

Agricultural Cooperation and Produce Marketing in Southwest Virginia

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Growers and community leaders have expressed interest in establishing a horticultural shipping-point market in Southwest Virginia. This paper reports on a study that assessed whether horticultural production would be profitable in the region and, if so, the physical and organizational requirements for a successful shipping-point market. It appears that tomatoes, peppers, and pumpkins can be produced and marketed profitably to large-volume wholesale buyers if growers meet the exacting requirements of the retailers. A cooperative association is the organizational structure with the greatest chance of success. At the conclusion of this study, a shipping-point market in the recommended form was established in Southwest Virginia.

Southwest Virginia is dependent on tobacco and cattle for most of its agricultural income, but markets for both of these commodities are likely to decline in the future, in part due to health concerns and income potential. Some have suggested that horticultural production has the potential to raise farm incomes, as markets are growing for fruit and vegetables and the region has a suitable agricultural resource base. Several producers in the region currently grow vegetables for small local retail outlets, roadside stands, and pick-your-own markets. These markets are saturated, however, and local growers face marketing constraints that prevent them from selling to larger wholesale and retail firms. One of the constraints is competition from large farms in Florida, California, and other primary production regions that can deliver large quantities of produce in a timely manner to the warehouses of major retailers. Local growers may have a transportation cost advantage in supplying the local region, but they find it difficult to assemble and deliver the required quantities in a timely fashion due to their small individual size.

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Growers and community leaders in Southwest Virginia have expressed an interest in establishing a shipping-point market to overcome these constraints. A shipping-point market is a marketing firm, or set of firms, with a facility in which fresh horticultural products can be cooled, graded, packaged, and, in some cases, processed. Management of the firm sells these products to distribution centers for retail chain stores. This allows growers to concentrate on what they do best—production—while leaving the task of post-harvest handling and marketing to the management of the shipping-point firm.

Led by the non-profit Southwest Virginia Agricultural Association, local growers and community leaders sought public support to: (1) assess the feasibility of developing such a marketing facility and (2) finance the initial equipment and management expenses. They asked land-grant university researchers and the U.S. Department of Agriculture to assess the feasibility of expanding the horticultural industry in Southwest Virginia and developing marketing infrastructure. A joint two-part study was undertaken by researchers, extension agents, marketing specialists, and producers to identify: (1) whether horticultural production with a supporting marketing facility would be profitable in the region and (2) the requirements, both physical and organizational, for a successful shipping-point market facility.

This paper briefly describes the process followed in the study, the results, and the lessons learned. It is not uncommon for growers to seek marketing assistance. One question that arises in responding to such a request is why, if a

marketing facility is feasible, has it not already been developed by the private sector? Is there really an appropriate role for the public sector in either the feasibility analysis or the provision of start-up capital? These questions are addressed in the following pages.

Assessing Potential Economic Profitability and Constraints

Data for the financial feasibility analysis were gathered through structured surveys of extension agents in the region, farmers, and local horticultural produce purchasing agents. Information was also obtained through personal interviews with growers, purchasing agents, and regional horticultural and marketing specialists. Published data on production, acreage, and prices were collected. The surveys and interviews were used to identify existing and potential producers in the region, current and potential horticultural crops, market requirements of produce buyers, market windows for specific crops, and potential constraints to establishing a shipping-point market for horticultural production. Enterprise budgets were used to assess the profitability of individual crops, followed by a profitability analysis of the marketing facility itself.

Extension agents in the 19 surveyed counties estimated that there are currently 403 horticultural growers with 2,000 acres planted in the region. Also, they estimated that 8,200 potential acres were available for horticultural production. Three agents did not respond to the survey. Twenty-five of the 76 farmers that were surveyed indicated that they would commit 460 additional acres to horticultural production to be sold through the proposed shipping-point market. This acreage estimate may be conservative as several farmers said that they would wait for the establishment of the market before committing acreage. Forty-four growers indicated interest in producing horticultural commodities, and of the 16 commodities mentioned, tomatoes, peppers, pumpkins, and sweet corn were ranked the highest in terms of grower interest. Seventy-six percent of the respondents reported that they would produce less than 10 acres, implying a need for a large number of producers and a strong organization to coordinate growers in order to make the shipping-point market feasible. Only 38 percent of the growers

currently have irrigation, and most are dependent on family labor. Growers felt that their primary constraints to expanding horticultural production are related to irrigation, labor, marketing infrastructure, and experience.

The purchasing agents surveyed included agents for four large supermarket chains, six small independent retailers, eight wholesalers, and three processing firms that provide food for institutions and restaurants. The retail firms represent 497 stores, including 404 supermarkets, each of which have almost \$6 million in average annual sales. The survey was conducted through field visits to purchasing agents at their warehouse locations and through telephone interviews. Results indicated that a shipping-point facility must meet minimum-volume requirements to succeed and that the 19 counties might be unable to absorb all of the product marketed from the facility. However, an analysis of the bordering market areas of Charlotte, Richmond, and Nashville indicated that each of these markets individually could absorb any excess production. More than 2,700 supermarket outlets are located in these market areas (*Progressive Grocer*, 1995).

The purchasing agents were asked about their interest in cooperating with a local shipping-point facility, the products that they would most be interested in purchasing, and the problems that they have experienced in buying produce from Southwest Virginia growers. Most agents indicated an interest in cooperating with a local facility, with 50 percent responding very positively, 17 percent responding positively, and 33 percent expressing mild interest. Agents would most like to purchase peppers, tomatoes, and cucumbers. Some firms estimated their weekly product volume requirement.

