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COMPETITION IN MARKETS FOR FRUITS AND VEGETABLES

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The fresh fruit and vegetable industry is among the largest and fastest growing agricultural industries in the U.S. In 1981, over five million acres of land in the U.S. was utilized in the production of over 42 million metric tons of fresh produce, producing an on-farm value of approximately \$10 billion (1).

During the 1975-1977 period, the United States per capita consumption of fresh vegetables was estimated at 102 pounds, an increase of 3.1% over the 1970-1972 period. Fresh fruit per capita consumption increased from 73.8 pounds in 1973 to 81.4 pounds in 1982. During the 1981-1982 period, 43% of the U.S. vegetable acreage went to the fresh market, accounting for 76% of the total farm value. Combined production in the nine Southeastern and four Western states accounted for nearly three-fourths of the produce grown in the U.S. in 1981, up 17% from 1975. Between 1973 and 1982, the production of vegetable crops in the Southeast increased 17% (2).

This paper focuses on interregional and international competition in fruits and vegetables with emphasis on the competitive position of Southeastern production. Regional production and shipment patterns for fruits and vegetables are examined.

Florida dominates the fruit and vegetable industry of the Southeast. Excluding Florida, the Southeast plays a minor role in national markets. Although the Southeast has climate constraints, fruit and vegetable production has the potential to expand in both fresh and processing markets due to adequate water resources, transportation facilities, excellent location with respect to growth markets, and increasing demand from nutritionally conscience consumers. However, the region continues to seasonally import a large proportion of its fresh produce from other states. Long distance shipping of fresh produce results in high retail prices due to refrigerated transportation expenses and significant quality deterioration of the product (averaging 25% for some commodities). Vegetable and fruit production could also be increased by expanding the processing industry.

PRODUCT QUALITY IN INTERREGIONAL COMPETITION

Poor product quality in consort with low yields is a deterrent to increasing production in the Southeast. Growers are dissatisfied

with the existing procedure of paying transportation costs before the shipment is accepted by the processor. Further, bulk load acceptance decisions are inconsistent and processors face production delays and unnecessary expenses when lots are delivered with unacceptable quality.

Unpredictable and inferior product appears to limit expansion of intrastate sales of many fresh commodities that can be grown in the region. Wholesalers and brokerage firms cite short shelf life of produce grown in Georgia. Most product deterioration occurs during postharvest handling operations. According to extension and research personnel, the reasons for the Southeast's poor reputation include; 1) the use of cultivars that have superior quality in the field but do not ship well, 2) harvesting at or after the peak of quality has been achieved, 3) lack of control during postharvest handling, and 4) lack of unit packaging prior to wholesale produce marketing. As a result, only 3% of the fresh produce handled at the Atlanta, Georgia Terminal Market. However, most of the non-Georgia source arrivals occur during seasons when Georgia is not producing.

California is the major source of fruit and vegetable shipments for the United States and Canada (table 1). The Southeast, excluding Florida, ships a smaller volume of fruits and vegetables than any other region except the North Central. However, including Florida the Southeast shipments are second to California. Including Florida, the Southeast ships 15% of the U.S. total; 22% of the fruits and 12% of the vegetables.

One reason for California's dominance, beyond yield advantage and long growing season, is that the State of California has successfully administered standards for the postharvest quality of a wide range of fruits, nuts and vegetables. The program includes commodity inspection manuals to describe specific procedures for use by third party inspectors at approved inspection stations located throughout the state. The credibility of the standards program is enhanced through mutual grower and processor agreement on quality factors, measurement methods, and acceptance limits prior to the production season. Florida also has an extensive agricultural inspection program that ensures consistent quality.

CONCENTRATION IN FRUIT AND VEGETABLE PRODUCTION

The pattern of interregional competition remained fairly stable over the 1977-1983 period (table 2). The ability of Southeastern producers to compete in targeted markets is adversely affected by a combination of low yields and low quality. The pattern of interregional competition is dominated in the winter and early spring by shipments of commodities from Florida, with south Texas and Mexico also shipping substantial quantities. By summer, California dominates shipments to all markets especially in fruits and melons.

Vegetable production is concentrated in a few states. Arizona, California, Florida, Michigan, Minnesota, New York, Oregon, Texas, Washington, and Wisconsin, account for over 75% of all vegetable and melon production. Although more dispersed, fruit production is also concentrated in a few states. Production for processing has also become fairly concentrated, with most processing occurring in California, the Northwest and the Great Lakes areas.

Regional value and volume of production in 1983 for fruits and vegetables are shown in tables 3 and 4, respectively (3). For purposes of this paper, California, Florida and Texas are treated as regions. The rest of the country is divided into the Northwest, West, East, Lake, Southeast and North Central regions (4).

