound on the cost of regulatory compliance that producers must pay.

The food production and processing sector is also a major component of the Central Valley Region's economy and employs up to 35 percent of the workforce in some counties. This sector generates about 20 billion dollars annually, most of it from the San Joaquin Valley. Due to its agricultural wealth, the Region contains the some of the largest food processing plants in the nation. While some discharge to publicly owned treatment works, most discharge to "land application sites." The source water for many farms and food processing plants is the Region's groundwater.

In 1978 Stanislaus County, California established the Food Processing Residue Use Program. This program allowed for the diversion of food processing residue from landfills to permitted sites that use the residue as direct cattle feed; feed processing product, or soil supplements. The majority of food residue in the program originated from food processing plants such as Hunt-Wesson, Del Monte, Stanislaus Foods, Patterson Frozen Foods, and Eckert Cold Storage. Residue use sites include diaries and feedlots, which directly feed the material to livestock; land spreading operations; and animal feed processors. The program was originally sponsored by the food processing manufacturers. As the commodity users recognized the value of the program, the funding system was changed to bill the food residue use sites for their proportional costs of the program. During the first twenty years of the program, more than 52 million tons of food residues were diverted from landfill to permitted sites throughout the Central Valley region.

In 1985, State Water Resources Control Board adopted regulations in Title 27 of the California Code of Regulations for the Treatment, Storage, Processing or Disposal of Solid Wastes. Title 27 requires wastes that have significant potential to cause groundwater pollution be fully contained if they are discharged to land for treatment, storage or disposal. Title 27 establishes prescriptive standards for liners, collection systems, as well as requirements for monitoring and closure. In the Central Valley Region, discharges of food processing waste to land have historically been regulated under the Waste Discharge Requirement (WDR; formerly Non-Chapter 15) Program, and have been considered to be exempt from the full-containment, monitoring, financial assurance and corrective action requirements of the Title 27 regulations.

In 1999 Section 13269 of the California Water Code, was amended (SB390), causing all regional board waivers that were in effect as of 1 January 2000 to expire on 1 January 2003. Formal Regional Board action was required, including a public hearing, to continue any waiver after that date. Further, all renewed or newly adopted waivers now automatically expire every five years and must require monitoring to demonstrate compliance with waiver conditions. Section 13269, as amended, requires the Regional Boards to re-evaluate how food processing and other wastes are being managed under waivers. In light of these legislative initiatives the regional water control board governing such activities in Stanislaus County began action to consider changes to their

food processing waste residue use program. If adopted, growers were concerned that changes in the existing program would have a negative effect either in the form of direct charges for disposal of the waste or indirectly in the form of lower commodity prices as processing companies passed along their additional waste disposal costs to producers.

Given the dynamic policy environment surrounding the regulations associated with agricultural and food production systems such as food processing and orchard pruning waste disposal it is prudent for the industry to evaluate the possible outcomes that may result from policy induced alternatives to existing practices. In this paper we present the results of an examination of the potential impact on the profitability of individual farming operations of a possible change in policy related to food processing waste disposal along with the cumulative burden of changing regulations on citrus fruit producers in the Central Valley of California. We conclude with a discussion of how this initial work will be expanded to include additional commodities and a comparison of the effects of regulations facing producers in other states and countries.

Methodology

This study is concerned with evaluating the impact that regulatory compliance costs have on the profitability of a representative farm. A representative farm is a farm that best characterizes the size and operational characteristics of a commercial farm for a specific crop in a specific region. In this analysis specialty crop representative farm models are stochastic simulation models that are used to analyze the impacts of current and changing market conditions and government policies on a number of key operating variables (KOV). The application of such models has a rich history in work pioneered at the Texas A&M University Agricultural and Food Policy Center focusing on changes in farm policy for primary crops, dairy and other livestock operations.[1] Examples of KOV's in the specialty crop representative farm models are yearly net income, cash flow position, financial ratios such as return on assets, debt to equity or liquidity, and net present values of net income. Currently 23 representative farm models have been developed for California specialty crops by staff at the Center for Agribusiness, based on initial work done at the California Institute for the Study of Specialty Crops.[2]

The study undertaken was to determine the differences in probability distributions of net farm income, net present value, and return on land and equipment when regulatory compliance costs are included or excluded from the cost of production. The representative farm yield and price data were obtained from California Agricultural Statistical Service reports, production costs were based on sample