Problems identified by purchasing agents from past experience when purchasing from local growers included poor-quality produce due to a lack of proper cooling, grading, poor reliability of delivery, and product availability problems. These problems point to the need for irrigation to help ensure produce availability and quality, a shipping-point market with proper cooling equipment, and a coordinated marketing strategy. Purchasing agents stressed the need for growers to meet exacting quality standards with respect to color, shape, size, variety, packing, shelf-life, and other characteristics. When asked why they might be

interested in purchasing local produce, the agents responded that the product might be fresher, that consumers prefer locally grown produce, and that prices are better. Given Southwest Virginia's proximity to distributional warehouses in the market area, the region possesses a possible transportation cost advantage over current suppliers of produce.

The profitability of the 10 highest-ranked crops from the three surveys (extension agents, producers, purchasing agents) was assessed using horticultural crop enterprise budgets and market-window analysis. Budgets developed by Virginia Tech were updated and adjusted with yield data from similar geographic regions in Tennessee and North Carolina (Virginia Cooperative Extension, 1994). The budgets include transportation, grading, and packing costs, in addition to production costs.

Market-window analysis identifies a time period (market window) during which crops may be marketed profitably. Adrian et al. (1989) provide an evaluation of a number of state and regional market-window studies. In general, a market-window analysis consists of the following steps: identification of feasible commodities; identification of potential target markets; establishment of price expectations; development of production cost expectations; estimation of marketing and transportation costs; analysis of market alternatives; and identification of feasible markets and market periods. Henneberry and Kang (1992) examined market windows in five wholesale markets for six Oklahoma horticultural crops. They concluded that wholesale markets offer lucrative marketing channels to Oklahoma growers. Furthermore, they stated that market-window analysis is a simple and inexpensive device for evaluating market potential for selected crops. Runyan et al. (1986) analyzed commercial marketing opportunities for small vegetable growers in southside and southwestern Virginia. While they found potential opportunities for Virginia growers, they indicated that a multidisciplinary approach would be required to overcome remaining barriers. The current study represents such an approach.

In the current study, the price data used for the market-window analysis are 1992 through 1995 prices from the four closest terminal markets: Atlanta, Baltimore, Cincinnati, and Colum-

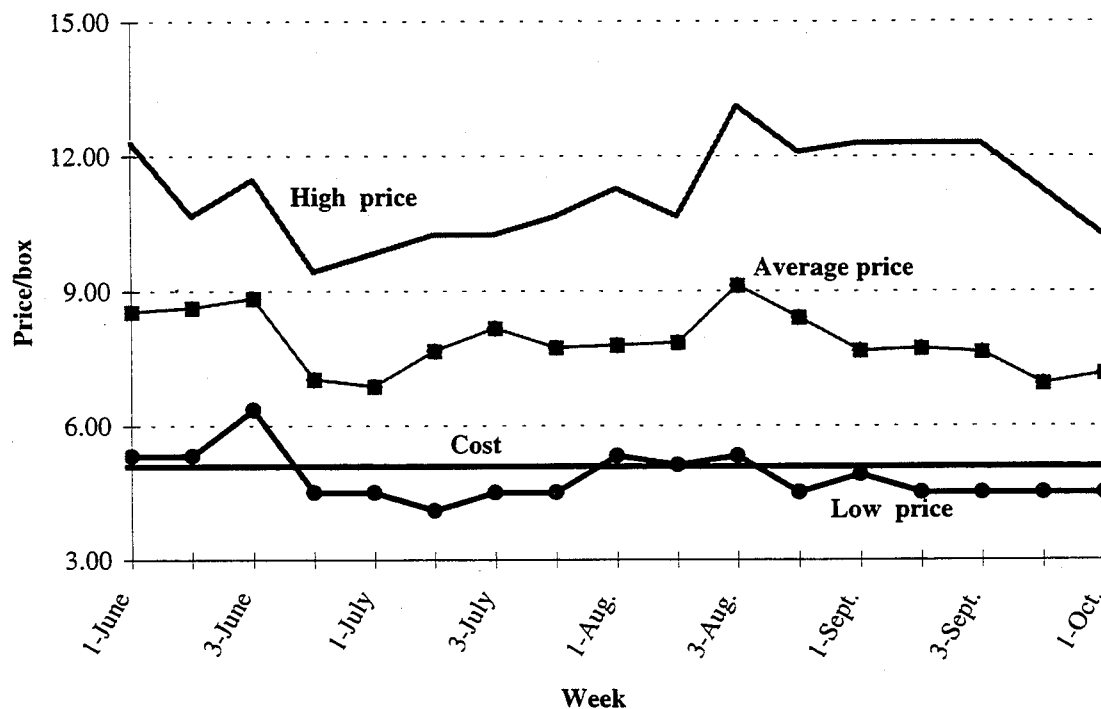
bia. High, average, and low prices based on averages across these four terminal markets were used. These three price levels reflect differences in quality and variety. An example of the results of market-window analysis for string-weave tomatoes is presented in Figure 1. String-weave is a production practice that lends itself to hand-picked, vine-ripened tomatoes.

