

Southwest Virginia Shipping-point Market Project: Phase Two

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Table of Contents

List of Tables	II
List of Figures	II
Acknowledgments	III
Introduction	1
Chapter 1 Operational Issues	2
Section 1.0: Introduction	2
Section 1.1: Product Mix.....	2
Section 1.2: Harvesting Schedule:	4
Section 1.3: Acreage and Volume Estimates	4
Production	?
Section 1.4: Forecast of Cooperative Revenue.....	11
Tomatoes and Peppers	11
Pumpkins	11
Section 1.5: Estimated Costs of Operating the Cooperative	12
Section 1.6 Financing Future Growth	18
Section 1.7 Expected Returns to Growers	18
Section 1.8 Education	20
Chapter 2 Facilities and Equipment	21
Section 2.0: Introduction	21
Section 2.1: Facility	22
Section 2.2: Receiving	22
Section 2.3: Processing Line	22
Recommended processing line.....	22
Alternative processing line.....	23
Section 2.4: Cold Room	24
Description of Cold Room Costs and Product Capacity	26
Section 2.5: Pre-cooler	27
Lighting	28
Refrigeration	28
Section 2.6: Product Flow	28
Chapter 3 Organizational Development	33
Section 3.0: Introduction	33
Section 3.1: Steering Committee.....	34
Section 3.2: Purpose of Mission Statement	34
Section 3.3: The Cooperative's Organizational Structure	35
Section 3.4: Temporary Committees	35
Section 3.5: Organizational Structure.....	35

Section 3.6 Business Plan	38
Section 3.7: Marketing Strategy	39
Section 3.8: Marketing Agreement	40
Appendix 1: Calculations showing per unit charges to cover fixed expenses	43
Appendix 2.A: Range of returns for various levels of production (Tomatoes)	46
Appendix 2.B: Range of returns for various levels of production (Peppers)	47
Appendix 2C: Range of returns for various levels of production (Pumpkins)	48
Appendix 3.: Expected Profits for First Five Years of Operations (Average Values)	49
Appendix 4: Mission Statement	50
Appendix 5: By laws	51
Appendix 6: Marketing Agreement	56

List of Tables

Table 1.1 Optimal Harvesting Schedule	5
Table 1.2 Yearly production estimates	6
Table 1.3 Range of potential yield estimates by graded produce	15
Table 1.4 Average production estimates by graded yield	8
Table 1.5 Quantity estimates based on various yields	10
Table 1.6 Five year production forecasts	10
Table 1.7 Annual revenue estimates	14
Table 1.8 Fixed operating expenses	16
Table 1.9 Range of per unit charges to cover fixed expenses	17
Table 1.10 Total charges by product to cover fixed and variable expenses	17
Table 1.11 Expected per acre profits for various levels of production volumes	19
Table 2.1 Cold room construction and refrigeration costs	25

List of Figures

Figure 1.1 Factors affecting cooperative revenue	13
Figure 2.0 Flow chart for processing line	29
Figure 2.1 Warehouse view with processing line and cold rooms	30
Figure 2.2 Elevation view of processing line and cold storage	30
Figure 2.3 Alternative washing, packing, and sorting line	31
Figure 2.4 Cold room, plan view	31
Figure 2.5 Cold room, elevation view	32
Figure 2.6 Cold room wall and ceiling construction	32
Figure 3.1 Cooperative organizational structure	36

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Introduction

The focus of this report is to identify specific issues related to planning, organizing, and managing a horticultural cooperative in Southwest Virginia. This publication draws on the experiences of other horticultural cooperatives and should be used as a guide to organizing the Southwest Virginia Co-op. The study is based on previous research that examined the feasibility of organizing a horticultural co-op in the region. This publication, a result of two years of research, should provide the cooperative organizers and management with important information to consider in their decision making process. The information includes production volumes, estimated operating expenses, volumes of produce passing through the facility, per unit costs of marketing produce, and expected returns to co-op members.

This study also presents a section on equipment and facilities that provides information relevant to building and equipping the cooperative warehouse. The warehouse dimensions that are needed to move specified volumes of produce are presented in Chapter Two. The costs of purchasing and operating the required grading and packing equipment are also presented in Chapter Two. Chapter Three focuses on organizational issues related to carrying out all the necessary tasks for a successful cooperative. Chapter Three identifies all essential tasks needed to operate a shipping-point market and addresses these issues within the context of a cooperative business plan, marketing strategy, bylaws, and marketing agreement.

