International Agricultural Trade and Policy Center

FLORIDA AGRICULTURE AND THE VEGETABLE INDUSTRY

By

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INTERNATIONAL AGRICULTURAL TRADE AND POLICY CENTER

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Abstract

Florida ranked ninth in the U.S. in agricultural receipts for the year 2000, and ranked first or second in receipts for 12 of the nation's top 25 agricultural commodities. Ten of these twelve leading agricultural commodities were fresh fruits or vegetables, and combined, they represented over 45 percent of the state's agricultural receipts in 2000. Despite Florida's preeminent standing as a producer of fresh fruits and vegetables, it's future leadership in this industry is less clear. In real terms, Florida's annual agricultural receipts have declined from $7.41 billion in 1992, to $6.42 billion in 2001. In 2000, receipts fell by over $521 million, the sharpest one-year drop since 1990. The overall trend in fresh vegetable receipts for the State has been downward since 1992 and receipts for fresh tomatoes, the state's most important fresh vegetable, fell by almost half over the same period. With nearly 90 percent of its receipts from fresh vegetables coming from out-of-state sales, it is estimated that the vegetable industry generated a total economic output impact of $3.14 billion for the state in 2001. Changes in agricultural policy or market conditions can and will continue to have a significant impact on Florida's economy. Given that the bulk of many fresh vegetables are produced within a handful of counties within the state, even minor changes in policy or market prices can result in dramatic consequences for local producers and the economies of individual counties.

Keywords: Florida, agriculture, vegetable, fruit, tomato, industry, economic, performance

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Introduction

The purpose of this report is to describe the Florida fresh vegetable industry and estimate its economic importance to the state of Florida and the United States. Florida's importance and place in U.S. agriculture is briefly described and compared. The discussion then focuses on the composition and performance of the vegetable industry in Florida during the ten years between 1992 and 2001, and in particular on the production of fresh tomatoes. Statistics are also presented on the geographic distribution of vegetable production within the state, which illustrates its high degree of regional concentration. Finally, the methods and results of an economic impact analysis on the industry are presented and explained.

Florida's Position in U.S. Agriculture

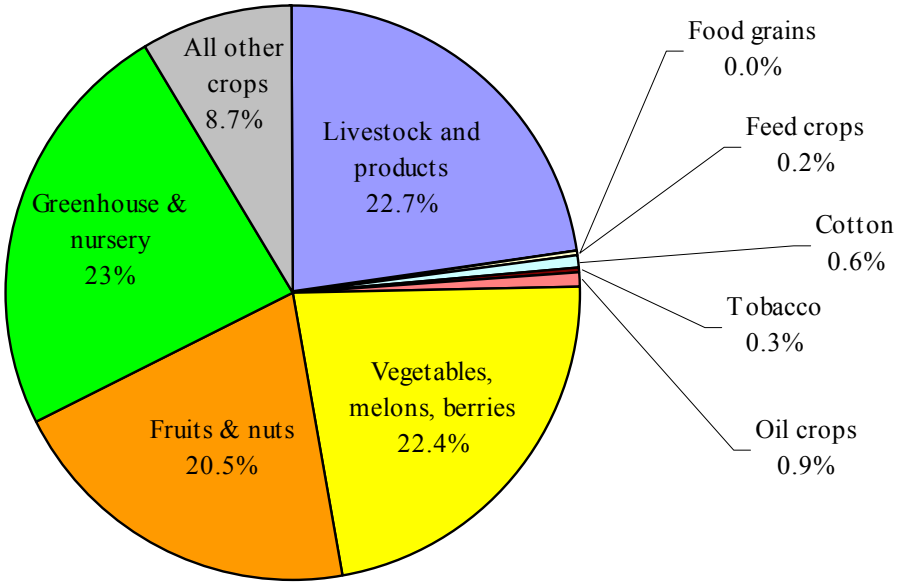
Thanks to it's southern latitude, abundant rainfall, and variety of soil types, the state of Florida has an important and highly diversified agricultural sector. Florida's agricultural output is higher-valued on a per-acre basis when compared to the rest of the United States. With less than 1.1 percent (10.2 million acres) of the United States' farmland acreage, Florida generated more than $6.4 billion, or 3.5 percent, of the nation's total agricultural receipts in 2001 (USDA-NASS). This is primarily due to the greater proportion of farmland in the state that is dedicated to higher-value fruit, vegetable and greenhouse/nursery crops (Figure 1). At the same time Florida has comparably fewer farms and acres devoted to more land-extensive forms of agriculture like livestock and feed-grain production. While over half of all agricultural receipts in the U.S. came from sales of livestock and livestock products in 2001, less than 23 percent of Florida's agricultural receipts came from this type of agriculture. Conversely, nearly two-thirds of Florida's agricultural receipts in 2001 were from the sale of fruit, vegetable, greenhouse and nursery products, while these three commodity groups only made up one-fifth of total U.S. agricultural receipts that year.

According to the USDA, Florida ranked ninth in the country in terms of overall agricultural receipts for the year 2000. At the same time, it ranked first or second in receipts for 12 of the nation's top 25 agricultural commodities (Table 1). Ten of these twelve leading

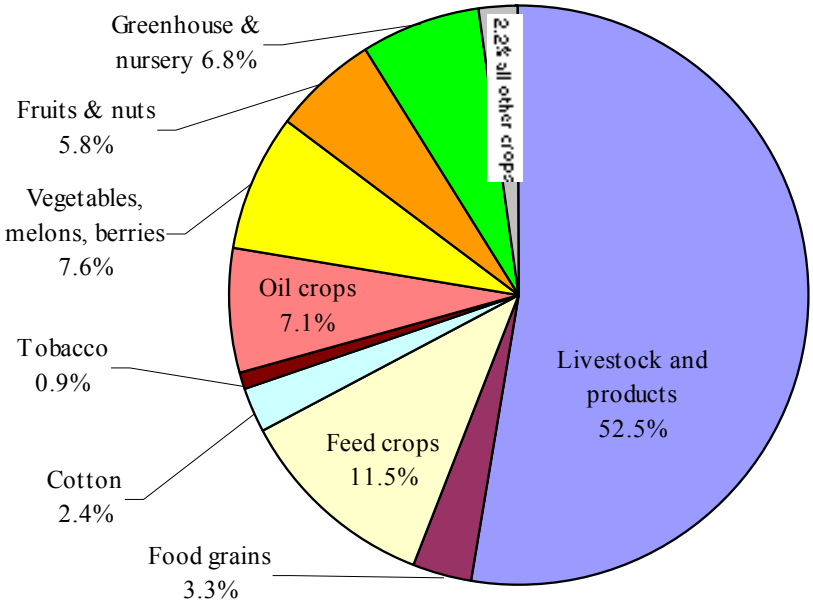
agricultural commodities were fresh fruits or vegetables, and combined, they represented over 45 percent of the state's agricultural receipts in 2000. Of course, Florida is well known for being the nation's leading producer of oranges and grapefruit. It is less well known for leading the country in sales of fresh tomatoes, bell peppers, snap beans and sweet corn (Table 1). Florida ranks second in the nation in receipts for fresh strawberries, cucumbers, eggplant and endive. For many of these commodities, Florida is the nation's sole domestic supplier during the fall, winter and/or spring seasons of the year. Clearly, Florida is an important and vital component in the nation's food supply system.

Figure 1. Distribution of Florida and U.S. Agricultural Receipts, 2001 [1].

Florida



United States



Source: USDA-ERS, U.S and State Farm Income Data, www.ers.usda.gov/data/farmincome/finfidmu.htm

[1.] Berries, including strawberries, are typically classified by the USDA in the fruit and nuts category.

