The South Atlantic Coast Vegetable Project: A Multistate Team Approach to Research on Alternative Farming Opportunities

The South Atlantic Coast vegetable project, officially titled "Agricultural Adjustment in the Southeast Through Alternative Cropping Systems", involves a group of horticulturists and agricultural economists working as an interdisciplinary team. This regional project directly involves three universities—the Depts. of Horticulture and Agricultural Economics at Clemson Univ., the Univ. of Georgia, and North Carolina State Univ.

History and background

In 1984, personnel in the Depts. of Horticulture and Agricultural Economics at Clemson Univ. discussed common interests in vegetable research and the possibility for obtaining grant funds. Agricultural economists and horticulturists at the Univ. of Georgia and North Carolina State Univ. were included in further discussions and participated in the development of a proposal for submission to the Special Grants program of the USDA. The proposal was initially funded in 1985.

Objectives of the project

The basic objective of the project is to analyze the feasibility of producing vegetables in the Carolinas and Georgia in a manner and scale that will provide alternatives

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and/or supplements to current enterprises. An advantage of the three-state area is that there are climatic differences within the region that make possible the production of vegetables over extended periods of time, a necessity in penetrating potentially profitable markets. Specifically, the objectives are: 1) Evaluate alternative markets for new and expanded production of selected horticultural crops, including international markets; 2) identify commodities that have the most potential for expansion; 3) determine the feasibility of developing production practices for competitively producing specific vegetable crops on family farms in the three-state region; and 4) develop and disseminate specific information and research results.

Commodities

The commodities being studied intensively are broccoli, carrots, cauliflower, collards, cucumbers, leaf lettuce, muskmelon, onions, peppers, potatoes, snap beans, spinach, and tomatoes, with other crops also being evaluated. Four cultivars of each crop were planted.

Research results

Horticulture. Plot work is being conducted at seven locations throughout the region (Fig. 1). Table 1 summarizes the (continued on inside back cover)



Fig. 1. Location of research plots, South Atlantic Coast Vegetable Project.

Сгор	Planting date ²								
	1		2		3		4		
	1985	1986	1985	1986	1985	1986	1985	1986	
		$kg \cdot ha^{-1}$ (thousands)							
Bean	1.25	1.01	1.97	1.43	0.57	1.69	1.12	1.52	
Broccoli	2.03	1.36	1.98	1.42	1.36	1.62	0.68	1.60	
Carrot	1.68	1.77	1.97	1.39	1.00	1.28	1.10	2.50	
Cauliflower	2.19	1.82	1.69	1.43	1.23	2.54	0.52	1.70	
Collard	2.15	2.76	1.71	3.07	2.49	2.63	1.92	2.49	
Cucumber	15.23	6.66	9.67	5.00	4.44	4.60	3.13	4.16	
Leaf lettuce	1.34	3.97	NT	4.02	0.86	2.73	1.27	1.39	
Muskmelon	9.90	7.86	8.43	7.44	3.80	6.01	3.14	3.11	
Pepper	2.39	3.16	2.53	2.78	1.20	2.86	NT	NT	
Potato ^y	NT	2.81	NT	2.57	NT	NT	NT	NT	
Tomato	12.28	6.58	9.45	7.04	5.31	5.94	NT	NT	

 Table 1. Marketable yields for 11 vegetable crops with four planting dates, in North Carolina, South Carolina, and Georgia, 1985– 86.

 $^{z}1 = \text{earliest}, 4 = \text{latest}.$

^yNo potatoes were tested in 1985; only spring crops in 1986.

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production data for 1985–86. Four planting dates, differing by location, were used at each site. The first and fourth are the earliest and latest possible production dates of each season, while the second and third are regarded as being less risky with regard to weather factors. Exceptions were only two spring plantings for potatoes and three plantings for tomatoes and peppers (no late-fall planting).

Preliminary analysis of the data indicates that all commodities have potential for production in the South Atlantic Coast area. There were distinct responses by each crop to the season of production. Spring was more favorable than fall, based on the overall response of the crops. Collards and broccoli were less affected by climate than were leaf lettuce and snap beans. This stability may be due to the production system selected for each crop. Even though these commodities can be produced, profitability will depend on market availability.