Two types of budgets were calculated: (1) returns per acre at each quality level, using average prices for the feasible production period, and (2) returns per acre at each quality level using prices for the best feasible marketing period as identified by the market-window analysis. A summary of these results is presented in Table 1. Tomatoes are the most profitable crop, with returns to management and land of \$12,589 per acre for high-quality produce during the feasible marketing period (July 10 through October 1) and \$15,015 per acre for high-quality produce during the best harvest period (August 21–30). All the selected crops are profitable at high quality levels, and all are unprofitable or only marginally profitable at low quality levels (except for asparagus). According to purchasing agents and other experts, most growers in the region currently produce products that fall into the average or low quality categories.

The selection of crops to be marketed through a shipping-point facility cannot be based solely on the individual profitability of potential crops. Other factors to consider are grower experience, potential for producing large volumes, ability to manage labor, irrigation requirements, initial investment required, purchasing agent interest, and suitability for processing through a shipping-point facility. A ranking of selected potential crops based on these factors is presented in Table 2. The ranking is, therefore, based on profitability analysis, survey results, and the results of interviews with extension agents, purchasing agents, and regional horticultural and marketing experts.

Management and Organizational Issues

A number of management and organizational issues arose during analysis of survey and interview information. The key management issues that were identified included the need for: 1) careful identification of the appropriate product

Figure 1. Market Window Analysis, Stringweave Tomatoes.**Table 1. Crop Profitability in Southwest Virginia.^a**

Crop	Profit for Optimal Timing ^b	Profit for High Quality ^c	Profit for Low Quality ^d	Production Costs	Feasible Harvest Period ^e
----- dollars per acre -----					
Tomatoes	15,015	12,589	(804)	10,203	July 10–Oct. 1
Asparagus	8,649	6,516	3,233	1,845	April 15–June 15
Cucumbers	5,744	4,782	(2,691)	3,679	July 25–Oct. 1
Strawberries	3,891	3,383	163	7,480	May 15–June 15
Pumpkins	4,416	2,448	(3,353)	3,456	Sept. 1–Oct. 30
Broccoli	3,340	2,110	(3,123)	3,219	Sept. 1–Nov. 1
Peppers	3,175	1,902	(549)	3,384	July 15–Oct. 1
Green beans	2,090	1,219	(1,203)	2,624	June 15–Oct. 1
Cabbage	2,448	1,022	(4,678)	4,772	May 10–Oct. 30
Sweet corn	2,093	556	(1,541)	3,629	June 20–Oct. 1

^a Prices based on an average at the terminal markets of Atlanta, Baltimore, Cincinnati, and Columbia for 1992 through 1995.

^b Based on the high-quality price during optimal harvest period.

^c Based on the high-quality price during the feasible harvest period.

^d Based on the low-quality price during the feasible harvest period.

^e Based on horticultural expert opinion.

Table 2. Crop Ranking and Rationale.

Rank/Crop	Rationale and Comments for Southwest Virginia
1. Vine-ripe tomatoes	Highest profit; quality is major concern.
2. Green bell peppers	Medium profitability; low risk; broad local knowledge; high willingness by large chains to purchase directly.
3. Pumpkins	High profit but risky for low quality; not a primary crop but a complementary crop for late season use of the facility.
4. Strawberries	High profit but risky due to limited local knowledge; could become key early season crop to spread facility utilization.
5. Green Cabbage	Low profit but broad regional experience; allows for early season facility utilization.
6. Cucumbers	Highly profitable for high quality; very unprofitable for low and medium quality.
7. Green beans	Medium profitability for high price; allows early season facility utilization.
8. Asparagus	High-profit crop with limited local knowledge and reputation; initially difficult to convince farmers and purchasers.
9. Broccoli	Good profitability for high-quality product; high losses for low quality. Purchasing agents were mixed on acceptance.
10. Sweet corn	Moderate profit for high quality; risky to produce. Hydro-cooling is required and costly.

mix, (2) implementation of pre-planting contracts that specify volume and specific production and harvesting practices, (3) maintenance of quality control, and (4) grower education. Purchasing agents do not wish to carefully inspect produce but prefer to rely on the supplying firm's reputation. The establishment of such a reputation takes time and effort and is essential for receiving higher returns. The rejection of produce for quality reasons also may cause conflicts between management and producers. Educational efforts are needed to ensure that producers understand market standards and what they should do to achieve them.

The two primary types of organizational arrangements for managing the shipping-point facility are private ownership and a grower cooperative. A single private firm that purchases directly from growers would be most efficient at minimizing costs but would also be in a position to exercise market power, thus reducing grower returns. Such market power is common in markets that deal with perishable products because growers must sell im-

mediately (Harstin and Leuthold, 1994). Growers would benefit from a shipping-point market with several competing private marketing firms; however, this situation is unlikely to develop in Southwest Virginia because of insufficient production to support multiple firms.

A benefit of cooperative management is that it might allow producers to capture a greater share of profits than a private firm would because the objective of a cooperative is to maximize the financial returns to its members. Producers might have a greater incentive to coordinate their production if the resulting lower marketing costs increase member returns. It would be advantageous for a cooperative to provide information to growers because members must be committed to marketing through the cooperative. For example, Cumberland Products Vegetable Cooperative, a successful cooperative in Kentucky, provides growers with detailed technical production advice through frequent newsletters that relate the latest production research and optimal times for applying inputs.

It appears that, if a shipping-point market is to succeed in Southwest Virginia, its organizational structure is likely to be a cooperative. However, there are several potential problems that often prevent cooperatives from succeeding. These problems include: internal conflicts regarding pricing practices; the failure to attract a first-rate manager/professional broker; lack of farmer commitment; and lack of coordination among many individuals with different goals and objectives. Various cooperatives have gone out of business in Virginia during the past several years although the overall volume of cooperative sales has increased in the Southeast region of the United States. Therefore, it is important to consider the key elements that would be needed for a cooperative shipping-point market to succeed. However, before turning to those elements and the potential profitability and structure of a shipping-point market organized as a cooperative, the issue of whether there is a role for government assistance must be addressed. This issue is related to the question of what failure in the market has prevented growers from developing the market on their own in the past.