The current study is a continuation of a study that was conducted from May 1995 to July 1996. That study (hereafter called Phase One) examined the feasibility of expanding horticultural production in Southwest Virginia's Ninth Congressional District. The focus of the initial study was to determine if markets exist for locally grown produce, identify the barriers that have prevented the expansion of local production, and determine if the existence of a shipping-point market would be sufficient to overcome the existing barriers and allow for increased horticultural production in the region.

The methodology used during the Phase One study included interviewing and surveying produce purchasing agents, marketing specialists, horticulturists, local producers, and community leaders, as well as conducting an economic analysis of potential crops. The findings of the Phase One study concluded that certain high volume crops such as

tomatoes, green peppers, and pumpkins meet the evaluation criteria for potentially profitable crops. All three of these crops can be produced in the region, purchasing agents have expressed an interest in buying them, and local producers have an interest in growing them. All three were estimated to be financially profitable during certain weeks of the year.

Produce purchasing agents located in and around the study region responded that they were interested in buying locally grown produce if the region could meet their strict marketing standards. These standards consisted of large volumes, high quality, specific varieties, long shelf-life, definite color, shape and size specifications, and certain grading, packing, cooling, and delivery requirements. The study concluded that the construction of a shipping-point market could provide all the necessary physical infrastructure required to meet the purchasing agents' market requirements. It was also determined that although the construction of a shipping-point facility could help overcome the barriers created by the lack of an adequate marketing infrastructure, there were certain organizational issues that needed to be addressed in order to increase the probability of successfully expanding local horticultural output.

The organizational structure that best addresses the region's concerns is a cooperative organization. The Southwest Virginia growers interested in breaking into new markets need to organize themselves and community leaders into a marketing cooperative that will operate on behalf of its members. A cooperative has been shown to be the optimal structure because of the small and dispersive nature of the region's growers. The required acreage with proper irrigation facilities is dispersed over a large geographic region; therefore, growers must pool their resources, share costs, and work together in order to produce sufficient volumes of produce that will allow them to break into new markets currently closed to the region's small producers.

The cooperative structure will allow the region's growers to assemble the required large volumes of produce, employ specialists to deal with managerial and marketing tasks, and share the costs of operating the shipping-point facility, which will increase the probability of their producing and marketing a product that meets the industry standards.

The major organizational issues that must be addressed by the cooperative include the following:

maintaining good communications between all participants, developing an appropriate marketing strategy, designing an appropriate business plan, forming and training the board of directors, determining roles for all participating personnel, and writing job descriptions. Past horticultural cooperative efforts in the state of Virginia have possessed extensive production and marketing infrastructure, but these cooperatives were forced to disband after a few years because of organizational issues that did not ensure that all market requirements were being met.

The Phase One study identified the importance of organizational issues; this second phase of the study will therefore stress the organization and coordination among all five participating entities: growers, management, board of directors, employees, and produce buyers. The overall objective of this study is to provide an organizational framework that will ensure all issues ranging from production to marketing are considered and that the cooperative's organizational structure carries out all the tasks necessary to ensure that the final goods being produced meet market requirements.

The specific objectives of the study include:

- Objective #1** Estimate total and weekly production by graded yield of each product that will pass through the market facility in each of the first five years of operation.
- Objective #2** Estimate total and weekly income for each product handled in the proposed facility.
- Objective #3** Estimate construction and operating costs for a facility operating at levels estimated in objective No. 1. above
- Objective #4** Determine facility equipment needs based on types of products handled and projected production levels
- Objective #5** Develop facility layout, incorporating handling and packaging equipment, offices, coolers, utilities, etc., required for operating proposed market. Prepare conceptual plans describing operational procedures and product flows, i.e. receiving handling, storage and shipping
- Objective #6** Determine the optimal organizational structure and five-year organizational work plan for the group of horticultural producers participating in the project.

Objective #7 Determine specific roles, job responsibilities of each particular group participating in the proposed market - producers, Extension agents, employees, etc.

Chapter 1.

Operational Issues

Section 1.0 Introduction

This chapter specifically addresses the objectives related to production, revenue, and profitability issues. The authors have worked closely with the Southwest Virginia cooperative organizing committee in order to specifically address key issues of particular relevance to the committee. The organizing committee, consisting of interested growers, community leaders, Extension agents, professional marketers, and horticulturists, has provided many of the estimates used in the following analysis.

During the period of this study, the organizing committee was responsible for nominating candidates, electing an interim board of directors, and selecting various sub-committees to develop the cooperative bylaws, articles of incorporation, business plan, retail marketing plan, wholesale marketing strategy, and budgets. Findings and figures developed by these committees are an important source of the estimates that were used in much of the following analysis.

