



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

The Economic Impact of the Stanislaus County Food Processing Industry and the Food Processing By- Products Use Program

A Report to the California Institute for the Study of Specialty Crops

**Dr. Sean Hurley
Jessica Bylsma***

Prepared: October 30, 2007

*Sean Hurley is Associate Professor, in the Department of Agribusiness at the California Polytechnic State University—San Luis Obispo. Jessica Bylsma is a Research Assistant at the California Polytechnic State University—San Luis Obispo. Funding for this project has been made available by the Governor’s Buy California Initiative, the California Department of Food and Agriculture (“CDFA”) and the U.S. Department of Agriculture (“USDA”). The content of this publication does not necessarily reflect the views or policies of CDFa or USDA, nor does any mention of trade names, commercial products and organizations imply endorsement of them by CDFa or USDA.

Executive Summary

In 1978, the County of Stanislaus took a proactive stance on the issue of food processing by-product by developing the Stanislaus County Food Processing By-Product Use Program (Program). This program allows food processors to take their by-products to local agricultural producers, who in turn reuse the by-products by feeding it to their livestock or spreading it across their fields as a soil amendment. Since its inception the county has reported that over 6 million tons of by-products have been reused by agricultural producers and consequently diverted from local landfills. Within the last couple of years, the Regional Water Quality Control Board (RWQCB) has brought concerns to Stanislaus County that this program may pose a risk to the county's surface and ground water resources. The RWQCB proposed that program participants implement several new levels of product and environmental monitoring. Program participants believe that the current program is environmentally sound and that additional monitoring may be unnecessary.

In response to RWQCB proposal, program participants are funding research under direction and supervision of the RWQCB and Stanislaus County to evaluate the program for environmental risk and to identify the types and level of product and environmental monitoring needed to properly address those risks. If additional product and environmental monitoring is required beyond the current requirements, the cost of participating in the program would obviously increase.

As a result of the pending proposal, food processors and producers who have taken the by-product in the county have been investigating what the new cost of the program would be. A few of the food processors have come to the conclusion that one of the proposed environmental monitoring requirements, i.e. groundwater monitoring at the level proposed would make the program prohibitively costly. They believe that the change would result in their withdrawal from the program. Furthermore, they believe that the program in its current state has allowed them to maintain their competitiveness in a domestic and international marketplace which has kept them from moving out of the county.

The primary emphasis of this study is to investigate what economic impact would occur if one of the food processors decided to leave the county due to a change in the current policy. Data was collected from two processors who currently use the program. One of these processors operates in Stanislaus County while the other is located in San Joaquin County. This data was used to develop three scenarios related to these processors leaving the county they reside. Another two scenarios used as their basis an average processor in the Stanislaus food manufacturing industry and an average processor in the Stanislaus fruit and vegetable processing industry. Four economic impacts were studied—output, value-added, taxes, and employment.

It was estimated in this study that if Processor 1 decided to leave Stanislaus County because the Program was no longer viable for it, a significant negative impact would be felt by the county. It is estimated that the county should expect to see a loss of \$482.656 million to \$651.656 million in total economic output. Job losses are estimated to be in the range of 2,248 to 2,715 jobs where a majority of those jobs will be felt by supporting industries in the county.

It was found in this study that not only does Stanislaus County have a vested interest in making sure that the Stanislaus County Food Processing By-Product Use Program remains a viable program for processors, San Joaquin County will also feel the effects of this program being unviable. If the program ceases to be useful and a processor in San Joaquin must relocate outside of the county, then the county should expect a loss of economic activity of approximately \$80.896 million and a loss of approximately 503 jobs.

Table of Contents

Introduction.....	1
Background.....	2
National Waste Reduction	2
National Recycling Rates.....	3
California Waste and Recycling	3
California Solid Waste Bill.....	4
California Food Processing.....	6
Food Processing By-Product Use Program	6
Methodology	8
Input-Output Modeling	8
IMPLAN	9
Data Collection.....	13
Scenarios Examined Using IMPLAN.....	13
Limitations to the Analysis	15
Results	15
Summary and Conclusions.....	21
Works Cited.....	23
Appendix.....	25

Introduction

In the late 1970's, Stanislaus County recognized that there existed a potential issue with the disposal of food processing by-products. The concern at the time was that the disposal of the by-products could be handled in a more efficient manner that could benefit all interested stakeholders. In 1978, the county took a proactive stance on the issue and brought together a group of producers, UC extension representatives, management from local food processors, and other interested stakeholders to discuss better ways of handling the by-products that came from processing agricultural products. As a result of these discussions, Stanislaus County developed the Stanislaus County Food Processing By-Product Use Program. This program allows food processors to take their by-products to local agricultural producers, who in turn reuse the by-products by feeding it to their livestock, drying, composting, or spreading across their field as a soil amendment. The county through a self-supporting permitting process oversees how producers use the by-product to minimize any potential deleterious effects that could occur to society due to the program (Stanislaus County Board of Supervisors).

Since its inception the county has reported that over 6 million tons of by-products have been reused by agricultural producers and consequently diverted from local landfills. Within the last couple years, the Regional Water Quality Control Board (RWQCB) has brought concerns to Stanislaus County that the Stanislaus County Food Processing By-Product Use Program may have a potential negative effect to local groundwater. The RWQCB has proposed that Stanislaus County start conducting groundwater testing and monitoring which would increase the expense of operating and participating in the program. To offset these potential new expenses, the county would need to increase the cost of the permitting process and the participating producers would incur greater expenses for the monitoring program (Stanislaus County Board of Supervisors). This new expense would make the program less palatable to all who are involved.

In response to the proposal of starting groundwater monitoring at a greater expense to all those involved, food processors and producers who have taken the by-product in the county have been investigating what the new cost of the program would be. A few of the food processors have come to the conclusion that the groundwater monitoring system would make the program prohibitively costly. They believe that the change in the program would require them to no longer participate in the program. Furthermore, they believe that the program in its current state has allowed them to maintain their competitiveness in the industry and has kept them from moving out of the county. Some processors have indicated that without the program in its current state, they may consider relocating outside of Stanislaus County to regain the competitiveness loss due to the increased expense.

This study is designed to examine what current regional economic impact the food processing industry has on Stanislaus County. It also investigates what economic impact would occur if one of the food processors decided to leave the county due to a changing of the current Stanislaus County Food Processing By-Product Use Program.