Market Failure and Government Assistance

Certain horticultural products are potentially more profitable than the traditional crops grown in the region. Farmers who have attempted to produce horticultural crops have encountered marketing constraints that have prevented them from achieving potential levels of profitability. If the farmers were able to overcome these constraints and break into the larger wholesale and retail markets, not only would their production be individually more profitable, but the increased economic activity would benefit the region as well.

Cooperation among growers would appear to be a potential solution. However, cooperation depends on the behavior of others. When that behavior is unknown, each grower, while attempting to maximize individual expected returns, may achieve a sub-optimal outcome, both from an individual and a societal standpoint. Hence, a market failure exists. Assume, for example, that tomato production is a more profitable alternative than the existing practice of producing corn for grain but requires the cooperation of other growers to achieve

the necessary economies of scale in marketing. If one producer chooses to produce tomatoes but others choose to produce corn, the producer's tomatoes will not provide the expected payoff. Because of the uncertainty in payoff (similar to the "prisoner's dilemma"), all producers may continue their current agricultural practices, resulting in a sub-optimal outcome for the region.

The element that is needed to overcome this "dilemma" is communication. A widespread flow of information among the growers is needed to assure cooperation and a higher payoff. The obstacle that has prevented this flow of information and a subsequent change in production behavior within the region has been the high costs of communicating, organizing, and enforcing contracts, combined with the uncertainty of the long-term payoff. Horticultural production requires a substantial initial commitment of resources; farm equipment and irrigation systems, as well as living quarters for migrant workers, are necessary investments. These investments are costly and must be financed over a number of years. If individual growers are uncertain about the long-term success of the cooperative, they may continue to plant existing crops with a lower but more certain payoff, rather than investing in equipment for new crops.

An additional factor is the gains from division of labor and specialization. Both horticultural production and marketing require a number of specific skills that are difficult for one person to perform efficiently. In addition to the skills of the farmer, those of a marketing specialist are needed for communicating with buyers, analyzing markets, and developing contractual arrangements. The skills of a business administrator and manager are needed for accounting, planning, paying and collecting bills, and supervising labor. Engineering skills are needed for post-harvest handling, grading, packing, cooling, storing, removing waste, and construction. The skills of a horticulturist are needed for identifying planting and harvest times, selecting varieties, and determining agricultural practices. In the past, farmers who attempted to produce horticultural products had to take on all of these functions simultaneously and could not perform them all efficiently or produce the volume necessary to purchase these services. Therefore, unless growers cooperate and a manager is hired to perform some of these services, individual producers are not likely to succeed.

Cooperation is hindered by the transaction costs of organizing the growers, the costs of enforcing compliance of each participant, and uncertainty. Unless there is an initial infusion of outside assistance, it appears unlikely that growers will organize themselves into a cooperative, design and develop the necessary grading and packing facilities, and establish a marketing network.

The question remains: Is it justifiable to use government resources to infuse such assistance into a horticultural cooperative? What public benefit would result? The use of public support might be justified if: (1) net social benefits exceed net private benefits (yet market failure precludes the activity from being undertaken), (2) returns to this specific use of public funds exceed returns to the use of those funds in alternative public investments, or (3) the program meets a development objective, such as facilitating economic growth in a low-income region.

It would appear that all three rationale are met in the case of the horticultural cooperative in Southwest Virginia. Government assistance in helping to establish the cooperative may lead to increased competition with lower prices and higher quality for consumers. The entry of an eastern producer would provide some geographic diversity to the industry, which may help provide price stability when climatic conditions adversely affect other producing regions. While it is not clear that the return on public funds to help establish this cooperative exceeds the return on alternative uses, there is potential for such a return. Since the region lags far behind the national average in family income, education, and employment level, and above the national average in percentage of population below the poverty level, public support should help with the development objective and perhaps replace other needs for public support.

Government support for a horticultural cooperative in Southwest Virginia would involve a one-time infusion of funds to overcome informational, organizational, infrastructure, and technical barriers that have prevented the formation of a market. Once the funds have been used to overcome these barriers, the cooperative must be able to survive and grow on its own. Therefore, it is imperative to consider the over-

all potential profitability of the marketing facility and key components of the organizational structure for the cooperative.

Projected Profitability of the Marketing Facility

Based on information provided from the survey results, enterprise budgets, and interviews, growers in the Southwest Virginia Agricultural Association chose the following crops for an initial profitability analysis for the marketing facility: string-weave tomatoes, green bell peppers, and pumpkins. Peppers and tomatoes were chosen because of their high profitability, regional acceptance, large volume potential, and purchasing agent interest. Pumpkins were chosen because of high local interest, the fact that they are not very labor-intensive, and the fact that they are a late season complement to the other early season crops, as well as to burley tobacco. Volume, revenue, and cost estimates were made based on this three-crop product mix. Other crops, such as asparagus and certain herbs and spices, were found to be very profitable on a per-acre basis, but there was insufficient demand to involve a large number of local producers.

