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Economic Impacts of Florida's Agricultural and Natural Resource Industries

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Economic Impacts of Florida's Agricultural and Natural Resource Industries

by Alan W. Hodges, W. David Mulkey and Effie Philippakos

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Gainesville, Florida

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Economic Impacts of Florida's Agricultural and Natural Resource Industries

by Alan W. Hodges, W. David Mulkey and Effie Philippakos

Abstract

The state of Florida has a large complex of agricultural and natural resource industries which produce a wide array of food, fiber and mineral products, and associated services. Florida's subtropical climate and abundant water resources provide a comparative advantage for production of high-valued products such as citrus, sugar, vegetables, and ornamental plants. The state also is a leading producer of forest products, seafood, livestock and animal products, and phosphatic fertilizers. For many of these commodities, production is closely integrated with manufacturing and service activities. This report reviews the historical economic trends in Florida's agricultural and natural resource sectors and estimates their total economic impact using the *IMPLAN* input-output modeling system. Direct impacts of the agricultural and natural resource industries in 1997 included $31.4 billion (B) in industry output (sales), $18.2B in exports from the state, $12.3B in total value added, and 314,000 jobs. The direct employment and value added represented 3.9 percent and 3.3 percent of the entire Florida economy, respectively. Total impacts, reflecting the multiplier effects of exports, local final demand, intermediate demand of other industries, and personal consumption expenditures of industry employees, were estimated at $49.2B in industry output, $23.8B in value-added, and 544,000 jobs. Results are detailed for 102 individual industry sectors and 11 major industry groups including fruits and vegetables, sugar and confectionary products, field crops, dairy products, livestock and meat products, forest products, seafood products, other food and tobacco products, ornamental plants and landscape services, agricultural inputs and services, and mining.

Keywords: Florida, agriculture, natural resources, economic impacts, multipliers, output, value added, employment, exports, *IMPLAN*, input-output analysis.

Economic Impacts of Florida's Agricultural and Natural Resource Industries

by Alan W. Hodges, W. David Mulkey and Effie Philippakos[1]

Introduction

Geography and Natural Resources of Florida

The economy of the state of Florida is largely dependent upon its rich natural resource endowments, characterized by a warm-humid climate, extensive freshwater and coastal resources, and a broad array of ecosystems with unusual or unique flora and fauna. The state covers 58,620 square miles, extending from 24 to 30 degrees north latitude. The landform of Florida is extremely flat, which facilitates development, with elevations nowhere exceeding 350 feet above sea level. Florida soils are generally coarse, well-drained and low in organic matter and nutrients; however small areas of organic muck soils surrounding the Everglades region and heavy clay soils in the Panhandle are valuable agriculturally (Brown et al., 1999). The Sunshine state receives more intense solar radiation than most of the US, and receives abundant rainfall, averaging 50 inches annually across the state, which is relatively evenly distributed throughout the year. The state is bounded by the southern Atlantic ocean and the Gulf of Mexico, with 2.1 million acres of estuaries and 5.4 million acres of territorial seas. The 1,350 miles of seacoast exceed that for all other states combined along the US Atlantic seaboard. Because of the high rainfall and moisture provided by the adjacent coastal waters, Florida is uniquely productive among areas at this latitude--most other regions are deserts. Florida has abundant surface water resources, including 7800 freshwater lakes covering 2.3 million acres, over 1 million acres of marshes and swamps, and 1,700 rivers and streams extending 10,500 miles. The Floridian aquifer, which underlies most of the state, is one of the most productive aquifers in the country. The karst geology gives rise to more large springs than in any other region of the world. These water resources supply water for domestic, industrial, agricultural, and natural system uses, and they support both commercial and recreational fishing activities (Hornsby et al., 1999, Cichra et al., 1999). Florida features a wide range of ecosystems, from tropical hammocks and coral reefs in the Florida Keys, to native grasslands in the central region, to temperate forests in the north central and panhandle portions of the state. The state's 25,000 square miles of public and private commercial forest lands have a diverse array of softwood and hardwood forest types (Carter et al., 1999). Florida is also rich in wildlife, including 822 wild vertebrates, and the state has more plant and animal species than any other state except Hawaii (Labisky et al., 1999). Because of its geographic position and long peninsular shape, Florida has a high degree of biological endemism, with 235 plants and 115 vertebrates not found elsewhere, and 47 vertebrates which are federally listed as endangered or threatened.

The rich natural resources and environmental amenities in Florida are attractive for both human settlement and agricultural utilization. Rapid population growth in Florida is a critical issue affecting the agricultural and natural resource industries, both positively and negatively. Urban populations inevitably compete for land and water resources, and impose more stringent environmental

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regulations, but also provide workers for labor-intensive activities, and represent a large local demand for goods and services. In 1999 the population of Florida was over 15 million persons, making it the fourth largest state in the nation, and by 2025 the population is expected to surpass 20 million.

Florida has over 16,000 square miles in farmland, including cropland, pasture, orchards, and farm woodlands (Census of Agriculture, 1997). Collectively, agricultural and forest lands represent 73 percent of Florida's total land area, while urban, industrial, and other land uses comprised 27 percent of Florida's total land area (Brown et al., 1999). Land allocated to urban and other developed urban uses has increased dramatically, by more than four-fold since 1959, commensurate with the state's population growth (Brown, et al., 1999), as shown in Figure 1. The proximity of agricultural production to the human population in Florida is shown in Figure 2, with the shaded areas representing 14 counties with population exceeding 250,000 persons, and each dot representing $1.5 million in net agricultural sales (1997). The 14 largest counties contain 67 percent of the state's population and account for a majority of agricultural production. Approximately 93 percent of Florida's citizens reside in urban areas having at least 50,000 residents or in non-urbanized settlements with at least 2,500 persons (Florida Statistical Abstract, 1998). Clearly, agricultural and natural resource industries in Florida coexist with the human population, especially in the central and southern portions of the state.

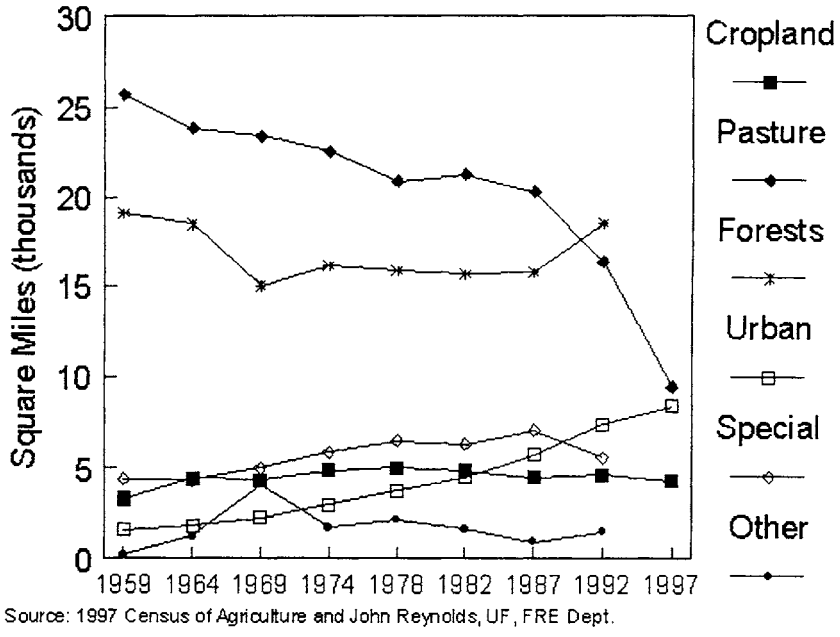


Figure 1. Florida land use trends, 1959-97.

The rapid urbanization leads to an increasing disassociation from the agrarian and rural lifestyle. Many consumers and political leaders in the state have a limited understanding of where food and other natural products come from, and the issues surrounding the management of natural resources. This report is intended to facilitate a better understanding of Florida's agricultural and natural resource industries, by reviewing historical economic trends of these industries, and by evaluating their economic impacts.

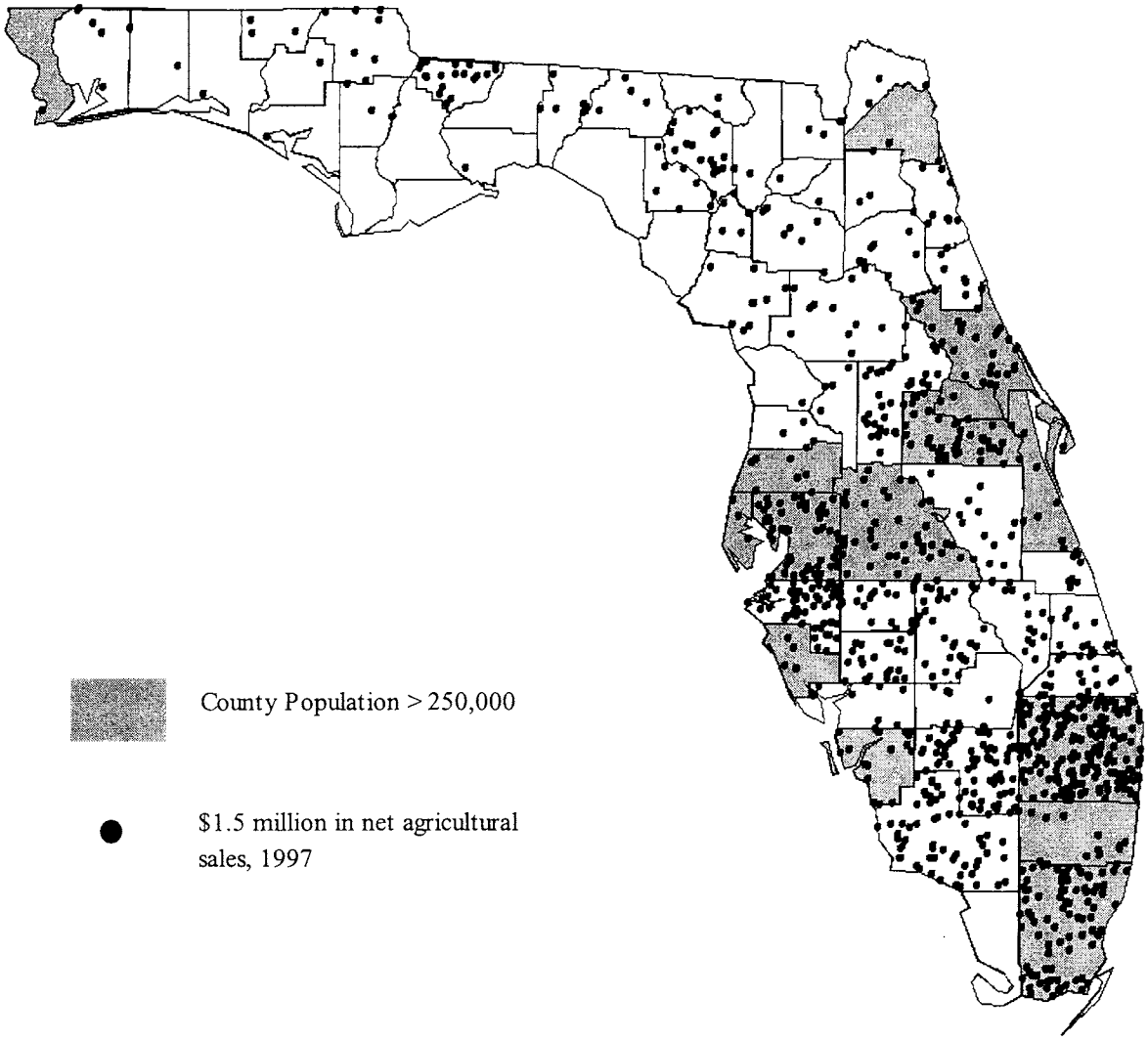


Figure 2. Location of population and agricultural production in Florida.

Economic Structure of Agriculture and Natural Resource Industries

The agricultural and natural resource industries comprise a complex and integrated network of enterprises associated with production, processing and service activities, and is tied to other economic sectors through extensive inter-industry linkages. Delineating these linkages is essential to a full understanding of the impact of these industries. Figure 3 illustrates the economic structure of these industries, with each small box symbolizing a functional economic role. The economy receives renewable natural resource inputs in the form of sun, rain, soils, timber, etc. The local economy also trades goods and services with the rest of the United States and world economy. These inputs enable the production of raw agricultural commodities by the production sector. The raw commodities are processed into a variety of manufactured products in Florida, including meats, dairy products, preserved fruits and vegetables, sugar and confectionary products, lumber and wood products, paper and allied products, and fertilizer. These products are then distributed through wholesale and retail channels to consumers in Florida or for export to customers outside the region. Agriculture input vendors and service firms provide critical goods and services to the agricultural and natural resource sector, and Florida residents supply labor to each regional industry. As commodities progress from one economic sector to another, value is added from labor, capital, and management.