Background

National Waste Production

The growth of the US population has put enormous pressure on domestic landfills to keep up with the copious production of municipal waste resulting from the seemingly unending expansion of the population. In October of 2006, the US Census Bureau estimated that there were 300 billion people in the US (Tolbert). While this represented a major landmark for the country and the economy, it represents a continually growing level of stress for the country's landfills. Unfortunately, the population increase has resulted in a proportional decrease in landfill capacity, which is further compounded by the fact that per capita waste generation has experienced a marked increase from 2.7 pounds per day to 4.5 pounds per day since 1960

(USEPA). Each of these factors has contributed to the substantive increase in the pollution emanating from local dumping sites.

National Recycling Rates

In an effort to moderate the consequences of this increase, numerous recycling programs have been implemented across the nation. In 2005, the United States generated 245 million tons of municipal solid waste, with an average recycling rate of 32% or approximately 72 million tons (USEPA). While this represents a significant victory for the programs in place, this rate of recycling is not enough to eliminate the issues caused by current waste production.

Consequently, there is increasing concern for the integrity of the nation's water supply and general air quality in the surrounding environment.

California Waste and Recycling

According to the United States Census Bureau, California's estimated population was approximately 36.5 billion people in 2006, making it the most populous state in the nation (2007). With such a large population, it is especially important for California to manage its waste disposal practices. In 2006, statewide waste production was estimated to be 92.2 million tons, which represents an increase of well over 40 million tons in the last two decades and a substantial portion of total US waste generation (Stephens). Fortunately, this increase in production has been met by a similar increase in diversion. California boasts an exceptionally high diversion rate of 54 percent or over 50.1 million tons (Stephens). While this is an important accomplishment in the state's fight to preserve its dwindling landfill space, the growth of the population continues to put immense pressure on the state's landfills.

While it is natural to measure diversion by volume, it can also be measured based on its economic benefits. Numerous state studies have concluded that diversion generates superior economic externalities compared to disposal. One such study was conducted by Goldman and

Ogishi regarding the economic impact waste diversion has on the California economy. In this study, the authors state that the “statewide economic impacts from disposal and diversion at 1999 rates were estimated to be 17 to 20 percent higher than the impacts if all the waste had been disposed” (p. vii).

Table 1 presents the average statewide impacts for additional disposal and diversion of waste to landfills estimated by Goldman and Ogishi. These statistics reflect the reality of the economic climate of California. Based on the findings of the study, the 1999 rate of diversion generated \$3.12 billion in additional revenue and an extra 25,100 jobs (Goldman and Ogishi). In other words, for every ton of waste disposed during that year, the authors estimated that there was \$108 in total income impacts to the California economy and another \$144 in value-added impacts to the state economy (Goldman and Ogishi). Conversely, for every ton of waste that was diverted, the authors estimated that the state benefited from “\$209 in total income impacts and \$290 in value-added impacts” (Goldman and Ogishi, p. viii). However, the monetary statistics underestimate the benefits of diversion. Average estimates indicate that for every 1,000 tons of waste generation, disposal creates 2.5 jobs, but for the same amount of waste, diversion creates 4.7 positions in similar industries (Goldman and Ogishi).

Table 1: 1999 Average Impacts Statewide for Additional Disposal or Diversion

	Disposed	Diverted	Additional Gain from Diversion
Total Sales (\$/ton)	\$119	\$254	\$135
Output Impact (\$/ton)	\$289	\$564	\$275
Total Income Impact (\$/ton)	\$108	\$209	\$101
Value Added Impact (\$/ton)	\$144	\$290	\$146
Jobs Impact (Jobs/ton)	2.46	4.73	2.27

Source: Goldman and Ogishi, 2001

California Solid Waste Bill

In an effort to mitigate the onerous side effects of the state’s landfills and hopefully enjoy some of the benefits associated with diversion, Governor George Deukmejian signed Assembly

Bill 939 (AB 939) into law on September 29, 1989 (Stanbra). The new law restructured the state's waste logistics and ideas concerning waste management. This was accomplished by developing an "integrated waste management hierarchy" (Stanbra).

The principle sustaining this new approach to waste management was founded on the idea that prioritizing the waste entering the landfills would result in a decrease in the volume plaguing the environment. The bill obligated California counties and cities to develop plans to meet ambitious diversion goals. Each of the agendas was expected to include eight different components including source reduction, recycling, composting, special waste, public education and information, disposal facility capacity, funding, and integration (Stanbra). The initial mandate required that counties decrease their waste production 25% by the year 1995 and 50% by the year 2000 (Stanbra). Unfortunately, few municipalities have successfully managed to meet the objectives of the bill despite the threat of incurring fines. This is largely because those fines were rarely levied against the offending county. Instead, the original deadlines were extended in the hope that they would continue to strive to meet their objectives (Stanbra). As a result of this reality, the effective rate of diversion for each of the California jurisdictions varies; not only as a result of the differences in initial waste production, but also because of inconsistent program compliance.

In response to mounting political pressures, each region was given the liberty to tackle waste diversion with its own instruments based on what local governments deemed prudent under their unique circumstances. Stanislaus County responded by implementing a number of different mechanisms. However, one of the solutions employed, Stanislaus County Food Processing By-Product Use Program, had actually been in place before the passage and implementation of the new bill and appears to be an integral part in the county's compliance with

the new waste requirements. This program addressed waste disposal issues plaguing the local food processing industry.

California Food Processing

Since food consumption is relatively stable, industries (e.g., food processing) that cater to food consumption tend to have a stable source of income. This is largely because demand for processed food items is relatively inelastic and does not show significant change during times of economic instability by comparison to other manufacturing industries (RDI). This is evidenced by the relative immunity of the industry to the most recent economic recession. This stability can be very attractive to a region because industries that support food consumption are a reliable tax basis and source of employment.

According to the 2002 Economic Census, there were 230 establishments in the fruit and vegetable canning, pickling, and drying industry in California, which employs approximately 24,101 people who are paid over \$800 million in annual payroll (United States Census Bureau, 2002). Stanislaus County constitutes a significant percentage of this industry and is one of the top ten largest counties in terms of agricultural production in the US. Fruit and vegetable canning and drying is the largest industry in the county based on output (MIG, Inc.). Due to the sheer volume of processed by-product, this industry is highly affected by restrictions on reusing the by-product.