Harvesting schedules were developed for each of the three crops based on obtaining maximum returns to growers while facilitating product flow and marketing logistics. Key objectives were to: (1) sell during the highest price periods, (2) market one crop at a time, (3) maintain the operations of the cooperative during an extended period, and (4) minimize storage space and packing equipment costs. Price data from 1992 through 1995 on major terminal markets located in and near the region were analyzed to determine the dates that have traditionally provided the highest prices for each crop. Peppers received a higher price early in the summer while tomato prices rose after the third week in August. By spreading out the harvest over a four-week period around these dates, the cooperative could potentially obtain the highest prices, remain within storage and grading capacity, reduce costs of adapting equipment and space, and meet volume requirements of purchasing agents. Pumpkins would be harvested in October.

Based on grower meetings in the various counties, acreage estimates were calculated for

each product for the first five years of operation. Based on farm-level field trials, estimates of overall yield and yield of top-quality number-one produce were made with yields adjusted downward to be conservative. Ranges for potential yields and grades were used to arrive at volume and grade estimates, projected by year for five years. Weekly and annual gross revenue for the cooperative was then calculated based on the expected volumes and on average prices received from 1992 through 1995 at the terminal markets in Atlanta, Cincinnati, Baltimore, and Columbia, as reported by the U.S. Department of Agriculture, Agricultural Marketing Service. These revenue projections represent best estimates but are subject to many factors that influence prices and costs (see Figure 2).

Based on discussions with growers, production was projected to start out low in the first year, with just 43,750 boxes of No. 1 tomatoes, 16,000 bushels of peppers, and 3,360 bins of pumpkins (Table 3). Production was expected to double in the second year and to reach 175,000 boxes of tomatoes, 64,000 bushels of peppers, and almost 4,000 bins of pumpkins by year three. After the third year, assuming profitability in the first three years, a 10 percent growth path was projected for years four and five. Projected annual sales revenue estimates under three price assumptions are presented in Table 3. Total annual gross revenues for the marketing cooperative are projected to conservatively reach \$2,810,000 by the end of year five.

The costs of operating the cooperative during each of the first five years was estimated based on personnel, equipment, and infrastructure requirements identified by the study team. Costs were divided into variable and fixed costs. Variable costs of grading, packing, cooling, and transporting produce were charged to each producer on a per-unit basis. Variable costs include costs such as boxes, warehouse labor, and transport of produce to the final market. Fixed costs include the salaries of the manager, broker, and secretary, costs of renting the warehouse, utilities, equipment depreciation, and certain minimum operating expenses. Total annual fixed costs were projected to range between \$69,500 and \$103,400 (Table 4). The cooperative can obtain a loan for start-up expenses through the Southwest Virginia Agricultural Association to cover the initial

costs. The total amount of production will be estimated based on pre-planting agreements, and the total fixed costs will be divided by the total units of production to determine the per-unit charge needed to cover these costs.

Variable expenses will depend greatly on the volume of produce passing through the facility. Based on the volume estimates made for the first year of the cooperative, variable expenses would be roughly \$2.00 per box for tomatoes, \$2.40 per box for peppers, and \$9.50 per bin for pumpkins. These expenses include costs of the box or bin, company logo on the box, grading, hauling, washing, and packing. Each year the management of the cooperative would need to estimate the variable and fixed costs and submit them to the board of directors for approval to charge to growers on a per-unit basis. Based on detailed analysis of likely acreage, volumes, and costs, a likely minimum and maximum per-unit charge to cover both fixed and variable costs was estimated for each crop (Table 5).

Expected returns to growers were calculated for a range of potential production levels, marketing costs, and product prices. For example, the per-unit cost of producing and marketing a box of string-weave tomatoes for a farmer with a 2,000 box-per-acre yield will vary from \$6.26 to \$7.25, depending on the quantity produced by fellow growers. The impact on the profit-per-acre can vary by as much as \$1,700 per acre. Estimates of per-acre profits for conservative assumptions are presented in Table 6. The figures were derived using yield estimates of 725, 1,750, and 2,040 for peppers, tomatoes, and pumpkins, respectively.

In arriving at the cost estimates, it was necessary to perform an analysis of the facility and equipment requirements for the cooperative. A warehouse was located, and an agricultural engineer from Virginia Tech (see Trupo et al., 1998) identified construction and equipment needs in detail. The specific facilities needed for receiving, processing, packaging, and storing the tomatoes, peppers, and pumpkins were specified. Flexibility and mobility were stressed. For example, a processing line was designed so that additional parallel lines could be added as volume grows.

Figure 2. Factors Affecting Cooperative Revenue.