Table 1. Florida's national rank and market share in receipts for selected top 25 agricultural commodities in the U.S. in the year 2000. [1]

Commodity(ies)	U.S. Rank	Receipts million, 2001 $	Percent of U.S. market
All Commodities	9	7,116	3.6%
All Crops	2	5,705	5.9%
Fruits and Nuts [2]	2	1,963	15.1%
Greenhouse/Nursery	2	1,585	11.9%
Vegetables	2	1,490	9.2%
Oranges	1	1,430	68.1%
Tomatoes, fresh	1	519	27.8%
Sugar Cane	1	452	48.4%
Grapefruit	1	320	76.3%
Snap Beans	1	257	48.6%
Bell Pepper, fresh	1	250	46.2%
Strawberries	2	172	17.2%
Sweet Corn, fresh	1	105	21.2%
Cucumbers, fresh	2	75	33.8%
Potatoes, winter	2	36	42.1%
Cabbage fresh	5	20	5.8%
Eggplant, fresh	2	14	29.1%
Escarole/Endive	2	14	22.7%
Watermelon	6	10	4.2%
Romaine Lettuce	4	3	1.0%

Source: USDA-NASS, Statistical Highlights, 2001-2002. www.usda.gov/nass/pubs/stathigh/2002/econindex.htm

1. With the exception of potatoes, Florida's rank is based on year-round production. The ranking is higher when receipts are evaluated seasonally, i.e., Florida is the sole domestic supplier of winter-season strawberries.
2. Berries are counted as fruit and nuts in this table

Recent Economic Performance of Florida Agriculture

Florida agriculture has only seen sporadic growth during the ten years between 1992 and 2001. When adjusted for inflation and expressed in 2001 dollars, Florida's annual agricultural receipts declined from $7.41 billion in 1992 to $6.42 billion in 2001 (Figures 2 and 3). After loosing 8.5 percent in value between 1992 and 1995, receipts for the State recovered to $7.51 billion by 1998, but by 2001 they had fallen to their lowest level since 1974. Florida's farm receipts declined by over $521 million in 2001, the sharpest one-year decline since 1990. This downturn has not been evenly distributed among the different commodity groups in the State. As can be seen in Figure 3, almost all of the reduction in agricultural receipts since 1998 has occurred in the fresh fruit and vegetable subsectors. Florida fruit production is dominated by citrus products. During the 2000-01 season, the citrus industry experienced significant declines in both production and prices. This accounted for much of the decline in Florida farm receipts that year.

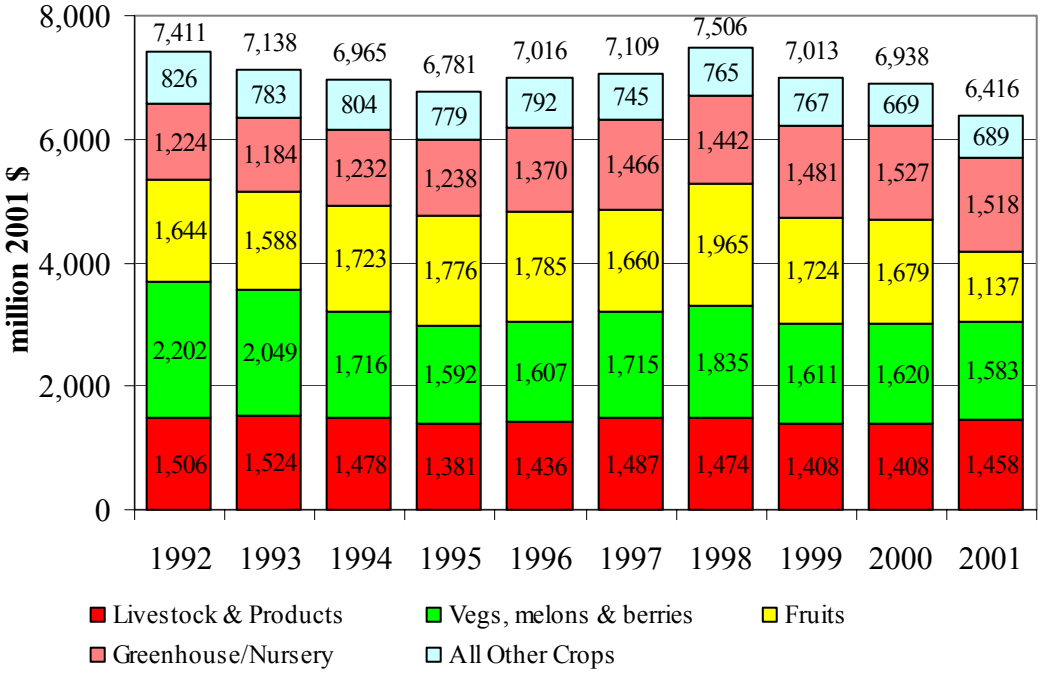
There have been significant trends in Florida's receipts from fresh vegetable production in the last ten years (Figures 2 and 3). From 1992 to 1995, vegetable receipts declined dramatically, falling from $2.20 to $1.59 billion in real terms, or about 28 percent. Although the industry had recovered about 10 percent of these losses by 1998, receipts resumed their earlier decline, so that by 2001 industry sales were just above $1.58 billion, which was nearly 14 percent below their 1998 levels.

On the bright side, the greenhouse and nursery industry in Florida has seen increases in constant dollar receipts during eight of the 10 years between 1992 and 2001. This sector grew by more than 24 percent during this period. As can be seen in Figure 2, revenues for the nursery and greenhouse industry were approximately $1.52 billion in 2001, down only slightly from $1.53 billion the year before.

Receipts to Florida's livestock industry have remained relatively stable over the 10 year period. Since 1992, livestock receipts have only fallen about three percent, to $1.46 billion, by 2001. In 1993, receipts from livestock sales rose to 1.52 billion, but then fell to $1.38 billion in 1995 (Figure 2).

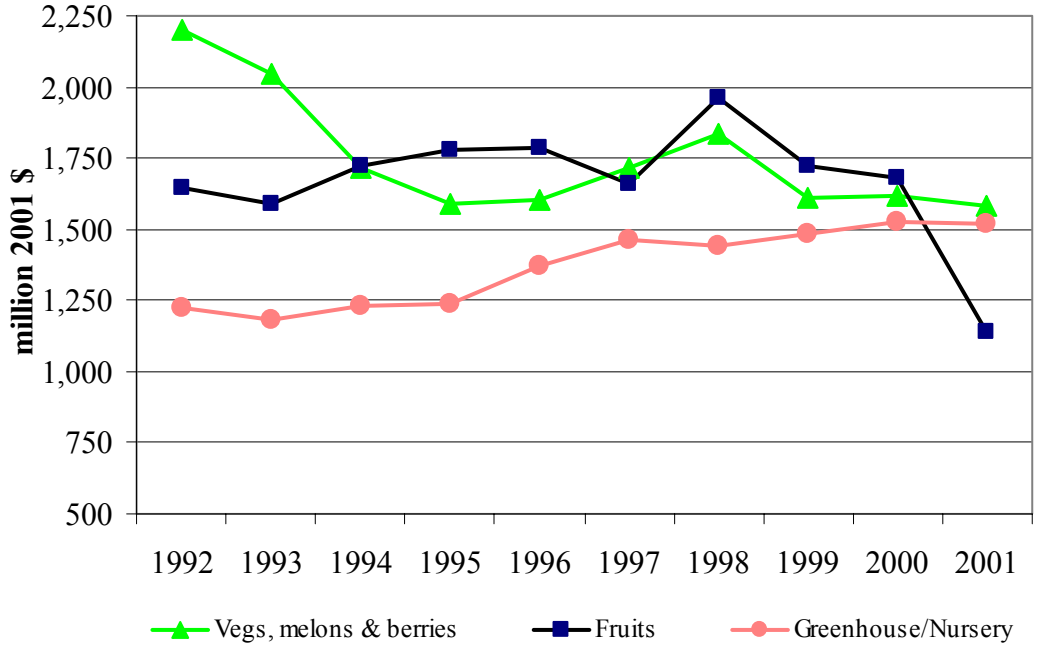
The category of "All other crops" for Florida includes sugarcane, peanuts, tobacco, feed crops, cotton and other minor crops. Receipts for this category of crops declined by

Figure 2. Florida Agricultural Receipts by Commodity Group, 1992 - 2001.



Source. USDA-ERS, U.S and State Farm Income Data, www.ers.usda.gov/data/farmincome/finfidmu.htm

Figure 3. Florida Agricultural Receipts for Vegetable, Fruit and Greenhouse Crops, 1992 - 2001.



Source. USDA-ERS, U.S and State Farm Income Data, www.ers.usda.gov/data/farmincome/finfidmu.htm