Food Processing By-Product Use Program

In an effort to ease strain on local landfills, the Stanislaus County Food Processing By-Product Use Program was established in 1978 to address escalating concern surrounding the problematic disposal of food processing by-products. These by-products were defined as materials generated from product processing, such as culls, stems, and other fruit and vegetable by-products (CRWQB). The program redirects these by-products to avenues where they may

serve as alternative inputs for other agricultural operations, such as animal feeds or soil amendments. During the first two decades of the program, more than 6 million tons of food by-products were diverted to other beneficial applications (Stanislaus County Board of Supervisors). If not for the program, these by-products would have been disposed of in the nearest landfill and the county would not be in compliance with the diversion requirements of AB 939.

In order to ensure that the program has only minimal externalities, participants must go through a permitting process to participate. In order to obtain a by-product application permit for a given location a detailed plan of operation must be submitted. This application must include information regarding the drainage system, the daily maximum amount of residue expected to be received, and the residue handling method (McHargue). To further solidify the health of the program, the county frequently conducts inspections at each site during the season that the participant is receiving the by-product (McHargue). Each inspection includes an analysis of the fly population, unfavorable odors, and improper drainage.

Externality issues are the predominant concerns for program inspectors because it is important to the health of the program that negative externalities are minimized. The affected operations typically include dairies, feedlots, crops with land spreading operations, and animal feed processors (McHargue). Most of the by-product entering these facilities originates from fruit and vegetable processing establishments within Stanislaus County and has demonstrated to be a valuable organic commodity. Consequently, it is Stanislaus County that derives the greatest benefit from the success of the program. “Sites are required to keep current information regarding delivery dates, types of residue, amount of residue, and the hauling companies who deliver the residue” (McHargue). This ensures that the program’s operations can be accurately monitored and regulated. Additionally, this guarantees that the funding for the program varies

proportionally with the time consumed by each operation. The land owners receiving the by-product are charged for the inspector's hours, consequently creating a program that is self-sufficient. This makes it an environmentally and fiscally ideal solution to a major disposal management issue.

While there is substantial pecuniary incentive for the program, it is also important to consider the cost of the disposal alternatives if the program was discontinued. Currently, it provides an economically efficient channel for disposal. However, without this outlet for their by-products, food processors could potentially face a large increase in their disposal expenses. For processors in the county, the absence of this program would mean that their by-products would have to be hauled to neighboring landfills at significant expense; not only contributing to the problem of decreasing landfill space, but also increasing air pollution as a result of the trucks hauling the by-product longer distances.

Methodology

Input-Output Modeling

To measure the importance of the food processors in Stanislaus County who might use Stanislaus County Food Processing By-Product Use Program, an input-output model was employed to develop a picture of its influence on the local economy. Input-output modeling is a mechanism for examining relationships among firms, industries, and institutions within a local economy (Mulkey and Hodges, 2001). This approach is often used to analyze the impact of a specific industry activity on an economy. It encompasses all fiscal transactions for a given time period. Holland and Yeo describe input-output modeling as a system that describes "the circular flow of income and product throughout an economy" (p. 2). Hall and Skaggs elaborate on this description by explaining that these models represent "all consumption and production in an

economy, which is divided into sectors that include firms or organizations with similar characteristics or activities” (p. 3).

IMPLAN

In order to create a model of Stanislaus County, this study employed an economic modeling program known as IMpact Analysis for PLANning (IMPLAN). Numerous researchers have used IMPLAN to evaluate the regional economic impacts of agriculture and agribusiness. The program has been recognized for its value as an economic modeling system in other studies done in California, Arkansas, Washington, and Idaho.

IMPLAN simulates how much of an economic impact would occur if a change was made to a local economy. It estimates these impacts by using social accounts and I/O (Input/Output) multipliers that are generated from the U.S. Department of Commerce, the U.S. Bureau of Labor Statistics, and other federal and state government agencies. Data are collected for 528 distinct producing industry sectors of the national economy corresponding to the Standard Industrial Categories (SICs). Industry sectors are classified on the basis of the primary commodity or service produced. Corresponding data sets are also produced for each county in the United States, allowing analyses at the county level and for geographic aggregations such as clusters of contiguous counties, individual states, or groups of states. Data provided for each industry sector include outputs and inputs from other sectors, value added, employment, wages and business taxes paid, imports and exports, final demand by households and government, capital investment, business inventories, marketing margins, and inflation factors (deflators). These data are provided both for the 528 producing sectors at the national level and for the corresponding sectors at the county level. Data on the technological mix of inputs and levels of transactions between producing sectors are taken from detailed input-output tables of the national economy.

National and county level data are the basis for IMPLAN calculations of input-output tables and multipliers for local areas.

IMPLAN was originally developed in 1970 by the USDA Forest Service in cooperation with government agencies in an effort to improve land and resource management. However, in 1993 the Minnesota IMPLAN Group was established to privatize the software and all of its future developments (MIG, Inc). The most recent version available, IMPLAN Professional 2.0, was utilized in this research in addition to the 2004 economic data for California. At the time of the study, this was the most recent data available. The data gathered to run this analysis was in terms of either 2006 dollars or 2002 dollars. IMPLAN has a tool to deflate/inflate these 2006 dollars to 2004 dollars. Once the economic impact was estimated, all results, unless otherwise stated, were adjusted to represent 2007 dollars.

IMPLAN has developed three descriptive classes to express the economic impacts of a select industry. These classes qualify each impact as either direct, indirect, or induced effects. These titles are indicative of the manner in which the transaction affects the economy. Direct effects represent the impact that occurs that are directly related to the event. In terms of this study, direct effects are the dollar value directly associated with a departure of a firm or a downsizing in the food processing industry. These in turn produce a ripple effect that echoes throughout the industry known as indirect effects. These effects are changes that occur as other industries produce and sell more or less as a consequence of the direct effects in the study industry. The last class of economic impacts is the induced effects. These effects occur due to changes in the direct and indirect effects. Impacts of this nature manifest as changes in local consumer spending resulting from direct and indirect changes in affected economic sectors.