[1] A detailed discussion on modeling stochastic simulation models including determination of the appropriate probability distributions and its construction can be found in *Simulation for Applied Risk Management* by James Richardson, Texas A & M University. For a recent example of the results from the application of the AFPC methodology see AFPC Briefing Paper 09 -1, http://www.afpc.tamu.edu/pubs/3/523/JAN09%20Baseline%20booklet%20-%20for%20web.pdf

[2] The current modeling efforts of the Center for Agricultural Business and the California Institute for the Study of Specialty Crops is provided in: http://www.cissc.calpoly.edu/research/FinalReportRepresentativeFarmModels07.pdf

cost and returns studies done by the University of California Cooperative Extension Service and updated with grower panel data. Price and yield forecasts were obtained from the National Food and Agricultural Policy Project at Arizona State University and updated with new observations where available.

In the next sections, this report provides examples of how the models were used to generate quantitative estimates of use to agricultural decision makers. The first example is the models' capability to simulate future performance of individual farms facing multiple regulatory compliance costs. This is demonstrated by providing three year estimates of returns to cash expenses given stochastic values for prices and yields. The results are for an application addressing of the cumulative effects of compliance costs associated with a number of regulatory requirements facing California citrus producers. An analysis of a specific policy change is demonstrated with an example of analysis of possible changes to existing regulations governing waste disposal from food processors. The results are for an application addressing the changing requirements that would face California peach and processed tomato growers in Stanislaus County.

Cumulative Costs: California Citrus

In 2006 a study was conducted to develop case study analyses of regulatory compliance costs on important specialty crops in the state, and to compare those costs with commercial-scale operations in other states where specialty crops are prevalent.[3] Oranges and lettuce were chosen, as they are commonly among the top ten products in value of production in California, and like-sized operations could be identified in other states. Oranges and lettuce were also appealing because they represent two important production regions in the state that have very different environmental regulatory requirements.

The orange case study provided compelling evidence that the regulatory pressure is much more significant in the San Joaquin Valley of California than is evident in the comparison state of Texas. The California grower's regulatory costs amounted to $356.20 for each acre of oranges produced. When taking into account that the cultural costs of production (not including harvest) were $1,945, this adds 17.85% to the cost of raising oranges in California; if harvest and packing costs are included, it adds over 6% to the total cost. On the Texas orange operation, the regulatory costs were calculated to be $31.71 per acre. In terms of the relative costs of production, this adds 3.29% to the grower's cost of production of $963 per acre.

In March 2008 the orange farm regulatory costs were updated using information obtained from a panel of Southern San Joaquin orange producers in March 2008. Table 1 provides the representative orange farm operation information and general category cost of production data used in this study. Table 2 shows the comparison between the Hamilton (2006) study and the estimated 2008 regulatory compliance costs used in this study. It should be noted that these costs were adjusted to account for inflationary and

[3] Hamilton, Lynn "Comparing California's Cost of Regulation to Other States: A Case Study Approach for Agriculture" Report prepared for California Institute for the Study of Specialty Crops, October 2006). Available at: http://cissc.calpoly.edu

market factors for each year the representative farm model simulates farm financial information.

Table 1
Farm and Cost of Production Information

Farm Operation Information	
First Year To Simulate	2008
Acres on Farm	300
Acres in Production	240
Acres Owned	300
Investment in Land and Equipment	

Production Cost Data	
Total Cultural Costs ($/acre)	$2,000/acre
Total Fresh Market Harvest Costs	$5.61/carton
Interest Expense (Average 2008 - 2012)	$307/acre
Total Non-Cash (Depreciation)	$1,303/acre

Table 2
Regulatory Compliance Costs

Regulatory Compliance Cost Category	Hamilton (2006)	Updated (2008)
Education/Training for Regulatory Compliance	$7.40	$23.79
Air Quality Requirements	$208.22	$218.01
Water Quality Compliance	$0.28	$0.30
Department of Pesticide Regulation	$23.01	$24.17
Labor Requirements (Workman's Comp)	$95.60	$32.51
Capital Investment	$21.69	$100.00
Liability Insurance/Legal Costs	$0	$6.73
Total	$356.20	$401.51

The differences in the Hamilton (2006) and 2008 estimated regulatory compliance costs figures can be attributed to changes in different cost categories (e.g. workman's comp

changes) and also differences in how different orange producers account for regulatory compliance costs. The figures indicate that between when Hamilton (2006) reported her findings and the time when the study's costs were estimated that regulatory compliance costs have increased by $45.31/acre.