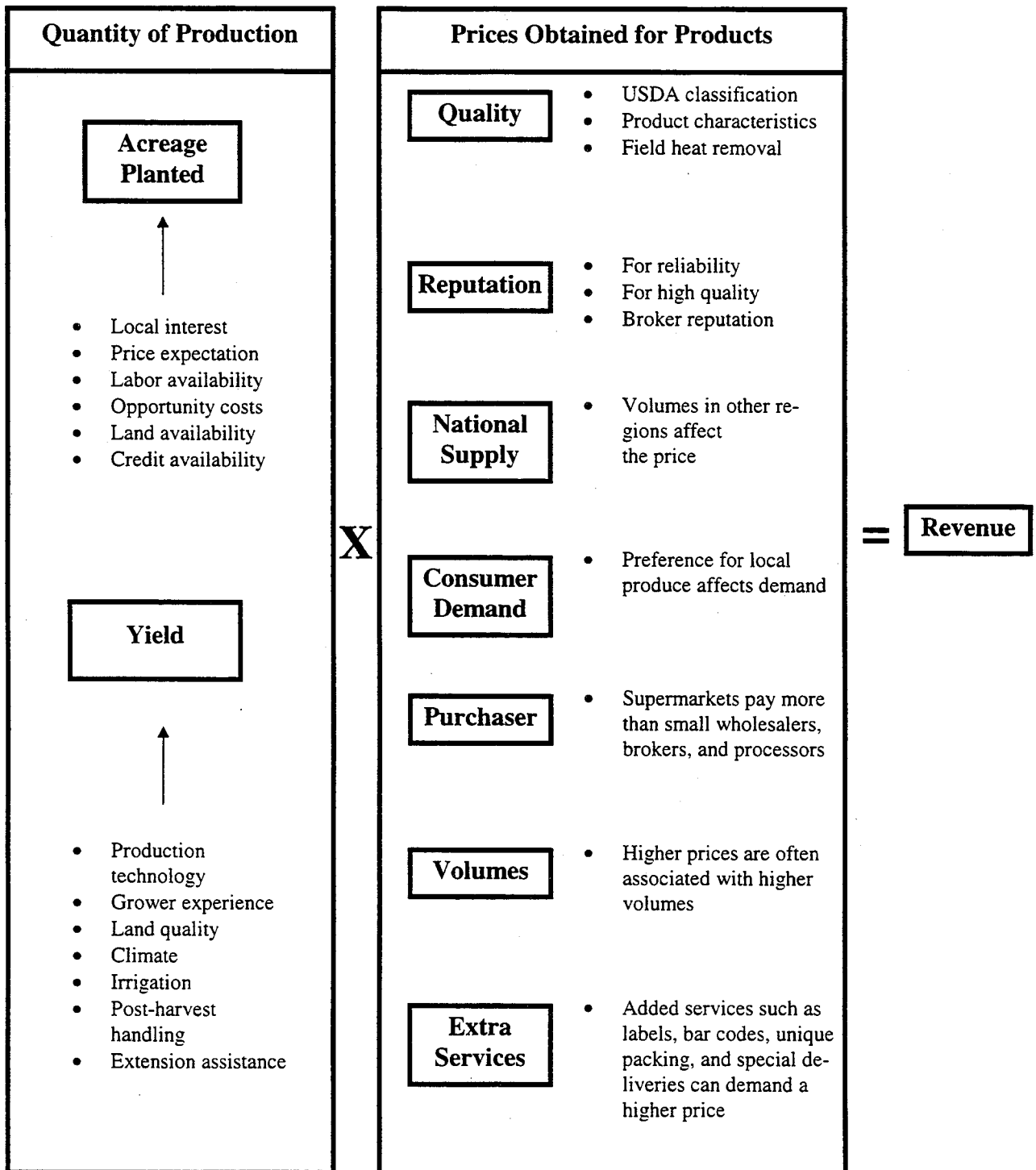


Table 3. Annual Sales Revenue Estimates with Low, High, and Average Projected Prices.^a

	Acres	Units	Low	High	Average
Year 0					
Peppers (1 1/9 bu.)	0	0			
Tomatoes (25# box)	0	0			
Pumpkins (bins)	50	2,812	\$185,592	\$466,792	\$281,200
Total Revenue					\$281,200
Year 1					
Peppers (1 1/9 bu.)	20	16,000	\$93,440	\$185,280	\$128,800
Tomatoes (25# box)	25	43,750	\$210,875	\$544,688	\$360,500
Pumpkins (bins)	60	3,360	\$154,560	\$557,760	\$336,000
Total Revenue					\$825,300
Year 2					
Peppers (1 1/9 bu.)	50	40,000	\$233,600	\$463,200	\$322,000
Tomatoes (25# box)	60	105,000	\$506,100	\$1,307,250	\$865,200
Pumpkins (bins)	65	3,656	\$168,176	\$606,896	\$365,600
Total Revenue					\$1,552,800
Year 3					
Peppers (1 1/9 bu.)	80	64,000	\$373,760	\$741,120	\$515,200
Tomatoes (25# box)	100	175,000	\$843,500	\$2,178,750	\$1,442,000
Pumpkins (bins)	70	3,937	\$181,102	\$653,542	\$393,700
Total Revenue					\$2,350,900
Year 4					
Peppers (1 1/9 bu.)	85	68,000	\$397,120	\$787,440	\$547,400
Tomatoes (25# box)	110	192,500	\$927,850	\$2,396,625	\$1,586,200
Pumpkins (bins)	80	4,500	\$207,000	\$747,000	\$450,000
Total Revenue					\$2,583,600
Year 5					
Peppers (1 1/9 bu.)	90	72,000	\$420,480	\$833,760	\$579,600
Tomatoes (25# box)	120	210,000	\$1,012,200	\$2,614,500	\$1,730,400
Pumpkins (bins)	80	5,000	\$230,000	\$830,000	\$500,000
Total Revenue					\$2,810,800

^aBased on prices during optimal harvest period.**Table 4. Projected Fixed Operating Expenses.^a**

	Low	High
	----- dollars -----	
Manager	35,000	40,000
Broker	0	15,000
Secretary	6,000	15,000
Rent	6,000	6,000
Utilities	3,000	3,000
Interest payments	6,500	9,400
Operating expenses	2,500	7,500
Depreciation	7,500	12,500
Total	66,500	108,400

^a Since the expenses are projections, a range is provided.

Table 5. Total Unit Charges by Product to Cover Variable and Fixed Expenses.