The IMPLAN model that was developed to determine these figures for Stanislaus County was constructed using basic multipliers. These multipliers have a magnifying effect on direct economic changes that cause an economic impact. These numbers are derived from industry response to final demand. As the study industry increases or decreases output based on consumption patterns, they generate demand for goods and services in the industries that support them (MIG, Inc). Multipliers take into account that when an economic impact occurs to an industry, its direct effect reverberates through the economy causing effects to related industries. The multipliers that IMPLAN uses represent these transactions and their impact on the economy.

There are three different types of multipliers that IMPLAN uses to estimate economic impacts: Type I, Type II, or Type SAM. For the purposes of this analysis Type SAM multipliers were used for two primary reasons. First, Type I multipliers can only account for direct and indirect effects and do not take into consideration induced effects. Type II and Type SAM multipliers both take into account induced effects. Second, Type SAM multipliers take into account more induced effects than Type II multipliers. Type II multipliers are based on resident-only income, whereas, Type SAM multipliers account for effects that go beyond residential income, e.g., social security and income tax leakages (MIG, Inc.).

The multipliers calculated by IMPLAN are used to establish the direct, indirect, and induced effects of changes within an industry. These effects can be estimated for total output, employment, value-added, and tax impacts. These four factors offer a glimpse of how Stanislaus County will be affected as a result of changes in the food processing industry. In terms of this study, the event being analyzed is the closure of a food processing company due to the loss or elimination of the Stanislaus County Food Processing By-Product Use Program.

One of the economic impacts that IMPLAN estimates due to a change is for total output. For the purposes of this study, total output is defined as the dollar value of production for an industry in a given time period which is usually a calendar year (MIG, Inc). This can be measured in one of two ways; either by the total value of purchases by intermediate and final consumers or by “intermediate outlays plus value-added” (MIG, Inc). More simply, it can be thought of as the national output per worker multiplied by the state/county employment statistics. The output numbers derived from this analysis represent the output value that would be lost to the Stanislaus County economy as a result of one or more of the food processors exiting.

Another economic impact estimated by IMPLAN is in terms of employment numbers. Changes in employment resulting from the loss of a food processing facility include both wage and salaried employees, in both full-time and part-time positions. These jobs are measured based on Full-Time Equivalence (FTE), where IMPLAN uses 2,080 hours in a year to represent one FTE employee. The job impacts reported by IMPLAN represent those that will be lost when a firm chooses to leave the county. In other words, it reflects the total employment impact and the number of people forced to seek alternative employment.

A third calculation made by IMPLAN is regarding the economic impacts due to the value-added impacts. This impact is a subset of the total output impact and is contingent on four components: employee compensation, proprietor income, other property income, and indirect business taxes (MIG, Inc). These encompass employee and proprietary income, benefits, and taxes paid to businesses by consumers during normal operations.

The fourth economic impact that IMPLAN estimates is the tax impact. This calculation is a measurement of the changes in tax revenues resulting from a change made in the industry.

This is a simple estimate of taxes generated by the change in final demand and reflects the loss in revenue to the government due to the change (MIG, Inc).

Data Collection

In order to analyze the effects of the program on the county, data had to be collected from the businesses known to rely on the program as part of their daily operations. To determine exactly who to contact in an effort to collect this data, the Stanislaus County Department of Environmental Resources (DER) was contacted. The county DER is credited with running the program and therefore has access to much of this information. Nine companies were identified as potential participants for this study.

Once the program participants were established, a letter was sent out to each company outlining the goals of this project and requesting the company data that would be required to run the analysis. This included some relatively private business information including: 1) total dollar output, 2) number of employees, 3) total payroll expenses, 4) the percentage of employees residing in Stanislaus County, and 5) disposal alternatives. Due to the proprietary nature of the data that was being requested, only two companies were willing to provide the information needed to conduct the analysis. In order to maintain the anonymity of these companies, they will be referred to only as Processor 1 and Processor 2. Since only two companies provided the information needed, information was gathered from the U.S. Census Bureau to use as proxies for companies who may be affected.

Scenarios Examined Using IMPLAN

There were five scenarios that were run through IMPLAN to gauge the potential effect if the Stanislaus County Food Processing By-Product Use Program was no longer usable to the participating food processors and they left their county of operation. The first two scenarios were derived from Processor 1's information. This company provided all the necessary

information except a solid value on revenue. Instead this company provided a range of revenue that was between \$300 million and \$400 million. Since this company provided a range, it was decided that two scenarios should be run for this company. The first scenario, which is denoted as Processor 1A, simulated this company leaving Stanislaus with an estimated revenue base of \$300 million and 1,025 fulltime equivalents. The second scenario, which is denoted by Processor 1B, maintained the same employment level as Processor 1A, but used the upper stated revenue of \$400 million.

The third scenario investigated the economic impacts related to Processor 2's information. Processor 2 reported yearly revenue that was slightly over \$51 million and had a fulltime equivalent employee base of 302. This company participates in the Stanislaus County Food Processing By-Product Use Program but has its operation in San Joaquin County. While this project was initially going to examine the impacts that only economically affected Stanislaus County. It was judged that this scenario would be useful information in understanding the impact that would occur if the Stanislaus County Food Processing By-Product Use Program was no longer tenable for the processors using it.

Since few of the participants were willing to provide their proprietary data, two scenarios were developed from US Census Bureau data. The fourth scenario investigated a \$40 million reduction in revenue with employment and total revenue numbers taken from the US Census Bureaus 2002 Census statistics for the food manufacturing sector in Stanislaus County. The reason \$40 million was used is because it represents the average revenue for firms in the food manufacturing industry in the county. The fifth scenario used statistics from the census regarding the fruit and vegetable canning industry. The economic impact used for this scenario

was \$120 million which represents the average size firm in the fruit and vegetable canning sector in Stanislaus County.

Limitation to the Analysis

One of the primary limitations of IMPLAN needs to be addressed before examining the results. IMPLAN as it is used in this study does not take into account any industry that may fill the gap if the processing firm leaves Stanislaus. In a sense, IMPLAN is only being used to investigate the initial effect if a food processor leaves Stanislaus. It is possible that another industry and/or firm may enter into the county to absorb some of the negative effect that may occur due to the processor exiting. No attempt was made in this study to examine what industries may fill the gap if a processor decided to leave.