The updated information provided from the citrus grower panel was incorporated into the representative citrus representative farm model. The results of a 5 year projection of operating costs and returns are presented in Table 3. The differences in simulated net income after taxes with and without regulatory compliance costs included in the cost of production. As indicated there is approximately a 74% difference in the simulated 2008 - 2012 average net income after taxes when regulatory costs are included and excluded in the representative orange farm cost of production.

Table 3. Comparisons of Net Income after Taxes with and without Regulatory Compliance Costs Included in the Cost of Production

Net Income after Taxes when Regulatory Compliance Costs are Included in the Cost of Production
2008 - 2012

Year	***2008***	***2009***	***2010***	***2011***	***2012***	***Average***
Mean	***$35,159***	***$58,957***	***$82,855***	***$130,608***	***$174,317***	***$96,379***

Net Income after Taxes when Regulatory Compliance Costs are Excluded from the Cost of Production
2008 - 2012

Year	***2008***	***2009***	***2010***	***2011***	***2012***	***Average***
Mean	***$112,784***	***$133,211***	***$154,697***	***$199,226***	***$239,942***	***$167,972***

Charts 1A and 1B provide a comparison of the simulated 2010 probability distributions of net income after taxes when regulatory costs are included and excluded in the representative orange farm cost of production.

The inclusion of regulatory compliance costs in the orange farm cost of production reduce the probability of earning a net income after taxes of over $300,000 by 7% and of earning a net income after taxes between $0.00 and $300,000 by 3%.
Those probability differences result in a 10% increase in the probability of experiencing a financial loss when regulatory compliance cost is included in the cost of production.
Although the percentage differences associated with the net income after tax categories would change somewhat year to year the 2010 example illustrates that the probability of experiencing a financial loss is increased as regulatory compliance costs increase.
Two other financial measures can also be used to evaluate the impact of regulatory

compliance costs on orange farm profitability. The first is the net present value of the net income after tax stream from 2008 - 2012 and the second is the net income after taxes return on orange farm land and equipment. Charts 2A and 2B show the differences in the 2008 - 2012 net present value (NPV) when regulatory compliance costs are included and excluded from the representative orange farm cost of production.