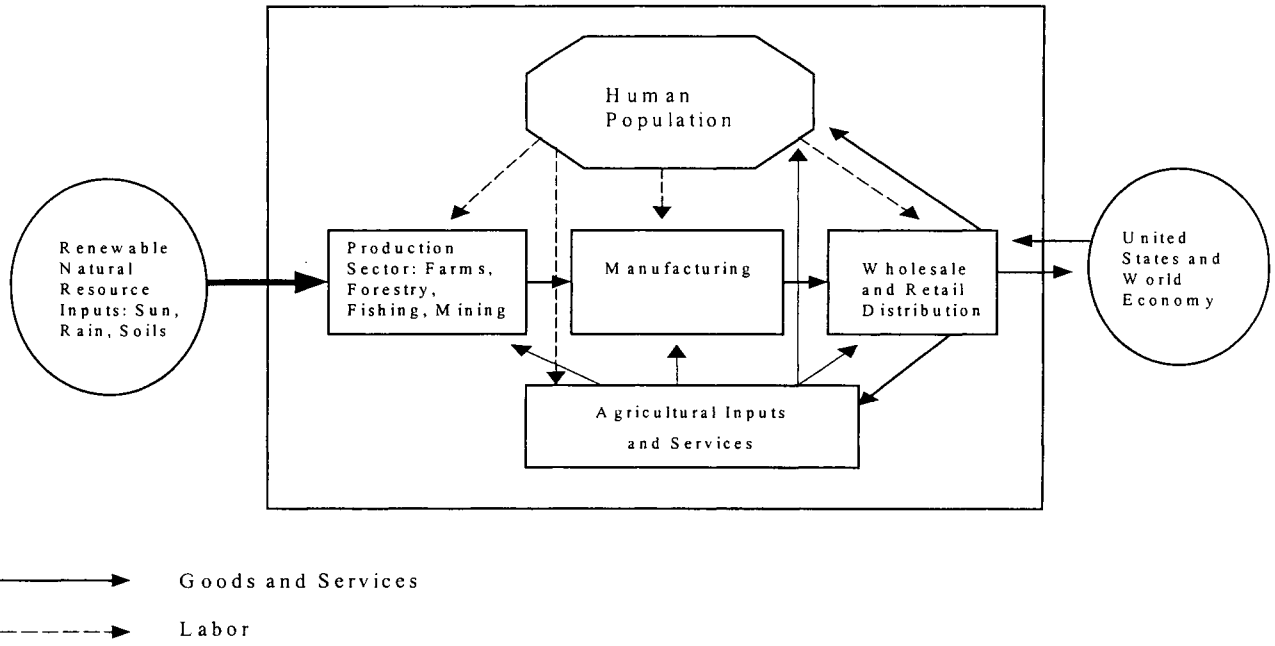


Figure 3. Economic structure of agricultural and natural resource industries.

Industrial activities stimulate the local economy in three primary ways. First, as direct effects, industries generate output and value-added, and provide employment and wages to employees. Second, as indirect effects, purchases of goods and services as inputs from other industries supports additional economic activity in these industries. Third, earnings by industry employees boosts the local economy through their personal consumption expenditures, known as induced effects. The total economic impact is the sum of the direct, indirect and induced effects. Exports of goods to customers outside the region have a greater impact than sales to local consumers, by introducing new money into the local economy, which is then recirculated. Also, inputs which are obtained from local firms rather than imported from outside the region are associated with greater economic impact because the money is retained within the region.

Export earnings augment the economic base of the region and generate additional economic activity in the economic sectors which provide inputs to produce the exports (indirect effects), and increased personal consumption expenditures by industry employees (induced effects). These secondary economic impacts may be estimated with economic multipliers derived from input-output models. Input-output analysis is a method that captures the regional economic interdependence between different industries, households and government institutions. This approach assumes that production of each commodity or service is associated with a certain basket of inputs, such that for a given level or change in final demand for a particular industry there are predictable impacts in other linked sectors of the economy. For further information on export base theory and application of input-output models and economic impact analysis see Miller and Blair (1988), Schaeffer (1999, http://www.rri.wvu.edu/regscweb.htm), or Mulkey and Hodges (2000).

Economic Characteristics and Impacts of Florida Agricultural and Natural Resource Industries

Direct Economic Impacts

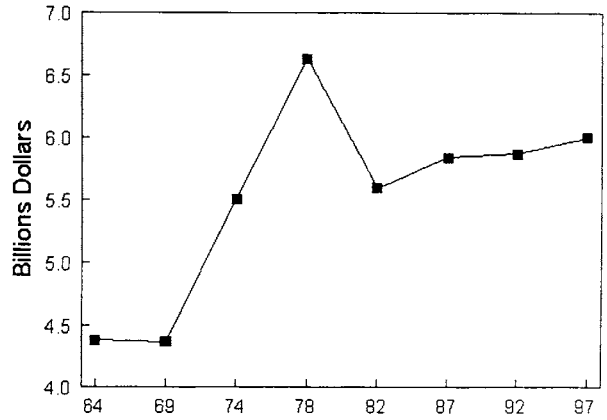
Florida's agricultural and natural resource industries produce a wide array of food, fiber and mineral products and associated services, including fruits and vegetables, sugar, dairy, livestock and meats, seafood, ornamental plants, tobacco, wood and paper products, fertilizers, chemicals and machinery. Information on economic characteristics were compiled for a total of 102 distinct industries and their associated commodities that were identified as dependent upon the agricultural or natural resource base in Florida. The gross value of sales, or economic output, of these products and services, was $31.4 billion (B) in 1997, including $18.2B exported to customers outside the state of Florida (Table 1). Local final demand by households, governments and institutions for these products totaled $5.4B, and intermediate sales by the agriculture and natural resource sector to other Florida industries totaled $3.5B. The agriculture and natural resource industries provided employment for about 314 thousand persons, and generated $12.3B in value added, including $7.1B in labor income and $767 million in indirect business taxes paid to state and local governments. As a share of the overall Florida economy, the agricultural and natural resource industries represented 5.1 percent of economic output, 10.9 percent of exports, 3.3 percent of value added and 3.9 percent of employment.

Table 1. Economic characteristics and direct impacts of Florida agricultural and natural resource industries, 1997.

Industry Group	Industry Output	Total Exports	Local Final Demand	Intermediate Output to Non-Agriculture Sectors	Employ-ment (jobs)	Value Added	Labor Income	Indirect Business Taxes Paid
Fruits and Vegetables	5,528	4,410	855	90	46,388	2,257	1,345	83
Forest Products	5,359	2,702	252	1,355	28,261	1,859	1,026	98
Agricultural Inputs and Services	5,121	3,595	175	138	79,005	1,602	1,122	69
Other Food and Tobacco Products	5,038	2,835	1,776	351	18,319	1,640	773	327
Ornamental Plants and Landscape Services	2,843	874	479	773	78,062	2,127	1,372	49
Livestock and Meat Products	2,068	442	1,062	168	23,858	512	390	21
Mining	1,916	1,118	102	379	9,258	1,033	313	71
Sugar and Confectionary Products	1,505	1,215	99	24	7,601	471	244	22
Dairy Products	1,080	158	530	108	4,541	300	232	6
Seafood Products	723	595	24	59	10,632	344	184	10
Field Crops	267	235	2	7	7,718	149	73	11
Total	31,448	18,179	5,356	3,452	313,643	12,296	7,073	767

All values in million US dollars (1997), except employment (jobs).
Source: Minnesota Implan Group, 1999.

The value of all Florida crops and livestock has grown from about $4.4B in the 1960's to about $6 billion in the 1990's, in inflation-adjusted terms (Figure 4).



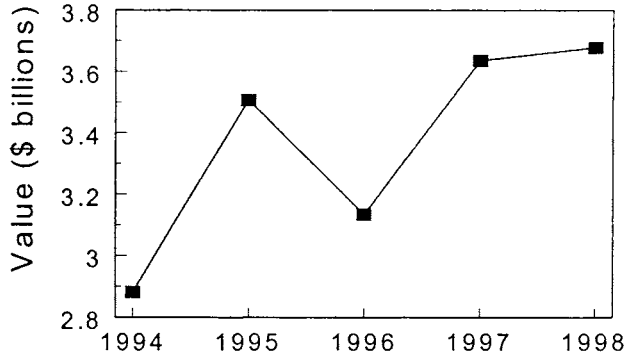
Source: 1997 Census of Agriculture
Values adjusted with GDP price deflator

Figure 4. Value of Florida agricultural crops and livestock sold, 1964-97.

The leading industry groups in terms of economic output were fruits and vegetable products ($5.5B), forest products ($5.4B), agricultural inputs and services ($5.1B), other food and tobacco products ($5.0B), ornamental plants and landscape services ($2.8B), and livestock and meat products ($2.1B) (Table 1). A detailed listing of the individual industry sectors included within these groups is discussed later in this report.

Value added represents sales revenues less purchased inputs, and is a good indicator of the net contribution of an industry to the economy, since it reflects the increase in value from each stage of processing and marketing, and avoids double counting the sales of products from production sectors to the manufacturing and processing sectors which is inherent in the values for economic output. Value-added consists of employee compensation, proprietor income, other property income and indirect business taxes[2]. In terms of value added, the largest industry groups were fruit and vegetable products ($2.3B), ornamental plants and landscape services ($2.1B), forest products ($1.9B), agricultural inputs and services ($1.6B), other food and tobacco products ($1.7B), and mining ($1.0B) (Table 1). In terms of employment, the leading industry groups were agricultural inputs and services (79,005 jobs), ornamental plants and landscape services (78,062), fruit and vegetable products (46,388), forest products (28,261), livestock and meat products (23,858), other food and tobacco products (18,319), and seafood products (10,632) (Table 1).

As mentioned above, exports from a regional economy have a special role because they generate additional impacts through the multiplier effect. In terms of total exports, the leading industry groups were fruit and vegetable products ($4.4B), agricultural inputs and services ($3.6B), forest products ($2.7B), other food and tobacco products ($2.8B), and mining ($1.1B) (Table 1).



1998 Dollars
Source: Bureau of the Census, US Exports History

Figure 5. Value of international exports of agricultural and natural resource products through Florida ports, 1994-98.

Florida has a comparative advantage as an international exporter of many agricultural and natural resource products because of its strategic location with respect to Latin America, and its several large port facilities. The value of agricultural and natural resource products exported to international markets through Florida ports was $3.7 billion in 1998. Interstate

[2] Employee compensation includes wage payments, salary payments and non-cash benefits. Proprietor income includes income derived from self-employment. Other property income includes payments from interest, rents, royalties, dividends and profits. Indirect business taxes includes household excise and sales taxes paid to businesses by households, excluding taxes on profit and income.

shipments by truck or rail are not included in these figures and some of these products may not have originated in Florida. Waterborne exports increased by 28 percent between 1994-98 (Figure 5). The passage of the General Agreement on Tariffs and Trade (GATT) and the North American Free Trade Agreement (NAFTA) may in part be responsible for this increase in international trade through Florida. Fertilizer products were the highest valued commodity, accounting for 48 percent of total exports, followed by paper products (16%), meat products (8%) and processed agricultural crops (8%). The largest trading partners with Florida for agricultural and natural resource products were Asia (37%), South America (18%), the Caribbean (15%) and Europe (12%) as summarized in Table 2.

Table 2. Value of international exports of agricultural and natural resource products from Florida ports, by commodity and region, 1998.

Commodity	million $	Region	million $
Fruits	116	Asia	1,262
Vegetables	55	South America	637
Sugar	41	Caribbean	640
Field Crops	37	Europe	508
Processed Agricultural Crops	280	Central America	314
Floriculture	44	Australia and New Zealand	237
Livestock	39	Africa	31
Livestock Products	64	North America	50
Meat	422		
Lumber and Wood	177		
Paper and Allied Products	581		
Fish	38		
Fertilizer	1754		
Agricultural Machinery	30		
Total	**3,679**		**3,679**

Source: Bureau of the Census, U.S. Exports History, Historical Summary, 1998.

Total Economic Impacts

Total economic impacts of the agriculture and natural resource industries in Florida were estimated with economic multipliers developed using the *IMPLAN PRO*™ software[3] and associated databases for Florida. *IMPLAN* was originally developed by the USDA Forest Service in 1979 and subsequently privatized by the Minnesota IMPLAN Group (MIG), Inc. The *IMPLAN* system enables construction of regional input-output models for any county, group of counties, or state in the United States based on a combination of county level and national economic data. Industries are classified in 528 economic sectors, corresponding to the US Department of Commerce's four-digit

[3] *IMPLAN Professional, Version 2.0, Social Accounting and Impact Analysis Software, User's Guide, Analysis Guide and Data Guide*, 1999, MIG, Inc., Stillwater, MN.