Another limitation to this study is that the processors who participated in this study provided information that could not be directly verified by the researchers for this project. To handle this particular issue, scenarios 4 and 5 were developed to take into consideration average producers in the industry who may use the Stanislaus County Food Processing By-Product Use Program.

A third limitation to this study is that it only examined the effects of one processor exiting its county due to the loss in the viability of the Stanislaus County Food Processing By-Product Use Program by stakeholders. It does not assess the probability that any processor would leave or what specific conditions would make the processor exit the county. This study examined what would be the short-run economic impact of one processor leaving that fit the profile of the scenarios that were investigated.

Results

Using IMPLAN, it is estimated that Stanislaus County had a total output of \$27.484 billion dollars in industry output in 2004 which inflates to \$29.629 billion in terms of 2007

dollars. Focusing on the fruit canning and drying industry, it is estimated that this industry directly provided \$1.840 billion to the Stanislaus economy in 2004 which equates to \$1.984 in 2007 dollars. This implies that this industry contributed approximately 6.7% output to the total Stanislaus economy without considering the indirect or induced effects due to the industries existence.

Examining table 2 shows the estimated economic impact in total output terms that would occur under five different scenarios discussed above. All of these impacts are in terms of 2007 dollars. This table shows that if processor 1 could no longer use the Stanislaus County Food Processing By-Product Use Program and decided to exit the county because of loss of competitiveness, then the county should expect that it would lose between \$482.656 million to \$651.656 million in total economic output. Approximately 63% of this loss comes from the direct effect of the firm no longer operating in Stanislaus. Thirty-seven percent of this loss will affect other industries, government, and local households through indirect and induced effects. These indirect and induced effects show that loss of a single processor has significant ramifications to other sectors in Stanislaus County outside of the processors industry.

Table 2: Potential Loss in Output in Terms of Dollars under Differing Scenarios

Scenario	Direct	Indirect	Induced	Total*
Processor 1A	\$ 307,657,664	\$ 126,945,129	\$ 48,053,234	\$ 482,656,022
Processor 1B	\$ 410,210,208	\$ 182,105,452	\$ 59,604,642	\$ 651,920,310
Processor 2	\$ 52,570,080	\$ 17,665,499	\$ 10,660,543	\$ 80,896,120
Stanislaus Food Manufacturing	\$ 43,902,204	\$ 18,639,484	\$ 6,697,857	\$ 69,239,547
Stanislaus Fruit and Vegetable Processors	\$ 131,706,616	\$ 47,780,034	\$ 22,634,264	\$ 202,120,907

* Totals may not sum to direct, indirect, and induced due to rounding errors.

Processor 2, who uses the Stanislaus County Food Processing By-Product Use Program but resides in San Joaquin County, is estimated to have a total effect to San Joaquin County of \$80.896 million. If this processor decides to leave San Joaquin County because the program no

longer is a viable option to it, San Joaquin County can expect to lose over \$80 million in economic activity. Sixty-five percent of this total impact comes from the processor leaving, while 35% of the impact will affect supporting industries, governments, and households. Examining Processor 2 shows that Stanislaus County is not the only county that will be affected by the loss of viability of the program.

If an average Stanislaus County food manufacturer uses the Stanislaus County Food Processing By-Product Use Program and decided to exit due to any changes in the program, it is estimated that the county of Stanislaus would lose a total of \$69.240 million in economic activity. Thirty-seven percent of this impact, i.e., \$25.337 million, will be felt by households, government, and supporting industries through indirect and induced effects. The direct affect alone of the firm leaving is \$43.902 million.

The average food processor tends to be smaller and less likely to use the Stanislaus County Food Processing By-Product Use Program than a typical fruit and vegetable processor. If an average fruit and vegetable producer decided to leave Stanislaus because of the loss of viability of the Stanislaus County Food Processing By-Product Use Program, then the county should expect \$202.121 million loss to the local economy. This comes from \$131.707 million loss in direct output provided by the processor plus another \$70.414 million in indirect and induced effects.

A subset of the total output that an economy generates is the value-added area which encompasses employee compensation, proprietor income, other property income, and indirect business taxes. Using IMPLAN, it is estimated that Stanislaus County has a total value-added of \$14.092 billion in terms of 2004 dollars which inflates to \$15.191 billion in 2007 terms. This total value-added equates to 51% of the total output generated in the Stanislaus economy. The

fruit canning and drying industry represents \$457.399 million of this value-added in terms of 2007 dollars.

Table 3 presents the estimated losses in value-added that would occur if the Stanislaus County Food Processing By-Product Use Program was no longer a viable option for processors. Examining this table shows that if Processor 1 decided to leave Stanislaus County due to a changing of the Stanislaus County Food Processing By-Product Use Program, the county would lose approximately \$183.858 million to \$220.443 million in value-added economic activity. The direct effect would be \$86.077 million under either scenario because the payroll would be the same. The difference in the upper and lower estimate occurs due to the indirect and induced effects that occur because of the difference in revenue. If the scenario of Processor 1A held true, Stanislaus can expect to lose \$97.781 million in indirect and induced effects, while if the second scenario was closer to reality, the county should expect to lose \$220.443 million in value-added economic activity.

Table 3: Potential Value-Added Loss under Differing Scenarios

Scenario	Direct	Indirect	Induced	Total*
Processor 1A	\$ 86,076,688	\$ 68,679,552	\$ 29,101,731	\$ 183,857,971
Processor 1B	\$ 86,076,688	\$ 98,277,719	\$ 36,089,031	\$ 220,443,436
Processor 2	\$ 21,986,188	\$ 9,847,427	\$ 6,420,706	\$ 38,254,318
Stanislaus Food Manufacturing	\$ 11,165,446	\$ 10,076,630	\$ 4,056,014	\$ 25,298,090
Stanislaus Fruit and Vegetable Processors	\$ 49,676,788	\$ 25,904,294	\$ 13,710,832	\$ 89,291,911

* Totals may not sum to direct, indirect, and induced due to rounding errors.

Given that Processor 2 exits San Joaquin County due to a change in the Stanislaus County Food Processing By-Product Use Program, San Joaquin should expect that it would lose \$ 38.254 million in value-added activity which encompasses employee compensation, proprietor income, other property income, and indirect business taxes. This stems from a loss of \$21.986 million in direct effects and a loss of \$16.268 million in indirect and induced effects.