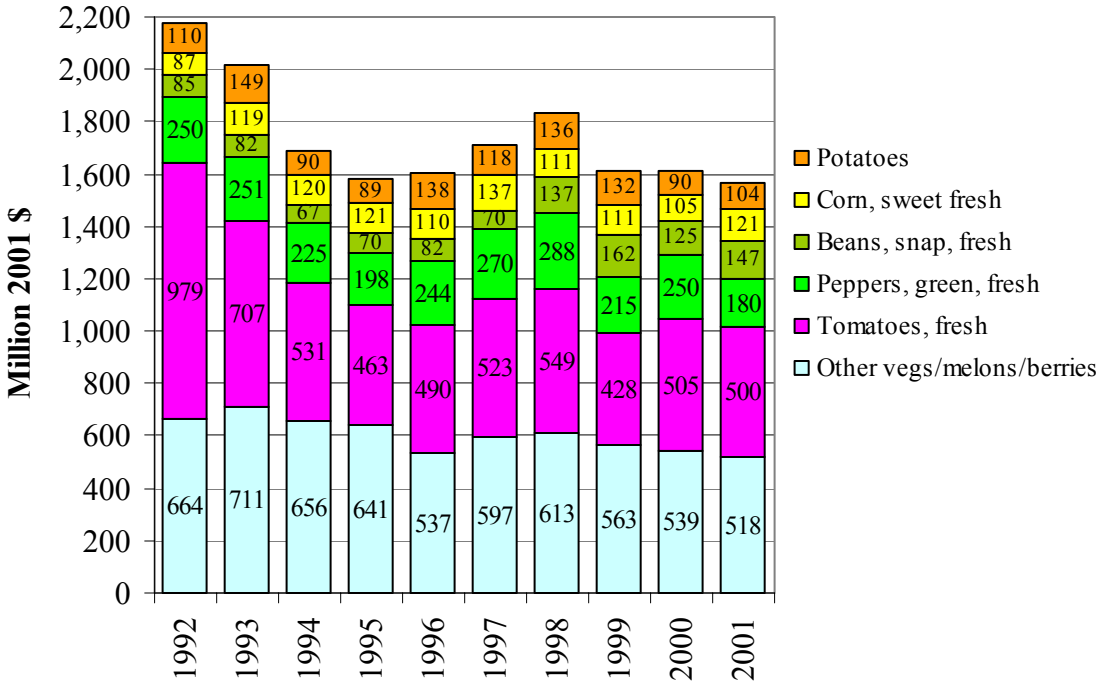
about 17 percent in real terms, between 1992 and 2001 (Figures 2 and 3). Much of that reduction occurred in the year 2000 when receipts for this category dropped by $98 million or nearly 13 percent.

Florida's Vegetable Industry

A detailed breakout of Florida's vegetable industry receipts by commodity is provided in Figures 4 and 5. As previously mentioned, the overall trend for fresh vegetable receipts in the State has been downward, particularly between 1992 and 1995. During this period, the U.S. fresh tomato market saw increased imports from Mexico following the implementation of the North American Free Trade Agreement (NAFTA). Although many of the other important vegetables produced in Florida had declining revenues during these years, tomatoes fared the worst. By volume, tomato imports represented on average, 29 percent of national utilization between 1992 and 2001. This compared to imports' 22 percent share of U.S. utilization between 1982 and 1991. Between 1992 and 1995, receipts from Florida tomato sales dropped by over 47 percent, resulting in a cumulative decline in receipts of $721 million in those three years. Tomato sales changed from comprising nearly 45 percent of Florida's fresh vegetable, melon and berry receipts in 1992, to just over 29 percent in 1995. Although, a modest recovery in vegetable and tomato revenues occurred between 1995 and 1998, these gains have since evaporated as 2001 receipts declined to their lowest levels of the 10 year period.

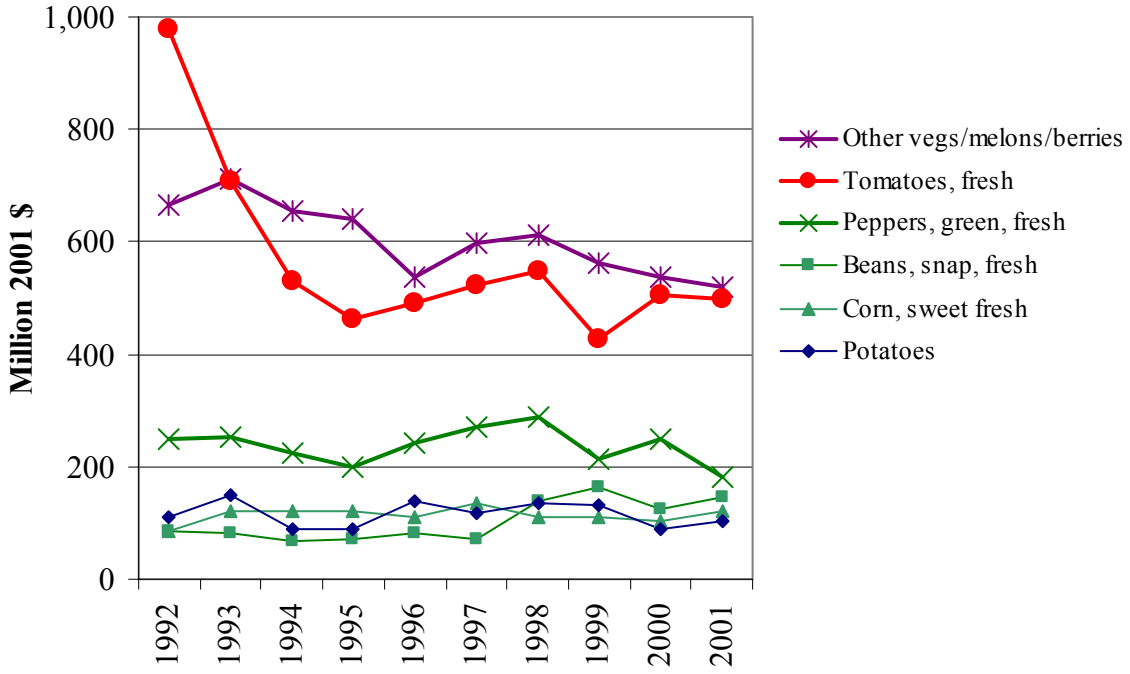
Not all of Florida's vegetable producers experienced diminishing real revenues during the 1990s. Sweet corn and snap beans generated $121 and $147 million in revenues respectively in 2001 (Figure 4). These values represent a 39 percent increase in receipts for sweet corn and a nearly 73 percent increase for snap beans compared to 1992. These increases, however, have not been nearly sufficient to offset the losses in tomatoes and other vegetables experiencing declining receipts. Since many of Florida vegetable producers specialize in one or two commodities, numerous operations have left the industry. According to the Census of Agriculture, the number of vegetable farms in the State fell from 1,988 in 1992, to 1,500 in 1997. This represents a loss of nearly 25 percent of Florida's vegetable farms in just five years.

Figure 4. Florida Receipts for Fresh Vegetables by Commodity, 1992 – 2001.



Source: USDA-ERS U.S. and State farm income data, www.ers.usda.gov/data/farmincome/finfidmu.htm

Figure 5. Florida Receipts for Fresh Vegetables by Commodity, 1992 – 2001, 2001 dollars

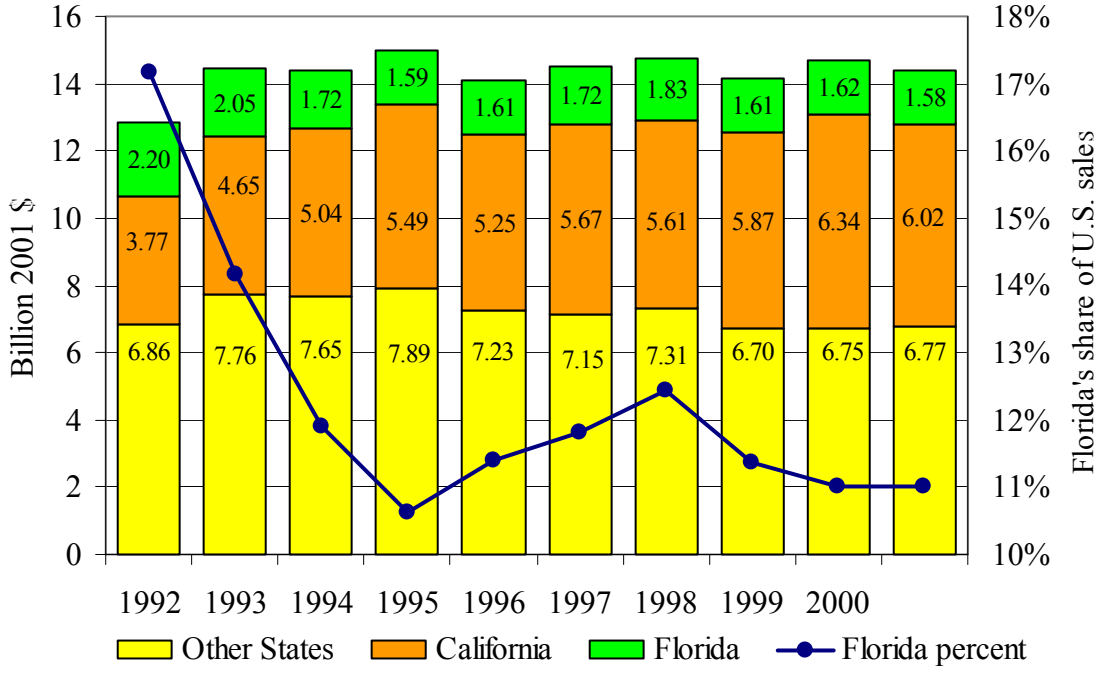


Source: USDA-ERS U.S. and State farm income data, www.ers.usda.gov/data/farmincome/finfidmu.htm

The trend in receipts for the "all other vegetables" category was also significantly down between 1992 and 2001. This category includes cucumbers, watermelon, squash, cabbage, carrots, eggplant, radishes, lettuce, berries and other miscellaneous vegetable crops. The combined receipts (in 2001 dollars) for these vegetables declined from $664 million in 1992, to $518 million in 2001, or 22 percent over the 10 year period (Figures 4 and 5).