Chart 1A

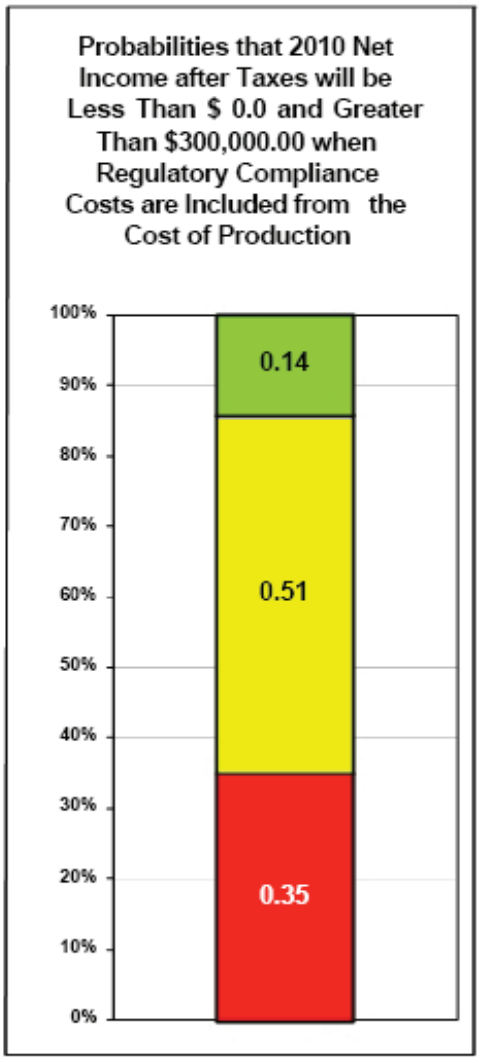


Chart 1B

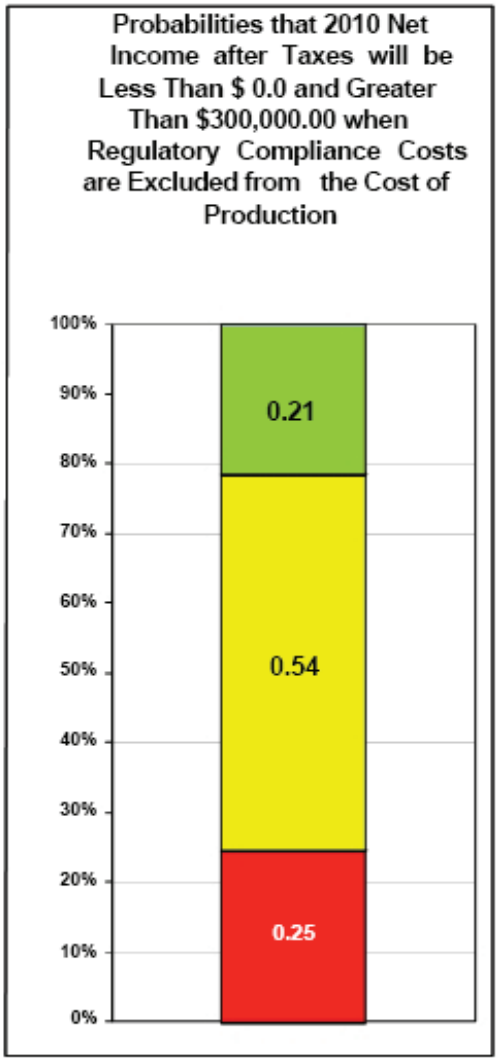


Chart 2A

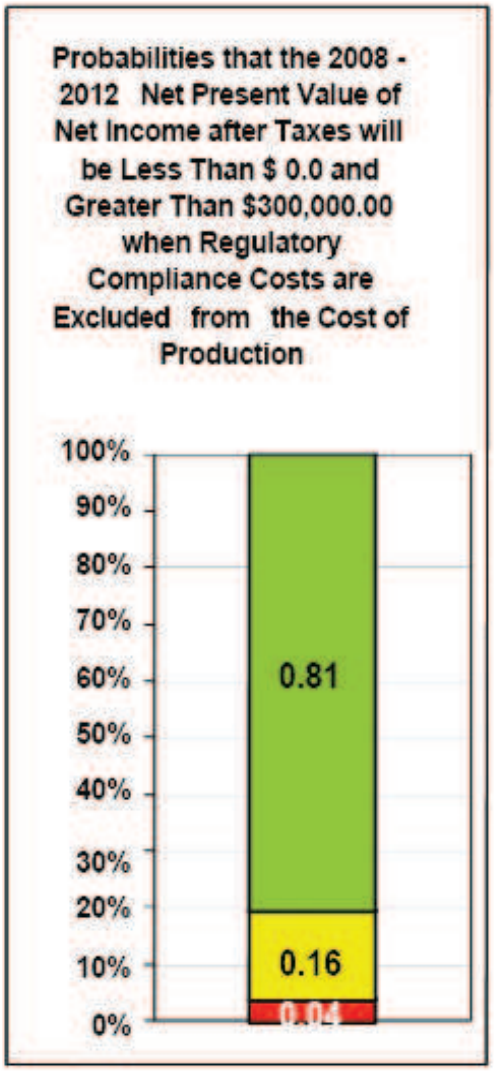
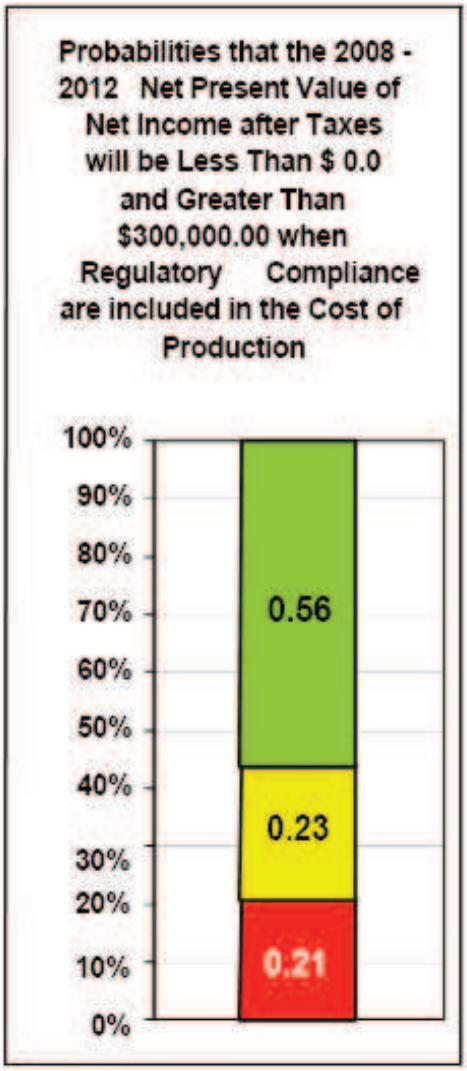