Assuming that the average Stanislaus food manufacturer is a participant in the Stanislaus County Food Processing By-Product Use Program, Stanislaus County should expect a loss of \$25.298 million in value-added activity if this processor decides to leave due to a change in the program. This loss is derived from an \$11.165 million direct effect, a \$10.077 million indirect effect, and a \$4.056 million induced effect. On the other hand, if the participant in the program can be represented by the average fruit and vegetable processor, then the county should expect a loss of \$89.292 million in total value-added activity. Nearly 56% of this loss comes from direct effects, while the rest occurs because of indirect and induced effects.

Table 4 provides a look at what would happen to tax revenues if any of the scenarios put forth in this study come to fruition. To interpret the results from this table, the reader should realize that these results are predicated on the processor going out of business or moving their operations out of the country. If the processor decided to leave Stanislaus County and moved to another county in California, the federal government would lose very little to nothing and the state portion of the tax dollars would remain approximately the same. Only the local county taxes would be affected by the processor leaving. A breakdown of the taxes that support Table 4 are provided in the Appendix which gives more detail of what taxes would be affected.

Table 4: Potential Tax Loss in Output under Differing Scenarios (2004 Dollars)

Scenario	Federal	State/Local	Total*
Processor 1A	\$ 23,032,849	\$ 18,612,133	\$ 41,481,786
Processor 1B	\$ 27,984,966	\$ 22,915,048	\$ 50,701,248
Processor 2	\$ 4,912,644	\$ 3,704,440	\$ 8,579,926
Stanislaus Food Manufacturing	\$ 3,185,196	\$ 2,584,702	\$ 5,747,295
Stanislaus Fruit and Vegetable Processors	\$ 11,064,786	\$ 8,720,982	\$ 19,707,106

* Totals may not sum to direct, indirect, and induced due to a transfer that occurs from the government to the processor.

If Processor 1 decided to leave the county due to a change in the Stanislaus County Food Processing By-Product Use Program, the local, state, and federal government could expect a loss

in tax revenue of approximately \$41.482 million and \$50.701 million. The state and local government should expect 45% of this total tax revenue. If Processor 2 decides to leave San Joaquin County, the local, state, and federal government is estimated to lose approximately \$8.580 million in tax revenue where the state and local government receive 43% of this total. Assuming that an average size food manufacturer who participates in the program decides to leave, the state and local government should expect to lose \$2.585 million in tax revenue while the federal government could lose \$3.185 million in taxes. Stanislaus County should expect a bigger tax impact if an average size vegetable and fruit processor leaves the county. It is estimated that this average processor generates \$19.707 million in total taxes with \$8.721 million going to state and local tax coffers.

The results of this report have focused on the dollar impact that would be felt by the local economy if a particular food processor went out of business due to a change in the Stanislaus County Food Processing By-Product Use Program. To this point, all of these impacts to the local economy have been measured in terms of dollars. IMPLAN allows for one other important impact to be estimated—the loss of employment opportunities. It is estimated using IMPLAN that there were 4,287 employees in the fruit and vegetable canning and drying industry in 2004.

Table 5 presents the estimated loss in employment due to a processor leaving the county it produces in. It is estimated that if Processor 1 leaves Stanislaus County, the county should expect the loss of 2,248 to 2,715 jobs. Since over half of these jobs are coming from indirect and induced effect, the loss of employment would hit employees in supporting industries more than the employees who work for Processor 1. Processor 2 does not have quite the same effect as Processor 1. More than half of the 503 job losses that would occur in San Joaquin County would happen to employees working for Processor 2. Only 43% of the total job losses would affect

employees in supporting industries. The job losses if an average Stanislaus food manufacturer left the county are estimated at 310 jobs for the county. A majority of these jobs, 59%, would come from supporting industries. If an average Stanislaus food and vegetable manufacturer left Stanislaus due to the Stanislaus County Food Processing By-Product Use Program becoming unviable, then the county should expect to lose 1,076 jobs. The highest job loss at 51% would occur to those employees who were directly employed by the processor. The rest of the job losses, 522, would be felt by industries that support the fruit and vegetable processor.

Table 5: Number of Potential Job Losses under Differing Scenarios*

Scenario	Direct	Indirect	Induced	Total**
Processor 1A	975	819	455	2,248
Processor 1B	975	1,175	565	2,715
Processor 2	287	118	98	503
Stanislaus Food Manufacturing	126	120	63	310
Stanislaus Fruit and Vegetable Processors	554	308	214	1,076

*Job numbers are in terms of 2004 values.

** Totals may not sum to direct, indirect, and induced due to rounding errors.

Summary and Conclusions

This report highlighted the economic impacts that would occur if a food processor no longer produced in its county because the Stanislaus County Food Processing By-Product Use Program became an unviable option for them to use. Data was collected from two processors who currently use the program. One of these processors resides in Stanislaus County while the other is located in San Joaquin County. This data was used to develop three scenarios related to these processors leaving the county they reside. Another two scenarios used as their basis an average processor in the Stanislaus food manufacturing industry and an average processor in the Stanislaus fruit and vegetable processing industry. Four economic impacts were studied—output, value-added, taxes, and employment.

It was estimated in this study that if Processor 1 decided to leave Stanislaus County because the Stanislaus County Food Processing By-Product Use Program was no longer viable for it, a significant negative impact would be felt by the county. It is estimated that the county should expect to see a loss of \$482.656 million to \$651.656 million in total economic output. Job losses are estimated to be in the range of 2,248 to 2,715 jobs where a majority of those jobs will be felt by supporting industries in the county.

It was found in this study that not only does Stanislaus County have a vested interest in making sure that the Stanislaus County Food Processing By-Product Use Program remains a viable program for processors, San Joaquin County will also feel the effects of this program being unviable. If the program ceases to exist and the processor in San Joaquin must relocate outside of the county, then San Joaquin County should expect a loss of economic activity of \$80.896 million and a loss of 503 jobs.