Standard Industrial Classification (SIC) system. Multipliers for each sector are available from *IMPLAN* for the economic indicators of output, total value added, employment, employee compensation, labor income, other proprietary income, and indirect business taxes. Furthermore, the multipliers are provided for direct, indirect and induced effects. Appendix A lists the total effects economic multipliers for output, value-added, and employment for each of the 102 industry sectors identified with agricultural and natural resource activities. The multipliers for output, value added, and labor income are stated in terms of dollars per dollar of sales to final demand, while the employment multiplier represents jobs per million dollars of sales to final demand. The total economic impacts of each sector of the agriculture and natural resource industries were computed by applying the economic multipliers as follows:

$$T = E * M_{T(Output,\ VA,\ Emp)} + (LFD + ID) * M_{D(Output,\ VA,\ Emp)}$$

where T is total economic impacts,
E is export demand (sales),
LFD is local final demand (total final demand less exports),
ID is intermediate industry demand from non-agricultural sectors,
$M_{T(Output,\ VA,\ Emp)}$ is the total effects multiplier (direct + indirect + induced effects) for output, value added, employment, and
$M_{D\ (Output,\ VA,\ Emp)}$ is the direct effects multiplier for output, value added, employment.

The expression for total final demand less exports represents local (Florida) final demand. The base information on output and exports for each industry, as well as the multipliers, were provided by the IMPLAN system for 1997. The ratio of total impacts to direct impacts for each major industry group given in Table 3 represent a weighted average of the constituent industry sectors. For example, in the case of the agricultural inputs and services industry, the ratio of 1.61 means that for each dollar output by the industry, an additional $0.61 in output is supported in the Florida economy. Total impacts were calculated for each sector using the formula above, with multipliers given in the Appendix.

Table 3. Ratio of total output impacts to direct impacts for Florida's agricultural and natural resource industries, 1997.

Industry Group	Ratio
Agricultural Inputs and Services	1.61
Field Crops	2.04
Fruits and Vegetables	2.01
Sugar and Confectionary Products	1.87
Livestock and Meat Products	1.02
Dairy Products	0.90
Seafood Products	1.70
Other Food and Tobacco Products	1.62
Forest Products	1.46
Ornamental plants and Landscape Services	1.17
Mining	1.47

The total economic impacts of the agricultural and natural resource industries collectively in Florida in 1997 were estimated at $49.2 billion (B) in output, $23.8B in value added, $14.7B in labor income, $1.7B in indirect business taxes, and 544 thousand jobs (Table 4). The leading industry groups for output impacts were fruits and vegetables ($11.1B), agricultural inputs and services ($8.2B), forest products ($7.8B), other food and tobacco products ($8.2B), ornamental plants and landscape services ($3.3B), sugar and confectionary products ($2.8B), and livestock and meat products ($2.1B). In terms of value-added impacts, the leading groups were fruits and vegetables ($5.8B), forest products ($3.6B), agricultural inputs and services ($3.6B), other food and tobacco products ($3.6B), ornamental plants and landscape services ($2.4B), sugar and confectionary products ($1.3B), and mining ($1.6B). In terms of employment impacts, the leading industry groups were agricultural inputs and services (98,229 jobs), fruits and vegetables (130,206), ornamental plants and landscape services (77,291), forest products (68,387), and other food and tobacco products (60,490) (Table 4).

Table 4. Total economic impacts of Florida's agricultural and natural resource industries, 1997.

Industry Group	Output Impacts (m$)	Value Added Impacts (m$)	Labor Income Impacts (m$)	Indirect Business Tax Impacts (m$)	Employment Impacts (jobs)
Fruits and Vegetables	11,138	5,754	3,654	386	130,206
Agricultural Inputs and Services	8,248	3,631	2,361	247	98,229
Other Food & Tobacco Products	8,151	3,601	2,116	480	60,490
Forest Products	7,822	3,579	2,203	242	68,387
Ornamental Plants and Landscape Services	3,318	2,363	1,539	97	77,291
Sugar and Confectionary Products	2,821	1,288	782	93	25,715
Mining	2,811	1,627	768	120	23,915
Livestock and Meat Products	2,105	669	483	40	25,612
Seafood Products	1,230	663	396	37	17,882
Dairy Products	971	287	201	15	5,199
Field Crops	545	327	190	26	11,481
Total	49,161	23,790	14,692	1,782	544,407

Note: total impacts represent exports times total effects multiplier plus local final demand and local intermediate demand from non-agriculture sectors times direct effects multiplier.
All values in millions US dollars (1997), except employment (jobs).
Source: Minnesota Implan Group, 1999.

Profiles of Florida Agricultural and Natural Resource Industries

The remainder of this report examines in greater detail the industry groups and individual sectors comprising Florida's agricultural and natural resource industries, including fruits and vegetables, sugar, field crops, dairy products, livestock and meat products, forest products, seafood products, ornamental plants and landscape services, and agricultural inputs and services. Each section describes trends in commodity production or manufacturing, employment, exports, and total economic impacts. Note that the employment figures from MIG, Inc. may differ slightly from other sources given in this report, due to differences in classification of industries., and in accounting measures. For example, value of shipments by manufacturers represents product sales, while economic output represents sales plus inventory change.

Fruits and Vegetables

Florida agriculture is perhaps best known for its fruit and vegetable products. This is the largest sector of the state's agricultural and natural resource industries. Florida growers supply the majority of winter vegetables in the eastern United States, and the state is the leading national producer of citrus fruit and fruit juices. The direct and total economic impacts of the fruit and vegetable industries are summarized in Table 5. The sector had direct employment of over 46 thousand persons, industry output of $5.5 billion (B), and value added of $2.3B. Total economic impacts included $11.1B in output, $5.8B in value added, and 130 thousand jobs, with $3.7B in labor income to employees. Farm production of fresh fruits, vegetables, and tree nuts accounted for total impacts of over 82 thousand jobs, $5.9B in industry output, and $3.3B in value added. The fruit and vegetable processing industries, including frozen concentrate and fresh citrus juice products, had over 10,000 employees, with total impacts of $5.1B output, $2.5B value added, and employment of 47 thousand persons.

Table 5. Economic impacts of Florida's fruit and vegetable industry, 1997.

	Direct Impacts				Total Impacts*			
Industry Group/Sector	Employment (jobs)	Industry Output (m$)	Value Added (m$)	Labor Income (m$)	Employment (jobs)	Output (m$)	Value Added (m$)	Labor Income (m$)
Fruits	21,096	1,658.5	666.4	392.3	44,442	3,069.7	1,562.5	986.8
Vegetables	14,240	1,456.3	848.7	490.2	38,269	2,890.3	1,743.7	1,084.1
Frozen Fruits, Juices and Vegetables	6,070	1,273.5	336.2	237.1	25,686	2,755.4	1,250.2	835.9
Canned Fruits and Vegetables	4,193	983.0	353.6	198.7	19,329	2,137.2	1,066.9	668.2
Frozen Specialties	362	66.2	22.6	13.3	1,071	120.5	55.3	34.9
Dehydrated Food Products	192	30.0	10.9	6.2	542	56.0	27.0	16.9
Pickles, Sauces, and Salad Dressings	160	43.3	14.4	5.1	591	76.0	34.3	18.4
Canned Specialties	45	15.9	3.4	1.4	230	30.5	12.1	7.2
Tree Nuts	29	1.3	0.9	0.7	47	2.5	1.7	1.1
Total	46,388	5,528.1	2,257.1	1,345.1	130,206	11,138.2	5,753.6	3,653.5

*Total impacts represent exports times total effects multiplier plus local final demand and local intermediate demand from non-agriculture sectors times direct effects multiplier.
All values in millions US dollars (1997), except employment impacts (jobs).
Source: Minnesota Implan Group, 1999.

Citrus. Florida is the leading state for US citrus production. The value of raw citrus fruit production in the1998-99 season was $1.1 billion. The most important Florida citrus crops are oranges and grapefruits, which together account for about 93 percent of total value (Table 6). Other citrus fruits produced commercially include K-early and temple oranges, tangerines, tangelos, limes and lemons. Following the disastrous freezes in the mid-1980's, the citrus industry expanded in value and bearing acreage, while decreasing in farm numbers. In inflation-adjusted terms, the value of citrus production increased by 30 percent between 1994-99 (Figure 6). The bearing acreage of Florida citrus groves rose in the mid-1990's then declined to about 775 thousand acres in 1999. Similarly, the number of citrus farms increased in 1992, then dropped to 7,676 in 1997.

Table 6. Cash receipts for Florida citrus fruits, by variety, 1998-99.

Variety	$ million
Oranges	953
Grapefruit	106
Tangerines	61
Tangelos	12
Temples	9
Limes	6
Lemons	2
K-Early	0.2
Total	1,149

Source: USDA, Florida Agricultural Statistics Service.

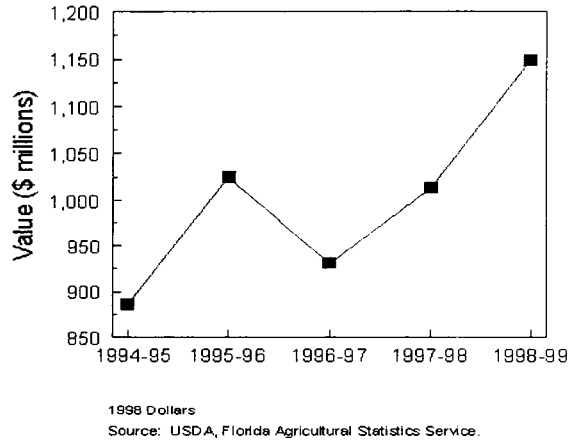


Figure 6. Cash receipts for Florida citrus fruit, 1994-99.

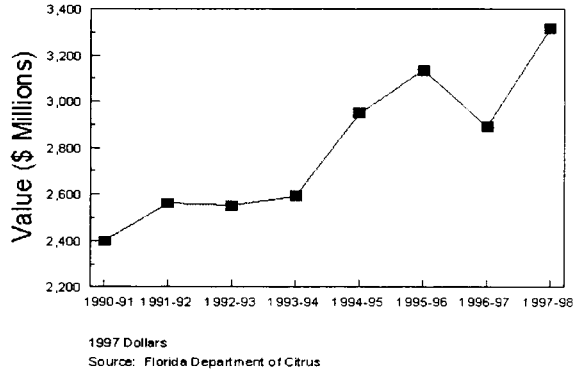


Figure 7. Value of processed citrus products, Florida, 1990-98.

A large share of Florida's citrus fruit is processed into frozen concentrate and reconstituted juice products. During the 1990's, processed citrus accounted for 86 percent of total value while fresh citrus fruit shipped to retailers represented 14 percent. The value of processed citrus grew by 38 percent between 1990-98, to $3.3 billion (Figure 7). The value of fresh citrus shipments to US and international markets reached $364 million in 1997, a 63 percent increase from 1985. Grapefruit is the dominant fresh citrus product, accounting for about 71 percent of total shipment value. Both grapefruit and processed citrus shipments experienced modest increases during the mid-to-late 1980s, dramatic swings during the early 1990s, then again modest increases in the later 1990s. An all-time high of $455 million in value was reached in 1990. These changes in values were largely due to fluctuations in commodity prices rather than production volumes.

Vegetables and Melons. The state of Florida produces a wide variety of vegetable and melon crops, and is an important supplier of winter vegetables to the eastern United States and Canada. The total value of vegetables and melons was $1.54 billion in 1998. Tomatoes were the largest vegetable crop, at $507 million, followed by green peppers ($246M), snap beans ($130M), potatoes

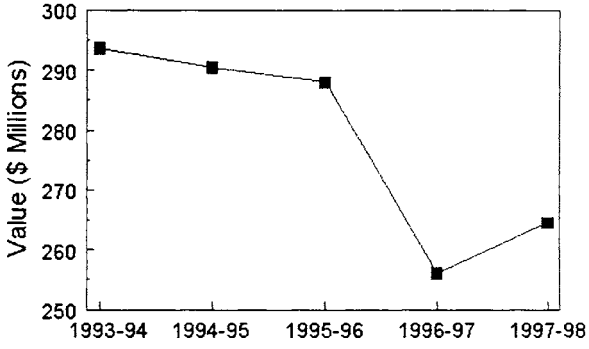
($123M), and sweet corn ($103M) as summarized in Table 7. The value of vegetables and melons decreased by 10 percent between 1993 and 1998 (Figure 8). Values of tomatoes increased moderately during this time, as did cabbages. Sales of green peppers increased markedly, and other minor crops also increased in value, including snap beans, escarole and squash, however, lettuce and radishes decreased. While production values declined during the 1990s, both the number of farms and harvested acreage increased between 1987 and 1997. The number of Florida vegetable and melon farms grew by one third, to 2,053, and harvested area grew by 25 percent to 311,000 acres. Employment in the fruit and vegetable processing sector varied from a high of 10,400 persons in1989, down to 9,300 in 1996 (Figure 9).