Chart 2B



The information presented here is similar that provided by Chart 1A and Chart 1B. The probabilities of net income after tax net present value categories for each is lower when regulatory compliance costs are included in the cost of production.[4] These charts indicate that there is a 17% increase in the probability of having a five year financial loss when regulatory costs are included in the representative orange farm cost of production.

[4] The discount rate used for the net present value calculation was 4.3%. This figure is based on those presented in the Circular No. A-94 (revised) Appendix C White House Office Budget and Management (http://www.whitehouse.gov/omb/circulars/a094/a094.html). The 4.3% number is the five year nominal rate on treasury notes and bonds.

Table 4 provides a summary of the return on investment in land and equipment assets from mean net income after taxes for each of the years 2008 - 2012 and the average return on investment in land and equipment assets from mean net income after taxes for the 2008 - 2012 time period.

Table 4

Net Income after Taxes Return on Land and Equipment

Year	2008	2009	2010	2011	2012	
Investment in Land and Equipment	$4,745,379	$4,762,479	$4,802,499	$4,842,943	$4,883,816	
Mean Net Income After Taxes- Regulatory Compliance Costs Included in the Cost of Production	$35,159	$58,957	$82,855	$130,608	$174,317	2008 - 2012 Average
Return on Land and Equipment	0.74%	1.24%	1.73%	2.70%	3.57%	1.99%
Mean Net Income After Taxes- Regulatory Compliance Costs Excluded from the Cost of Production	$112,784	$133,211	$154,697	$199,226	$239,942	2008 - 2012 Average
Return on Land and Equipment	2.40%	2.80%	3.20%	4.10%	4.90%	3.50%

The information presented in Table 4 indicates that the return on investment on land and equipment for the representative orange farm from net income after taxes is lower when regulatory cost are included in the representative orange farm cost of production. The difference in the five year average is approximately 1.5%. This may seem to be a small difference until it compared to the size of the investment at risk. The 1.5% difference results in approximately a $71,250 year mean difference in net farm income after taxes.

Specific Policy Change: Food Processing Waste Disposal in Stanislaus County

In this example representative farm models for cling peaches and processing tomatoes were used to analyze the changes in returns to cash costs if Stanislaus County producers were assessed a fee equal to the estimated cost of disposal of processing waste at approved facilities rather than being allowed to incorporate that waste into their fields, the current practice. In addition a three year forecast of the possible change in net returns above cash costs is provided. Such a change from current regulatory policy was being considered by the Stanislaus County Water Control Board in spring 2007.[5]

The data used for the stochastic simulation models is based on University of California Extension, Cost and Returns survey information as amended by input from regional

[5] A concurrent study of the potential soil and water quality impacts of the current practice of incorporating food processing by-products into soils established a best management practices manual for producers. "Manual of Best Practices for Application of Food Processing By-products on Farmlands". California Agricultural Technology Institute, California State University, Fresno, CATI Pub. #070702, July 2007.

producers of peaches. The estimate of costs associated with the disposal of peach processing waste was supplied by representatives from regional food processing firms.