Works Cited

- California Integrated Waste Management Board (CIWMB). "Statewide Profile for the State of California." <http://www.ciwmb.ca.gov/Profiles/Statewide/>, Accessed July 7, 2007a.
- California Integrated Waste Management Board (CIWMB). "History of California Solid Waste Law, 1985-1989." <http://www.ciwmb.ca.gov/Statutes/Legislation/CalHist/1985to1989.htm>, Accessed July 7, 2007b.
- California Regional Water Quality Control Board (CRWQB). "Stanislaus County Food Processing by-Products Use Program." Department of Environmental Resources. June 28, 2006, http://www.swrcb.ca.gov/rwqcb5/adopted_orders/Resolutions/R5-2006-0052.pdf, Accessed August 10, 2007.
- Goldman, George, and Aya Ogishi. "The Economic Impact of Waste Disposal and Diversion in California." A report submitted to the California Integrated Waste Management Board, April 4, 2001, <http://are.berkeley.edu/extension/EconImpWaste.pdf>, accessed August 10, 2007.
- Hall, T. Y. and R. K. Skaggs. "Economic Impact of Southern New Mexico Vegetable Production and Processing." Report 9 for the New Mexico Chile Task Force, May 2003, <http://spectre.nmsu.edu/dept/docs/cnas/CTF9.pdf>, Accessed August 10, 2007.
- Holland, D. and J. H. Yeo (2001). *The Economic Impact of Potatoes in Washington State*. XB1039, Agricultural Research Center, College of Agriculture and Home Economics, Washington State University, Pullman, Washington, 2001, <http://www.agribusiness-mgmt.wsu.edu/AgbusResearch/docs/eb1925.pdf>, Accessed: August 9, 2007.
- McHargue, Jim. "Stanislaus County: Best Waste Prevention Program." 2001 Trash Cutter Awards Program Case Studies. California Integrated Waste Management Board. <http://www.ciwmb.ca.gov/Trashcutters/Winners/2001/Stanislaus.htm>, Accessed: July 16, 2007.
- MIG, Inc. (2000). *IMPLAN PRO User's Guide, 2nd ed.* Minnesota IMPLAN Group, Inc., Stillwater, Minnesota.
- Mulkey, D. and A. W. Hodges. (2001). *Using IMPLAN to Assess Economic Impacts*. www.fred.ifas.ufl.edu/impact. Department of Food and Resource Economics, IFAS, University of Florida, Gainesville, Fla.
- Regional Development Institute (RDI). "Comprehensive Industry Analysis: Food Processing Industry." Northern Illinois University Outreach, DeKalb, IL, November 2005,

<http://www.rockfordil.com/pdf/pubs/Winnebago%20Food%20Processing%20Industry.pdf>, Accessed August 10, 2007.

Stanbra, Ryan. "History of California Solid Waste Law." California Integrated Waste Management Board. <http://www.ciwmb.ca.gov/Statutes/Legislation/CalHist/>, Accessed August 10, 2007.

Stanislaus County Board of Supervisors. "Action Agenda Summary." Board Agenda # B-19. June 13, 2006, <http://www.co.stanislaus.ca.us/bos/AGENDA/2006/20060613/B19.pdf>, Accessed: August 10, 2007.

Stephens, Larry. "California's 2006 Statewide Diversion Rate Estimate." California Integrated Waste Management Board (CIWMB), July 24, 2007. <http://www.ciwmb.ca.gov/LGCentral/Rates/Diversion/2006/Default.htm>, Accessed August 10, 2007.

Tolbert, Mark. "Nation's Population to Reach 300 Million on Oct. 17." Press Release from the United States Department of Commerce, Washington, D.C., October 12, 2006, <http://www.census.gov/Press-Release/www/releases/archives/population/007616.html>.

United States Census Bureau. 2002 Economic Census. http://www.census.gov/econ/census02/data/ca/CA000_31.HTM, Accessed August 10, 2007.

United States Census Bureau. "State and County Quick Facts: California." <http://quickfacts.census.gov/qfd/states/06000.html>, accessed August 10, 2007.

United States Environmental Protection Agency (USEPA). "Municipal Solid Waste in the United States: Facts and Figures." Publication number: EPA530-R-06-011 October 2006.

Appendix

Table A1: Tax Impact for Processor 1A

		Total in 2004 Dollars
Enterprises	Transfers	-163,195
(Corporations)	Total	-163,195
Federal	Corporate Profits Tax	5,609,631
Government	Indirect Bus Tax: Custom Duty	286,727
NonDefense	Indirect Bus Tax: Excise Taxes	878,639
	Indirect Bus Tax: Fed NonTaxes	306,416
	Personal Tax: Estate and Gift Tax	0
	Personal Tax: Income Tax	6,548,561
	Personal Tax: NonTaxes (Fines- Fees)	0
	Social Ins Tax- Employee Contribution	4,854,113
	Social Ins Tax- Employer Contribution	4,548,761
	Total	23,032,849
State/Local	Corporate Profits Tax	1,594,493
Government	Dividends	3,256,238
NonEducation	Indirect Bus Tax: Motor Vehicle Lic	84,085
	Indirect Bus Tax: Other Taxes	833,038
	Indirect Bus Tax: Property Tax	3,571,043
	Indirect Bus Tax: S/L NonTaxes	400,801
	Indirect Bus Tax: Sales Tax	4,936,832
	Indirect Bus Tax: Severance Tax	1,515
	Personal Tax: Estate and Gift Tax	0
	Personal Tax: Income Tax	2,270,173
	Personal Tax: Motor Vehicle License	92,302
	Personal Tax: NonTaxes (Fines- Fees)	871,050
	Personal Tax: Other Tax (Fish/Hunt)	16,166
	Personal Tax: Property Taxes	37,914
	Social Ins Tax- Employee Contribution	149,600
	Social Ins Tax- Employer Contribution	496,885
	Total	18,612,133
	Total Federal, State, and Local	41,481,786