Fruit and nut crops in California in 1983 were down in production from 1982, however total bearing acreage was the largest on record. Grapes represented over 35% of the value of production in this category. Citrus fruits represent 24% of the value of fruit and nut production. Almonds, the largest nut crop, contributed about 10% of the value of fruit and nut production. The 1983 vegetable crop was a record in value and was up 2.3% from 1982, although volume was down. Commodities with the largest increase in value were lettuce, celery, mushrooms, cauliflower, and carrots. Seasonality of production in California varies between areas of the state. Due to the climate in California, and the use of irrigation, crops such as broccoli, carrots, cauliflower, lettuce, potatoes, and lemons are harvested year around. Other crops may be harvested six or seven months of the year. Most products are stored and shipped the year around.

Apples account for 63% of the value of fruit and nuts in the Northwest Region followed by sweet cherries 13%, and pears other than bartlets 8%. Potato production is concentrated in southcentral and eastern Idaho and the east central region of Washington. Eighty four percent of all fresh fruit and nut production in the Northwest is located in Washington. Over 90% of the apple production in the region was located in central Washington in 1983. Forty percent of all pear

production in the region is located in Oregon. Forty five percent of the sweet corn in the region is produced in Oregon with 42% in Washington. Sixty two percent of the onions are produced in Oregon. About 37% of the fruit, 80% of the vegetables, and 62% of the potatoes in the Northwest Region went to processing in 1983.

Between 1977 and 1983, fruit production in the Northwest rose dramatically, with apple production up almost 50% and grape production doubling during the same time period. Strawberry acreage was up over 50%. Seasonality of production in the Northwest has changed little but the shipping season is growing longer because of the increasing use of storage.

For many of the warm climate crops -- such as citrus and sugar cane -- Florida holds a dominant position within the U.S., and competes primarily with foreign producers. Florida produces fresh vegetables during the seasons when production in most other regions of the U.S. is cost prohibitive. The long north/south orientation of the Florida Peninsula allows for staggered harvests of vegetable crops. For example, the winter potato crop grown in South Florida is being harvested when potatoes for the spring crop are being planted 250 miles to the north. Fruits and vegetables account for over 55% of Florida's total agricultural value with most production going to fresh markets. The principal exception to this is citrus. Typically, over 80% of the Florida orange crop and 50% of the grapefruit crop is processed.

Much of the success of growers in Florida in marketing fruit, vegetable, berry, and specialty commodities depends upon the ability to produce in the winter and spring, when production in most other areas is limited to greenhouse production. The production season for Florida ornamentals begins in October or late September. Production builds slowly to a peak around the first of the year. Through January and early February, harvest stabilizes until late April or early May, when production increases.

Fruits and berries are not significant crops in the West outside of California. Apples are the major fruit with almost all production in Utah. Vegetables are also not a major part of regional crop production but the region does supply about 20% of the lettuce production. Between 1977 and 1983, lettuce production was up 51%, with 90% of the production in Arizona. In the Lake states, apples, cherries, grapes, peaches and strawberries are the dominant fruit crops, with apples producing the greatest value. Tomatoes, carrots, potatoes and sweet corn dominate the vegetable crops.

In the eastern states, most vegetable production is in New York, New Jersey, Maine, and Pennsylvania. Potatoes, cabbage, and onions are the major vegetable crops in New York. The primary vegetable crop in Maine is

potatoes. New Jersey is the Northeast Region's primary producer of fresh market vegetables. Apples are the eastern states' primary fruit crop although New Jersey and Pennsylvania are also important peach producing states. New York grown apples are mainly fresh market varieties while more of the apple production in Pennsylvania, West Virginia and Maryland is utilized for processing.

Texas produces a wide variety of perishable fruits and vegetables. Historically, onions have been the highest valued of these commodities -- in 1983, Texas-produced onions had an estimated value of \$62.1 million. In 1983, cantaloupes, watermelons and cabbage production ranked second, third and fourth in value of state production, but through time, two of these commodities have ranked either second or third. Other Texas-produced fruit and vegetables which rank among its most valuable are potatoes, carrots, oranges, bell peppers, grapefruit, and broccoli; these commodities have all ranked among the ten most valuable crops between 1977 and 1983, except broccoli. Although no significant changes occurred in the top six crops over this period, some trends appear to be developing. For the entire period, onions were the highest valued Texas produced commodity, followed by cantaloupes, watermelons, cabbage, potatoes and carrots. Since the 1983 freeze, the relative importance of grapefruit and oranges declined.