The cost of processing waste disposal if that waste had to be taken to the Bay Area or alternative waste disposal sites has a range of $800 to $1,100 a truckload not accounting for labor and equipment costs. Each truckload was assumed to carry 25 tons of waste by-products. With approximately 30,000 tons of processing waste to dispose of 1,200 truck loads would be required. Based on the established range of tipping fees, disposal charges to growers were calculated to range from $7.68 per ton to $10.56 per ton of product delivered for processing.

The results on grower net returns from the new disposal charges are presented in Table 5 Given the historic price and yield variability for growers in the Stanislaus country area the representative peach production unit continues to generate positive, albeit smaller, net returns. The reduction in average net returns for peach growers ranges from 12% to 17%.

Table 5. Impact of Waste Disposal Back Charge

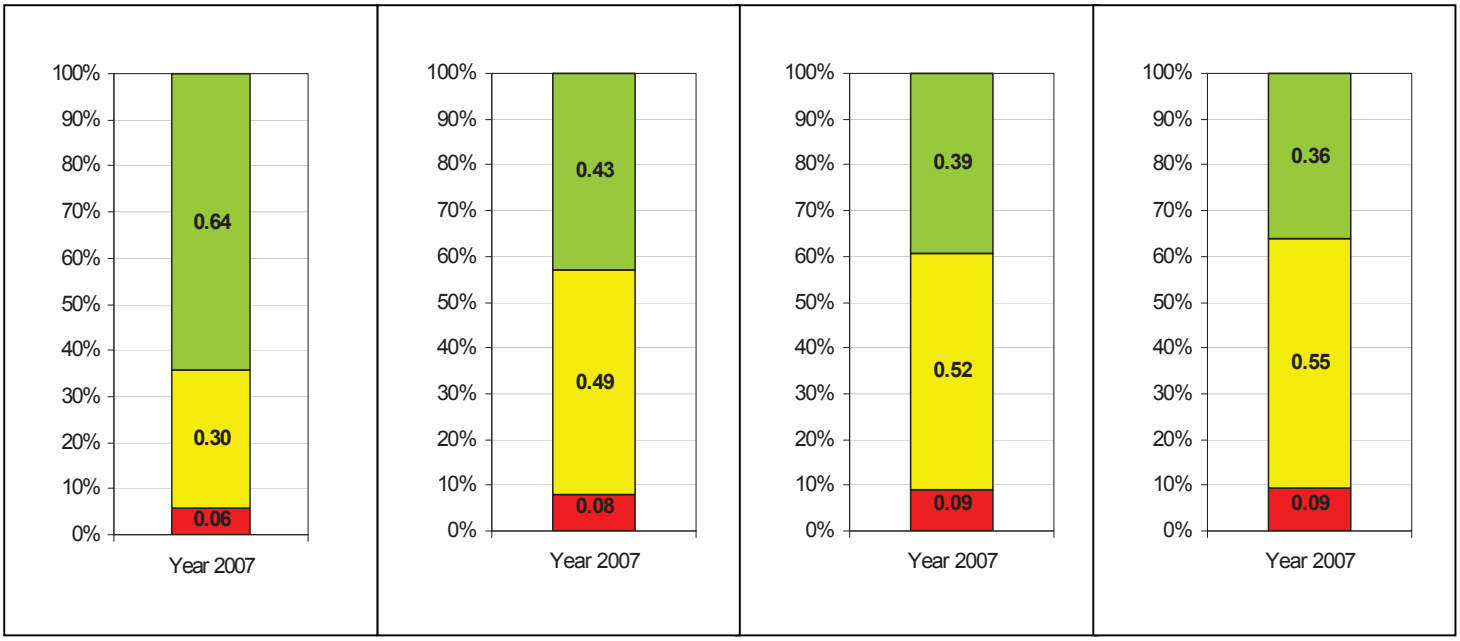
Peaches: Mean Net Return ($/acre)

	No Back Charge	Low Back Charge	Medium Back Charge	High Back Charge
Average	**$1,047**	**$921**	**$897**	**$873**
2007	$1,060	$936	$913	$889
2008	$1,043	$917	$892	$868
2009	$1,038	$910	$886	$862

In addition to the estimate of changes in net returns an analysis of the probability that peach producer net returns will fall within a given range was conducted. The results of this analysis are presented in Chart 3, panels A through D. As indicated the imposition of a disposal back charge results in an increased probability of a growers returns falling below the $500 per acre target compared to no-charge status-quo conditions.

