THE FOOD, FIBER AND FORESTRY INDUSTRIES OF SOUTH CAROLINA: THE CONTRIBUTION OF FARMING

by

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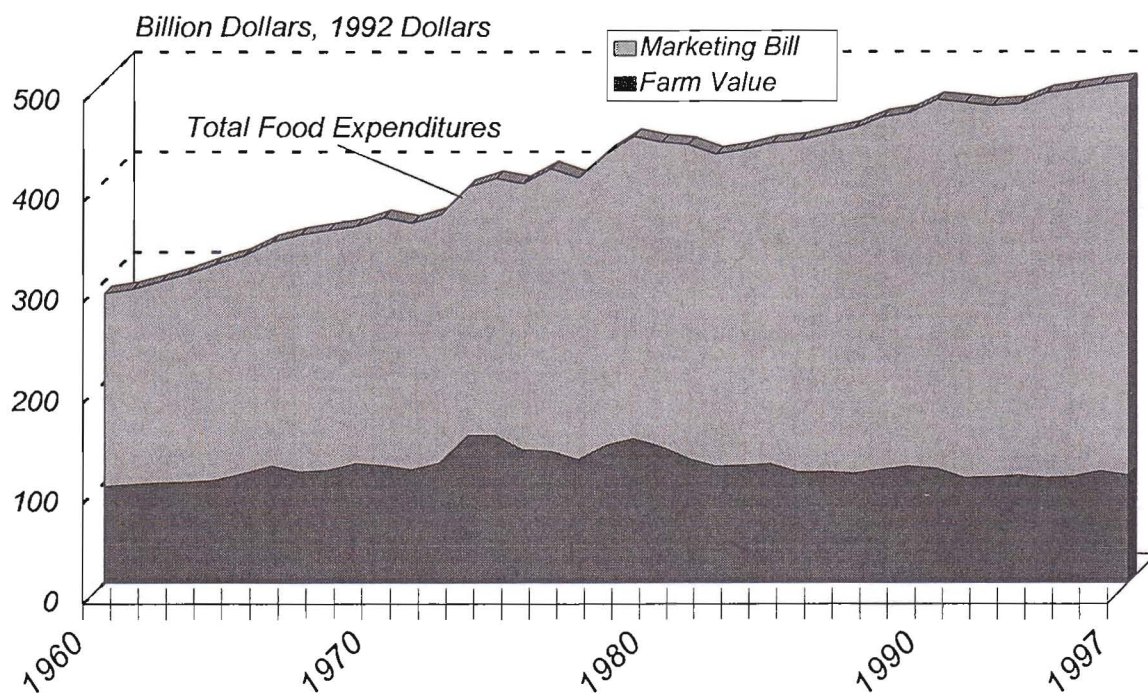Clemson, South Carolina 29634-0355

Executive Summary

The IMPLAN Input-Output (IO) accounting system and model are used for measuring the impact of the food, fiber and forestry sectors on the South Carolina economy. In 1996, South Carolina's Food and Fiber and Forestry System (FFF) accounted for about $36 billion of the $161 billion in total gross output of the state. This was about 22% of the state total. In terms of value added, the FFF generated $15.1 billion -- about 17% of total state value added. Finally, about 460,000 employees resulted from FFF industries.

Production agriculture is a small part of the total food and fiber and forestry system. This finding is consistent with national trends that show service and trade activities growing faster than primary production of farm products or manufacturing. Food retailing is now a major component of the South Carolina food, fiber and forestry system. Food processing is likely to become more important to the FFF and state economy as meat packing and poultry processing spreads from neighboring states to South Carolina.

Like the national economy, the FFF in South Carolina is an important component of the economy. However, it is the value added to farm and forestry products that is increasing in real terms. For example, the real farm value of total food expenditures has been essentially flat over the past forty years in the U.S. while the value added share of total food expenditures has more than doubled (see figure below). This trend for food expenditures is likely to be similar for forestry and fiber final expenditures. In turn, this suggests that the farm and forester producer shares of the total activity of the food, fiber and forestry system will become smaller over time even as the system expands in absolute terms.

U.S. Real Consumer Food Expenditures and Farm Value

Billion Dollars, 1992 Dollars

| | Marketing Bill |
| | Farm Value |

Total Food Expenditures

500

400

300

200

100

0

1960   1970   1980   1990   1997

Real dollars computed from the Gross Domestic Product price deflator, Department of Commerce, Bureau of the Census. Marketing Bill defined as difference between what consumers spent on food and the farm value of food. Farm Value and Marketing Bill are in 1992 dollars.

Source: Economic Research Service Website: www.econ.ag.gov/briefing/foodmark/cost/data/bill/value.htm

The Food, Fiber and Forestry Industries of South Carolina:

The Contribution of Farming

Introduction

Food, fiber and forestry production in South Carolina is an important component of the South Carolina economy. About 20% of the state's economic output as well as about one in five jobs are associated with these three industries in South Carolina. Food, fiber and forestry (FFF) activities in South Carolina are diverse and often closely linked. Producers of raw materials (Farmers and Foresters) continue to strengthen their ties to processors (Food, Wood, Paper and Textile products) as contracting and quality control become more prevalent. In turn, processors must respond to rapid changes in consumer tastes by providing retailers with new and improved products for sale to the final users of food, fiber and forestry products.

So, it is useful to think of these activities as part of a system or chain that delivers these products to the final consumer. Ultimately it is the level of demand by final users for these goods that determines the impact that this system has on the South Carolina economy. While many final users are located in South Carolina, most production is exported to consumers in other states and increasingly to other countries. Like the changing composition of final users of food, fiber and forestry products, the system that produces these goods is changing. Its parts will change in relative importance over time but the total system is likely to remain important to the South Carolina economy as it provides many of the basic needs that South Carolina residents and export markets have for food, shelter and clothing.

The purpose of this report is to take a snapshot of the system in recent years and to document the contribution that the FFF system makes to the South Carolina economy in a typical year. We begin by taking stock of the critical base support of the system -- farms and the people who run them. It is a point that, while farm numbers are declining, the productivity of farms in South Carolina has increased dramatically over the last several decades. In Chapter 2, we examine the economic activities in S.C. most closely associated with farming -- food processing and farm input suppliers. In the

final chapter, a modern view is provided of the complete system that provides food, fiber and forestry products to final consumers. In this sequence, a picture is presented of how the oldest part -- farming -- fits into the broader context of "value-added" agriculture and with the complete system that delivers food, fiber and forest products to final users.

Key Links in the Food, Fiber and Forestry (FFF) System
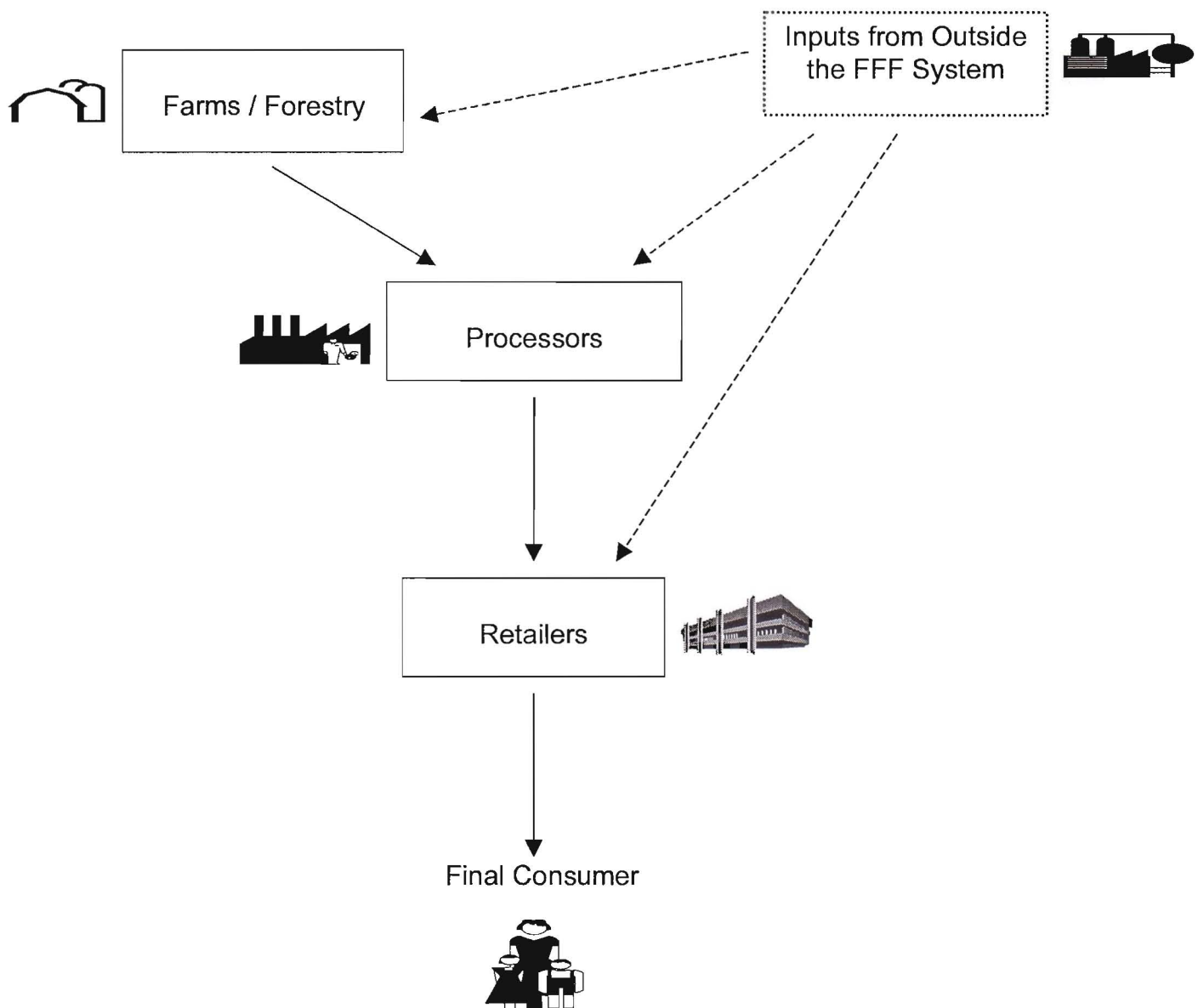
Chapter 1
Farms and Farm Characteristics

How the Land is Used

South Carolina has over 20,000 farms which produce on 4.59 million acres of land. This is 23.8% of the total land area in the state. Cropland constitutes 53.6% of the farmland, 35.3% of the farmland is in woodland including woodland pasture, and the remainder is divided among rangeland, house lots, ponds, roads, and wasteland as shown in Figure 1-1.