The value of vegetable exports shipped internationally from Florida ports has decreased dramatically in recent years, from $93 million in 1995 to $33 million in 1998. The Caribbean region remained the top export destination of vegetables shipped from Florida ports, accounting for about 54 percent of total vegetable export values between 1994-98, followed by Africa (21%) and South America (8%). Exports to the Caribbean increased by 59% between 1994-98, while exports to Africa and South America decreased by 86 percent.

Table 7. Cash receipts for Florida vegetables and melons, by crop, 1998.

Crop	million $
Tomatoes	507
Green Peppers	246
Other	148
Snap Beans	130
Potatoes	123
Sweet Corn	103
Cucumber	69
Watermelons	60
Squash	55
Cabbage	26
Radishes	19
Eggplant	16
Escarole	12
Carrots	11
Lettuce	11
Celery (1996)	5
Total	1,536

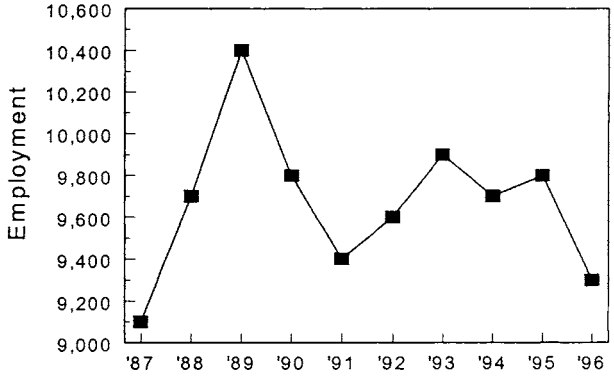
Source: USDA, Florida Agricultural Statistics Service.



1997 Dollars

Source: USDA, Florida Agricultural Statistics

Figure 8. Cash receipts for Florida vegetables and melons, 1993-98.



Source: Annual Survey of Manufactures

Figure 9. Employment in Florida fruit and vegetable processing, 1987-96.

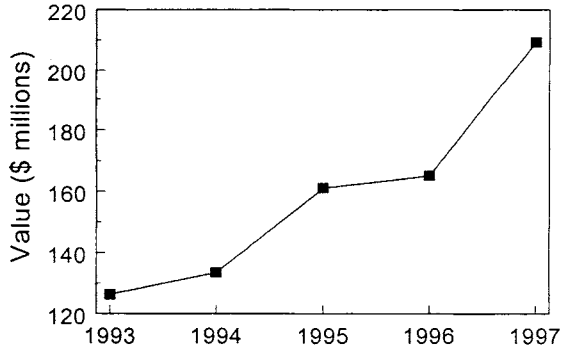
Other Fruits, Nuts and Berries. In addition to citrus, Florida produces an array of fruit, nut and berry crops including avocados, mangos, pecans, blueberries and strawberries. These crops were collectively valued at $209 million in 1997 (Table 8). Strawberries were by far the most valuable commodity in this category, at $146 million. Avocados are also an important crop in Florida, valued at $14 million, and blueberries are valued at $6 million. Avocados and mangos are tropical fruits grown only in South Florida and California within the United States, limited by climatic constraints.

The value of Florida fruit, nut and berry commodities increased consistently from $126 million in 1993 to $209 million in 1997 (Figure 10). Both the number of farms and harvested acreage decreased between 1987 and 1992, then subsequently increased in 1997. Approximately 9,500 fruit, nut and berry farms were present in Florida in 1997. Harvested acreage decreased between 1987 and 1992, then returned to about 762,000 acres in 1997. The Asian, European and South American markets were the top international export destinations for fruit, nut and berry products from Florida. The Asian market represented 49 percent of exports, followed by Europe (14%) and South America (11%). Export values in all three regions declined between 1994-98. The value of fruit, nut and berry crops, including citrus, leaving Florida ports steadily decreased from $179 million in1994 to $116 million in 1998.

Table 8. Cash receipts for Florida fruits, nuts and berries, by crop, 1997.

Crop	million $
Strawberries	146.1
Other	40.4
Avocados	14.0
Blueberries	6.0
Mangos	1.5
Pecans	1.3
Total	209.3

Source: USDA, Florida Agricultural Statistics Service

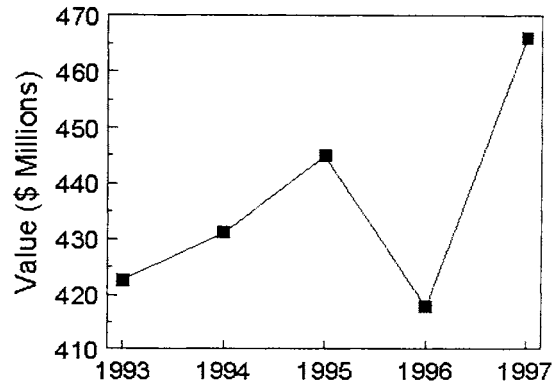


1997 Dollars
Source: USDA, Florida Agricultural Statistics Service

Figure 10. Cash receipts for Florida fruit, nut and berry crops, 1993-97.

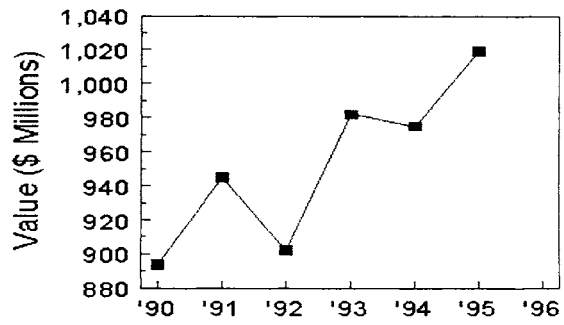
Sugarcane and Sugar

Florida is a major producer of sugarcane and raw sugar. Production is located in South Florida and centered in Palm Beach County. The value of raw sugarcane production increased during the 1993-97 period to $466 million in 1997 (Figure 11). The area of harvested Florida sugarcane increased to a high of 446,000 acres in 1992 then decreased to 437,000 acres in 1997. The number of Florida sugarcane farms increased slightly to 206 in 1997. Raw sugarcane is processed into refined sugar and confectionary products. Value of shipments of Florida processed sugar and confectionary products increased by 14 percent between 1990-96, reaching over $1 billion in 1996 (Figure 12). Meanwhile, employment in sugar and confectionary products manufacturing declined by 44 percent between 1990-96, to 2,900 persons. International sugar exports from Florida are to the Caribbean region, South America and Europe. The value of sugar and confectionary products exported through Florida ports grew 7 percent annually between 1994 and 1998 to $34 million. The total economic impacts of sugarcane crops, sugar processing and confectionary products included 25,715 jobs, $2.8B in output, $1.3B in value added, and $782M in labor income, as summarized in Table 9.



1997 Dollars
Source: USDA, Florida Agricultural Statistics Service

Figure 11. Cash receipts for Florida sugarcane, 1993-97.



1996 Dollars
Source: Annual Survey of Manufactures

Figure 12. Value of shipments of Florida processed sugar and confectionary products, 1990-96.

Table 9. Economic impacts of Florida's sugar industry, 1997.

Industry Group/Sector	Direct Impacts Employment (jobs)	Direct Impacts Industry Output (m$)	Direct Impacts Value Added (m$)	Direct Impacts Labor Income (m$)	Total Impacts* Employment (jobs)	Total Impacts* Output (m$)	Total Impacts* Value Added (m$)	Total Impacts* Labor Income (m$)
Sugar Crops	4,737	433.5	256.0	93.6	7,773	601.0	367.5	192.6
Sugar	2,416	969.7	182.7	137.2	17,455	2,115.5	886.5	574.8
Confectionery Products	448	101.7	32.5	13.1	488	104.3	34.3	14.3
Total	7,601	1,504.8	471.3	243.9	25,715	2,820.9	1,288.3	781.7

* Total impacts represent exports times total effects multiplier plus local final demand and local intermediate demand from non-agriculture sectors times direct effects multiplier.
All values in millions US dollars (1997), except employment impacts (jobs).
Source: Minnesota Implan Group, 1999.

Field Crops

Field crops produced in Florida include, corn, cotton and cottonseed, hay, peanuts, potatoes, soybeans, tobacco, and wheat. Together, these crops were valued at $291 million in 1998 (Table 10). Potatoes are the largest field crop valued at $129 million, followed by hay ($59 million) and peanuts ($57 million).

Table 10. Cash receipts for Florida field crops, 1998.

Crop	million $
Potatoes	129
Hay	59
Peanuts	57
Tobacco	29
Cotton	21
Corn	8
Soybeans	4
Cottonseed	3
Wheat	1
Total	291

Source: USDA, Florida Agricultural Statistics Service.

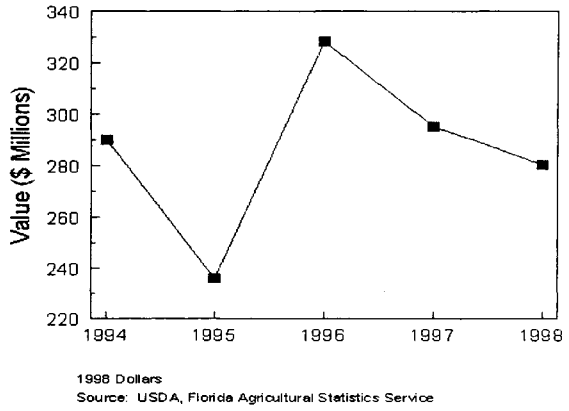


Figure 13. Cash receipts for Florida field crops, 1993-97.

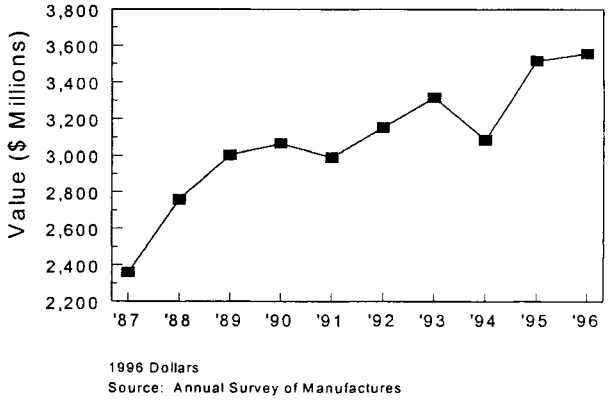


Figure 14. Value of shipments of processed Florida crops, 1987-96.

Between 1994 and 1998, the value of field crops fluctuated markedly, and decreased by 8 percent overall (Figure 13). Individual commodities which declined in value include corn (-49%), soybeans (-43%), cotton (-37%), wheat (-15%) and hay (-11%). Potatoes, cottonseed, tobacco and peanuts all marginally increased in value. The number of field crop farms declined to 3,533 farms in 1997. Harvested area of Florida field crops declined from 408,000 acres in 1987 to 370,000 acres in 1997.

Value of shipments of processed Florida crops, including citrus, other fruits, nuts, berries, vegetables, melons and field crops, but excluding sugarcane, grew from $2.4 billion in 1987 to about $3.6 billion in 1996 (Figure 14). The value of field crops exported to international markets through Florida ports more than doubled from $15.6 million in 1994 to $37.3 million in 1998. The Caribbean was the top export destination for field crop products (55%), followed by South America (29%) and Central America (7%). Export values to the Caribbean nearly doubled between 1994 and 1998, while exports to South America and Central America increased by three and four times, respectively. The value of processed agricultural crops exported through Florida ports, including processed fruit, nut, berry, field crop and vegetable commodities, increased by 11 percent between 1994 and 1998, to $330 million. Europe was the top export destination, with 49 percent of total export values, followed by Asia (19%) and the Caribbean region (18%). Exports increased by 108 percent to Europe, decreased by 62 percent to Asia and increased by 47 percent to the Caribbean.

The total economic impacts of field crops, are summarized in Table 11. Total impacts included 11,481 jobs, $545M in output, $327M in value added, and $190M in labor income.

Table 11. Economic impacts of Florida's field crops, 1997.