California represents Florida's biggest domestic rival in the production of fresh vegetables and its dominance of the industry has been growing. While Florida's fresh vegetable receipts declined in real value and in percentage terms of the national market during the 1990s, California has benefited from a growing market for cool-season and specialty vegetables (Figure 6). Producers there have responded by increasing acreage and production. Between 1992 and 2001 California's share of domestically produced fresh-vegetable receipts increased from 29 to 41 percent. Although fresh vegetable receipts for states other than Florida and California rose between 1992 and 1995, by 2001 they had fallen back to 1992 levels.

Figure 6. Florida, California, and Other State's Receipts for Fresh Vegetables, 1992 - 2001.



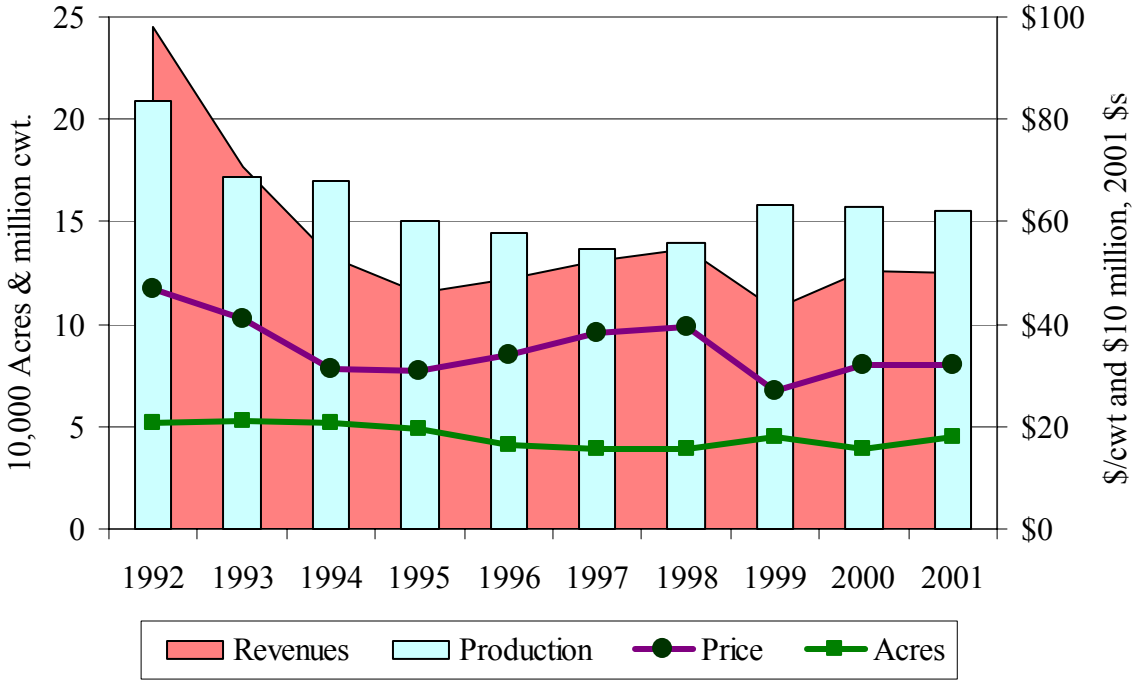
Source: USDA-ERS, U.S. and State farm income data, www.ers.usda.gov/data/farmincome/finfidmu.htm

It is interesting to look at changes in Florida's position in the U.S. fresh tomato market between 1992 and 2001. Although California is known as the leading producer of processing tomatoes in the U.S., it is also the second largest domestic supplier of fresh tomatoes. Like Florida, it has faced increasing competition from Mexico, but to a lesser extent due to a smaller overlap in seasonal production patterns. While Florida's tomato receipts declined by over 48 percent between 1992 and 2001, California's declined by 34 percent (Figures 7 and 8). In 2001 California's fresh tomato acreage and production was above 1992 levels. Florida's 2001 acreage and production numbers were respectively 13 and 25 percent below where they were in 1992.

To appreciate the competitive dynamics of Florida's tomato industry, it is useful to compare the volume and timing of tomato shipments from Florida, California, Mexico and Canada (Figure 9). This diagram shows average monthly shipments of fresh tomatoes for the years 1999, 2000 and 2001 from these four major supply regions. From January through March, Florida and Mexico supply nearly equal shares of U.S. tomato shipments. Then in April and May, Florida dominates the U.S. market as Mexican imports subside. June is a transition month when shipments from Florida fall off dramatically, those from California begin to pick up, and shipments from Mexico and Canada are still considerable. California is the nation's largest supplier of tomatoes from July through October, although substantial quantities of tomatoes originate from all across the continental U.S., as numerous local growers supply tomatoes for local demand (not shown). Florida begins to re-enter the national market in October, and by November its shipments dominate the highways. Over thee quarters of U.S. tomato shipments originate in Florida in December, with Mexico capturing most of the residual volume. By January, again, Mexico has nearly caught up to Florida in U.S. shipments.

Figure 10 demonstrates the phenomenal growth in imports of fresh tomatoes that took place in the 1990s. From 1992 through 1996, the value of Mexican tomato imports to the U.S. more than quadrupled, with trade restrictions reduced through NAFTA and prices for Mexican imports reduced due to a devalued Peso. In October of 1996, the U.S. and Mexico signed an agreement to suspend an anti-dumping investigation. This agreement restrained Mexican tomato growers from selling tomatoes in the U.S. for less than a reference price of about $0.21 per pound. While the value of Mexican imports has trended lower since that year (Figure 10),

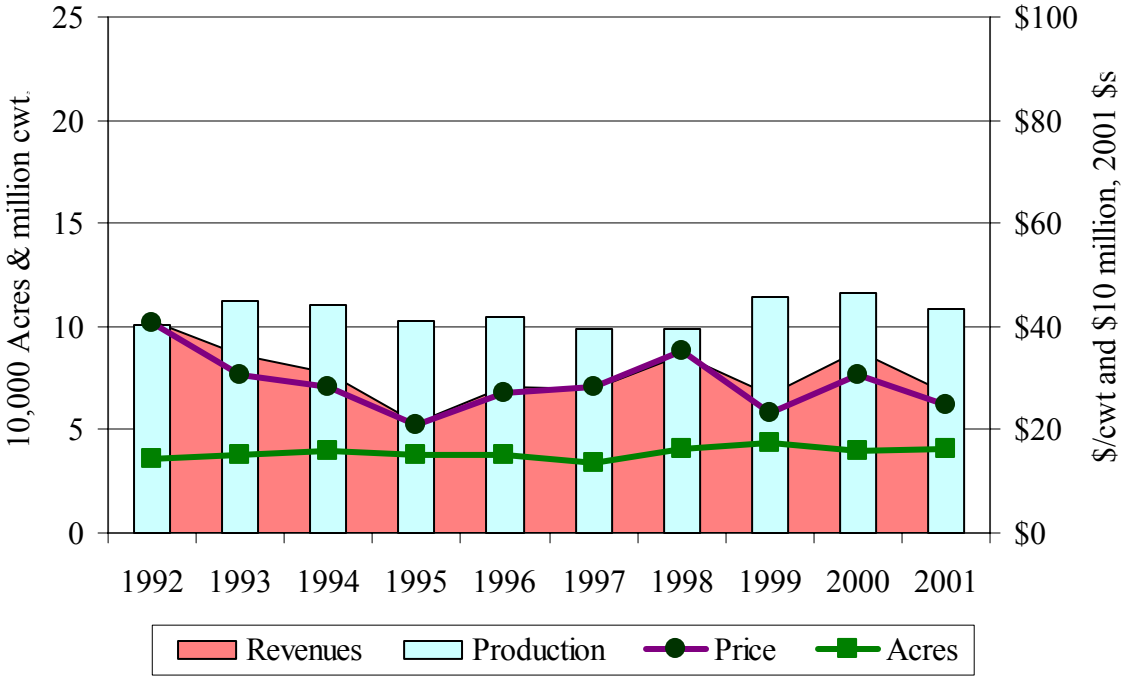
Figure 7. Florida Fresh Tomato Production, Acres, Price and Revenues, 1992-2001 [1]



Source: USDA-NASS, "Agricultural Statistics", 1994, 1998, and 2002, http://www.usda.gov/nass/pubs/pubs.htm

[1.] Does not include cherry or plum type fresh tomatoes.