Figure 1-1. Farm Land Use in South Carolina, 1997
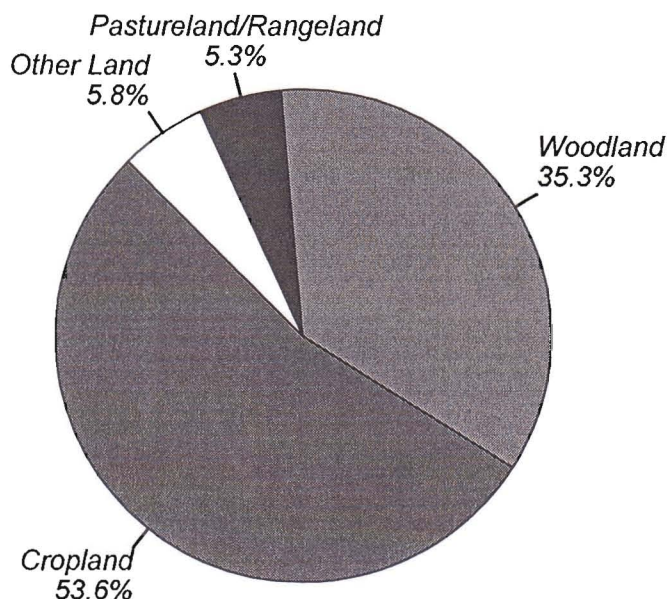
Source: U.S. Bureau of the Census, Census of Agriculture, 1997. South Carolina.

Tables 1-1 and 1-2 illustrate the decrease in farmland that has occurred over the past several decades. In 1997, total farmland increased slightly though. Woodland and other land increased yet cropland decreased from 1992 to 1997. Horticultural products, which include greenhouse, nursery and floriculture production, has grown since 1982. Other crops such

as tobacco, cotton, wheat, sugar cane and hay, increased from 1992 to 1997.
All other categories decreased from 1992 to 1997.

Table 1-1. How the Land is Used

|	Total land area (1000 acres)	Land in farms and ranches (1000 acres)	Percent of total land area	Total cropland* (1000 acres)	Percent of total land area in farms & Ranches	Harvested cropland (1000 acres)	Percent of total Cropland	Woodland including woodland pasture (1000 acres)	Percent of total land in farms & ranches	All other land in farms & ranches** (1000 acres)	Percent total land in farms & ranches
UNITED STATES											
1969	2,263,591	1,062,893	47.0%	458,990	43.2%	273,016	59.5%	112,013	10.5%	491,890	46.3%
1974	2,265,661	1,017,030	44.9%	440,039	43.3%	303,002	68.9%	92,528	9.1%	484,464	47.6%
1978	2,265,661	1,014,777	44.8%	453,874	44.7%	317,146	69.9%	91,815	9.0%	469,088	46.2%
1982	2,265,105	986,797	43.6%	445,362	45.1%	326,306	73.3%	87,088	8.8%	454,346	46.0%
1987	2,265,105	964,471	42.6%	443,318	46.0%	282,224	63.7%	79,894	8.3%	441,258	45.8%
1992	2,262,444	945,532	41.8%	435,366	46.0%	295,937	68.0%	73,962	7.8%	436,204	46.1%
1997	2,262,462	931,796	41.2%	431,145	46.3%	309,395	71.8%	71,465	7.7%	429,185	46.1%
SOUTH CAROLINA											
1969	19,345	6,992	36.1%	3,440	49.2%	2,042	59.4%	2,747	39.3%	804	11.5%
1974	19,345	6,177	31.9%	3,201	51.8%	2,251	70.3%	2,212	35.8%	764	12.4%
1978	19,347	6,046	31.3%	3,376	55.8%	2,524	74.8%	2,133	35.3%	537	8.9%
1982	19,330	5,590	28.9%	3,179	56.9%	2,474	77.8%	1,889	33.8%	522	9.3%
1987	19,912	4,759	23.9%	2,686	56.4%	1,590	59.2%	1,508	31.7%	565	11.9%
1992	19,961	4,473	22.4%	2,589	57.9%	1,591	61.5%	1,431	32.0%	453	10.1%
1997	19,271	4,593	23.8%	2,463	53.6%	1,654	67.2%	1,620	35.3%	510	11.1%

* Includes cropland, cropland used for pastures, and other cropland. ** Includes rangeland, house lots, ponds, wastelands.
SOURCE: U.S. Bureau of the Census, Census of Agriculture.

Table 1-2. South Carolina Agricultural Land Use by Category (1,000 acres)

	1978	1982	1987	1992	1997
Harvested Cropland:	2,524	2,474	1,590	1,591	1,654
Cash Grains*	1,278	1,287	546	490	46
Vegetables and Melons	49	39	34	38	35
Fruits and Nuts	62	59	59	44	30
Horticultural Products	3	3	7	14	21
Other Crops**	606	559	433	529	814
Livestock and Animal Areas, Land in Farms***	2,332	2,024	2,022	1,946	1,736

* Includes wheat, corn, soybeans, etc.

** Includes cotton, tobacco, sugarcane, hay, etc.

*** Includes livestock, dairy, poultry and eggs, swine and other animal specialties.* Includes wheat, corn, soybeans, etc.

**** Includes unharvested cropland and other general farm land. ** Includes cotton, tobacco, sugarcane, hay, etc.
Note: Total of harvested cropland, livestock and animal areas & other land in farms may exceed total land in farm and ranches due to double cropping, etc.

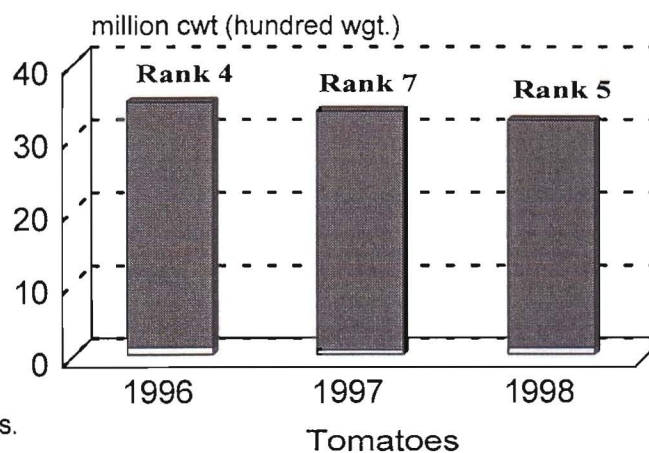SOURCE: U.S. Bureau of the Census , Census of Agriculture.

Figure 1-2. South Carolina Harvested Cropland by Category, 1992 and 1997

Source: U.S. Bureau of the Census, Census of Agriculture, 1997.
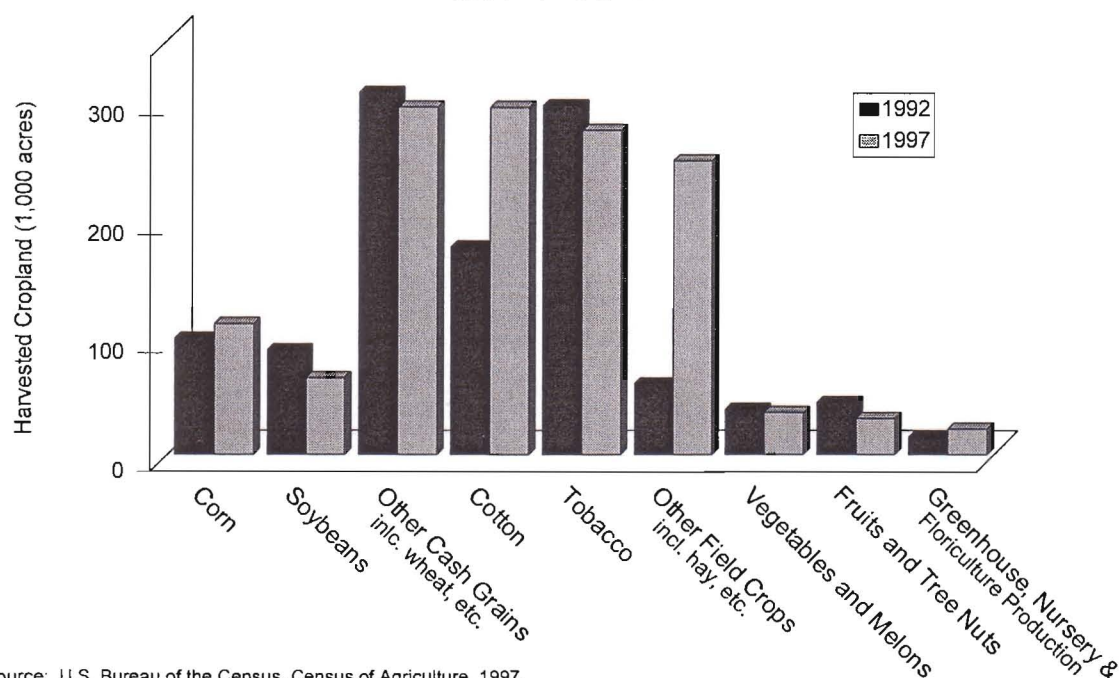
Commodities

South Carolina agriculture produces a wide array of farm products. The top four commodities -- broilers, tobacco, greenhouse/nursery/ floriculture, and cotton -- represent over 51% of South Carolina's total cash receipts from farm marketings. South Carolina ranks near the top in the nation in the production of some products. As illustrated in Figure 1-3, South Carolina, in 1997, was the third leading producer of tobacco and in 1996 the fourth leading producer of tomatoes in the U.S. In 1997, South Carolina was the second leading producer of peaches, producing over 6% of the total production in the U.S. In 1998, South Carolina ranked second in peach and flue cured tobacco production, fifth and eighth in tomato and watermelon production respectively, and eighth in number of turkeys raised.

Figure 1-3. U.S. and South Carolina Production of Peaches, Tobacco and Tomatoes, 1996-1998

million pounds

Rank 14*   Rank 2   Rank 2

3000
2500
2000
1500
1000
500
0

1996   1997   1998
Peaches

US
SC

million pounds

Rank 3   Rank 3   Rank 2

1400
1200
1000
800
600
400
200
0

1996   1997   1998
Flue-Cured Tobacco

million cwt (hundred wgt.)