Production trends include the decline in relative importance of sweet potatoes and tomatoes (grown largely in northeast Texas) which ranked ninth and eleventh, respectively in 1977. In 1983, they ranked 14th and 17th. Of significance is the increased importance of spinach and broccoli. Spinach has increased its rank from 16th to 12th and broccoli increased from 18th to 10th in rank. All other major fruit and vegetable commodities grown in Texas have experienced only minor season-to-season variations in rank. The fresh market was the principal outlet for the State's five leading fruit and vegetable products in 1983 (onion, cantaloupes, watermelons, cabbage and potatoes). Other important commodities which rely totally on the fresh market are bell peppers, honeydew melons, lettuce, and peaches. Significant portions of Texas' orange (41%) and grapefruit (30%) production were processed in 1983. Processing was also an important outlet for spinach (47%) and tomatoes (61%). On the average, about 85% of Texas' fruit and vegetable production is destined for the fresh market, while the remaining 15% is processed.

In the Southeast (excluding Florida), the Atlantic states (Georgia, South Carolina, North Carolina and Virginia) dominated fruit and vegetable production in 1983. Within the vegetable group; tomatoes, potatoes, sweet corn and snap beans constitute most of the production, however more than 20 vegetables are grown in the Southeast. Vegetable crop production in these states generated income of

approximately \$178 million or 90% of the total vegetable value in the Southeast. Income from sweet potatoes was valued at approximately \$83 million, followed by tomatoes. North Carolina produced 77% of all sweet potatoes and 70% of all sweet corn produced in the Atlantic states. South Carolina and Virginia accounted for 50% and 25% respectively of tomato production.

The length of the growing seasons varies widely over the region allowing for a variety of truck crop production. Of the truck crops, 131,500 tons, or 84%, were sold on the fresh market with 25,720 tons or 16% going to the processing market. South Carolina, Virginia, North Carolina and Georgia produced 40%, 26%, 15% and 11% respectively of the region's truck crops.

The total value of fruit crops along the Atlantic coast was \$118 million. Apple production in the region was valued at \$64.1 million with Virginia producing 50% and North Carolina 46%. Peach production contribute \$51.7 million with Georgia producing 43% and South Carolina 41%. Grape production accounted for 2% of the fruit production with a value of \$2.7 million dollars.

In the rest of the Southeast (Alabama, Arkansas, Kentucky, Louisiana, Mississippi and Tennessee) peaches comprised about 42% of the volume of production within the fruits and nuts group followed by pecans and apples. Pecans represented almost 58% of the value of production within the fruits and nuts crops in the region. Within the vegetable crops group, tomatoes comprised about 61% of the volume of production and about 76% of the value and production in the region. Volume of production declined for seed crops, berry crops, vegetable crops, and for fruits and nut crops from 1977 to 1983.

In the North Central Region, fruit and vegetable crops are of minor importance. Iowa accounts for most of the vegetable production value in the region, with about 70% of total production going to the processed market.

POTENTIAL FOR SOUTHEAST PRODUCTION

In order to evaluate the economic potential for expanded agricultural production in the Southeast, it is necessary to include the entire production - processing - distribution system. Not only must enterprise patterns be determined, but also the ability of Southeast producers to ship and compete with established producers in targeted markets including regional, national and international markets.

Given the yield and seasonal advantages of Florida and California growers (although the Southeast experiences little head-to-head competition with California and Florida in late spring and summer vegetable), opportunities for Southeastern producers to expand into new markets is limited. However, some states, such as Georgia, have recently been experiencing a 4% per year increase in vegetable

production; most going to the fresh market in northern cities and Canada. Three areas where further attention is warranted include:

1. Improved Quality and Supply Consistency. Improving the quality of fruits and vegetables for fresh markets within the region can aid market expansion. Attention must also be paid to some consistency in the supply of produce.

2. Market Windows. Although supplies from Florida and California will continue to dominate the fruit and vegetable industry, market windows could be identified when supplies from the major producers are low. As production moves north from Florida in the spring, and before California begins shipments, market windows exist for a number of commodities that could be filled by producers in the Southeast. To some extent, this is already the case for tomatoes, cucumbers and peppers. Market niches, such as pick-your-own and roadside markets, should also be further explored (5).

3. Multi-commodity processing. The failure of a number of fruit and vegetable processing facilities in the Southeast has been due to a lack of supply of any one or two commodities. While the plants operate at near capacity levels for a few months, most of the year they are idle. Research on multi-commodity, regional processing facilities similar to those in the Lakes Region may produce information on a new market (6).

In summary, Southeastern producers of fruits and vegetables will find opportunities for expansion into targeted markets outside of the region difficult, but some expansion is currently taking place. There appear to be opportunities to expand in the intra-regional markets for fruits and vegetables. Within the Southeast, growers may be able to compete with other regions production, especially with improved quality and attention to market windows and multi-commodity processing opportunities.