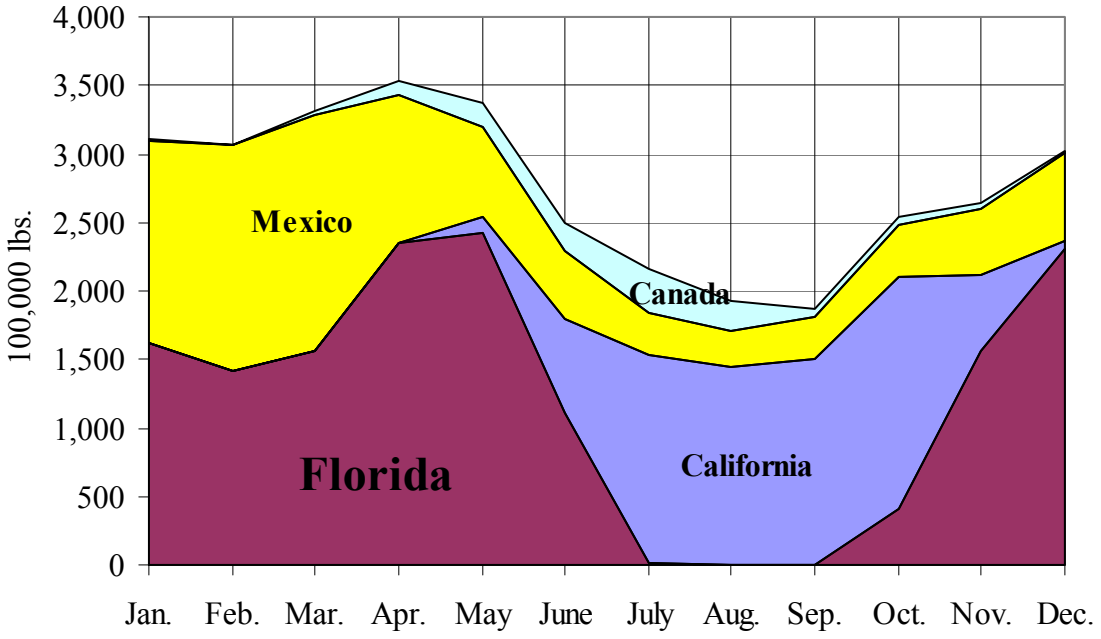
Figure 8. California Fresh Tomato Production, Acres, Price and Revenues, 1992-2001



Source: USDA-NASS, "Agricultural Statistics", 1994, 1998, and 2002, http://www.usda.gov/nass/pubs/pubs.htm

[1.] Does not include cherry or plum type fresh tomatoes

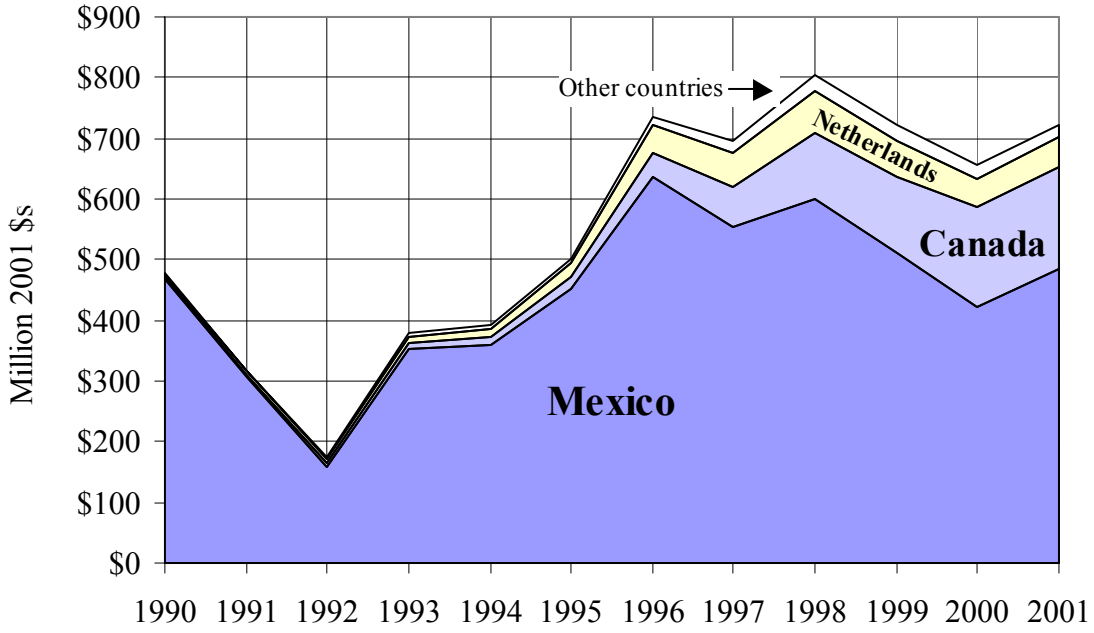
Figure 9. Average U.S. Monthly Fresh-Tomato Shipments Originating from Florida, California, Mexico and Canada, 1999 - 2001 [1].



Source: USDA-AMS, "Fresh Fruit and Vegetable Shipments". 1999 - 2001. www.ams.usda.gov/fv/mncs/shipsumm99.pdf

[1.] Does not include shipments of cherry or plum type fresh tomatoes, or shipments from other states or countries.

Figure 10. Value of Fresh Tomato Imports by Country of Origin, 1992 - 2001.



Source: USDA-ERS, "Annual Fresh-Tomato Import Value by country".
http://www.ers.usda.gov/briefing/tomatoes/tomatopdf/FrTomImpCntry.pdf

imports of Canadian greenhouse tomatoes have surged. This has been a result of increased U.S. demand for higher quality tomatoes and currency exchange rates favorable to Canadian exports. Since 1996, imports of tomatoes from the Netherlands to the U.S. have also become significant.

Geographic Distribution of Florida's Vegetable Industry

Like many other specialty crops, the production of fresh vegetables has become concentrated in specific geographic areas of the nation and within individual states as well. Climate and soil types are important environmental determinants of the suitability of an area for specific types of agricultural production, and these are closely associated with geographic location. The availability of various forms of public infrastructure are also critical to the development of many types of industrial development and this is true for agriculture as well.

The concentration and national importance of fresh vegetable production in Florida is indicated in Tables 2 and 3. In Table 2, the top 10 Florida counties in terms of harvested acres of fresh vegetables, melons and berries are shown to represent over 81 percent of the State's total acreage in fresh vegetable production. As shown in the far right-hand column of Table 2, nearly 48 percent of the State's vegetable acreage is located in the top three producing counties and the top five counties have almost 64 percent of total production. The counties in Florida with the highest receipts from fresh vegetable sales are shown in Table 3. In 1997, Palm Beach County ranked first in the State and sixth in the Nation in terms of sales of fresh vegetables ($267 million in 2001 dollars). As the table shows, thirteen of the nation's top 100 counties for fresh vegetable sales are in Florida. Table 3 also lists the commodities that are predominantly grown in these leading counties. The value of individual commodities is shown later in Table 4.

Table 2. Florida's Leading Counties in Acres of Harvested Fresh Vegetables (including sweetcorn, melons and berries), 1997

County	State Rank	Acres	Percent	Cumulative Percent
Palm Beach	1	58,002	22.5%	22.5%
Dade	2	40,108	15.6%	38.1%
Manatee	3	25,110	9.7%	47.8%
Orange	4	23,469	9.1%	56.9%
Collier	5	17,070	6.6%	63.5%
Hillsborough	6	16,039	6.2%	69.7%
Hendry	7	9,646	3.7%	73.5%
Lee	8	6,938	2.7%	76.2%
Suwannee	9	6,860	2.7%	78.8%
Alachua	10	5,773	2.2%	81.1%

Source: USDA-NASS, 1997 Census of Agriculture, Florida State and County Data, Table 29

Table 3. Leading Florida Counties in Value of Fresh Vegetables, Sweet Corn, Melons in 1997 (2001 dollars). [1]

County	State Rank	US Rank	Receipts $1,000	Leading fresh vegetable crops
Palm Beach	1	6	267,016	Snap Beans, cabbage, celery, sweet corn, cucumber, eggplant, lettuce, sweet & hot peppers, squash, tomatoes
Collier	2	10	181,564	Snap Beans, sweet corn, cucumbers, eggplant, sweet & hot peppers, potatoes, squash, tomatoes, watermelons
Dade	3	13	138,658	Snap & pole beans, cabbage, sweet corn, eggplant, okra, pickles, potatoes, squash, tomatoes
Manatee	4	14	129,248	Cabbage, cauliflower, potatoes, tomatoes, watermelons
Orange	5	23	64,717	Cabbage, chinese cabbage, sweet corn, cucumbers, greens spinach.
Hendry	6	25	61,122	Snap Beans, sweet corn, cucumbers, eggplant, sweet & hot peppers, potatoes, squash, tomatoes, watermelons
Hillsborough	7	26	60,143	Blueberries, snap & pole beans, lima beans, cabbage, cucumbers, eggplant, squash, tomatoes, watermelons
Lee	8	28	58,275	Snap Beans, sweet corn, cucumbers, eggplant, sweet & hot peppers, potatoes, squash, tomatoes, watermelons
Gadsden	9	46	31,036	Pole beans, squash, sweet corn, tomatoes
Martin	10	54	(D)[2]	Cabbage, potatoes, tomatoes, watermelons
Suwannee	11	69	17,947	Cucumbers, greens, peppers, potatoes, squash, watermelons
Alachua	12	86	13,953	Snap beans, cucumbers, peppers, potatoes, squash
St Lucie	13	98	(D)[2]	Tomatoes, watermelons, snapbeans