Rank 4   Rank 7   Rank 5

40
30
20
10
0

1996   1997   1998
Tomatoes
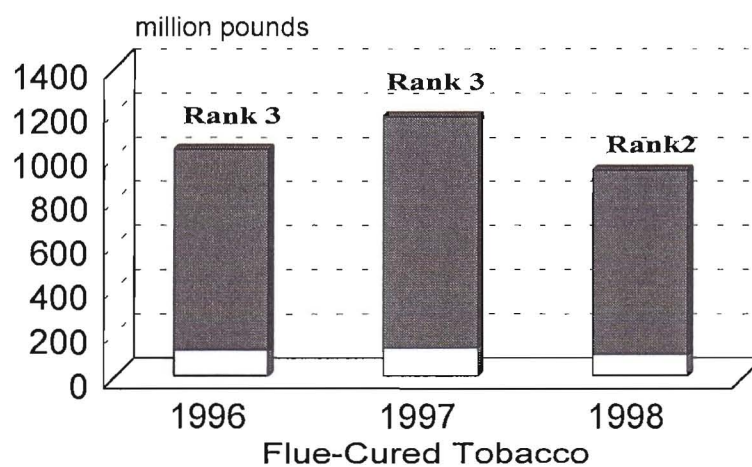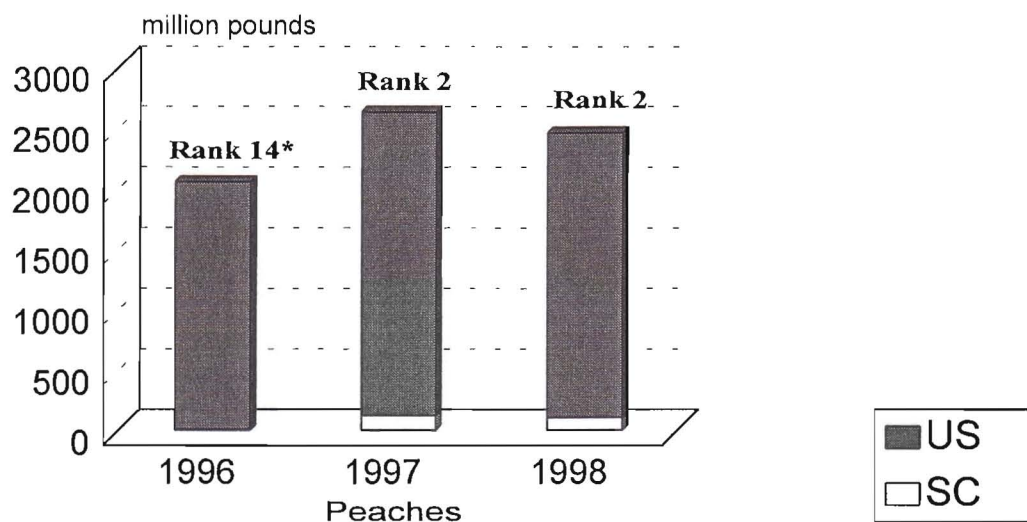
* Rank is the S.C. rank among all states.

Source: National Agricultural Statistics Service.

South Carolina farm productivity, as measured by average yield per acre, is near the national average in most crops. The state's largest cash crop, tobacco, had average farm yields about 11% above the national average in 1997. Cotton, one of South Carolina's leading cash crops, was about 12% above the national average yield in 1996. Table 1-3 shows the yield per harvested acre in the U.S. and South Carolina for various crops from 1994 to 1997.

Table 1-3. Yield per Harvested Acre, Representative Crops, U.S. and South Carolina									
		1994		1995		1996		1997	
Crop	Units	U.S.	S.C.	U.S.	S.C.	U.S.	S.C.	U.S.	S.C.
Corn	bushels	138.6	85.0	113.5	91.0	127.1	79.0	127.0	97.0
Cotton	pounds	705	846	533	528	701	774	679	674
Peanuts	pounds	2,624	2,900	2,282	2,800	2,653	3,100	2523	2900
Soybeans	bushels	41.4	27.0	35.3	24.0	37.6	25.0	39.0	22.0
Tobacco	pounds	2,359	2,300	1,913	2,100	2,071	2,310	2106	2340
Tomatoes**	cwt	276.2	300.0	260.0	310.0	277.0	300.0	302.0	190.0
Wheat	bushels	37.6	50.0	35.8	32.0	36.3	45.0	39.7	50.0

**For fresh market.

SOURCE: National Agricultural Statistics Service.

Cash Receipts

South Carolina's cash receipts from marketing of farm commodities increased 42% from 1992 to 1997. In comparison, cash receipts for the entire U.S. increased by only 22% during that same time. Preliminary figures for South Carolina show that 1997 cash receipts reached $1.7 billion. Increasing cash receipts have been especially important to farmers considering recent cuts in government payments received. Table 1-4 shows

cash receipts and government payments for South Carolina and the U.S. for selected years from 1961 to 1997.

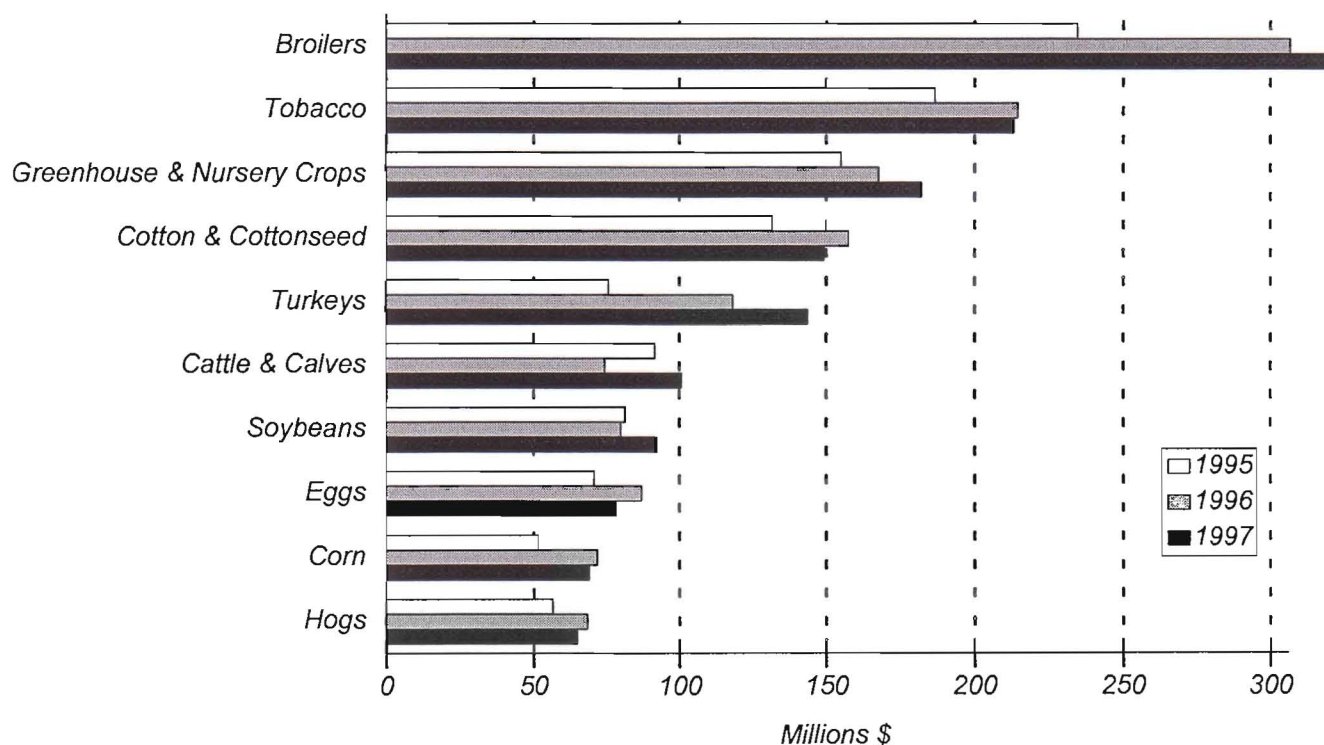|	Table 1-4. Cash Receipts from Farm Marketings, U.S. and South Carolina				
	Cash receipts from farm marketings (million dollars)		**SC as a % of US**	**Government payments (million dollars)**	
<u>Year</u>	<u>US</u>	<u>SC</u>		<u>US</u>	<u>SC</u>
1961	36,239	404	1.11%	1,484	18
1965	39,187	418	1.07%	2,452	27
1970	49,231	442	0.90%	3,717	56
1975	88,209	817	0.93%	807	7
1980	136,431	1,147	0.84%	1,286	13
1985	142,103	1,033	0.73%	7,704	35
1989	159,173	1,225	0.77%	10,887	73
1990	169,987	1,176	0.69%	9,298	63
1991	167,292	1,225	0.73%	8,214	49
1992	171,381	1,201	0.70%	9,169	73
1993	177,762	1,251	0.70%	13,402	103
1994	181,241	1,396	0.77%	7,881	60
1995	188,108	1,442	0.77%	7,252	35
1996	199,580	1,622	0.81%	7,286	43
1997	208,665	1,706	0.82%	7,460	43

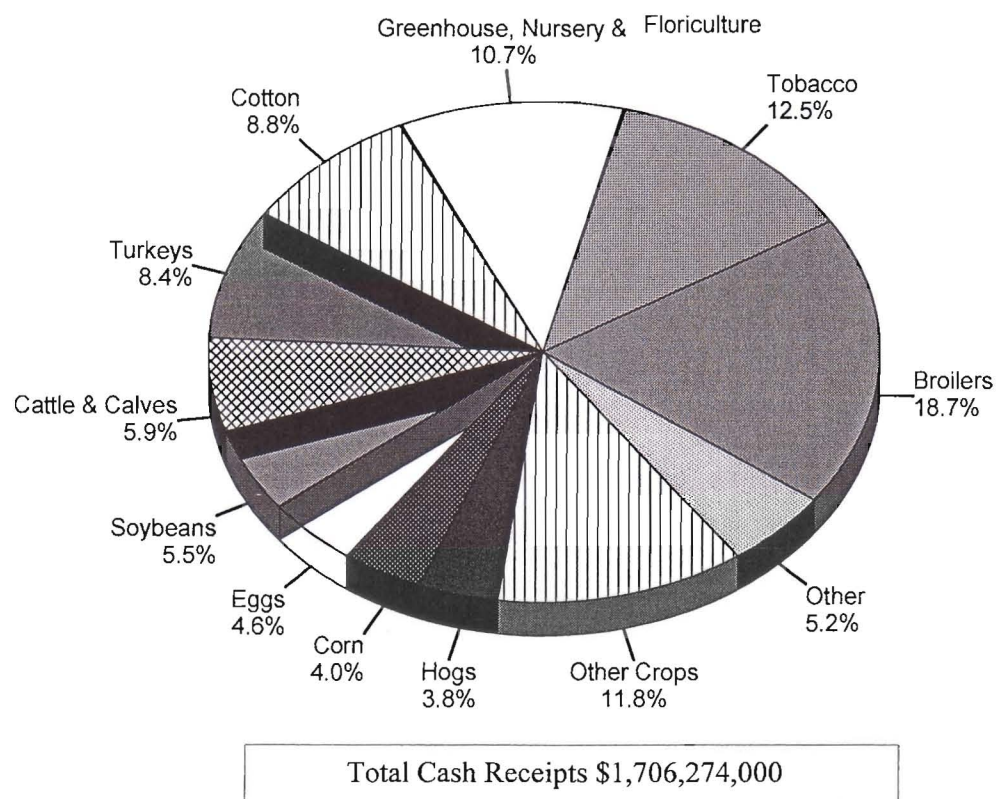SOURCE: Economic Research Service Website. Farm Business Report.