	Direct Impacts				Total Impacts*			
Industry Group/Sector	Employment (jobs)	Industry Output (m$)	Value Added (m$)	Labor Income (m$)	Employment (jobs)	Output (m$)	Value Added (m$)	Labor Income (m$)
Hay and Pasture	2,910	55.9	35.7	16.1	3,494	110.9	70.3	39.4
Oil Bearing Crops	1,526	71.6	43.8	20.4	2,738	157.7	98.9	55.7
Grass Seeds	922	11.5	7.6	3.0	1,036	20.8	13.3	6.8
Miscellaneous Crops	825	30.7	13.0	7.2	958	42.6	22.5	14.2
Tobacco	720	32.3	12.7	5.7	1,237	68.7	35.6	20.3
Cotton	403	44.0	24.8	15.7	1,315	102.3	61.7	39.6
Feed Grains	367	18.9	10.5	4.4	631	37.7	22.4	12.3
Food Grains	45	2.1	1.1	0.4	71	4.1	2.4	1.3
Total	7,718	267.0	149.3	73.0	11,481	544.8	327.1	189.6

* Total impacts represent exports times total effects multiplier plus local final demand and local intermediate demand from non-agriculture sectors times direct effects multiplier.
All values in millions US dollars (1997), except employment impacts (jobs).
Source: Minnesota Implan Group, 1999.

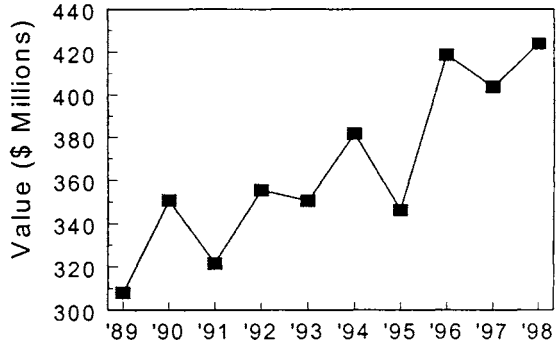
Dairy Products

Florida's dairy farms are characterized by large herd sizes, averaging greater than 500 cows. The industry is centered in the Kissimmee river basin near Lake Okeechobee and the Suwanee River valley of north Florida, where a large number of producers have relocated due to environmental problems associated with wastewater runoff.

The value of raw milk production in Florida reached $424 million in 1998, representing a 38 percent increase since 1989 (Figure 15). Milk values have been subject to considerable variation due to price movements throughout the 1990s. Florida had about 157 thousand milk cows in 1999, which represents a significant decrease since 1994. The number of Florida dairy farms steadily declined to 666 farms in 1997.

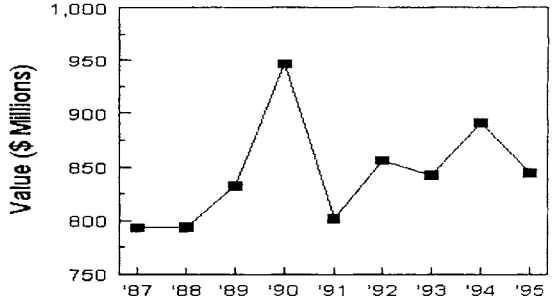
Value of shipments of Florida processed dairy products of pasturized milk, cheese, ice cream, cottage cheese, etc., increased to $844 million in 1995, but remained below the 1990 record high of $946 million (Figure 16). Employment in the dairy manufacturing industry decreased from 3,900 persons in 1987 to 2,000 persons in 1995 (Figure 17).

The total economic impacts of the Florida dairy products industry, are summarized in Table 12. Total impacts included 5,199 jobs, $971M in output, $287M in value added, and $201M in labor income.



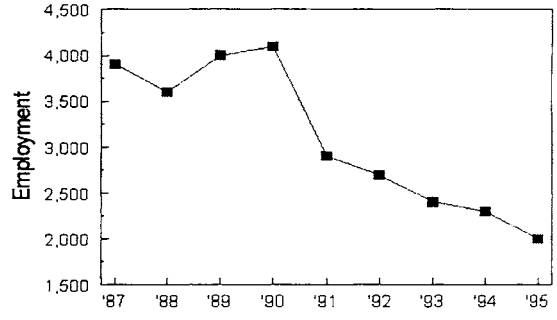
1998 Dollars
Source: USDA, Florida Agricultural Statistics Service

Figure 15. Cash receipts from Florida raw milk production, 1989-98.



1995 Dollars
Source: Annual Survey of Manufactures

Figure 16. Value of shipments of Florida dairy products, 1987-95.



Source: Annual Survey of Manufactures

Figure 17. Employment in Florida's dairy manufacturing industry, 1989-95.

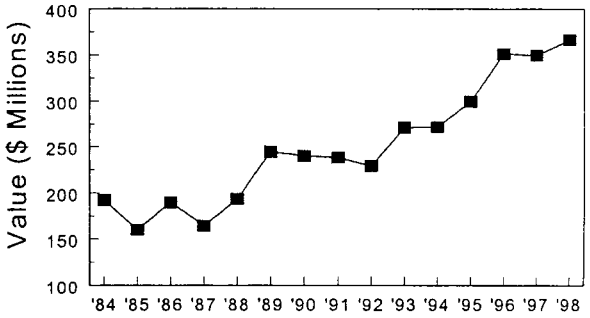
Table 12. Economic impacts of Florida's dairy products industry, 1997.

Industry Group/Sector	Direct Impacts				Total Impacts*			
	Employment (jobs)	Industry Output (m$)	Value Added (m$)	Labor Income (m$)	Employment (jobs)	Output (m$)	Value Added (m$)	Labor Income (m$)
Dairy Farm Products	2,677	407.7	182.5	154.7	2,894	277.6	149.1	109.3
Fluid Milk	1,439	545.3	92.7	63.5	1,834	563.2	111.4	76.5
Ice Cream and Frozen Desserts	364	96.4	18.4	11.8	394	98.7	19.9	12.7
Cheese, Natural and Processed	44	20.5	2.0	1.4	55	21.1	2.6	1.8
Condensed and Evaporated Milk	16	9.7	3.8	0.4	21	9.7	3.9	0.6
Total	4,541	1,080.3	299.6	231.9	5,199	970.9	286.9	201.0

* Total impacts represent exports times total effects multiplier plus local final demand and local intermediate demand from non-agriculture sectors times direct effects multiplier.
All values in millions US dollars (1997), except employment impacts (jobs).
Source: Minnesota Implan Group, 1999.

Livestock and Meat Products

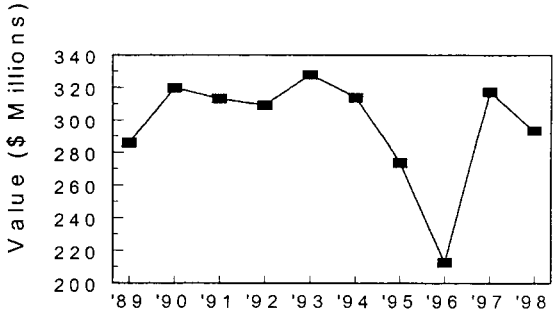
Poultry. The commercial poultry industry in Florida produces chicken meat and eggs. Broilers accounted for the majority of poultry value (60%), and eggs the remainder (40%). The value of poultry production nearly doubled during 1984-98, reaching $366 million in 1998 (Figure 18). The value of broilers tripled during this time while egg values remained steady and other chickens decreased by half. Poultry numbers increased between 1987 and 1997, to 32.9 million birds in 1997. The number of poultry farms decreased between 1987-97, to 2,757 farms in 1997.



1998 Dollars
Source: USDA, Florida Agricultural Statistics Service

Figure 18. Cash receipts for Florida poultry, 1984-98.

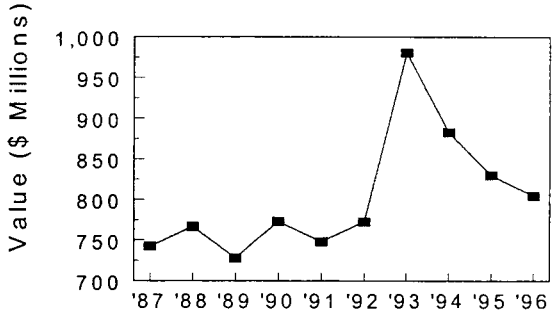
Beef Cattle. Florida has extensive beef cow-calf operations, particularly on rangeland in Central and South Florida. The value of beef cattle sold by ranches increased slightly between 1989 and 1998, to $293 million in 1998 (Figure 19). Beef cattle values fluctuated significantly, with a dramatic dip in 1996. The number of beef cows decreased slightly between 1994-99, to 973,000 animals in 1999 The number of farms with beef cattle decreased between 1987 and 1997 to 13,600 farms.



1998 Dollars
Source: USDA, Florida Agricultural Statistics Service

Figure 19. Cash receipts for Florida beef cattle, 1989-98.

Processed Meat Products. Meat products produced in Florida include packaged meats, sausages and prepared meats, and poultry slaughtering and processing. Value of shipments of Florida meat products settled at $805 million in 1996, after declining from a high of $980 million in 1993 (Figure 20). Employment in the Florida meat products industry has declined from a high of 6,500 employees in 1993 to 4,800 in 1996 (Figure 21). The value of livestock product exports leaving Florida ports nearly doubled during 1994-98, to $64.4 million in 1998. The Caribbean region was the largest international export destination (46%) for livestock products, followed by South America (29%) and Central America (18%). The value of meat products exported from Florida ports grew by almost threefold, to $422 million in 1998. Europe was the top meat export destination (43%) followed by the Caribbean (36%) and South America (11%). Livestock export values grew between 1994 and 1998, to $38.7 million. South America is the top destination region for livestock leaving Florida (52%), followed by Central America (23%) and Asia (14%).



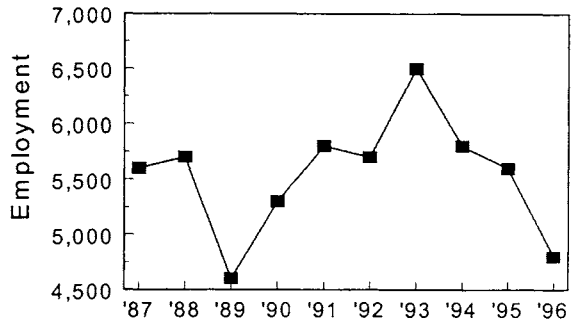
1996 Dollars
Source: Annual Survey of Manufactures

Figure 20. Value of shipments of Florida meat products, 1987-96.

Horses and Ponies. Florida is internationally recognized as a leading center for breeding of thoroughbred horses, particularly in Marion County in central Florida. Sales of Florida horses and ponies grew by one third between 1987 and 1997, to about $75 million in 1997. The number of Florida horses and ponies declined from 61,000 in 1987 to 55,000 in 1997, and the number of

Florida farms producing horses and ponies declined from 7,800 in 1987 to 6,800 farms in 1997.

The total economic impacts of the Florida livestock and meat products industry, are summarized in Table 13. Total impacts included 25,612 jobs, $2.1B in output, $669M in value added, and $483M in labor income.



Source: Annual Survey of Manufactures

Figure 21. Employment in the Florida meat products industry, 1987-96.

Table 13. Economic impacts of Florida's livestock and meat products industry, 1997.

Industry Group/Sector	Direct Impacts Employment (jobs)	Direct Impacts Industry Output (m$)	Direct Impacts Value Added (m$)	Direct Impacts Labor Income (m$)	Total Impacts* Employment (jobs)	Total Impacts* Output (m$)	Total Impacts* Value Added (m$)	Total Impacts* Labor Income (m$)
Miscellaneous Livestock (incl. horses)	9,948	296.3	126.7	90.9	11,152	427.3	215.6	147.5
Ranch Fed Cattle	3,846	212.3	68.4	50.5	5,158	317.3	148.6	100.4
Poultry Processing	3,546	428.1	90.5	76.8	3,424	411.5	88.1	74.4
Poultry and Eggs	2,207	353.8	87.4	62.2	932	139.9	36.5	25.8
Range Fed Cattle	1,571	93.0	30.8	23.6	2,022	128.7	59.6	41.3
Sausages and Other Prepared Meats	1,427	302.6	53.0	41.4	1,535	307.9	58.1	44.6
Meat Packing Plants	1,038	364.4	51.1	41.3	1,282	365.8	59.6	46.6
Hogs, Pigs and Swine	202	12.3	3.0	1.9	99	6.4	2.7	1.7
Cattle Feedlots	39	4.3	1.3	1.0	2	0.2	0.1	0.0
Sheep, Lambs and Goats	34	0.3	0.1	0.1	6	0.1	0.0	0.0
Total	23,858	2,067.6	512.4	389.7	25,612	2,105.1	668.8	482.5

* Total impacts represent exports times total effects multiplier plus local final demand and local intermediate demand from non-agriculture sectors times direct effects multiplier.
All values in millions US dollars (1997), except employment impacts (jobs).
Source: Minnesota Implan Group, 1999.