Copyright MIG 2007

Table A2: Tax Impact for Processor 1B

		Total in 2004 Dollars
Enterprises	Transfers	-198,766
(Corporations)	Total	-198,766
Federal	Corporate Profits Tax	6,412,743
Government	Indirect Bus Tax: Custom Duty	364,319
NonDefense	Indirect Bus Tax: Excise Taxes	1,116,411
	Indirect Bus Tax: Fed NonTaxes	389,337
	Personal Tax: Estate and Gift Tax	0
	Personal Tax: Income Tax	8,158,302
	Personal Tax: NonTaxes (Fines- Fees)	0
	Social Ins Tax- Employee Contribution	6,003,644
	Social Ins Tax- Employer Contribution	5,540,210
	Total	27,984,966
State/Local	Corporate Profits Tax	1,822,771
Government	Dividends	3,722,423
NonEducation	Indirect Bus Tax: Motor Vehicle Lic	106,839
	Indirect Bus Tax: Other Taxes	1,058,470
	Indirect Bus Tax: Property Tax	4,537,416
	Indirect Bus Tax: S/L NonTaxes	509,263
	Indirect Bus Tax: Sales Tax	6,272,805
	Indirect Bus Tax: Severance Tax	1,926
	Personal Tax: Estate and Gift Tax	0
	Personal Tax: Income Tax	2,828,214
	Personal Tax: Motor Vehicle License	114,991
	Personal Tax: NonTaxes (Fines- Fees)	1,085,169
	Personal Tax: Other Tax (Fish/Hunt)	20,140
	Personal Tax: Property Taxes	47,231
	Social Ins Tax- Employee Contribution	182,206
	Social Ins Tax- Employer Contribution	605,186
	Total	22,915,048
	Total Federal, State, and Local	50,701,248

Copyright MIG 2007

Table A3: Tax Impact for Processor 2

		Total in 2004 Dollars
Enterprises	Transfers	-37,158
(Corporations)	Total	-37,158
Federal	Corporate Profits Tax	1,130,773
Government	Indirect Bus Tax: Custom Duty	48,311
NonDefense	Indirect Bus Tax: Excise Taxes	148,043
	Indirect Bus Tax: Fed NonTaxes	51,629
	Personal Tax: Estate and Gift Tax	0
	Personal Tax: Income Tax	1,446,524
	Personal Tax: NonTaxes (Fines- Fees)	0
	Social Ins Tax- Employee Contribution	1,057,029
	Social Ins Tax- Employer Contribution	1,030,335
	Total	4,912,664
State/Local	Corporate Profits Tax	321,413
Government	Dividends	656,383
NonEducation	Indirect Bus Tax: Motor Vehicle Lic	15,817
	Indirect Bus Tax: Other Taxes	156,701
	Indirect Bus Tax: Property Tax	671,739
	Indirect Bus Tax: S/L NonTaxes	75,394
	Indirect Bus Tax: Sales Tax	928,654
	Indirect Bus Tax: Severance Tax	285
	Personal Tax: Estate and Gift Tax	0
	Personal Tax: Income Tax	501,023
	Personal Tax: Motor Vehicle License	20,092
	Personal Tax: NonTaxes (Fines- Fees)	189,003
	Personal Tax: Other Tax (Fish/Hunt)	3,618
	Personal Tax: Property Taxes	8,029
	Social Ins Tax- Employee Contribution	36,166
	Social Ins Tax- Employer Contribution	120,124
	Total	3,704,440
	Total Federal, State, and Local	8,579,926

Copyright MIG 2007

Table A4: Tax Impact for Average Stanislaus Food Manufacturer

		Total in 2004 Dollars
Enterprises (Corporations)	Transfers	-22,603
	Total	-22,603
Federal Government NonDefense	Corporate Profits Tax	758,701
	Indirect Bus Tax: Custom Duty	40,271
	Indirect Bus Tax: Excise Taxes	123,405
	Indirect Bus Tax: Fed NonTaxes	43,036
	Personal Tax: Estate and Gift Tax	0
	Personal Tax: Income Tax	913,986
	Personal Tax: NonTaxes (Fines- Fees)	0
	Social Ins Tax- Employee Contribution	675,782
	Social Ins Tax- Employer Contribution	630,015
	Total	3,185,196
State/Local Government NonEducation	Corporate Profits Tax	215,655
	Dividends	440,405
	Indirect Bus Tax: Motor Vehicle Lic	11,810
	Indirect Bus Tax: Other Taxes	117,001
	Indirect Bus Tax: Property Tax	501,554
	Indirect Bus Tax: S/L NonTaxes	56,293
	Indirect Bus Tax: Sales Tax	693,380
	Indirect Bus Tax: Severance Tax	213
	Personal Tax: Estate and Gift Tax	0
	Personal Tax: Income Tax	316,849
	Personal Tax: Motor Vehicle License	12,883
	Personal Tax: NonTaxes (Fines- Fees)	121,573
	Personal Tax: Other Tax (Fish/Hunt)	2,256
	Personal Tax: Property Taxes	5,292
	Social Ins Tax- Employee Contribution	20,720
	Social Ins Tax- Employer Contribution	68,820
	Total	2,584,702
	Total Federal, State, and Local	5,747,295

Copyright MIG 2007

Table A5: Tax Impact for Average Stanislaus Vegetable and Food Processor

		Total in 2004 Dollars
Enterprises	Transfers	-78,662
(Corporations)	Total	-78,662
Federal	Corporate Profits Tax	2,840,874
Government	Indirect Bus Tax: Custom Duty	128,658
NonDefense	Indirect Bus Tax: Excise Taxes	394,258
	Indirect Bus Tax: Fed NonTaxes	137,493
	Personal Tax: Estate and Gift Tax	0
	Personal Tax: Income Tax	3,073,838
	Personal Tax: NonTaxes (Fines- Fees)	0
	Social Ins Tax- Employee Contribution	2,297,124
	Social Ins Tax- Employer Contribution	2,192,541
	Total	11,064,786
State/Local	Corporate Profits Tax	807,496
Government	Dividends	1,649,050
NonEducation	Indirect Bus Tax: Motor Vehicle Lic	37,730
	Indirect Bus Tax: Other Taxes	373,796
	Indirect Bus Tax: Property Tax	1,602,376
	Indirect Bus Tax: S/L NonTaxes	179,845
	Indirect Bus Tax: Sales Tax	2,215,224
	Indirect Bus Tax: Severance Tax	680
	Personal Tax: Estate and Gift Tax	0
	Personal Tax: Income Tax	1,065,601
	Personal Tax: Motor Vehicle License	43,325
	Personal Tax: NonTaxes (Fines- Fees)	408,863
	Personal Tax: Other Tax (Fish/Hunt)	7,588
	Personal Tax: Property Taxes	17,797
	Social Ins Tax- Employee Contribution	72,108
	Social Ins Tax- Employer Contribution	239,502
	Total	8,720,982
	Total Federal, State, and Local	19,707,106

Copyright MIG 2007