Leading Commodities

South Carolina's top five farm marketings – broilers, tobacco, greenhouse/nursery, cotton, and turkeys – each exceeded $140 million in cash receipts in 1997. Cash receipts from broilers of $319 million represented 40% of S.C. cash receipts from livestock and livestock products. Tobacco's cash receipts of $213 million represented 23.5% of the entire cash receipts from crops in 1997. As shown in Figure 1-4, broilers lead tobacco in terms of growth in cash receipts. Figure 1-5 indicates percent contribution of cash receipts by commodity in 1997.

Figure 1-4. Cash Receipts from Marketing, South Carolina's Top Ten Commodities, 1995-1997

Source: Economic Research Service.

Figure 1-5. Cash Receipts from Farm Marketings: Percent Contribution by Commodity in South Carolina, 1997
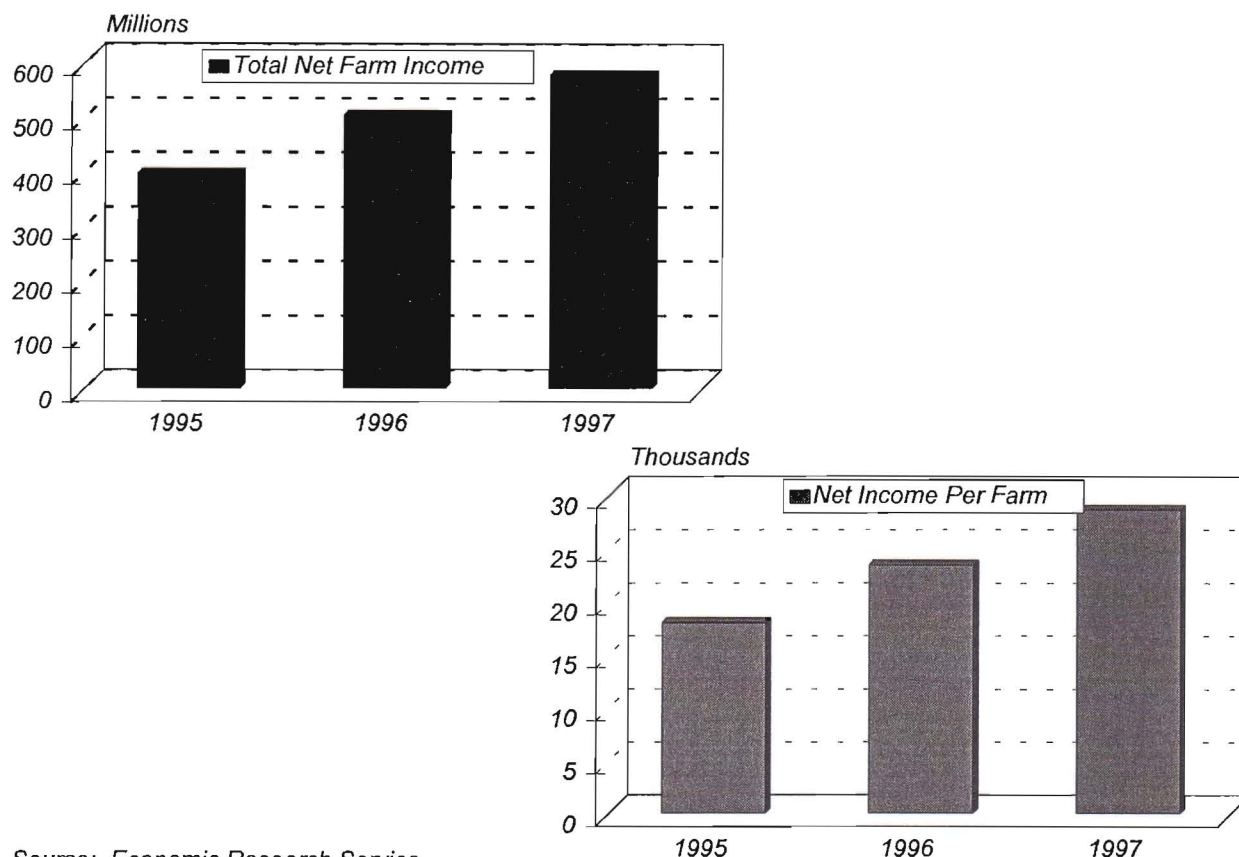

Total Cash Receipts $1,706,274,000

Net Farm Income

South Carolina's net farm income for 1997 was $576.9 million and in 1996 it was $502.9 million. In 1997, the average income per farm was $28,575. Net farm income for 1995, 1996 and 1997 varied from about $395 million to $576 million as shown in Figure 1-6.

Figure 1-6. South Carolina Net Farm Income and Net Farm Income Per Operation, 1995-1997

Millions

```
600
500
400
300
200
100
  0
```
■ Total Net Farm Income

1995   1996   1997

Thousands

```
30
25
20
15
10
 5
 0
```
■ Net Income Per Farm

1995   1996   1997

Source: Economic Research Service.

Leading Agricultural Counties

No single county dominates South Carolina's agricultural production. Four counties -- Orangeburg, Horry, Lexington and Florence -- account for 21% or more of the state's cash receipts from farm marketings. Every county reported at least $1.5 million in total cash receipts from farm marketings in 1997.

Orangeburg County -- the state's agricultural leader -- accounts for 5.6% of the state's cash receipts from farm marketings. It leads the state in the production of corn and oats. Estimates indicate Orangeburg's agriculture produced almost $95 million in cash receipts in 1997.

Table 1-5. South Carolina's Leading Agricultural Counties by Cash Receipts from Farm Marketings: 1997		
Rank	**County**	**Total Receipts (1,000 Dollars)**
1	Orangeburg	94,875
2	Horry	93,931
3	Lexington	88,762
4	Florence	82,755
5	Sumter	80,518
6	Clarendon	79,836
7	Darlington	69,181
8	Dillon	66,974
9	Saluda	64,356
10	Kershaw	63,021
11	Aiken	61,219
12	Williamsburg	56,972
13	Charleston	54,722
14	Spartanburg	52,646
15	Lee	50,806
16	Newberry	47,324
17	Oconee	46,516
18	York	38,015
19	Anderson	37,459
20	Marlboro	36,965
SOURCE: National Agricultural Statistics Service, 1997.	State Total	1,706,274

Figure 1-7. Cash Receipts from Farm Marketings, Five Leading Counties Crops and Livestock and Livestock Products, 1996
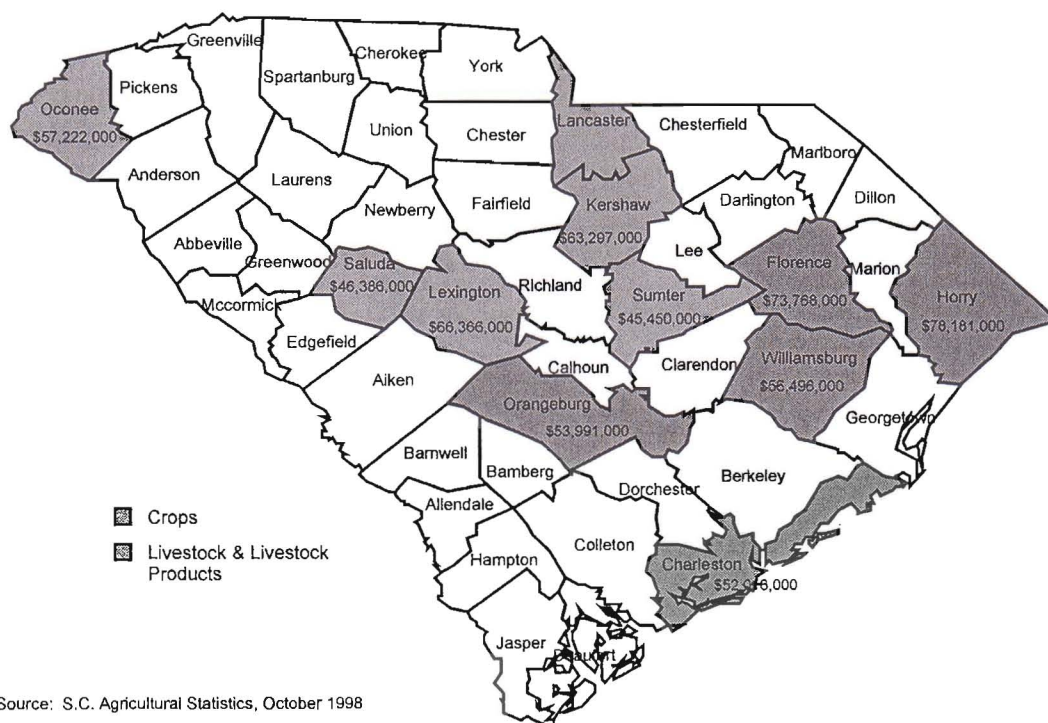
Source: S.C. Agricultural Statistics, October 1998

Agricultural Exports

South Carolina's agricultural exports were about $353.6 million in 1997. This is a 4% increase from 1996. The two leading agricultural exports, tobacco and cotton, account for over one-half of the total export value. Tobacco exports decreased 1.4% from 1996 to 1997. Table 1-6 shows the estimated value of several of South Carolina's agricultural commodities and compares them with estimates for the U.S.