Source: USDA-NASS, 1997 Census of Agriculture. Rankings of State and County Tables, http://www.nass.usda.gov/census/census97/rankings/tbl33.pdf

1. For purposes of comparison to other U.S. counties these estimates do not include berries.

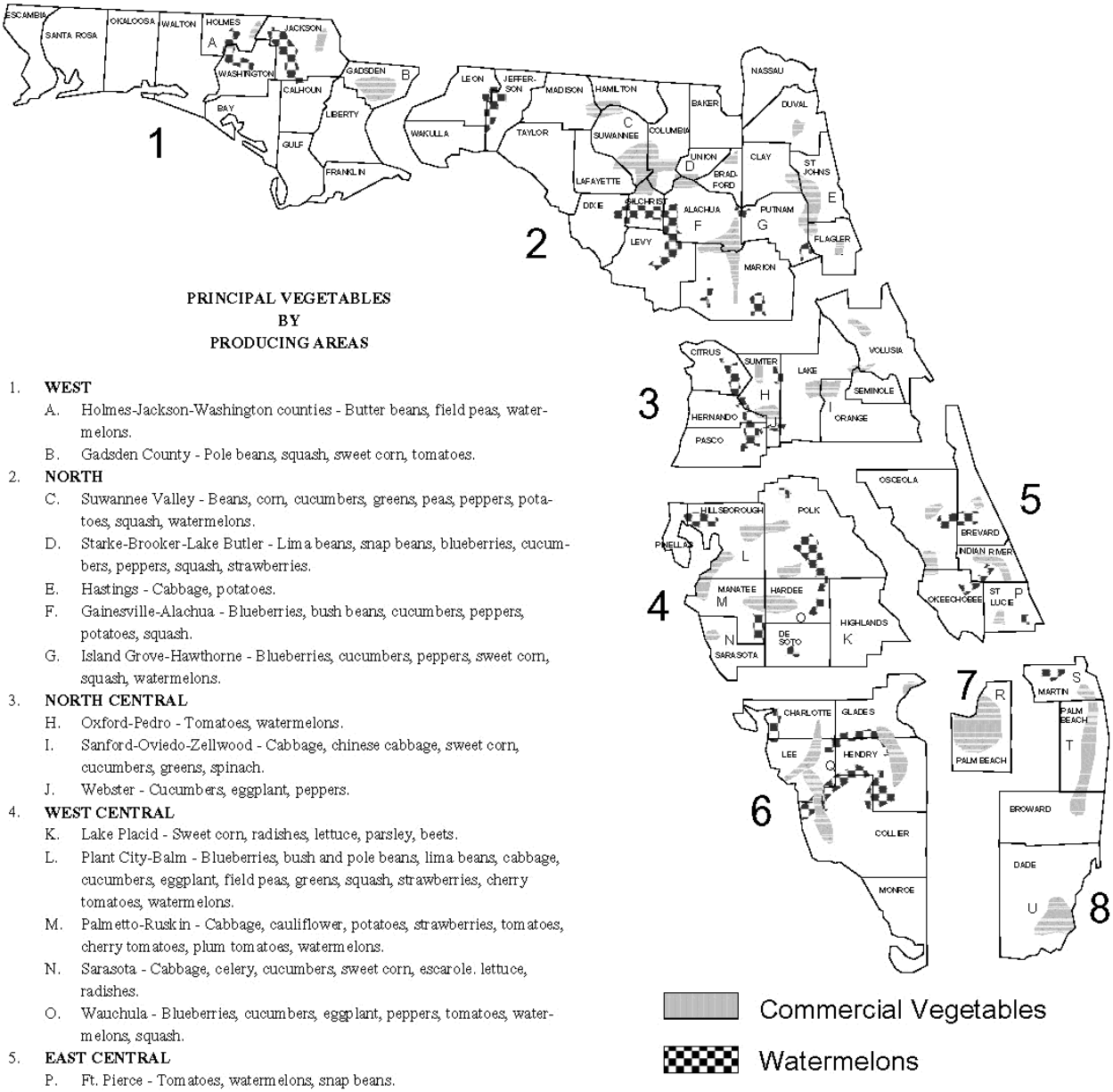
2. Value was withheld by USDA to avoid disclosing data on individual farms.

The geographic distribution of fresh vegetable production within the state of Florida is graphically shown in Figure 11. The top two counties in terms of acreage (Palm Beach and Dade) are located in the southeastern part of the state (areas 7 and 8 in Figure 11). Three other top-ten counties for vegetable acreage are also located in southern Florida (Collier, Lee and Hendry), but nearer the Gulf coast (area 6, Figure 11). Manatee and Hillsborough Counties are respectively the third and sixth largest fresh vegetable-acreage counties in the state, and are also located on the Gulf coast in area 4 (West Central Florida). Orange County, the fifth largest in terms of acreage, is located in the central region of the State (area 3, Figure 11). Only two of the State's 10 largest fresh-vegetable counties are located in north Florida. These are Alachua and Suwannee counties, which are located in Area 2 of Figure 11, and together account for less than 5 percent of total acreage.

Acreage data on the production of six important fresh vegetable commodities within the state of Florida are presented by county in Table 4. For all six commodities, 64 percent or more of the state's total production comes from its top 5 counties in terms of production acreage. In the case of snap beans, over 70 percent of the state's acreage is located in just two counties. Similarly, for sweet corn the two largest production-area counties in the State account for 68 percent of the state's total acreage. With the exception of watermelons, the top three counties have well over one-half the production for each of the commodities, ranging from 54 percent for tomatoes, up to 84 percent for sweet corn.

The major implication of these statistics is that the geographic distribution of fresh vegetable production is highly concentrated, not only nationally, but also within Florida. Consequently, changes in market conditions or policies that impact prices and trade can have dramatic impacts on local and regional economies. By the same token, local and regional policies and events with the potential to impact agricultural production can have significant implications for national markets for fresh vegetables.

Figure 11. Geographic Distribution of Florida's Vegetable Industry



PRINCIPAL VEGETABLES BY PRODUCING AREAS

1. **WEST**
   - A. Holmes-Jackson-Washington counties - Butter beans, field peas, watermelons.
   - B. Gadsden County - Pole beans, squash, sweet corn, tomatoes.
2. **NORTH**
   - C. Suwannee Valley - Beans, corn, cucumbers, greens, peas, peppers, potatoes, squash, watermelons.
   - D. Starke-Brooker-Lake Butler - Lima beans, snap beans, blueberries, cucumbers, peppers, squash, strawberries.
   - E. Hastings - Cabbage, potatoes.
   - F. Gainesville-Alachua - Blueberries, bush beans, cucumbers, peppers, potatoes, squash.
   - G. Island Grove-Hawthorne - Blueberries, cucumbers, peppers, sweet corn, squash, watermelons.
3. **NORTH CENTRAL**
   - H. Oxford-Pedro - Tomatoes, watermelons.
   - I. Sanford-Oviedo-Zellwood - Cabbage, chinese cabbage, sweet corn, cucumbers, greens, spinach.
   - J. Webster - Cucumbers, eggplant, peppers.
4. **WEST CENTRAL**
   - K. Lake Placid - Sweet corn, radishes, lettuce, parsley, beets.
   - L. Plant City-Balm - Blueberries, bush and pole beans, lima beans, cabbage, cucumbers, eggplant, field peas, greens, squash, strawberries, cherry tomatoes, watermelons.
   - M. Palmetto-Ruskin - Cabbage, cauliflower, potatoes, strawberries, tomatoes, cherry tomatoes, plum tomatoes, watermelons.
   - N. Sarasota - Cabbage, celery, cucumbers, sweet corn, escarole. lettuce, radishes.
   - O. Wauchula - Blueberries, cucumbers, eggplant, peppers, tomatoes, watermelons, squash.
5. **EAST CENTRAL**
   - P. Ft. Pierce - Tomatoes, watermelons, snap beans.
6. **SOUTHWEST**
   - Q. Snap beans, sweet corn, cucumbers, eggplant, sweet and hot peppers, potatoes, squash, tomatoes, cherry tomatoes, plum tomatoes, watermelons.
7. **EVERGLADES**
   - R. Bush beans, cabbage, celery, Chinese cabbage, sweet corn, escarole, greens, lettuce, radishes.
8. **SOUTHEAST**
   - S. Martin County - Cabbage, potatoes, tomatoes, watermelons.
   - T. Pompano - Bush beans, lima beans, sweet corn, cucumbers, eggplant, sweet and hot peppers, squash, tomatoes, cherry tomatoes, plum tomatoes.
   - U. Homestead - Bush and pole beans, cabbage, sweet corn, eggplant, okra, pickles, potatoes, squash, strawberries, tomatoes, cherry tomatoes, plum tomatoes.