Product	Year	Min. per-unit charge ^a	Max. per-unit charge ^b
Tomatoes (25# box)	1	\$2.95	\$4.04
	2	\$2.40	\$2.86
	3	\$2.25	\$2.53
	4	\$2.23	\$2.48
	5	\$2.21	\$2.45
Peppers (1 1/9 bu.)	1	\$3.35	\$4.47
	2	\$2.80	\$3.26
	3	\$2.65	\$2.93
	4	\$2.63	\$2.88
	5	\$2.61	\$2.85
Pumpkins (bins)	1	\$13.20	\$14.29
	2	\$12.65	\$13.11
	3	\$12.50	\$12.78
	4	\$12.48	\$12.73
	5	\$12.46	\$12.70

^aBased on minimum projected fixed costs and high production yields of all crops.

^bBased on maximum projected fixed costs and low production yields of all crops.

Table 6. Expected Per-acre Profits for Various Levels of Production.

Crop	Year	Acres	Total Boxes of Produce (co-op)	Total Cost Per Unit ^a	Expected Profit Per Acre ^b
Tomatoes	1	25	43,750	\$7.37	\$3,899
	2	60	105,000	\$6.57	\$5,306
	3	100	175,000	\$6.34	\$5,705
	4	110	192,500	\$6.31	\$5,758
	5	120	210,000	\$6.28	\$5,802
Peppers	1	20	16,000	\$7.76	\$1,260
	2	50	40,000	\$6.96	\$1,842
	3	80	64,000	\$6.73	\$2,008
	4	85	68,000	\$6.70	\$2,030
	5	90	72,000	\$6.67	\$2,048
Pumpkins	1	60	3,075	\$66.98	\$1,842
	2	65	3,656	\$66.25	\$1,887
	3	70	3,937	\$66.04	\$1,901
	4	80	4,500	\$66.01	\$1,902
	5	80	5,000	\$65.99	\$1,903

^aCost to the grower of producing and marketing the product to the co-op, assuming fixed costs of \$80,000, a representative fixed-cost projection.

^bEstimates derived using average prices.

Organizational Development

Past attempts in Virginia to organize growers into horticultural farmer cooperatives have often failed in relatively short periods of time. In these previous efforts, the problems were not infrastructure constraints but inadequate organizational structures that did not allow for the completion of all the tasks required to meet industry standards for quality and volume. The creation of an organizational structure that addresses all of the required tasks is essential. The structure must allow a flow of information within the organization that permits consumer demand and market standards to flow back to the producer and be considered at all stages of the production/marketing system. Careful coordination is needed to ensure that all producers are growing the same varieties, using the same production practices, planting and harvesting on designated dates, following specified post-harvest handling methods, and complying with established delivery requirements.

Through the efforts of the extension agents in Southwest Virginia, informational meetings were organized for discussions among local producers about the possibility of expanding horticultural production and marketing in the region. A steering committee, which elected an interim board of directors, was formed. This elected group consisted of community leaders, current and potential growers, extension agents, marketing specialists, and other interested citizens. Subcommittees were formed to draft articles of incorporation, bylaws, and budgets, and to develop business, retail marketing, financial, and operational plans. Detailed information from the feasibility study reported on in this paper was presented to and discussed with these subcommittees. A mission statement was written that specified two primary objectives: (1) to increase the family incomes of farmers, which should lead to economic development in the region, and (2) to make a supply of locally grown horticultural produce available in Virginia supermarkets.

The bylaws stipulated cooperative policies and procedures, including membership eligibility, election of directors, annual meetings, officers' duties, voting rights, dues, capital investments rules, and dividend payment rules. The bylaws specified that operations are to be carried out in

accordance with the business plan and marketing agreement. As others join the cooperative, it will be easier to amend the business plan and marketing agreement than the bylaws. The Board will consist of between 12 and 18 members. The organizational structure of the cooperative is presented in Figure 3. The key components are members, board (with officers and committees), manager, broker, secretary, and employees. The committees have responsibilities for gathering specific types of information on production technologies, post-harvest technologies, labor issues (including job descriptions), marketing strategies, and budgetary issues, and they should add long-term stability to the cooperative.