Table 1-6. South Carolina's Agricultural Exports, Estimated Value, 1996 and 1997								
Commodity Group	S.C. Exports (million dollars)		Percent of State's Total Ag. Exports		US Exports (million dollars)		South Carolina as % of US	
	1996	1997	1996	1997	1996	1997	1996	1997
Tobacco unmfd.	122.2	120.5	35.92%	34.08%	1,392.7	1,661.6	8.77%	7.25%
Cotton & Linters	55.1	57.9	16.20%	16.37%	2,658.6	2,441.4	2.07%	2.37%
Poultry & Products	49.4	53.9	14.52%	15.24%	2,727.2	2,832.3	1.81%	1.90%
Soybeans & Products	46.2	52.4	13.58%	14.82%	7,914.5	9,253.6	0.58%	0.57%
Wheat & Products	28.2	43.5	8.29%	12.30%	7,097.4	4,331.1	0.40%	1.00%
Fruits & Preps.	15.9	1.7	4.67%	0.48%	3,315.2	3,418.2	0.48%	0.05%
Live Animals & Meat	7.4	6.7	2.18%	1.89%	5,588.2	4,893.4	0.13%	0.14%
Vegetables & Preps.	4.5	5.4	1.32%	1.53%	3,733.3	4,088.6	0.12%	0.13%
Peanuts & Products	2.7	2.4	0.79%	0.68%	298.3	274.2	0.91%	0.88%
Cottonseed & Products	2.0	2.4	0.59%	0.68%	105.2	110.4	1.90%	2.17%
Seeds	1.5	1.8	0.44%	0.51%	713.9	912.9	0.21%	0.20%
Tree Nuts	0.7	.6	0.21%	0.17%	1,372.4	1,280.0	0.05%	0.05%
Fats, Oils & Greases	.6	.5	0.18%	0.14%	657.7	523.4	0.09%	0.10%
Hides & Skins	.2	.2	0.06%	0.06%	1,677.2	1,693.2	0.01%	0.01%
Other[1]	3.5	3.7	1.03%	1.05%	6,052.3	7,350.9	0.06%	0.05%
Total Ag. Exports	340.2	353.6			59,890.5	57,365.1	0.57%	0.62%

1 Includes Nursery & Greenhouse Products, Confectionery, Oils, Beverages excl. juice, Other misc. animal & vegetables products.
SOURCE: Foreign Agricultural Trade of the United States Website, www.econ.ag.gov.

Farm Size and Number

The amount of land in farms in South Carolina reached its zenith in 1950 with 12.2 million acres. Acreage has been steadily declining since that time, with 1997 total acreage only 38% of the 1950 acreage. Average farm size, however, has greatly increased since 1950, with the average farm size now over 2.7 times the 1950 average of 83 acres. The number of farms has also been steadily declining in South Carolina since its peak in 1945. All of these trends are consistent with the rest of the U.S. Table 1-7 shows this trend from 1950 to 1997. In 1997, over half of the total farms in S.C. were less than 100 acres and 22% were 100-219 acres (see Figure 1-8).

Table 1-7. Farm Acreage, Number and Size, U.S. and South Carolina

	United States			S.C.		
		Land in			Land in	
	Number	Farms	Average	Number	Farms	Average
Year	of farms	(1000 acres)	size (acres)	of farms	(1000 acres)	size (acres)
1950	5,648,000	1,202,000	213	147,000	12,200	83
1955	4,654,000	1,202,000	258	115,000	11,500	100
1960	3,955,000	1,171,000	296	86,000	10,000	116
1965	3,351,000	1,135,000	339	65,000	9,100	140
1970	2,944,000	1,098,000	373	52,000	8,300	160
1975	2,314,013	1,017,030	440	37,000	6,800	184
1980	2,439,510	1,038,885	426	34,000	6,400	188
1985	2,292,530	1,012,073	441	27,500	5,500	200
1990	2,143,150	987,721	461	24,500	5,200	212
1995	2,071,520	972,253	469	22,000	5,050	230
1996	2,063,910	970,048	470	21,500	5,000	233
1997	2,058,910	968,338	470	21,500	5,000	233
1997	1,911,859	931,795	487	20,189	4,593	228

SOURCE: USDA

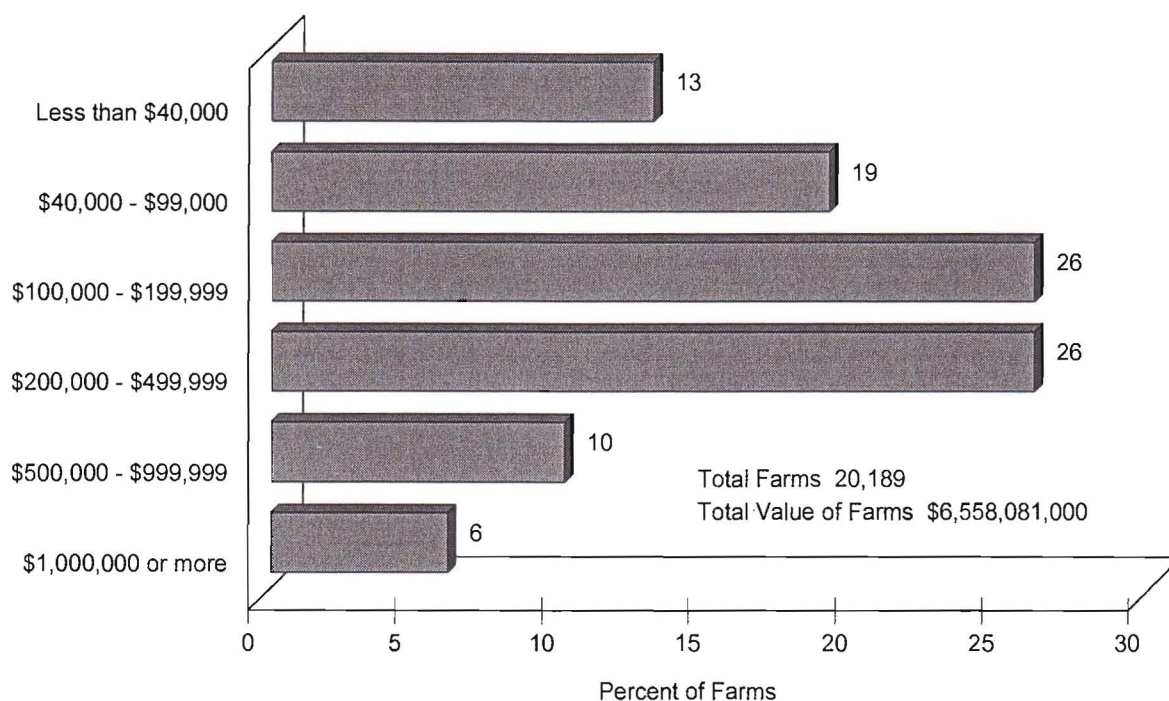## Figure 1-8. South Carolina Farms by Size of Farm, 1997
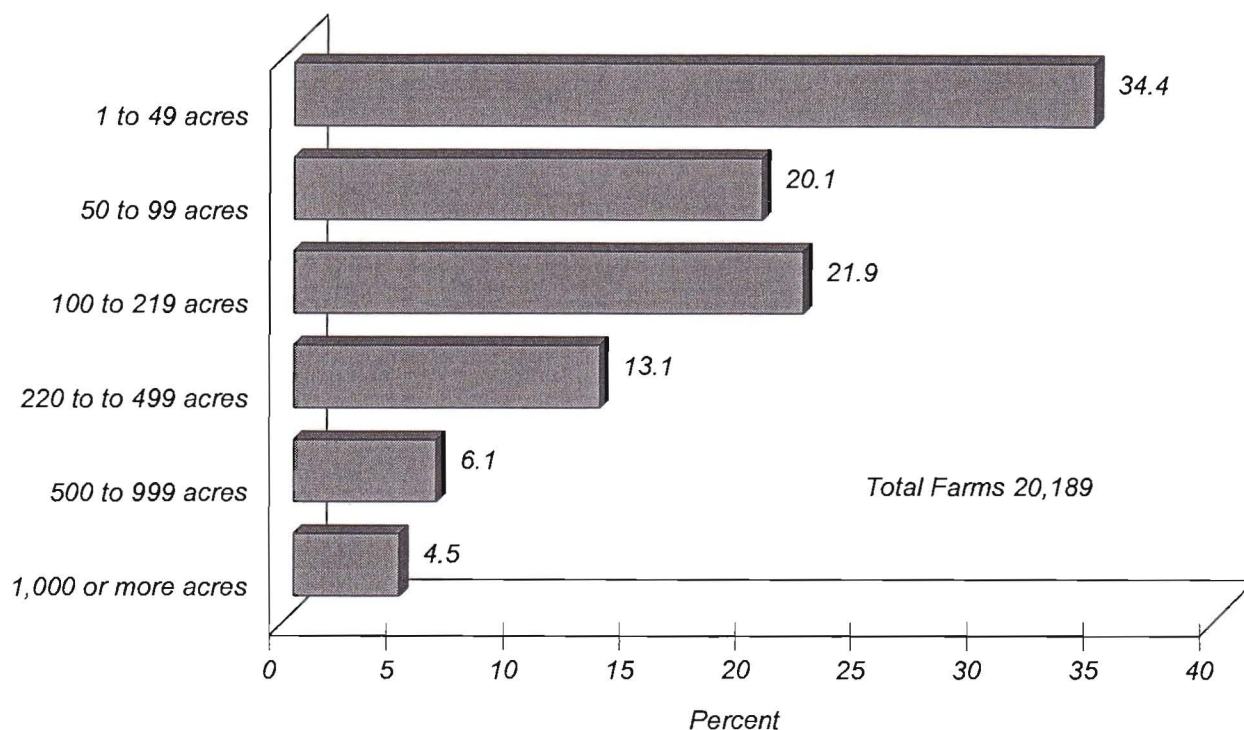
Source: U.S. Bureau of the Census, Census of Agriculture, 1997.

Value of Land and Buildings

The average value of land and buildings per farm and per acre in South Carolina has been steadily rising since 1950. While the per farm average is well below the U.S. average, the per acre value is 59% greater than that of the U.S. Table 1-8 shows trends for the U.S. and South Carolina in average value of land and buildings in farming.

Over 45% of all South Carolina farms had a value of land and buildings ranging in value from $40,000 to $199,999 in 1997 as shown in Figure 1-9.

Figure 1-9. South Carolina Farms by Value of Land and Buildings, 1997

Source: U.S. Bureau of the Census, Census of Agriculture, 1997.

Table 1-8. Value of Land and Buildings, U.S. and South Carolina

	United States			South Carolina		
Year	Total Value $1,000,000	Average Value per farm	Average Value per acre	Total Value $1,000,000	Average Value per farm	Average Value per acre, Dollars
1950	77,600	13,700	65	842	5,700	69
1955	102,216	22,000	85	1,022	8,900	89
1960	136,771	34,600	117	1,367	15,900	137
1965	166,980	49,800	147	1,613	24,800	177
1970	215,042	73,000	196	2,166	41,700	261
1975	358,640	142,500	340	3,176	85,800	467
1980	763,285	314,400	737	5,760	169,400	900
1985	689,807	296,379	679	5,036	179,900	899
1990	671,419	313,668	683	5,257	210,288	1,011
1995	807,017	390,581	832	6,749	306,795	1,337
1996	859,711	417,761	890	6,816	317,038	1,363
1997*	859,839	449,748	933	6,558	324,834	1,482

* 1997 Census of Agriculture.
SOURCE: USDA.