Forest Products

Florida's extensive forests are managed to produce wood and fiber products. North Florida has the world's largest concentration of intensively managed plantations of southern pines. In 1997, an estimated 543 million cubic feet of timber was harvested in Florida, of which 87 percent was softwoods, including pine, cypress and cedar, and the remainder was hardwoods such as oak, maple, gum and poplar (Table 14). Approximately 368 million cubic feet of longleaf-slash pine was harvested. The volume of timber harvested in Florida grew slightly between 1991-95, to 510 million cubic feet in 1995.

Table 14. Volume of timber roundwood harvested in Florida, by species group, 1997.

Species Group	Volume (million cubic feet)
Softwoods	**471.5**
Longleaf-slash pine	368.1
Loblolly-shortleaf pine	39.6
Other yellow pines	33.0
Cypress	30.5
Hardwoods	**71.3**
All Species	**542.8**

Source: United States Forest Service, Southern Research Station.

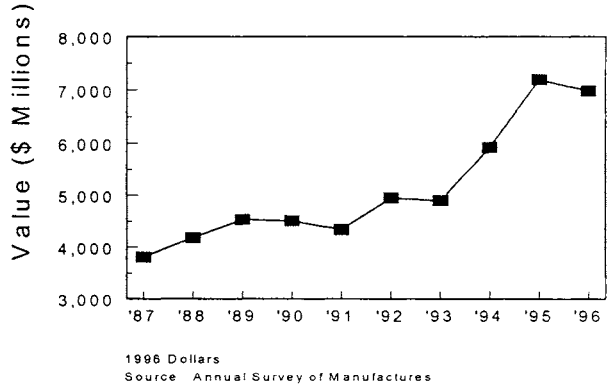


Figure 22. Value of shipments for Florida forest products manufacturing, 1987-96.

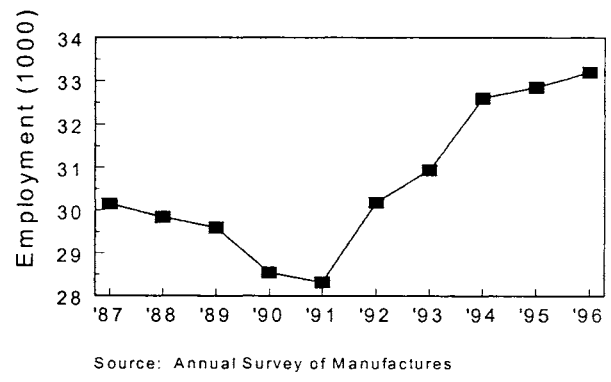


Figure 23. Employment in Florida's timber products manufacturing, 1987-96.

The timber products manufacturing sector produces lumber and other solid milled wood products, pulp, paper, and paperboard. The paper and allied products sector shipped goods valued at nearly $4 billion and employed nearly 10,000 persons. Overall value of shipments for manufactured forest products grew by 83 percent, from $3.8 billion in 1987 to $7.0 billion in 1996 (Figure 22), and employment in the forest products manufacturing sector increased to 33,200 employees in 1996 (Figure 23). The value of lumber and wood products exported from Florida ports increased to $177 million in 1998. The Caribbean region represented the top export destination (73%), followed by South America and Central America (19%). Paper products exported from Florida ports were valued at $581 million in 1998, with South America the top export destination (37%), followed by Central America (30%) and the Caribbean (24%). The total economic impacts of the Florida forest products industry included 68,386 jobs, $7.8B in output, $3.6B in value added, and $2.2B in labor income, as summarized in Table 15.

Table 15. Economic impacts of Florida's forest products industry, 1997.

Industry Group/Sector	Direct Impacts Employment (jobs)	Industry Output (m$)	Value Added (m$)	Labor Income (m$)	Total Impacts* Employment (jobs)	Output (m$)	Value Added (m$)	Labor Income (m$)
Structural Wood Members, N.E.C	4,731	501.6	168.4	133.2	8,397	791.1	343.0	245.6
Paperboard Containers and Boxes	4,724	840.4	243.7	197.4	3,791	612.3	193.0	152.0
Logging Camps and Logging Contractors	2,869	489.1	193.6	87.0	6,162	575.0	298.5	162.7
Sawmills and Planing Mills, General	2,682	425.1	123.5	88.0	2,276	305.8	105.2	71.0
Paperboard Mills	2,026	740.8	171.5	119.2	13,590	1,670.8	732.2	477.4
Paper Mills, Except Building Paper	1,924	462.2	174.7	125.1	9,344	1,042.2	529.5	353.1
Forestry Products (industrial timber)	1,495	499.5	236.4	2.9	5,542	517.0	279.5	106.4
Wood Products, N.E.C	1,278	99.5	47.7	34.6	1,362	105.9	52.0	37.3
Forest Products (farm timber)	1,146	65.2	45.6	12.3	976	60.1	40.3	16.7
Bags, Paper	986	159.2	45.8	34.5	2,933	313.9	138.6	95.5
Pulp Mills	852	473.9	190.1	55.5	8,457	1,085.3	552.2	288.8
Wood Pallets and Skids	721	50.8	24.5	20.1	687	48.5	23.6	19.2
Wood Preserving	642	175.9	35.5	20.6	680	176.7	37.2	21.7
Veneer and Plywood	597	83.7	32.9	22.6	712	88.8	37.7	25.2
Wood Containers	516	36.2	15.3	12.4	225	16.2	7.7	5.8
Gum and Wood Chemicals	373	123.2	51.3	24.3	1,547	206.8	103.6	58.4
Paper Coated & Laminated Packaging	257	54.1	18.4	12.3	889	102.2	48.2	31.9
Reconstituted Wood Products	158	30.6	9.5	4.6	164	28.7	9.5	4.8
Hardwood Dimension and Flooring Mills	153	12.8	7.2	4.4	151	12.6	7.1	4.4
Special Product Sawmills, N.E.C	86	10.7	7.1	7.0	122	13.2	8.5	7.7
Paper Coated & Laminated N.E.C.	45	24.3	16.8	7.6	382	48.7	32.2	17.9
Total	28,261	5,359.0	1,859.4	1,025.6	68,387	7,821.8	3,579.5	2,203.2

* Total impacts represent exports times total effects multiplier plus local final demand and local intermediate demand from non-agriculture sectors times direct effects multiplier.
All values in millions US dollars (1997), except employment impacts (jobs).
Source: Minnesota Implan Group, 1999.

Seafood Products

The warm waters of the Atlantic Ocean and Gulf of Mexico are productive fisheries for a wide variety of shellfish and finfish. The value of Florida commercial fisheries landings was about $209 million in 1998. The fishery value grew rapidly during the mid 1980's and early 1990's, then leveled off in recent years (Figure 24). The volume of fishery catch in Florida declined by one-third during this time, to 173 million pounds in 1998. This decline in commercial fisheries landings is largely attributed to more stringent regulatory action targeting over fishing activities in Florida. As an indication of the commercial fishing fleet capacity, Florida had about 32,500 vessels registered in 1999. The number of commercial vessels peaked during the mid-1990's, and has since declined.

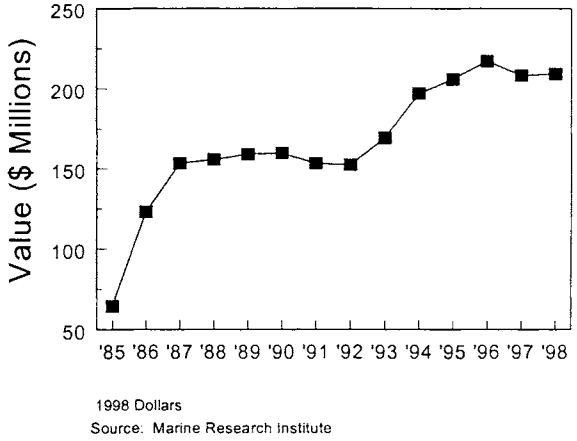


Figure 24. Value of Florida commercial fisheries landings, 1985-98.

Aquaculture is a rapidly developing industry in Florida. As natural fisheries become depleted or more regulated, it is expected that cultured seafood products will become more important. Florida aquaculture products include tropical fish, alligators, oysters and clams, catfish, and aquatic plants. The value of Florida aquaculture products reached $102 million in 1997 (Table 16, Figure 25). Tropical fish were the highest value aquaculture commodity, accounting for about half of total sales. Aquatic plants were the second highest aquaculture product (12%), followed by catfish and other products. The latter products more than doubled in value during 1989-97. Oysters and clams also demonstrated impressive value gains, growing at an average bi-annual rate of 70%. Employment in the Florida aquaculture industry more than doubled between 1987 and 1997, to 722 employees.

Table 16. Value of Florida aquaculture products, 1997.

Product	million $
Tropical Fish	57.2
Catfish and Others	14.2
Aquatic Plants	13.2
Oysters and Clams	13.1
Alligators	3.2
Sport and Game Fish	1.0
Total	102.0

Source: USDA, Florida Agricultural Statistics Service.

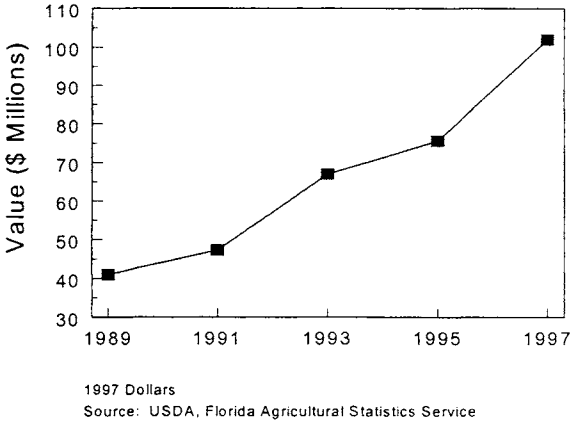


Figure 25. Value of Florida aquaculture products, 1989-97.

The seafood processing industry employed 2,368 persons and shipped $462 million worth of processed seafood products in 1997 (Census of Manufacturing, 1997). Exports of fish from Florida ports generally increased in value during 1994-98, to $40.5 million. Europe is the top export destination of fish products from Florida (32%), followed by the Caribbean (21%) and Asia (15%). The total economic impacts of the Florida seafood products industry included 17,882 jobs, $1.2B in output, $663M in value added, and $396M in labor income, as summarized in Table 17.

Table 17. Economic impacts of Florida's seafood products industry, 1997.

Industry Group/Sector	Direct Impacts				Total Impacts*			
	Employment (jobs)	Industry Output (m$)	Value Added (m$)	Labor Income (m$)	Employment (jobs)	Output (m$)	Value Added (m$)	Labor Income (m$)
Commercial Fishing	7,506	264.7	240.7	97.8	9,011	417.6	324.6	164.4
Prepared Fresh Or Frozen Fish Or Seafood	2,972	440.0	95.9	79.9	8,465	776.6	319.9	218.4
Canned and Cured Sea Foods	154	18.8	7.7	6.2	406	35.5	18.9	13.3
Total	10,632	723.4	344.2	183.9	17,882	1,229.8	663.4	396.0

* Total impacts represent exports times total effects multiplier plus local final demand and local intermediate demand from non-agriculture sectors times direct effects multiplier.
All values in millions US dollars (1997), except employment impacts (jobs).
Source: Minnesota Implan Group, 1999.

Other Food and Tobacco Products Manufacturing

Florida has numerous manufacturing industries that process a variety of other food and tobacco products. Many of the raw commodities processed by these industries are not necessarily produced in Florida. These businesses are located in Florida to serve the large markets in the state, and to take advantage of the labor supply. The total economic impacts of the these industry sectors included 60,490 jobs, $8.2B in output, $3.6B in value added, and $2.1B in labor income, as summarized in Table 18.

Table 18. Economic impacts of Florida's other food and tobacco manufacturing industry, 1997.