These results have served to identify cultural practices that warrant further research. Stand establishment, stress responses, and nutritional systems are examples of specific areas currently being investigated.

Results from a study of fertigation and plastic mulch on peppers and tomatoes indicate yields are increased by plastic mulch. Other findings indicate that the color of the plastic can influence seedling establishment and development and subsequent yields. These impact economic returns and costs, and therefore profitability.

Research has been initiated on the effectiveness of photodegradable mulches as a way to reduce end-of-season clean-up costs. Studies of different fertilizer source and rate effects on yield and quality of some crops have been initiated. Nineteen commercial cultivars of broccoli have been evaluated for heat tolerance.

Agricultural economics. Preliminary market window analysis indicates that there are potentially favorable price windows for snap beans, green peppers, and cabbage. Estimates have been made of price flexibilities to determine how much prices can be expected to decrease with increases in market volumes. These estimates will be used to adjust average expected prices for comparison with production costs to further analyze market windows.

Information from a survey of first handlers of vegetables was used to develop a market structure analysis. The results indicate that the most important factor that increases the probability of buying from a new supplier is a product of uniformly high quality. The most important negative influence is the fact that a buyer already has established suppliers who provide a product on a year-round basis.

Discriminant analysis was used to distinguish the major differences in market infrastructure between Asia, the European Economic Community (EEC), non-EEC Europe, and Latin America. The greatest potential for the United States to increase its export market share exists in Asia and the EEC. About 88% of the Asian importers and 60% of EEC importers predicted increasing levels of imports. The results also indicate that an increased market share is contingent on a total commitment to satisfying the demands of the export market at competitive prices.

Work has been completed on the determination of the relative competitiveness of agronomic row crops and selected vegetable crops. The components of the quadratic programing model are demand, supply, variable costs, risk, and land and biological constraints. Indications are that fresh vegetable crops compete favorably with traditional row crops. However, vegetable production is restricted by consumer demand.

A microcomputer program, "Budget Planner", has been designed to assist in the construction of crop enterprise budgets. Budgets can be generated for any crop or combination of crops, including those sequentially grown. A second software program, "Crop Planner", uses the information obtained in Budget Planner to develop maximum farm profit production plans.

An economic engineering approach was used to determine performance rates for various equipment used in the production and packing of peppers and cucumbers. The results indicate there are substantial economies associated with increases in size. It, therefore, appears that farmers in the tri-state area could compete more effectively in the production of peppers or cucumbers if they cooperated to attain the volume of production necessary for an economically efficient packing facility.

Summary

The South Atlantic Coast area could have a comparative advantage in the production of selected vegetable crops. The high level of management necessary for tobacco could be applied to vegetable crops. Soils in the South Atlantic Coast area are capable of producing yields comparable to many primary production areas. Irrigation equipment is readily available. The growing season is as long as 290 days on the coast. It is possible that three or four plantings of some vegetable crops could be produced per year in certain locales, with most crops being produced over 5 to 8 months. There is also potential for multiple cropping systems, including vegetable and agronomic crops. The area has transportation advantages to the eastern population centers and has seaports at Charleston, S.C., Wilmington, N.C., Savannah, Ga., and Norfolk, Va. for the possible development of export markets.

However, those involved with the project are not so naive as to believe that this effort will result in the solution of all problems for all farmers. Project personnel are excited about the long-term prospects, and pleased with the cooperative research effort that has occurred. More than 27 faculty members and a large number of graduate students from the three universities have participated in the project.

The knowledge and information developed in production and management techniques need to be transferred to producers and potential buyers. The cornerstone of the implementation phase of the project is based on providing information. A conference for potential buyers and producers is being planned, with the major objective to provide results that will enable those attending in decisionmaking on entering or expanding their involvement in the vegetable industry in the South Atlantic Coast area. The tentative program includes: 1) A produce show sponsored by the departments of agriculture; 2) keynote addresses by prominent persons in industry; 3) discussion of the project, outlining history, objectives, results, and future direction; and 4) a panel of buyers discussing needs, problems, and industry prospects, and reacting to the research presentations.

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