Both South Carolina and the U.S. experienced a period of decreasing farm real estate values in the 1980's. South Carolina seems to be rebounding from this downturn in both nominal and deflated dollars in the 1990's. Table 1-9 and Figures 1-10 and 1-11 illustrate land and building values for both the U.S. and South Carolina. S.C. continues to be substantially above the U.S. average in value of land and buildings per acre of farmland.

	UNITED STATES		SOUTH CAROLINA	
Year	Nominal Dollars	Deflated Dollars*	Nominal Dollars	Deflated Dollars*
1960	117	503	137	589
1970	196	643	261	856
1980	737	1,222	900	1,492
1990	683	730	1,011	1,080
1995	832	772	1,337	1,241
1997	945	841	1,482	1,319

Table 1-9. Average Value Per Acre of Land and Buildings, U.S. and South Carolina

*Deflated by Gross Domestic Product implicit price deflator, 1992=100.
SOURCE: USDA, and Economic Report to the President, February 1998.

Figure 1-10. South Carolina and U.S. Average Value of Land and Buildings per Acre, Nominal Dollars, Selected Years
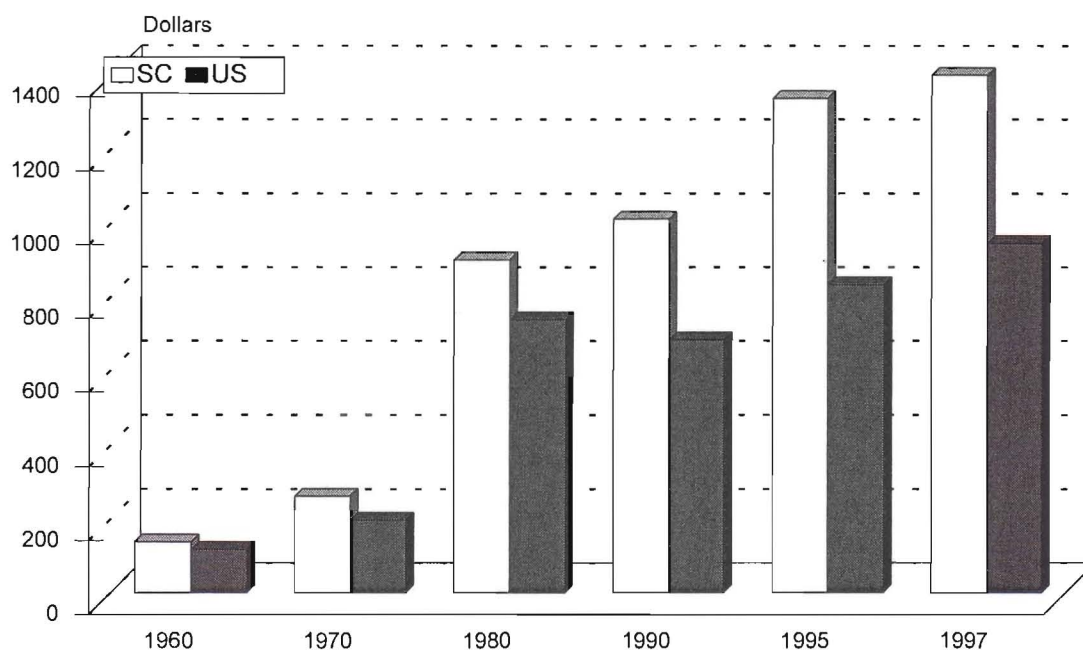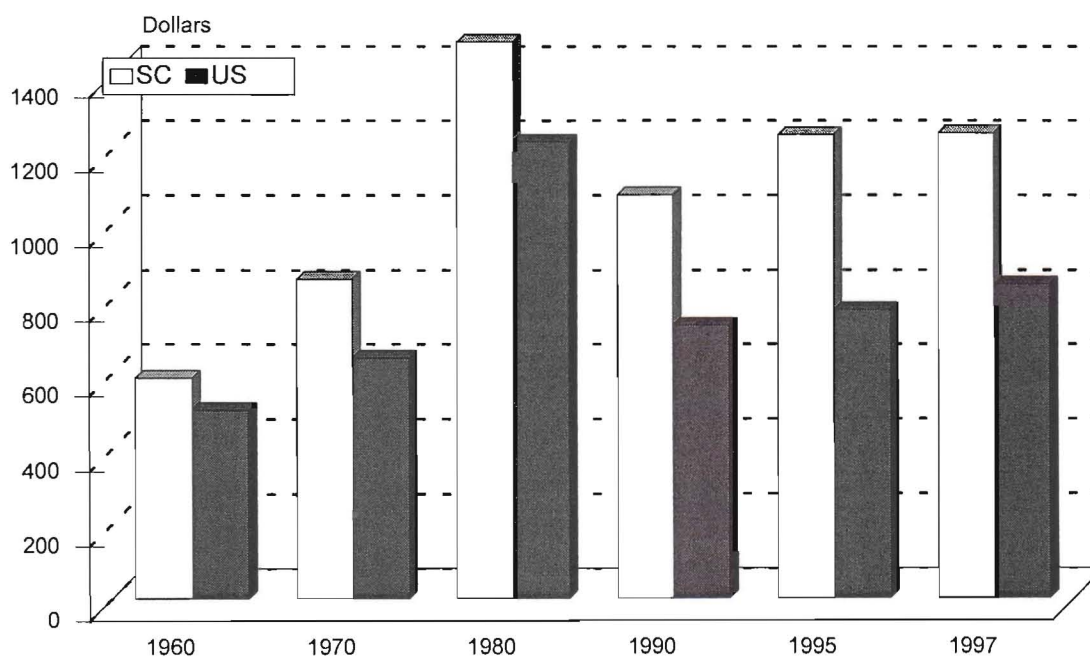

Figure 1-11. South Carolina and U.S. Average Value of Land and Buildings per Acre, Deflated Dollars, Selected Years

Source: USDA and Economic Report to the President, February 1998.
Deflated by the Gross Domestic Product implicit price deflator, 1992=100.

Assets

South Carolina's farm assets totaled $7.8 billion on December 31, 1997. That is an average per farm of $386,000 of total assets. Real estate accounts for 76% of total assets, with the rest in livestock and poultry, machinery and equipment, crops, purchased inputs, and financial assets. Table 1-10 gives a detailed account of the asset section of the balance sheet for South Carolina and the U.S.

The debt-to-asset ratio of 11.9% for South Carolina is over three percentage points below the U.S. debt-to-asset ratio (See Table 1-11). This means that South Carolina farmers have fewer debts relative to their assets compared to other farmers in the U.S.

Table 1-10. Value of Farm Business Assets, South Carolina and U.S., Dec. 31, 1997

	SOUTH CAROLINA $ Thousands	UNITED STATES $ Thousands
Real Estate	5,960,307	849,240,923
Non-real Estate		
Livestock & Poultry	294,510	66,771,124
Machinery & Equipment	629,590	88,083,749
Crops	110,637	29,903,389
Purchased Inputs	25,120	5,112,590
Financial Assets	860,833	49,729,776
Total Assets	**7,880,997**	**1,088,841,551**

SOURCE: U.S. Department of Agriculture, Economic Research Service.

Table 1-11. South Carolina and U.S. Farm Balance Sheet, Dec. 31, 1997		
	SOUTH CAROLINA $ Thousands	UNITED STATES $ Thousands
Assets		
Real Estate	5,960,307	849,240,923
Non-real Estate	1,920,690	239,600,628
Total	7,880,997	1,088,841,551
Debt		
Real Estate	398,025	85,359,386
Non-real Estate	539,108	80,054,108
Total	937,131	165,413,494
Equity (assets minus debt)	6,943,866	923,428,057
Debt to asset ratio (percent)	11.9%	15.2%

SOURCE: U.S. Department of Agriculture, Economic Research Service.

In both South Carolina and the U.S., farms seem to be shifting away from individual or family ownership and changing to corporate ownership. However, the vast majority of S.C. farms (89.5%) are still individually or family owned. Table 1-12 and Figure 1-12 indicate the number of farms by type of ownership for both South Carolina and the U.S. for census years from 1978 to 1997.

Corporate farms in South Carolina increased by 33% in the period from 1987 to 1997. Table 1-12 and Figure 1-12 show the number of corporate farms in both South Carolina and the U.S. from 1982 to 1997.

Table 1-12. Type of Organization and Percentage of Total Land Operated by Each Type, All Farms, U.S. and South Carolina

Year	Individual or Family	Partnership	Corporation	Other*	Total	Individual or Family	Partnership	Corporation	Other*
			Number of farms				Percent of total		
United States									
1978	1,965,860	232,538	50,231	9,146	2,257,775	87.1%	10.3%	2.2%	0.4%
1982	1,945,639	223,274	59,792	12,271	2,240,976	86.8%	10.0%	2.7%	0.5%
1987	1,809,324	199,559	66,969	11,907	2,087,759	86.7%	9.6%	3.2%	0.6%
1992	1,653,491	186,806	72,567	12,436	1,925,300	85.9%	9.7%	3.8%	0.6%
1997	1,643,424	169,462	84,002	14,791	1,911,859	85.9%	8.9%	4.4%	0.8%
South Carolina									
1978	30,135	2,647	453	177	33,412	90.2%	7.9%	1.4%	0.5%
1982	22,297	2,078	417	124	24,916	89.5%	8.3%	1.7%	0.5%
1987	18,337	1,583	488	109	20,517	89.4%	7.7%	2.4%	0.5%
1992	17,933	1,621	547	141	20,242	88.6%	8.0%	2.7%	0.7%
1997	18,078	1,337	649	125	20,189	89.5%	6.6%	3.2%	0.6%

*Other includes farms operated by cooperatives, estates or trusts, and institutions.
SOURCE: U.S. Bureau of the Census, Census of Agriculture.