	Direct Impacts				Total Impacts*			
Industry Group/Sector	Employment (jobs)	Industry Output (m$)	Value Added (m$)	Labor Income (m$)	Employment (jobs)	Output (m$)	Value Added (m$)	Labor Income (m$)
Bread, Cake, and Related Products	4,946	696.3	270.1	182.7	5,193	713.5	281.5	190.2
Bottled and Canned Soft Drinks & Water	4,800	1,646.8	352.1	211.6	22,851	3,072.7	1,213.1	787.6
Cigars	1,851	278.6	129.9	74.9	5,124	508.9	279.2	178.5
Food Preparations, N.E.C	1,306	237.6	56.5	33.4	1,685	262.9	73.6	44.7
Malt Beverages	1,107	624.6	300.1	85.3	9,661	1,242.2	689.0	357.8
Cookies and Crackers	873	152.8	54.0	27.6	884	153.1	54.4	27.9
Potato Chips & Similar Snacks	692	203.0	68.2	29.1	776	209.1	72.0	31.6
Roasted Coffee	632	401.4	95.8	34.8	2,784	563.9	196.1	101.1
Distilled Liquor, Except Brandy	512	247.1	183.2	26.1	5,711	579.9	415.2	197.4
Prepared Feeds, N.E.C	497	222.4	27.1	18.2	2,318	356.2	115.4	76.4
Flavoring Extracts and Syrups, N.E.C.	292	72.5	40.0	15.0	868	107.8	62.6	31.6
Animal and Marine Fats and Oils	211	55.0	12.4	7.8	566	71.6	28.0	18.0
Macaroni and Spaghetti	151	25.8	6.4	3.8	167	27.0	7.2	4.3
Dog, Cat, and Other Pet Food	134	49.5	8.6	7.1	586	85.5	30.0	21.3
Flour and Other Grain Mill Products	118	45.6	9.6	6.5	692	87.7	37.9	24.9
Chocolate and Cocoa Products	78	24.9	9.7	4.8	166	30.7	13.5	7.4
Cigarettes	25	11.8	5.1	1.1	54	13.8	6.4	2.0
Wines, Brandy, and Brandy Spirits	24	9.5	4.8	0.6	153	18.6	10.7	4.8
Blended and Prepared Flour	22	8.1	1.1	0.9	48	10.0	2.4	1.7
Rice Milling	20	9.9	1.3	0.8	143	20.0	7.5	4.9
Chewing and Smoking Tobacco	19	10.0	3.4	0.8	49	12.2	4.7	1.8
Shortening and Cooking Oils	9	4.8	0.8	0.3	11	4.1	0.8	0.3
Total	18,319	5,038.1	1,640.3	773.2	60,490	8,151.4	3,601.4	2,116.4

* Total impacts represent exports times total effects multiplier plus local final demand and local intermediate demand from non-agriculture sectors times direct effects multiplier.
All values in millions US dollars (1997), except employment impacts (jobs).
Source: Minnesota Implan Group, 1999.

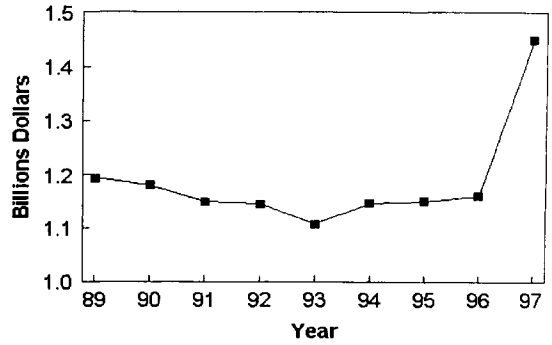
Environmental Horticulture

Ornamental plants grown in nurseries and greenhouses are a large specialty agricultural enterprise in Florida, Ornamental plants include tropical foliage, potted flowering plants, bedding plants, cut flowers and foliage, woody ornamentals, and sod. The value of these crops reached $1.45 billion in 1997 (Table 19). Woody ornamentals ($385M) and tropical foliage plants ($387M) were the two largest product categories, followed by potted flowers and bedding plants ($281M), cut flowers and greens ($175M), and turfgrass sod ($128M).

Table 19. Cash receipts for Florida greenhouse and nursery crops, 1997.

Commodity	million $
Tropical foliage	386.7
Woody ornamentals (nursery crops)	385.4
Potted flowers, bedding and garden plants	281.2
Cut flowers and cut cultivated greens	175.3
Sod	127.8
Other (Christmas trees, bulbs, unfinished plants, greenhouse vegetables, mushrooms, etc.)	93.6
Total	1,450.0

Source: USDA (FLO-1999)



Source: USDA (FLO-1999)
Values deflated with GDP price deflator

Figure 26. Value of sales of Florida greenhouse and nursery crops, 1989-97

Ornamental plants are among the fastest growing parts of agriculture in the United States. During the period1989-97, sales by Florida growers increased by 21 percent in inflation-adjusted terms (Figure 26). Growth within the ornamentals industry has been particularly strong for outdoor landscape plants (woody ornamentals), driven by the residential and commercial building boom in Florida and other sunbelt states. Florida's greenhouse and nursery industry has over 5000 farms, which operate a total production area of 126 thousand acres, including 5 thousand acres under cover of greenhouses or shadehouses.

The total economic impacts of the Florida ornamental plant and landscape service industry included 77,291 jobs, $3.3B in output, $2.4B in value added, and $1.5B in labor income, as summarized in Table 20. An independent survey of the landscape services industry in Florida estimated an even higher value for this sector (Hodges et al., 1999). According to this study, landscape service firms in Florida during 1997 had sales of $2.7 billion, employed an estimated 88 thousand persons, and generated $1.5 billion in economic value added. Also, sales of horticultural products by retailers in Florida were estimated at $1.75 billion.

The golf industry is also related to landscape services and is important to the state's tourism industry. Florida is home to more than 1400 golf courses which were estimated to have over $3 billion in sales, nearly $3 billion in economic value-added and employ more than 13 thousand persons 1991-92 (Hodges et al., 1994). Commercial and non-profit institutions, such as restaurants, hotels, airports, cemeteries, and local governments, employed over 50 thousand persons associated with turfgrass and landscape management in 1991-92, and this activity accounted for more than $500 million in value added.

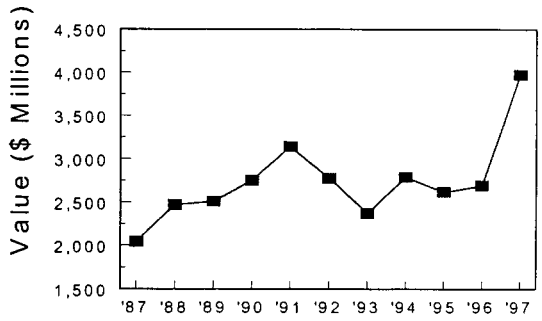
Table 20. Economic impacts of Florida's ornamental plant and landscape services industry, 1997.

Industry Group/Sector	Direct Impacts				Total Impacts*			
	Employment (jobs)	Industry Output (m$)	Value Added (m$)	Labor Income (m$)	Employment (jobs)	Output (m$)	Value Added (m$)	Labor Income (m$)
Greenhouse and Nursery Products	20,714	1,356.7	1,010.0	504.1	23,933	1,601.3	1,123.2	622.1
Landscape and Horticultural Services	57,348	1,486.0	1,116.8	868.1	53,358	1,717.0	1,239.7	917.0
Total	78,062	2,842.7	2,126.8	1,372.2	77,291	3,318.3	2,362.9	1,539.1

* Total impacts represent exports times total effects multiplier plus local final demand and local intermediate demand from non-agriculture sectors times direct effects multiplier.
All values in millions US dollars (1997), except employment impacts (jobs).
Source: Minnesota Implan Group, 1999.

Agricultural Inputs and Services

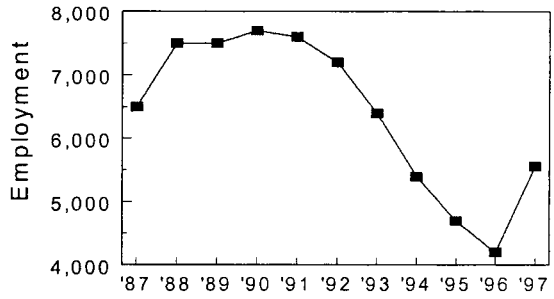
Businesses that perform agricultural, landscape and horticultural services are an important part of the agricultural and natural resource economy of Florida. Agricultural services include crop planting, cultivation, protection and harvesting, veterinary services, and farm labor and management services. Agricultural inputs such as fertilizer and farm machinery are important to the highly capitalized agricultural and natural resource sector of Florida. Industry sectors include manufacturing of agricultural chemicals, farm and garden machinery.



1997 Dollars
Source: Annual Survey of Manufactures

Figure 27. Value of shipments of Florida agricultural chemicals, 1987-97.

The Florida agricultural chemical manufacturing sector produces fertilizers and pesticides. The value of shipments of these products nearly doubled between 1987 and 1997, to almost $4 billion (Figure 27), while employment in agricultural chemical manufacturing declined to 5,500 persons in 1997 (Figure 28). The Florida farm, lawn and garden equipment manufacturing sector shipped products valued at $89 million, and employed 800 persons in 1997. The value of fertilizer exports leaving Florida ports increased to $1.8 billion in 1998, with Asia being the top export destination (65%), followed by South America (14%), and Australia/New Zealand (12%). The value of farm machinery exports leaving Florida ports was $30.1 million in 1998, with South America as the leading market (46%) followed by Central America (32%).



Source: Annual Survey of Manufactures

Figure 28. Employment in the Florida chemical manufacturing industry, 1987-97.

The total economic impacts of the Florida agricultural inputs and services industry included 98 thousand jobs, $8.2B in output, $3.6B in value added, and $2.4B in labor income (Table 21).

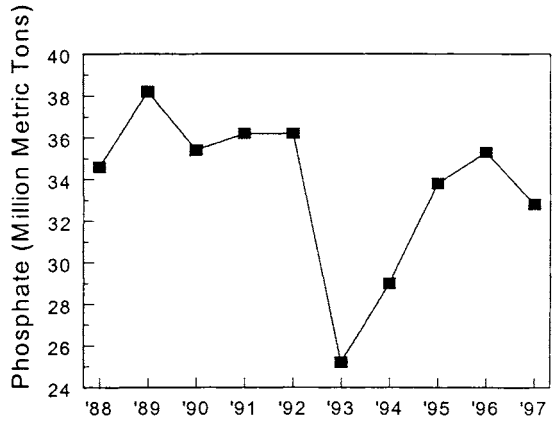
Table 21. Economic impacts of Florida's agricultural inputs and services industry, 1997.

	Direct Impacts				Total Impacts*			
Industry Group/Sector	Employment (jobs)	Industry Output (m$)	Value Added (m$)	Labor Income (m$)	Employment (jobs)	Output (m$)	Value Added (m$)	Labor Income (m$)
Agricultural, Forestry, Fishery Services	71,158	1,668.9	885.2	711.7	55,181	2,091.6	1,209.2	863.7
Nitrogenous and Phosphatic Fertilizers	5,280	2,836.6	537.5	305.2	35,291	5,168.9	1,998.2	1,230.5
Fertilizers, Mixing Only	1,060	261.0	55.8	44.6	4,032	508.8	203.6	139.8
Farm Machinery and Equipment	1,060	182.9	57.4	36.0	1,785	212.8	90.2	58.2
Agricultural Chemicals, N.E.C	375	151.5	59.3	22.6	1,824	245.4	121.6	66.2
Lawn and Garden Equipment	71	19.9	6.7	1.5	116	21.0	8.2	3.1
Total	79,005	5,120.8	1,601.9	1,121.7	98,229	8,248.4	3,631.0	2,361.5

* Total impacts represent exports times total effects multiplier plus local final demand and local intermediate demand from non-agriculture sectors times direct effects multiplier.
All values in millions US dollars (1997), except employment impacts (jobs).
Source: Minnesota Implan Group, 1999.

Mining

Florida has a variety of rich mineral deposits and offshore petroleum reserves. Florida is one of the world's largest producers of phosphate rock, accounting for approximately 75 percent of the United States supply and 25 percent of the world supply. About 90 percent of Florida phosphate rock is converted into phosphatic fertilizers. The value of shipments of phosphate mines in Florida was $764 million in 1997, and the volume of phosphate rock mined was 32.8 million metric tons. However, mine output has fluctuated dramatically, dropping as low as 25 million metric tons in 1993 (Figure 29). Employment in phosphate mining decreased to about 3,000 employees in 1997.



Source: USDA, Florida Agricultural Statistics Service

Figure 29. Phosphate rock mined in Florida, 1988-97.

The total economic impacts of the Florida mining industry included 77,291 jobs, $3.3B in output, $2.4B in value added, and $1.5B in labor income (Table 22).

Table 22. Economic impacts of Florida's mining industry, 1997.