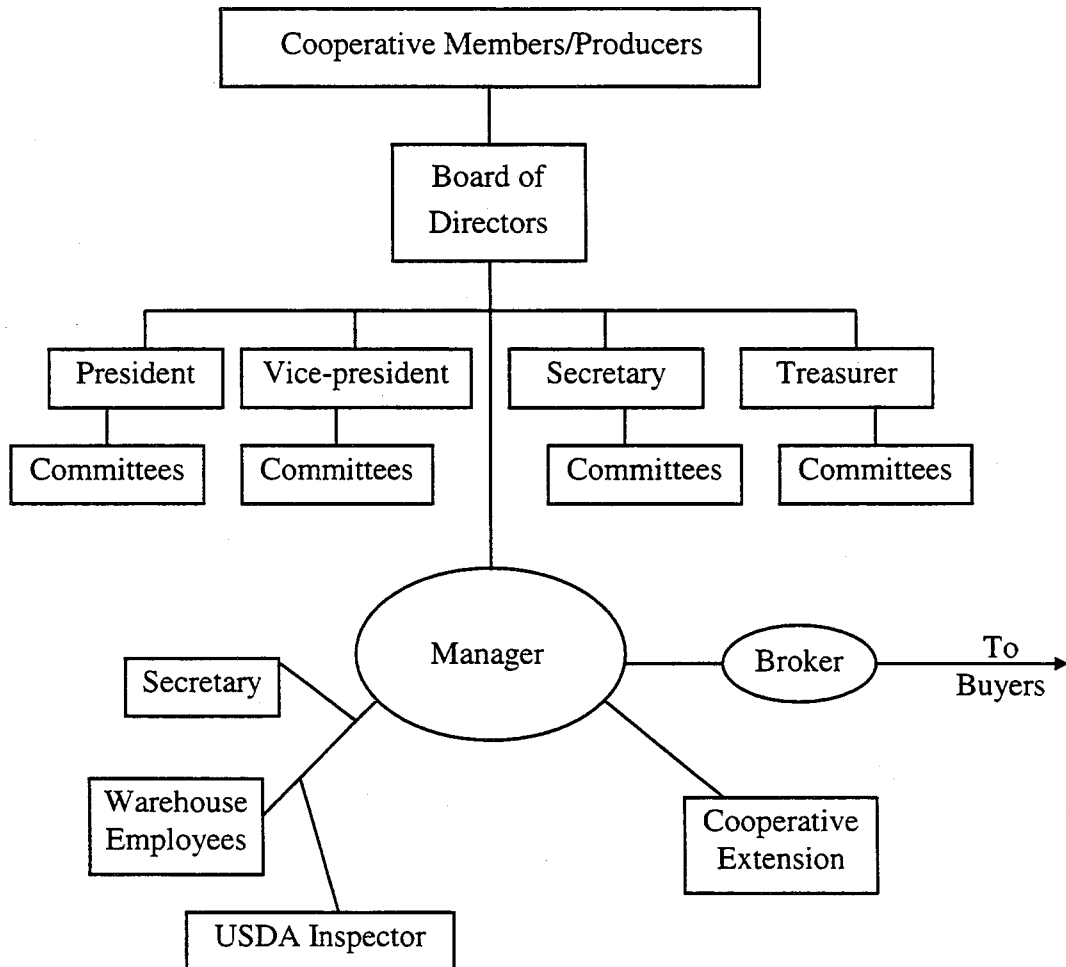
The business plan was developed to map out actions that need to be taken to achieve the cooperative's objectives. It includes issues discussed in this paper and contains a marketing strategy that focuses on sales to large supermarket chains. Secondary markets of lesser importance are small wholesalers, food service firms, independent grocers, and direct retail sales.

A detailed marketing agreement was prepared that provides a contract to be signed between the producer and the cooperative. In the marketing agreement, the obligations of both parties are specified, the rules for participating as a member of the cooperative are detailed, and operations of the cooperative are explained. The marketing agreement is the major tool used by the cooperative to ensure that the growers produce a product that meets the market standards. It includes an appendix that specifies the quality standards that must be met for the cooperative to market the member's produce. The agreement also includes a production information package as well as delivery and payment procedures.

Results and Lessons

The organizational structure highlighted above addresses the critical issues identified in the study. After the first phase of the study was completed, the Southwest Virginia Agricultural Association obtained a federal grant to support start-up costs. This grant helped provide impetus to form the steering committee and to develop the organizational structure described. The cooperative was organized in the first year, completing

Figure 3. Organizational Structure of the Horticultural Cooperative.



the various components presented above, and is implementing its first agreements with growers for the 1998 crop season.

Both the financial and the technical assistance provided by the public sector were important to overcoming the market failure discussed above. The grant is being managed by the Southwest Virginia Agricultural Association and is being used not only to purchase equipment and finance start-up costs but also to provide loans to growers to make the necessary investments to expand production. The public technical assistance component consisted of services from economists, an agricultural engineer, a horticulturist, and extension agents. Their input should significantly increase the cooperative's probability of success. The level of success of the cooperative will indicate the degree to which the public investment was worthwhile.

The ability to accumulate information on horticultural markets and cooperative structures involves more research than most growers or groups of growers can afford or successfully carry out. The research cost to obtain the required information to design an efficient cooperative structure has prevented past cooperative efforts from being properly organized, thus contributing to their failure. Information in the current study provided a group of generalist farmers with the specialized expertise to organize themselves properly into a cohesive cooperative. The abilities of the manager and broker hired to run the cooperative and market its products under the direction of the Board will prove crucial to the success of the venture. As long as all parties concerned comply with their agreements, produce quality products, and remain flexible in adjusting to unfore-

seen circumstances, the outlook for the cooperative's success is positive.

Conclusion

The fresh produce industry is dominated not only by large growers in the major production regions but by fewer and fewer very large retailers. It is not sufficient for local growers to produce a product preferred by local consumers; they must also meet the exacting requirements of the retailers. The requirements create barriers that have prevented Southwest Virginia growers from breaking into the fresh produce market on a large scale. A large-scale association is essential to compete with producers located in the regions that currently dominate the market. The large out-of-state producers possess advantages with respect to a longer growing season, higher yields, an established reputation, and perhaps even a certain amount of market power. Southwest Virginia growers do possess certain advantages of their own if they can organize to capitalize on them. They may have lower transportation costs, local brand recognition, fresher produce, and lower land costs. It may become particularly important to capitalize on the locally grown aspect.

Several parties that have participated in this research are convinced of the potential returns that can be obtained by Southwest Virginia growers if they modify their behavior and participate in the cooperative association. The cooperative structure and its governing documents have built on the past experiences of similar successful organizations. These documents emphasize issues and potential solutions that may confront other production regions with similar constraints and the same market failure. Copies of these longer detailed documents are available from the authors.

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