Figure 1-12. South Carolina Farms by Type of Organization, 1997
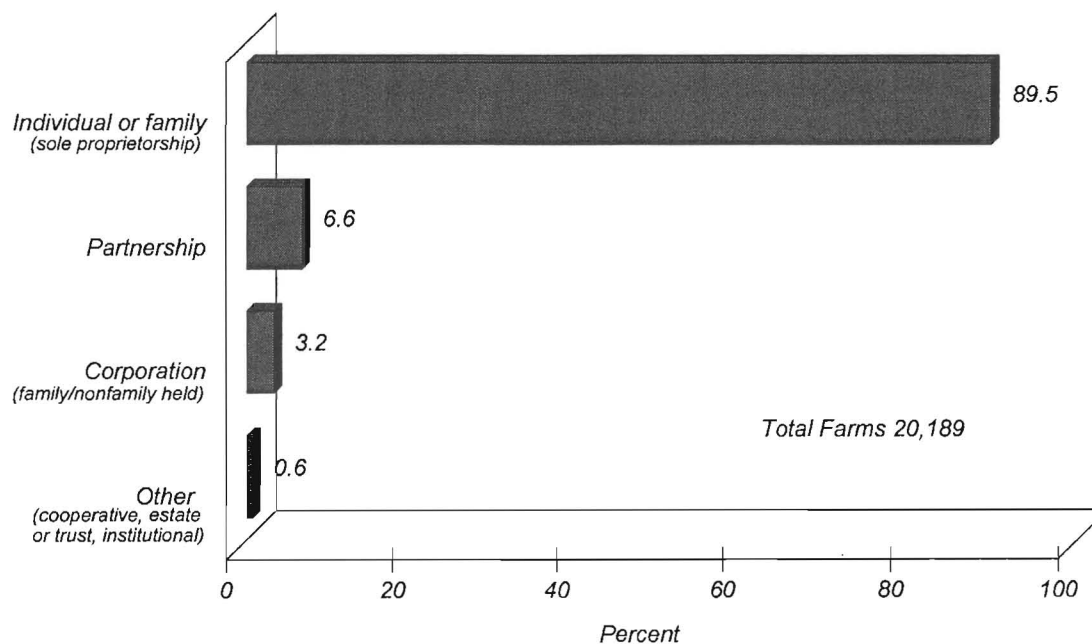
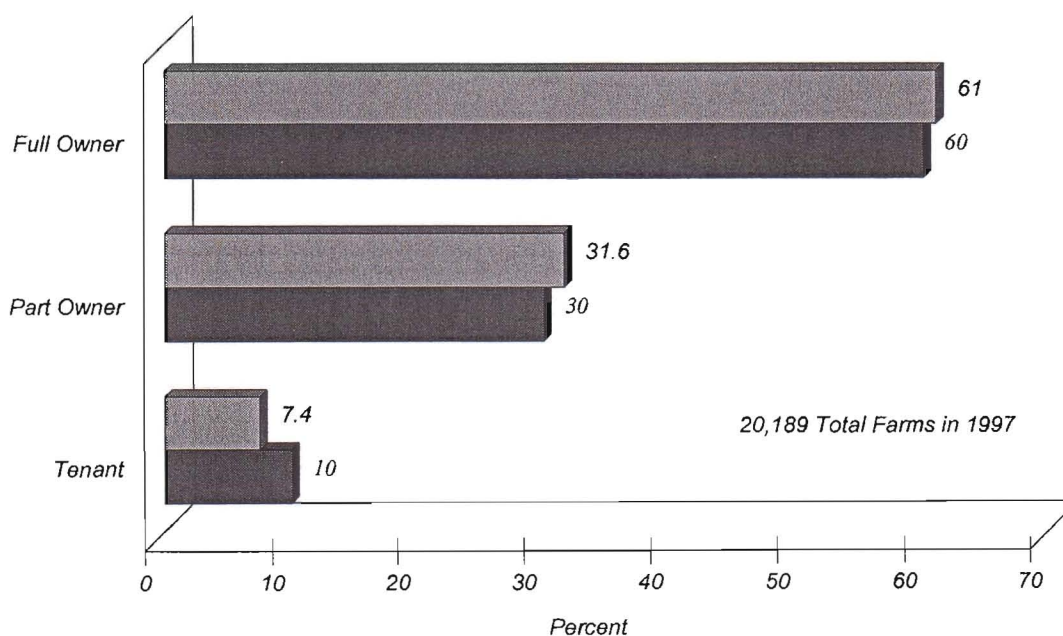Source: U.S. Bureau of the Census, Census of Agriculture, 1997.

The percentage of farm operators in South Carolina that are full owners increased by over 10% from 1974 to 1997. Of the state's 20,189 farmers, 13,016 were full owners, 5,921 were part owners, and 1,252 were tenants. Table 1-13 lists the tenure of farm operators for both South Carolina and the U.S. for census years from 1978 to 1997.

Table 1-13. Tenure of Farm Operators, U.S. and South Carolina, Farms							
					Percentage distribution		
	All farm Operators	Full owners	Part owners	Tenants	Full owners	Part owners	Tenants
UNITED STATES							
1978	2,257,775	1,297,902	681,112	278,761	57.5%	30.2%	12.3%
1982	2,240,976	1,325,773	656,249	258,954	59.2%	29.3%	11.6%
1987	2,087,759	1,238,547	609,012	240,200	59.3%	29.2%	11.5%
1992	1,925,300	1,111,738	596,657	216,905	57.7%	31.0%	11.3%
1997	1,911,859	1,146,891	573,839	191,129	60.0%	30.0%	10.0%
SOUTH CAROLINA							
1978	33,412	19,339	10,165	3,908	57.9%	30.4%	11.7%
1982	24,916	14,746	8,010	2,160	59.2%	32.1%	8.7%
1987	20,517	12,624	6,433	1,460	61.5%	31.4%	7.1%
1992	20,242	12,340	6,407	1,495	61.0%	31.7%	7.4%
1997	20,189	13,016	5,921	1,252	64.5%	29.2%	6.2%
SOURCE: U.S. Bureau of the Census, Census of Agriculture.							

Figure 1-13. South Carolina Farms by Tenure, 1992 and 1997

Source: U.S. Bureau of the Census, Census of Agriculture, 1997.

Chapter 2
Statewide Farm and Farm-Related Employment

Farm and Farm-Related Employment

South Carolina's farms hired 8,500 employees for more than 150 days and 23,890 employees for less than 150 days in 1997. Farm employment has been steadily decreasing across the U.S. over the past several decades from improved technology and rising off-farm wage rates relative to farm earnings.

Farm-related employment includes agricultural services, food manufacturing, and agricultural chemicals manufacturing. The total number of employees in agricultural related industries increased 64% from 1977 to 1996. In 1996, the food manufacturing sector employed the largest number of any of the farm related employment sectors with nearly 16,000 employees and a payroll of over $356 million in 1996. Recent estimates show food processing employment rising to 17,600 in 1996 and 18,300 in September, 1997 (S.C. Employment Security Commission Labor Market Information). Table 2-1 lists the farm-related employment in South Carolina for selected years.
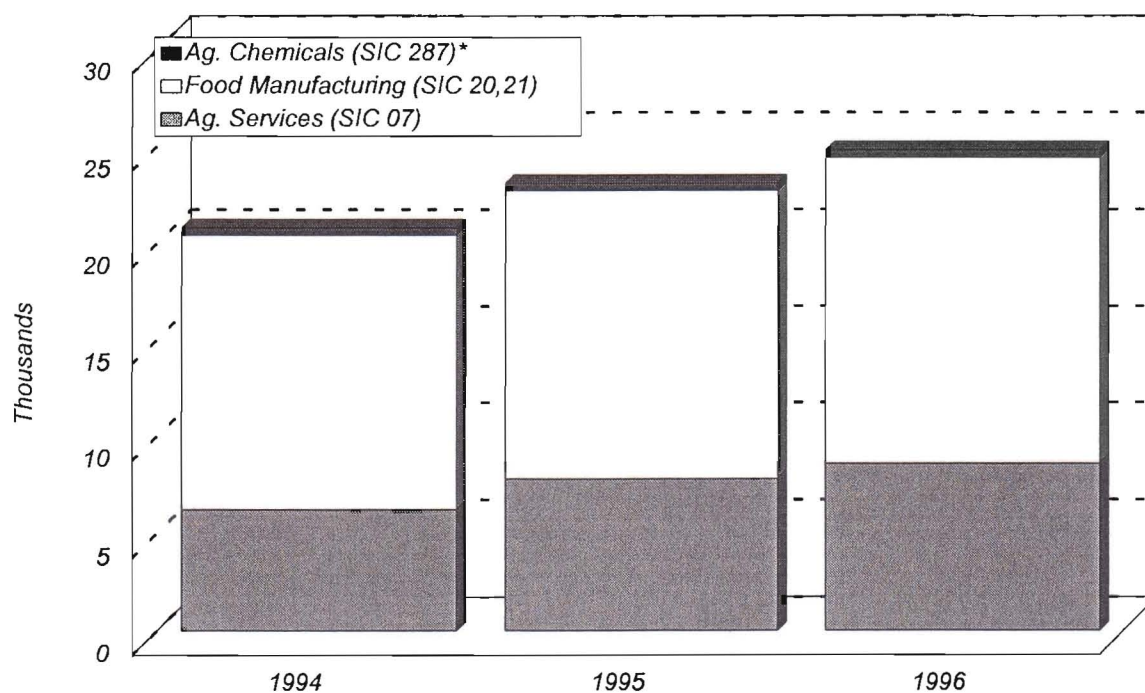
Table 2-1. South Carolina Farm-Related Employment Trends						
	1977	1982	1987	1993	1995	1996
Agricultural Services(07)						
Number of Employees	2,388	2,934	4,550	6,722	7,765	8,550
Payroll ($1,000)	17,346	26,363	57,041	97,011	119,605	135,948
Number of Firms	461	499	861	1,339	1,443	1,540
Food Manufacturers(20)						
Number of Employees	12,091	12,773	14,264	13,991	14,925	15,844
Payroll ($1,000)	114,306	167,472	244,059	295,941	329,107	356,217
Number of Firms	216	185	171	159	152	155
Agricultural Chemicals(287)						
Number of Employees*	587	439	E	E	E	E
Payroll ($1,000)	D	D	D	D	D	D
Number of Firms	33	20	13	15	23	22
Total Farm-Related Employment						
Number of Employees	15,066	16,146	19,189	21,088	23,065	24,769
% of Total	1.79%	1.68%	1.72%	1.61%	1.65%	1.73%
Payroll ($1,000)*	136,999	199,430	301,100	392,952	448,712	492,165
Number of Firms	710	704	1,045	1,513	1,618	1,717

E ranges from 250 to 499 employees, midpoint of 375 used for computing total farm employment. D denotes withheld to avoid disclosing data for individual companies. Data included in broader industry totals.

* Payroll for 1987, 1993, 1995, 1996 includes no amount for Ag Chem.-Mfg.

SOURCE: U.S. Bureau of the Census, County Business Patterns.