Section 1.1: Product Mix

The cooperative's product mix refers to the combination of crops that will be produced by the growers and marketed through the cooperative. Initially, the cooperative will produce and market string-weave tomatoes, green bell peppers, and Halloween pumpkins. The choice of product mix was based on grower acceptance, purchasing agent interest, and the financial feasibility study conducted during Phase One of the Southwest Virginia Shipping-point Market project. 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, they are not very labor intensive, and they are a good late season complement to the other earlier summer crops, as well as Burley tobacco. The

following feasibility analysis, volume estimates, and income estimates are based on this three-crop product mix.

Of the ten potential crops identified in the Phase One study, tomatoes ranked as the most profitable and peppers as the third most profitable of all crops examined. Both of these crops are demanded in high volumes by produce purchasers. The benefit of a high volume crop is that more local growers can potentially participate in the production of these goods. Other products such as asparagus and certain herbs and spices were found to be extremely profitable on a per acre basis, but there was not enough demand for these products to involve the participation of a large number of local producers.

The Southwest Virginia region has production experience with both peppers and tomatoes. There was a tomato cooperative in the region during the 1970s and a pepper co-op in the mid 1980s. Both of these commodities are grown in family gardens, and on a small scale for direct farm sales and for sale to local markets in the region. Farmers should have minimal difficulty adapting to the production of these two commodities. Unlike the producers in the broccoli cooperative of Southside Virginia, the producers in the Southwest Virginia region have ample experience in the production of tomatoes and peppers; therefore, they will not have an arduous learning process of adapting new technologies. The region has ample experience in the production of both commodities and the producers who have participated in the cooperative's organizational meetings have demonstrated enthusiasm for these two crops.

Purchasing agents surveyed in the Phase One study demonstrated strong interest in buying both tomatoes and peppers. Produce buyers recognized the strong preference of Southeastern United States consumers for locally grown produce. Eighty percent of all produce buyers interviewed showed strong interest in high volume crops that can be produced locally. These buyers recognized the marketing potential of both tomatoes and peppers for bringing new customers into their stores, thus giving them an edge over competitors who only market out-of-state produce.

Pumpkins were chosen because it is a traditional, late season, low labor intensive crop, that grows well in the region, and because supermarket chains are interested in purchasing this crop. The nature of marketing Halloween pumpkins, with large consumer demand during the last two weeks of October,

makes it a unique crop and one that complements the other two crops of the product mix. Pumpkins can be planted in mid summer and require minimal attention until October when the farm season for most other crops is already finished. Pumpkins thus provide an excellent source of late season revenue for the farmer and for the cooperative.

Traditionally, pumpkins and other crops from the same family such as squash have been produced in the region for many years. Many growers have been producing pumpkins for local sale, but due to the lack of an established marketing network, there has been no previous attempt to expand production and break into larger markets. The region is agronomically and climatically suited to the production of this crop. There has been enormous interest from local producers to increase production and develop marketing channels for Halloween pumpkins.

Local Extension agents have formed interested producers into an Association of Pumpkin Growers. This association has been legally incorporated and the association's bylaws have been drafted. The Pumpkin Association has very little working capital to develop their marketing network; thus, it can benefit from the infrastructure being assembled at the Southwest Virginia Vegetable Cooperative. The cooperative manager/broker, who will be developing relationships with produce purchasers and bargaining on behalf of the growers, will be able to use his/her expertise and connections to market the pumpkins for the local growers. In return the cooperative will charge the association for these marketing services, which will help the co-op offset some of the costs of operating late into the season and employing a year-round manager.

Supermarket purchasing agents have also demonstrated high interest in buying Halloween pumpkins. One large chain's regional produce purchaser has participated in several of the Pumpkin Association's organizational meetings outlining market requirements and standards for the production and marketing of pumpkins.

While tomatoes, peppers and pumpkins will make up the bulk of the cooperative's initial product mix, it is important to continually monitor consumer interest and changes in market demand in order to adjust the product mix to meet changes in consumer preferences. Section 3.3 describes the role of the broker in monitoring market trends and evaluating the financial profitability of other crops.

Section 1.2: Harvesting Schedule:

The harvesting schedule presented in Table 1 was developed based on obtaining the maximum financial benefits for the growers while facilitating product flow, marketing logistics, and time schedules for the cooperative organization. Four basic objectives were considered in designing the optimal product harvest schedules:

- sell during highest price dates,
- focus marketing on one crop at a time,
- keep the co-op operational during the longest period possible, and
- minimize storage space and packing equipment costs to meet budget constraints.

Historic price data for 1992-95 from major terminal markets located in and near the Southwest Virginia region were analyzed to determine the dates that have traditionally provided the highest prices for each of the three crops selected. Peppers command a higher price early in the summer, while tomato prices rise after the third week of August. By spreading out the harvest over a four-week period around these optimal dates, the cooperative should be able to obtain the highest possible price for the producers of both of these commodities, while not surpassing the facility's grading and storage capacity.