Source: USDA-NASS, Florida State Office

Table 4. Leading Florida Counties in Acreage of Specific Vegetable or Melon Commodities, 1997

Commodity	State/County	Rank	Acres	Percent	Cumulative Percent
Sweet Corn	Florida		43,595		
	Palm Beach	1	21,770	49.9%	49.9%
	Orange	2	7,960	18.3%	68.2%
	Dade	3	6,909	15.8%	84.0%
	Alachua	4	420	1.0%	85.0%
	Marion	5	84	0.2%	85.2%
Tomatoes	Florida		39,900		
	Manatee	1	8,596	21.5%	21.5%
	Collier	2	8,573	21.5%	43.0%
	Lee	3	4,447	11.1%	54.2%
	Dade	4	4,023	10.1%	64.3%
	Palm Beach	5	3,960	9.9%	74.2%
Watermelons	Florida		30,328		
	Manatee	1	2,792	16.9%	16.9%
	Hendry	2	2,492	15.0%	31.9%
	Levy	3	2,219	13.4%	45.3%
	Collier	4	1,592	9.6%	54.9%
	Suwannee	5	1,574	9.5%	64.4%
Snap Beans	Florida		30,275		
	Dade	1	17,138	56.6%	56.6%
	Palm Beach	2	4,291	14.2%	70.8%
	Alachua	3	2,027	6.7%	77.5%
	Suwannee	4	1,650	5.5%	82.9%
	Manatee	5	1,209	4.0%	86.9%
Sweet Peppers	Florida		19,711		
	Palm Beach	1	6,587	33.4%	33.4%
	Collier	2	3,851	19.5%	53.0%
	Manatee	3	3,274	16.6%	69.6%
	Hendry	4	2,440	12.4%	81.9%
	Lee	5	626	3.2%	85.1%
Cucumbers	Florida		16,561		
	Manatee	1	4,360	26.3%	26.3%
	Palm Beach	2	3,599	21.7%	48.1%
	Collier	3	2,052	12.4%	60.4%
	Dade	4	1,527	9.2%	69.7%
	Alachua	5	250	1.5%	71.2%

USDA-NASS Census of Agriculture, 1997

Economic Impact of Florida's Vegetable Industry

Production and sales data for an industry only give a indication of its direct impacts on an economy. A complete economic evaluation should also account for the industry's indirect impacts through the transactions it has with various suppliers, workers, owners and governments. In addition, induced impacts that follow from the earnings, profits and taxes generated by the direct and indirect activities should also be computed to estimate the industry's total impact on the economy. The theory and techniques used to model and calculate these interdependencies within an economy are known as input-output analysis (Miller and Blair, 1987).

An input-output analysis software and database package called IMPLAN PRO was used to estimate the total economic impacts of the vegetable industry for the state of Florida [1]. This software is licensed to the University of Florida by the Minnesota Implan Group, Inc. It allows construction of regional input-output models for any county, group of counties, or state within the United States. Industries within these models are classified into one of 528 different sectors, based on the four-digit Standard Industrial Classification (SIC) system . Vegetable, sweetcorn, melon and berry production as well as their associated packing enterprises are all classified under the "vegetable" sector within this system.

While Florida is a major vegetable producer for the nation, the production practices typically employed by producers within the state are often unique compared to other regions of the country that grow fresh vegetables. This is largely due to unique characteristics of Florida's climate, soils and economy. Many of the economic relationships modeled by IMPLAN are based on coefficients derived from national averages, which in some case may not be representative for a particular region. To provide more accurate and reliable estimates of the economic impacts of Florida's vegetable industry, historical budgets developed by the University of Florida for various vegetable production enterprises were used to customize IMPLAN's model parameters. These parameters were entered into the software database as production function or absorption coefficients, and represent the proportion of total production costs allocated to specific types of inputs. The customized production function coefficients for

[1] Minnesota IMPLAN Group, Inc. IMPLAN Pro, User's Guide. Second Edition, June, 2000. Stillwater, Minnesota. www.implan.com

Florida are shown in Table 5. A compilation of the crop production budgets used to generate these coefficients is given in Table A1 of the appendix to this report.

Table 5. IMPLAN Production Function Coefficients for Florida Vegetable Industry

Expense Category	IMPLAN Sector	Sector Number	Absorption Coefficient
Value Added			
Labor	Households, low income	10002	0.363
Land rent	Households, high income	10009	0.048
Total			**0.411**
Inter-industry Purchases			
Seed or transplants	Greenhouse & nursery products	23	0.047
Fertilizer and lime	Nitrogenous and phosphatic fertilizers	202	0.041
Chemicals (pesticides, surfactants)	Agricultural chemicals, n.e.c.	204	0.140
Plastic items (mulch, string, tubing, irrigation parts)	Plastics materials and resins	191	0.021
Wood items (stakes, packing crates)	Wood products, n.e.c.	147	0.086
Contract services (fert. application, land leveling, pollination)	Agricultural, forestry, fishery services	26	0.005
Insurance	Insurance carriers	459	0.002
Machinery & equipment (repairs, maintenance, fuel, lube, depreciation)	Farm machinery & equipment	309	0.109
Interest	Banking	456	0.020
Organization fees & assessments	Business associations	503	0.003
General overhead	Other business services	470	0.115
Total			**0.589**
Total Value Added & Inter-industry Purchases			**1.000**

To properly estimate the total economic impact of an industry within a particular region, consideration must also be given to the proportion of sales that occur outside the region or state. The proportion of fresh vegetables produced in the state and shipped outside the state represent "new" dollars for Florida. Compared to in-state sales, which only represent financial transfers among state residents, revenues from out-of-state sales have a multiplier effect because they generate indirect and induced impacts as they flow into and through the economy. It is estimated that 89.2 percent of the value of Florida's fresh vegetable production comes from

products shipped out of state [2]. Using this estimated proportion, the level of out-of-state sales for Florida fresh produce is calculated to be $1,411.68 million, as shown in Table 6. The remaining 10.8 percent of total receipts from in-state sales is equal to $170.92 million.

Table 6. Receipts from In-State and Out-of-State Sales of Florida Fresh Vegetables, Melons, and Berries, 2001

Category of Sales	**In-state**	**Out-of-State**	**Total**
Sales (Million $)	$170.92	$1,411.68	$1,582.61
Percent	10.8%	89.2%	100.0%

When these industry receipts and production parameters are entered into the IMPLAN model, the software calculates how these revenues are spent and distributed throughout 528 sectors or institutions within the state and national economy. Impact estimates are then computed for output, value added, labor earnings, taxes and employment at their direct, indirect, and induced levels. The total impact is represented by the sum of these three levels of effect. The estimated economic impacts from total fresh vegetable sales are shown in Table 7.

The estimated economic impacts are given in terms of output, value added, earnings, employment and taxes. Output values show the gross amount of economic impact from industry sales. Value-added impacts are the compensation to labor, management and ownership generated by the activity. Labor income is the component of value-added that is derived from the earnings to labor. Employment impacts represent the number of jobs (both full and part-time) created by the industry and are based on industry-average output per worker statistics. Indirect business taxes represent estimates of how much fresh vegetable receipts contribute to local, state and federal government revenues, through sales, excise, property and other taxes, but not income taxes. Importantly, these different types of impact estimates each represent a separate way of measuring an industry's local economic importance. They are not additive values.

The estimated economic impacts derived from fresh vegetable receipts are arranged in Table 7 by type of impact and level of effect. Direct output impacts from combined instate

[2] Based on estimates provided by Dr. Richard Beilock, Food and Resource Economics Department, Institute of Food and Agricultural Sciences, University of Florida, November, 2002. From data collected by the Florida Department of Agriculture and Consumer Services at highway inspection stations for all truck shipments from Florida.