Figure 2-1. South Carolina Farm-Related Employment, 1994, 1995, and 1996

Ag. Chemicals (SIC 287)*
Food Manufacturing (SIC 20,21)
Ag. Services (SIC 07)

Thousands

30
25
20
15
10
5
0

1994   1995   1996

* Ag Chemicals are reported as an employment class from 250-499. Actual employment not disclosed.
An average of the class, 375, used for chart.

Source: U.S. Department of Commerce, Bureau of the Census, County Business Patterns.

Chapter 3
The Food, Fiber and Forestry System, 1996

Introduction

To make estimates of the impacts of selected industry groups on the state economy requires an accounting system that incorporates all sectors of the economy and tracks interindustry linkages. The interindustry accounting system we use allows the estimation of the linked or "multiplier" contributions that the food, fiber and forestry industries have on the rest of the South Carolina economy. By adding the "direct" contributions of food, fiber and forestry industries to these "indirect" or linked impacts, we document the total contribution of the FFF system to the South Carolina economy (See Henry, 1997 for details on the methods used).

A two step accounting process is used. First, the deliveries to final demand (final product or services) are identified by sectors that make up the FFF. Second, the total support from all other state sectors that is needed to make these final demand deliveries possible is estimated through the state input-output linkage coefficients. This is the well known "multiplier approach" that counts the activities of the backward linked sectors needed to allow the FFF sectors to make deliveries to final demand.

The Food, Fiber and Forestry Industry Groups

The FFF related sectors include two major subgroups -- the food and fiber system and forestry. While food and fiber system (FFS) accounting has been the subject of analysis for years, the forestry accounts are not well developed. In this report, the forestry sectors are identified and the state economic activity from each is estimated.

<u>The Food and Fiber System (FFS).</u> The FFS concept has its roots in the food and fiber system work of Davis and Goldberg (1957). Further refined by Schluter, Lee and Edmonson (1986), economists at USDA's Economic Research Service (ERS), the food and fiber system is an accounting of economic activities that are needed to bring food and fiber products to the final consumer. These industries include farming, food processing (SIC 20), fiber processing (SIC's 22 and 23, selected subsectors) and food distribution through retail establishments (SIC's 54 and 58).[i]

Food, Fiber and Forestry in South Carolina. In addition to the food and fiber system, the activities of foresters and the downstream production (pulp, wood and paper products) are included to form the food, fiber and forestry (FFF) system for South Carolina.[ii] In part, the inclusion of forestry based activities reflects the role that tree farms and timber tracts play in the set of production options open to farmers in South Carolina. Production and natural resource use issues facing foresters, as well as farmers, are of keen interest to researchers and extension agents in South Carolina.

Aggregate Results

As shown in Table 3.1, in 1996 the FFF industries directly accounted for about 398,000 jobs, $31 billion in gross sales, and $12 billion in income *(note that income is measured as value added which is found as gross sales -- cost of purchased supplies and services).* If the stimulus that food, fiber, and forestry provides to production in linked industries is counted, then the total economic impact of the food, fiber and forestry system on South Carolina increases to 23% of the jobs and gross sales and 19% of the income (value added).

Farming and Forestry. Traditional on-farm activities account for about $2.1 billion in total sales, one million in value added and some 43,192 jobs.[iii] Forestry includes timber tracts and tree farms. It results in $645 million in gross sales, $336 million in value added, and about 1,560 direct jobs. Note that logging camps and sawmills are included below in the processing phase of forestry based activities.[iv]

Food, Fiber and Wood Processing. Processing farm goods contributed about $3.6 billion in gross output, $794 million in value added and 18,134 jobs to the South Carolina economy. (Sum for sectors 58 through 107 in IMPLAN). Processing cotton and synthetic fibers added about $12.0 billion in gross output, $3.97 billion in value added and 109,100 jobs to the South Carolina economy.

Retail distribution of food products. The marketing chain of food products includes two sectors: food stores and eating and drinking places. Together, these two sectors had gross output (retail markup for food stores - not actual sales volume) in 1996 of about $5.8 billion, value added was about $3.5 billion while employment was 191,434 in 1996.[v]

Multiplier effects. The FFF multiplier effects include the activities that are involved in supplying inputs to farmers, foresters, and fisheries (initial backward links) and other activities providing materials and services to these "initial input suppliers" to the FFF (second and subsequent rounds of the

multiplier effect). In this report, it is important to note that these backward links (*the indirect row in Table 3.1*) are all outside the FFF. For example, the SC supply of raw farm products to South Carolina food processors is not counted as a backward link since it is already included in the activity of one of the components of the FFF, Farming. This differs from traditional multiplier analysis that would count this link as part of the backward links for the food processing industry. Since the accounting is done for a system of industries in the FFF, only those backward links outside the FFF set of industries can be counted. [vi]

For 1996, total gross output resulting from FFF activities was $35.7 billion -- about 22% of the state total. To produce this output required 460,300 full and part-time employees including 398,400 direct FFF jobs and 61,900 non-FFF system backward linked jobs. Total value added attributable to the FFF activities in SC was $15.1 billion -- $12 billion directly by the FFF industries and $3.1 billion of valued added in other backward linked industries.

Table 3-1. Contributions of the FFF, 1996			
Sector	Income $ billion	Jobs 1,000	Sales $ billion
DIRECT: PRODUCERS: (Farmers & Foresters)	$1.3	44.8	$2.8
PROCESSORS: (Food, Wood/Paper & Textiles)	$7.2	162.3	$22.4
RETAILERS: (Food Stores & Eating Places)	$3.5	191.4	$5.8
TOTAL DIRECT FFF	$12.0	398.4	$31.1
TOTAL INDIRECT TO FFF (SC inputs to FFF)	$3.1	61.9	$4.6
FFF TOTAL	$15.1	460.3	$35.7
SC TOTAL	$86.5	2,081.2	$161.4
FFF% OF SC	17.5%	22.1%	22.1%

Source: Calculated by authors using IMPLAN.

Leading industries providing full and part time jobs within the food, fiber and forestry System in South Carolina industries are listed in Table 3-2. These do not count the backward linked or "multiplier" effects from the FFF system.

Table 3-2. Direct Jobs in the Food, Fiber and Forestry System , 1996	
	Jobs
PRODUCERS of raw materials:	47,750
Farming/forestry (crops, livestock, turf, aquaculture, ornamentals, tree farms and timber tracts)	
(note: Logging camps and Sawmills included in Wood Processing)	
PROCESSORS of raw materials:	
(SC and imported raw materials)	
Food Processing (Meat packing, poultry processing, fluid milk, grain mill and bakery products)	18,134
Fiber processing (Fabric, knit, yarn and thread mills, other textile and apparel products)	109,109
Wood processing (Logging camps, sawmills, millwork, veneer and	35,009
plywood, Wood furniture, paper and paperboard mills and other wood and paper products)	
RETAILERS of processed goods:	191,434
(SC and imported processed food)	
Food Stores and eating places	
Total	398,436
Source: Calculated by authors using IMPLAN.	

Endnotes

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i. The contribution of the food and fiber system to the U.S. economy is reported in the *Statistical Abstract of the U.S.* For the United States, the food and fiber system (FFS) accounted for about 23 million employees in 1995. This number has varied little over the past decade. As a share of total civilian employment, the FFS accounted for about 17% of the U.S. Total in 1995. This share has declined from about 22% in 1980. Thus, while total employment has been stable, other sectors (services in particular) have been growing. Analysis of the manufacturing sector indicates a similar trend -- stable employment but a falling share as the U.S. continues to move toward a larger role for service employment in its labor market structure. For the United States, the food and fiber System (FFS) accounted for about $980 billion in value added (income) in 1995. Like employment and despite substantial growth in FFS value added, the FFS share of U.S. total value added has declined from about 19% in 1980 to about 14% in 1995. Finally, value added has increased in real terms while employment has been stable in the FFS. This indicates that productivity of farmers has been rising during the past decade -- partly because of continued improvements in technology and management practices. The result for the economy is increased availability of labor for non-FFS activity.

ii. The Input-Output (IO) accounting system used for measuring the FFF in this report is based on the IMPLAN (1997) accounting system.

iii. These estimates are obtained by summing over IMPLAN sectors 1 - 21, 23, and 25-27 as shown in Henry, 1997.

iv. Forestry includes IMPLAN sectors 22 and 24.

v. Retailing includes IMPLAN Sectors 450 and 454. Total sales are the total value for the trade mark-up, not gross sales volume.

vi. Three steps are needed to estimate these indirect effects using the IMPLAN data base and model. First, the sales by each sector to final users (Household consumption, Investment, Government purchases of good and services, and Exports) is calculated for each sector. In IMPLAN,

these final demand components include Personal Consumption Expenditures (PCE) by low, middle and high income groups. Next are expenditures by Government: Federal Defense, Federal non defense, State and Local Noneducation and State and Local Education. These are followed by capital spending (K), inventory accumulation, and exports. Note that Domestic exports are on a commodity basis but that this distinction is of little importance at the level of aggregation in this model. More disaggregated models would require that commodity exports be converted to their industry counterparts by use of the make matrix for South Carolina. The supply/demand pool option for estimating trade flows was used as it generated the set of multipliers and final demands that were consistent with state totals for output, valued added and employment. The Regional Purchase Coefficient option did not yield Final demand based estimates consistent with state totals.

Second, Type 1 gross output multipliers are derived from the column sums of the open Leontief inverse matrix. Multiplication of total final demand for each of the FFF sectors by their corresponding multiplier yields the implied total gross output or sales associated with the FFF final demand deliveries.

Third, the total backward linkage effects from step 2 are adjusted to eliminate double counting of *within FFF system* input usage (e.g., the use of farm products in food processing). This adjustment is made by finding the difference between the sum of Total Industry Output that is final demand driven by FFF industries (as shown in step 2) and the sum of Total Industry Output over all FFF industries (which includes within FFF sales like hogs to meat packers). The difference represents use of inputs like fuel, utilities, business services, etc. needed to make final demand deliveries than come from industries outside the set defined as the food, fiber and forestry system. These non-FFF system inputs come from establishments located in SC so impact the state economy as indirect non-FFF system activities needed by the FFF system.

For example, to support the final demand sales (mainly exports outside SC) at the Farm level of $366 million required $133 million in supporting backward linkages in 1994. However, the non-final demand sales by South Carolina Farmers to South Carolina food processors also requires

some backward linkages. These are counted when Food Processing makes a sale to final demand since this will require farm inputs and thus more non FFF backward links for farmers. Recall that the inside system in this report are all the industries in the FFF categories. Since the sales of these FFF industries is known, the problem is to isolate the non FFF system links. The difference between the final demand based TIO across all FFF industries and the known TIO by the FFF industries yields the aggregate non FFF backward links in the economy.

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