Industry Group/Sector	Direct Impacts Employment (jobs)	Direct Impacts Industry Output (m$)	Direct Impacts Value Added (m$)	Direct Impacts Labor Income (m$)	Total Impacts* Employment (jobs)	Total Impacts* Output (m$)	Total Impacts* Value Added (m$)	Total Impacts* Labor Income (m$)
Phosphate Rock	2,911	990.8	560.2	151.1	9,598	1,351.3	801.9	347.2
Natural Gas & Crude Petroleum	2,175	146.6	91.8	12.3	2,580	182.7	111.5	37.5
Dimension Stone	1,576	217.5	136.2	65.8	4,488	428.7	271.5	155.4
Natural Gas Liquids	1,018	332.5	108.6	4.7	2,805	414.6	172.5	60.6
Sand and Gravel	716	68.3	48.8	27.0	1,676	137.4	93.4	56.3
Misc. Nonmetallic Minerals, N.E.C.	375	42.4	25.1	13.1	712	65.2	39.9	23.3
Metal Ores, Not Elsewhere Classified	216	36.5	11.9	11.4	688	72.6	35.3	26.1
Clay, Ceramic, Refractory Minerals, N.E.C.	196	33.5	18.6	9.9	674	68.6	41.0	24.6
Nonmetallic Minerals (Except Fuels) Service	36	5.8	3.3	1.3	82	8.8	5.3	2.7
Coal Mining	26	40.5	28.0	15.7	595	79.1	53.4	33.1
Gold Ores	8	1.6	0.6	0.4	9	1.7	0.6	0.5
Chemical, Fertilizer Mineral Mining, N.E.C.	5	0.4	0.4	0.3	8	0.6	0.5	0.4
Total	9,258	1,916.4	1,033.3	313.0	23,915	2,811.4	1,626.8	767.6

* Total impacts represent exports times total effects multiplier plus local final demand and local intermediate demand from non-agriculture sectors times direct effects multiplier.
All values in millions US dollars (1997), except employment impacts (jobs).
Source: Minnesota Implan Group, 1999.

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Appendix A. Implan Multipliers for Florida Agriculture and Natural Resource Industries, 1997

Sector Description	Employment Multipliers (Jobs/MM$)		Total Value Added Multipliers ($/$ output)		Output Multipliers ($/$ output)		
	Direct Effects	Total Effects	Direct Effects	Total Effects	Indirect Effects	Induced Effects	Total Effects
Agricultural Inputs and Services							
Agricultural, Forestry, Fishery Services	42.6	61.3	0.530	1.366	0.403	0.955	2.358
Nitrogenous and Phosphatic Fertilizers	1.9	15.0	0.189	0.846	0.572	0.580	2.152
Fertilizers, Mixing Only	4.1	18.3	0.214	0.921	0.641	0.642	2.282
Agricultural Chemicals, N.E.C	2.5	17.3	0.391	1.101	0.434	0.742	2.176
Farm Machinery and Equipment	5.8	19.0	0.314	0.945	0.373	0.651	2.024
Lawn and Garden Equipment	3.6	15.2	0.334	0.887	0.312	0.591	1.904
Dairy Products							
Dairy Farm Products	6.6	21.4	0.448	1.091	0.242	0.770	2.012
Creamery Butter	1.6	15.4	0.079	0.770	0.776	0.539	2.316
Cheese, Natural and Processed	2.1	17.6	0.098	0.864	0.720	0.605	2.325
Condensed and Evaporated Milk	1.7	16.6	0.394	1.107	0.476	0.735	2.211
Ice Cream and Frozen Desserts	3.8	18.5	0.191	0.908	0.606	0.629	2.236
Fluid Milk	2.6	21.1	0.170	1.082	0.835	0.757	2.591
Field Crops							
Cotton	9.2	30.4	0.563	1.424	0.374	0.986	2.359
Food Grains	21.8	38.6	0.527	1.313	0.352	0.892	2.244
Feed Grains	19.4	37.9	0.557	1.350	0.348	0.922	2.269
Hay and Pasture	52.1	70.5	0.640	1.435	0.283	0.982	2.264
Grass Seeds	79.9	94.9	0.662	1.346	0.209	0.902	2.111
Tobacco	22.3	38.8	0.393	1.118	0.393	0.762	2.155
Miscellaneous Crops	26.9	53.9	0.423	1.300	0.532	0.902	2.434
Oil Bearing Crops	21.3	39.4	0.612	1.426	0.300	0.973	2.273
Forest Products							
Forest Products	17.6	34.7	0.699	1.453	0.237	0.961	2.198
Forestry Products	3.0	34.0	0.473	1.459	0.608	0.992	2.600
Logging Camps and Logging Contractors	5.9	28.8	0.396	1.393	0.718	0.962	2.680
Sawmills and Planing Mills, General	6.3	28.8	0.291	1.339	0.883	0.930	2.813
Hardwood Dimension and Flooring Mills	11.9	29.2	0.564	1.374	0.381	0.941	2.322
Special Product Sawmills, N.E.C	8.0	28.9	0.659	1.638	0.446	1.155	2.601
Veneer and Plywood	7.1	26.6	0.393	1.294	0.618	0.896	2.514
Structural Wood Members, N.E.C	9.4	25.8	0.336	1.110	0.524	0.773	2.297
Wood Containers	14.3	31.0	0.421	1.212	0.452	0.845	2.297
Wood Pallets and Skids	14.2	32.4	0.483	1.327	0.463	0.925	2.388
Wood Preserving	3.6	20.9	0.202	1.029	0.731	0.710	2.442
Reconstituted Wood Products	5.2	19.9	0.309	1.017	0.489	0.692	2.181
Wood Products, N.E.C	12.8	29.7	0.479	1.270	0.415	0.879	2.294
Pulp Mills	1.8	17.9	0.401	1.169	0.511	0.786	2.298
Paper Mills, Except Building Paper	4.2	20.3	0.378	1.149	0.456	0.804	2.261
Paperboard Mills	2.7	18.4	0.232	0.992	0.564	0.698	2.262
Paperboard Containers and Boxes	5.6	17.0	0.290	0.829	0.272	0.579	1.851
Paper Coated & Laminated Packaging	4.8	17.0	0.340	0.918	0.303	0.633	1.936

Appendix A. Implan Multipliers for Florida Agriculture and Natural Resource Industries, 1997

Sector Description	Employment Multipliers (Jobs/MM$)		Total Value Added Multipliers ($/$ output)		Output Multipliers ($/$ output)		
	Direct Effects	Total Effects	Direct Effects	Total Effects	Indirect Effects	Induced Effects	Total Effects
Paper Coated & Laminated N.E.C.	1.9	16.4	0.692	1.359	0.141	0.914	2.056
Bags, Paper	6.2	18.5	0.287	0.875	0.373	0.607	1.980
Gum and Wood Chemicals	3.0	19.8	0.416	1.213	0.506	0.825	2.331
Fruits & Vegetables							
Fruits	12.7	34.6	0.402	1.237	0.486	0.856	2.342
Tree Nuts	22.0	41.9	0.720	1.539	0.234	1.065	2.299
Vegetables	9.8	33.1	0.583	1.468	0.413	1.010	2.423
Canned Specialties	2.8	17.9	0.213	0.923	0.563	0.630	2.194
Canned Fruits and Vegetables	4.3	21.0	0.360	1.151	0.492	0.790	2.282
Dehydrated Food Products	6.4	20.6	0.365	1.015	0.366	0.694	2.060
Pickles, Sauces, and Salad Dressings	3.7	17.9	0.332	0.991	0.417	0.668	2.086
Frozen Fruits, Juices and Vegetables	4.8	21.0	0.264	1.020	0.522	0.707	2.230
Frozen Specialties	5.5	19.2	0.341	0.977	0.385	0.670	2.055
Livestock and Meat Products							
Poultry and Eggs	6.2	22.2	0.247	0.809	0.368	0.564	1.932
Ranch Fed Cattle	18.1	32.7	0.322	0.948	0.350	0.666	2.016
Range Fed Cattle	16.9	32.2	0.331	0.953	0.379	0.672	2.051
Cattle Feedlots	9.0	21.2	0.299	0.851	0.268	0.599	1.867
Sheep, Lambs and Goats	97.9	111.2	0.321	0.871	0.252	0.616	1.867
Hogs, Pigs and Swine	16.4	28.0	0.242	0.759	0.295	0.530	1.825
Miscellaneous Livestock	33.6	47.8	0.428	1.039	0.257	0.723	1.980
Meat Packing Plants	2.8	13.0	0.140	0.521	0.320	0.366	1.686
Sausages and Other Prepared Meats	4.7	15.2	0.175	0.650	0.379	0.453	1.832
Poultry Processing	8.3	23.9	0.211	0.840	0.679	0.587	2.267
Mining							
Gold Ores	5.0	17.3	0.364	0.970	0.273	0.705	1.979
Metal Ores, Not Elsewhere Classified	5.9	19.7	0.324	1.008	0.343	0.715	2.057
Coal Mining	0.6	17.1	0.691	1.443	0.120	1.022	2.141
Natural Gas & Crude Petroleum	14.8	29.5	0.626	1.285	0.279	0.844	2.123
Natural Gas Liquids	3.1	16.7	0.327	0.940	0.503	0.621	2.124
Dimension Stone	7.2	22.2	0.626	1.321	0.189	0.895	2.084
Sand and Gravel	10.5	26.0	0.714	1.438	0.142	0.979	2.121
Clay, Ceramic, Refractory Minerals, N.E.C.	5.9	20.5	0.554	1.242	0.232	0.845	2.078
Phosphate Rock	2.9	17.1	0.565	1.241	0.242	0.822	2.065
Chemical, Fertilizer Mineral Mining, N.E.C.	11.2	28.3	0.840	1.632	0.089	1.132	2.221
Nonmetallic Minerals (Except Fuels) Service	6.2	20.4	0.574	1.236	0.209	0.831	2.040
Misc. Nonmetallic Minerals, N.E.C.	8.8	23.5	0.592	1.274	0.200	0.866	2.066
Ornamental plants and Landscape services							
Greenhouse and Nursery Products	15.3	34.3	0.744	1.586	0.244	1.071	2.315
Landscape and Horticultural Services	38.6	59.0	0.752	1.689	0.255	1.174	2.429
Other Food & Tobacco Products							
Flour and Other Grain Mill Products	2.6	17.9	0.211	0.972	0.515	0.676	2.192

Appendix A. Implan Multipliers for Florida Agriculture and Natural Resource Industries, 1997

Sector Description	Employment Multipliers (Jobs/MM$)		Total Value Added Multipliers ($/$ output)		Output Multipliers ($/$ output)		
	Direct Effects	Total Effects	Direct Effects	Total Effects	Indirect Effects	Induced Effects	Total Effects
Rice Milling	2.0	17.3	0.129	0.902	0.642	0.626	2.269
Blended and Prepared Flour	2.7	15.3	0.139	0.762	0.472	0.532	2.005
Dog, Cat, and Other Pet Food	2.7	16.9	0.174	0.846	0.540	0.590	2.130
Prepared Feeds, N.E.C	2.2	11.4	0.122	0.567	0.337	0.394	1.732
Bread, Cake, and Related Products	7.1	21.7	0.388	1.067	0.342	0.736	2.078
Cookies and Crackers	5.7	19.6	0.353	0.992	0.360	0.676	2.035
Chocolate and Cocoa Products	3.1	18.9	0.389	1.128	0.431	0.770	2.201
Animal and Marine Fats and Oils	3.8	16.5	0.225	0.811	0.460	0.557	2.018
Shortening and Cooking Oils	1.9	10.3	0.170	0.567	0.262	0.386	1.647
Malt Beverages	1.8	18.8	0.480	1.254	0.352	0.876	2.229
Wines, Brandy, and Brandy Spirits	2.5	22.1	0.505	1.401	0.381	0.991	2.372
Distilled Liquor, Except Brandy	2.1	26.0	0.742	1.812	0.210	1.325	2.535
Bottled and Canned Soft Drinks & Water	2.9	16.0	0.214	0.837	0.455	0.578	2.033
Flavoring Extracts and Syrups, N.E.C.	4.0	18.5	0.551	1.222	0.266	0.815	2.081
Roasted Coffee	1.6	22.2	0.239	1.203	0.751	0.825	2.576
Potato Chips & Similar Snacks	3.4	17.2	0.336	0.968	0.365	0.656	2.021
Macaroni and Spaghetti	5.9	21.3	0.248	0.986	0.521	0.680	2.202
Food Preparations, N.E.C	5.5	20.0	0.238	0.886	0.447	0.610	2.058
Cigarettes	2.1	19.9	0.433	1.245	0.424	0.863	2.286
Cigars	6.6	23.7	0.466	1.255	0.345	0.892	2.237
Chewing and Smoking Tobacco	1.9	17.1	0.337	1.032	0.438	0.691	2.129
Seafood Products							
Commercial Fishing	28.4	45.0	0.909	1.656	0.080	1.107	2.187
Canned and Cured Sea Foods	8.2	21.8	0.409	1.017	0.202	0.706	1.908
Prepared Fresh Or Frozen Fish Or Seafood	6.8	20.1	0.218	0.764	0.292	0.530	1.822
Sugar & Confectionary Products							
Sugar Crops	10.9	29.1	0.591	1.375	0.321	0.927	2.248
Sugar	2.5	18.4	0.188	0.933	0.569	0.645	2.215
Confectionery Products	4.4	18.9	0.320	1.003	0.433	0.681	2.114