Table 7. Estimated Economic Impacts of Florida Fresh Vegetables, Melons, and Berries, 2001,

Impact Type / Level	Units	Direct	Indirect	Induced	Total
Output	Million $s	1,582.60	458.80	1,093.76	3,135.16
Value added		650.45	237.75	703.06	1,591.26
Earnings		574.49	152.59	451.37	1,178.44
Indirect Taxes		0.00	9.83	57.63	67.46
Employment	jobs	14,037	4,477	13,532	32,046

and out-of-state sales of fresh vegetables are equal to total receipts of $1,582.61 million as was shown in Table 6. When the indirect and induced impacts are added to this, the total output impact is magnified to $3,135 million. This represents an average multiplier of 1.98. The value-added multiplier is even larger at 2.45, expanding the direct value-added impact from $650 million to a total value-added impact of $1,591 million. Direct earnings impacts are expanded by a factor of 2.05 when indirect and induced impacts are added to it, and the direct employment represented by 14,037 jobs in the state's fresh vegetable industry, is multiplied by a factor of 2.28 to ultimately generate an estimated 32,046 jobs throughout the state. It is important to note that employment estimates include both fulltime and part-time jobs, and that total impact estimates are the sum of direct, indirect and induced impacts. Fresh vegetable sales do not directly generate tax revenues for government institutions, but taxes resulting from indirect and induced spending yield over $67 million to these institutions. Due to the high proportion of revenues that are brought in from out-of-state sales, the total economic impact of Florida's fresh vegetable industry is significantly greater than its total receipts.

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Table A1. Florida Vegetable Crop Budgets, 1999-2000, dollars per acre.

Budget Category	Crop & Location / Budget Item	Snap Beans, Dade Co.	Cabbage, Hastings	Sweet Corn, Dade and Palm Beach Co.	Eggplant, Palm Beach Co.	Green Peppers, Palm Beach Co. and SW Fla.	Potatoes, Hastings and Dade Co.	Summer Squash, Dade Co.	Strawberries, Plant City	Tomatoes, Dade Co., Manatee/ Ruskin, North Fla., SW Fla.	Watermelons, Alachu/Levy Co., Manatee/ Ruskin, SW Fla., North Fla.
Seed or transplants	Seed	92	0	67	0	0	394	156		29	29
	Transplants		240	0	250	840	0	0	1,670	237	30
	Cover Crop Seed		6	6	0	32	8	0	38	0	0
Fertilizer and lime	Fertilizer and lime	139	153	319	470	359	202	100	184	365	149
Chemicals	Fumigant		0	0	602	602	24		650	570	139
	Fungicide	178	42	33	151	236	154	208	581	362	143
	Herbicide	3	34	38	33	44	37		82	65	16
	Insecticide	131	149	281	592	512	71	158	398	516	63
	Nematicide		42	0	0	0	115	227	323	453	259
	Surfactants		0	0	0	0	0	0	0	27	0
Plastics	Plastic String		0	0	35	7	0	0	0	74	0
	Plastic Mulch		0	0	378	224	0	0	293	263	32
	Trickle Tube		0	0	0	0	0	0	202	124	0
	Misc. Irrigation Material		0	0	0	0	0	0	0	14	0
	Styrofoam Cups		0	0	0	0	0	0	0	0	15
Wood	Stakes		0	0	113	18	0	0	0	62	0
	Replacement Stakes		0	0	0	0	0	0	0	7	0
	Containers		425	376	1,190	998	101	405	3,718	1,049	10
	Preditory Mites			0	0	0	0	0	98	0	0
Labor	Labor	285	230	258	538	428	172	0	0	0	0
	Machinery Labor			0	0	0	0	0	0	19	0
	Tie			0	163	13	0	0	0	131	0
	Scout			20	20	30	0	0	57	37	6
	Set Plants		102	0	0	0	0	0	0	0	0
	Set/Drive Stakes			0	110	31	0	0	0	56	0
	Cut/Pull/Bundle Stakes			0	126	42	0	0	0	0	15
	Clean Ditches			9	75	50	0	0	0	0	4
	Potato seed haul			0	0	0	8	0	0	0	0
	Tranplant labor			0	0	0	0	0	220	0	0
	Hand Weed			0	0	12	0	0	120	0	0
	Trickle Tube Cleaning/Maint.			0	0	0	0	0	0	1	0
	Prune Tomatoes			0	0	0	0	0	0	27	0
	Cross Ditch			0	0	0	0	0	0	4	0
	Set Cups			0	0	0	0	0	0	0	7
	Remove Cups			0	0	0	0	0	0	0	3
	Supervision	297		394	932	993	201	287	0	973	175
	Pick, pack and haul			370	1,638	2,370	0	0	0	0	162
	Pack, load and haul			0	0	0	0	0	968	0	0
	Cut and pack		404	0	0	0	0	0	0	0	315
	Dig and haul			0	0	0	146	615	0	1,069	0
	Haul		43	0	0	0	0		0	0	0
	Pick			0	0	0	0		3,344	0	0
	Packing			0	0	0	0			2,514	0
	Load	130		0	0	0	0	210		0	0
	Selling	93	213	55	700	525	93	150	1,650	208	321
	Grading			0	0	0	229			0	0
	Grade and Pack			0	0	0	0	570		0	0
	Harvest Supervision			0	0	0	0		330	0	0
Contract services	Aerial Fert Appl.			35	0	0	6			0	5
	Contract Fertilizer Application			2	0	0	0			0	0
	Level land			0	50	113	0			41	0
	Frost protection			0	0	0	0			14	0
	Bee rental			0	0	0	0			0	9
Insurance carriers	Crop Insurance			13	0	0	14			33	0
Rent	Land rent	200	100	425	400	425	217	200	875	371	53
Machinery & equipment	Machinery operation	341	147	343	331	586	170	272	362	573	266
	Machinery fixed	85	61	96	145	195	84	75	172	215	153
	Well maintenance	15		8	0	0	5	15		2	13
	Farm trucks	16	10	16	40	23	31	24	82	20	19
	Dumpster Container			0	0	0	0			0	4
	Hydro-cool	120		0	0	0	0			0	0
	Mechanical harvest + container	786		0	0	0	0			0	0
Interest	Interest	48	57	69	155	224	98	64	422	235	54
Overhead		371	329	492	1,166	1,241	428	359	1,938	1,217	188
	Organization fees			0	0	0	0			38	0
	Assessments			0	0	0	0			43	6
	Stake/String Disposal			0	0	0	0			106	0
	Plastic Mulch Disposal			0	40	59	0		56	69	39

Continued, next page

Table A1 (continued). Florida Vegetable Crop Budgets, 1999-2000, dollars per acre.

Crop & Location Budget Category & Totals	Snap Beans, Dade Co.	Cabbage, Hastings	Sweet Corn, Dade and Palm Beach Co.	Eggplant, Palm Beach Co.	Green Peppers, Palm Beach Co. and SW Fla.	Potatoes, Hastings and Dade Co.	Summer Squash, Dade Co.	Strawberries, Plant City	Tomatoes, Dade Co., Manatee/ Ruskin, North Fla., SW Fla.	Watermelons, Alachu/ Levy Co., Manatee/ Ruskin, SW Fla., North Fla.
Total operating cost	**1,248**	**1,214**	**1,517**	**4,272**	**4,550**	**1,473**	**1,223**	**5,836**	**4,526**	**1,228**
Total fixed cost	**953**	**490**	**1,406**	**2,642**	**2,846**	**577**	**920**	**2,986**	**2,833**	**587**
Total Preharvest Cost	**2,201**	**1,704**	**2,923**	**6,915**	**7,396**	**2,051**	**2,143**	**8,822**	**7,359**	**1,815**
Total harvest and marketing cost	**1,129**	**1,084**	**801**	**3,528**	**3,893**	**484**	**1,950**	**10,010**	**4,914**	**847**
Seed or transplants	92	246	74	250	872	403	156	1,708	266	59
Fertilizer and lime	139	153	319	470	359	202	100	184	365	149
Chemicals	312	268	352	1,379	1,394	402	593	2,034	1,993	621
Plastics	0	0	0	414	231	0	0	494	475	47
Wood products	0	425	376	1,303	1,016	101	405	3,718	1,118	10
Production Labor	582	332	681	1,965	1,599	381	287	397	1,247	210
Harvest/Marketing Labor	222	659	425	2,338	2,895	468	1,545	6,292	3,790	798
Contract services	0	0	37	50	113	6	0	0	56	15
Insurance carriers	0	0	13	0	0	14	0	0	33	0
Land rent	200	100	425	400	425	217	200	875	371	53
Machinery & equipment	1,363	218	463	515	803	289	386	617	810	453
Interest	48	57	69	155	224	98	64	422	235	54
General overhead	371	329	492	1,166	1,241	428	359	1,938	1,217	188
Organization fees & assessments	0	0	0	0	0	0	0	0	81	6
Waste disposal	0	0	0	40	59	0	0	56	175	39
Total Cost	**3,329**	**2,788**	**3,724**	**10,443**	**11,289**	**2,534**	**4,093**	**18,832**	**12,273**	**2,661**
Total Planted Acres	**36,000**	**8,200**	**41,000**	**1,800**	**18,600**	**33,400**	**12,100**	**6,300**	**43,200**	**30,000**
Total Harvested Acres	**35,000**	**7,900**	**36,900**	**1,800**	**18,100**	**33,000**	**11,800**	**6,300**	**43,200**	**27,000**