Chart 3.
Impact of back charge on mean of simulated net return for cling peaches: year 2007

Stoplight Chart for Probabilities Less Than $500 (Red) and Greater Than $1,000 (Green): per acre in Year 2007



Panel A	Panel B	Panel C	Panel D
No Back Charge	Low Back Charge (7.68$/ton)	Med Back Charge (9.12$/ton)	High Back Charge (10.56$/ton)

The focus of this analysis has been the effects of regulatory compliance on the profitability of individual firms. Another analysis was conducted that demonstrates the potential impact if the food processing by-product use program was discontinued resulting in an exit of the processing industry from the county. Using an IMPLAN model a series of scenarios were examined and the effects on income, tax revenue and employment were estimated.[6] The results of the analysis presented in Tables 6 are the potential loss in income, tax revenue and employment for the major cooperator in the Stanislaus County area with reported income between $200 – 300 million and 1,025 fulltime equivalent employees.

[6] IMPLAN simulates economic impacts using social accounts and input/output multipliers generated from the U.S. Department of Commerce, the U.S. Bureau of Labor Statistics, and other federal agencies. For a full discussion of the IMPLAN model and analysis see: http://www.cissc.calpoly.edu/research/EconomicAssessmentsoftheStanislausCountyFoodProcesssingWasteProgram.pdf

Table 6. IMPLAN Analysis of Loss of Processing Firm

	Direct	Indirect	Induced	Total
Income Loss	$307,657,664	$126,945,129	$48,053,234	$482,656,022
Value Added Loss	$86,076,688	$68,679,552	$29,101,731	$183,857,971
Employment Loss	975	819	455	2,248
	Federal	**State/Local**		
Tax Revenue Loss	$23,032,849	$18,612,133		$41,481,786

Conclusions

In California a bundle of regulatory initiatives designed to address a variety of eco-system and other public goods concerns have resulted in increased cost for specialty crop producers. These costs have a direct effect on the profitability of individual enterprises. As governmental agencies at all levels in the state consider changes in existing policies and programs or the promulgation of new initiatives it is important to have an understanding of the implicit compliance costs associated with those actions. Ideally in considering such actions the relevant decision makers would seek to balance the benefits that accrue from a given initiative against these costs. In addition it is important to recognize the cumulative burden resulting from the bundle of regulatory compliance costs facing producers.

In this paper we develop a framework to provide a quantitative estimate of both the cumulative costs of a bundle of regulatory initiatives associated with specialty crop production and the potential impacts of changes to an existing program or policy. The results of a study of the California citrus industry indicate that for the cumulative costs are increasing over time and have a negative effect on individual producer profitability. The results of a potential change in an existing regulatory program at the county level demonstrate how the same framework can be used to provide information on the possible effects of a specific initiative. In each case the compliance costs are revealed to have a negative effect on short and long term profitability at the farm level. In the case of the Stanislaus county example additional information on the potential community wide effects are provided with the application of an IMPLAN analysis.

The magnitude of the effects calculated with the representative farm model framework are dependent on the specific input parameters used in the stochastic simulations, the functional form of the distributions, etc. Accordingly the real value of this initial study is to develop confidence in the application of the methodology and reveal areas where additional work is necessary. However the results do help validate the notion that everything else being equal, an increasing level of costs related to compliance with existing regulations has a negative impact on farm level profitability.

References

Hamilton, Lynn. "IPM in the Salad Bowl: Is it Cost Effective?" Selected Paper session, American Agricultural Economics Association Meetings, Chicago, Ill., and Aug. 5 - 8, 2001.

Hamilton, Lynn "Comparing California's Cost of Regulation to Other States: A Case Study Approach for Agriculture" Report prepared for California Institute for the Study of Specialty Crops, October 2006). Available at: http://cissc.calpoly.edu

Hurley, Sean. "A Cross-Comparison Between California and Its Domestic and International Competitors with Respect to Key Labor Issues." California Institute for the Study of Specialty Crops, June 2004. Available at: http://cissc.calpoly.edu

Hurley, Sean. "A Synopsis of the Regulatory Environment Affecting California Specialty Crops." Report prepared for California Institute for the Study of Specialty Crops, January 2005b). Available at: http://cissc.calpoly.edu