Finally, the Southeast has an advantage in proximity to ports in Savannah, Charleston, New Orleans and Mobile. Yet targeted feasible markets for vegetables and fruits may be limited to the Atlantic seaboard states.

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NOTES AND REFERENCES

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(1) U.S. Department of Agriculture. 1983. Agricultural Statistics. U.S. Government Printing Office. Washington, D.C.

(2) Prussia, S. E., J. L. Jordan, R. L. Shewfelt, and W. C. Hurst. 1986. A Systems Approach for Interdisciplinary Postharvest Research for Horticultural Crops. Georgia Res. Report (Forthcoming).

(3) The data for tables 3 and 4 and the regional production information included in this section were compiled from various state and Federal sources by members of the Southern Regional Project, S-182 "Transportation of Southern Perishables." Especially helpful were Richard Beilock, Ken Cassavant, Steve Fuller, and William Hardy.

(4) Regional breakdown as follows:

Northwest: Washington, Oregon, Idaho

West: Wyoming, Montana, Colorado, Nevada, Utah, New Mexico, and Arizona

East: Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, Delaware, Pennsylvania, Maryland, W. Virginia, and New Jersey

Lake: Minnesota, Wisconsin, Michigan, Illinois, Indiana, Ohio

Southeast: Arkansas, Louisiana, Mississippi, Alabama, Tennessee, Kentucky, Georgia, South Carolina, North Carolina, Virginia

North Central: North Dakota, South Dakota, Iowa, Nebraska, Missouri, Kansas, and Oklahoma

California

Texas

Florida

(5) Vitelli, V. A., L. Bateman, and W. J. Free. 1982. An Assessment of the Production and Marketing Potential for Fruits and Vegetables in the South. Southern Cooperative Service Bulletin 269. Tennessee Valley Authority: Alabama.

(6) Epperson, J. E., C. T. Lewis, and R. J. Williams. 1982. Cost Analysis of a Multiline Vegetable Processing Plant by Size with Special Reference to Use of the Cost-Generator Model. Georgia Research Bulletin 285, University of Georgia College of Agriculture.

Table 1. Average annual shipments of fruits and vegetables by region, United States, 1977-1983 (1000 cwt.).

Region	Fruits	Vegetables	Total
California	55,746	113,496	169,242
Northwest	25,452	38,072	63,524
Florida	27,689	25,799	53,488
West	8,744	33,697	42,441
East	8,410	20,681	29,091
Texas	5,308	19,037	24,345
Lake	1,693	22,231	23,924
Mexico	--	17,239	17,239
Southeast	2,727	12,856	15,583
Midwest	800	12,807	13,607
Total	136,569	315,915	452,484

Source: USDA Fruit and Vegetables Shipments, 1977-1983.

Table 2. Average monthly shipments of fruits and vegetables, by regions of the United States, 1977-83 (1000 cwt.).

Origin	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
California	9653	9095	9535	11319	16989	23004	22313	18721	15508	12974	10309	9824
Northwest	6211	5437	5739	5552	5015	4168	3248	4122	4772	6459	6201	6598
Florida	3936	4015	4771	5575	7256	4305	1430	1762	3076	5288	5730	5351
West	4028	3391	4900	4269	3248	4065	2394	1659	1693	3290	4695	4794
East	2967	2574	2995	2634	1452	757	1517	3022	2991	2781	2680	2719
Texas	1996	1799	2147	2659	3511	3427	2222	1696	505	777	1469	2136
Lake	2492	2267	2754	2182	771	85	536	2598	3123	2785	2206	2128
Mexico	2062	2925	3516	3514	2532	622	154	114	95	187	436	1082
Southeast	204	194	244	220	591	4277	6465	1489	652	454	449	346
Midwest	1648	1615	2056	1787	801	56	382	335	668	1201	1480	1576

Source: USDA, Fruits and Vegetables Shipments, 1977-1983.

Table 3. Regional production of fruit, nut, and berry crops, United States, 1983.

Region	Value of production (000 dollars)	Volume of product (000 cwt)
California	2,915,000	230,356
Northwest	692,872	52,343
Florida	1,012,115	63,408
West	28,502	1,246
East	360,333	31,909
Texas	181,783	13,720
Lake	157,459	13,316
Southeast	237,838	14,545
Midwest	27,001	1,611

Data provided by members of the S-182 regional project.

Table 4. Regional production of vegetable crops, United States, 1983.

Region	Value of production (000 dollars)	Volume of product (000 cwt)
California	2,900,000	266,000
Northwest	295,052	58,632
Florida	989,269	36,783
West	183,360	16,285
East	242,201	22,673
Texas	261,604	21,766
Lake	360,258	61,815
Southeast	71,458	3,950
Midwest	6,288	897

Data provided by members of the S-182 regional project.