Another advantage of this schedule is that a single crop will be harvested at a specific time. This allows the co-op management and co-op employees to concentrate their efforts on a single product. By concentrating on a single product at a time, the costs of adapting machinery and space from one crop to another will be limited, and the specialization achieved by focusing on a single crop should improve efficiency. Another benefit of concentrating on a single product at a time is that this should ensure that large volumes of the product will be harvested over a relatively short period of time. In order to be cost effective and meet purchasing agent requirements, the cooperative must be able to fill up trucks with produce, and have large quantities of produce available to meet the volume needs of the large supermarket chains. If both crops were to be harvested over the entire span of the summer, produce volumes would be less concentrated and the potential for failing to meet volume requirements would exist.

The third benefit of this schedule is that it allows the cooperative to have a source of revenue over a longer period of time. Having both mid summer and fall crops, the cooperative will have a source of revenue to offset the costs of operating the facility over the entire summer. This schedule also gives the co-op a chance to build up some equity in the early months that can be used to improve operations or allow for a faster payout to growers in the later months.

An additional determinant in designing the harvesting schedule was to minimize the costs of building cold storage space and purchasing grading and packing equipment. Produce cannot be harvested in volumes that would exceed the storage and grading capacity of the facility. The storage and grading capacity is limited by the funds allocated to these items, and thus, the amount of production that can be harvested at any given point is constrained by the capacity of the available equipment and storage capacity.

The production schedule presented in Table 1.1 gives the optimal harvest dates and acreage of the three crops chosen for the cooperative's product mix. The schedule was elaborated using estimates provided by the Southwest Agricultural Association, the results of the Phase One grower survey, interviews with current producers, and farmer participation in the organizational meetings. The schedule provides the optimal harvest times for each crop for each of the first five years, based on the acreage estimates explained in section 3. If production increases or decreases, the same schedule remains optimal as long as the volume of produce is large enough each week to ensure that full truckloads are able to be assembled and sent to buyers. There is also room at both extremes of the pepper and tomato harvesting season in case the cooperative expands production and needs to stagger supply over a five- or six-week period. Peppers can potentially be harvested earlier and tomatoes later without great decreases in yields or prices.

Section 1.3: Acreage and Volume Estimates

Based on preliminary meetings with growers in the five principal counties, acreage estimates have been calculated for each product for the first five years of operation. Based on the lack of production experience in the region for the two principal crops—tomatoes and peppers—and the limited resources available to provide technical and managerial support during the first year, the cooperative

Table 1.1 Optimal Harvesting Schedule

Optimal harvesting schedule based on:

- historic price data (capture high price for each commodity)
- harvesting one product at a time
- keep facility operational over long period of time

Year 0 (1997)²

dates listed by weeks of the month

	1-May	2-May	3-May	4-May	1-Jun	2-Jun	3-Jun	4-Jun	1-Jul	2-Jul	3-Jul	4-Jul	1-Aug	2-Aug	3-Aug	4-Aug	1-Sep	2-Sep	3-Sep	4-Sep	1-Oct	2-Oct	3-Oct	4-Oct	1-Nov	2-Nov	3-Nov
Peppers																											
Tomatoes																											
Pumpkins																											

Year 1 (1998)

Peppers																											
Tomatoes																											
Pumpkins																											

Year 2 (1999)

Peppers																											
Tomatoes																											
Pumpkins																											

Year 3 (2000)

Peppers																											
Tomatoes																											
Pumpkins																											

Year 4 (2001)

Peppers																											
Tomatoes																											
Pumpkins																											

Year 5 (2002)

Peppers																											
Tomatoes																											
Pumpkins																											

* shaded area indicates feasible harvesting dates

** numbers indicate acreage harvested at that particular time

² 1997 is termed "year 0" because first year efforts will concentrate on organizational and educational issues and production will be limited to late season pumpkins.

will dedicate the first year (1997) to organizing itself and educating prospective members. During the first year, the cooperative will not produce tomatoes or peppers, but it expects to produce a late season crop of pumpkins. In order to ensure success and avoid mistakes that have been made in the past due to lack of planning, the interim board of directors has decided to proceed cautiously and assure that all critical steps are being taken before beginning operations. The board believes that by mid summer a manager will be hired, the warehouse will be rented, and that this will provide sufficient time to enter the market for Halloween pumpkins.

1998 will be the second year of operations, but the first full year that all three products will be produced and marketed by the cooperative. Hereon, when referring to the initial, educational and organizational year 1997, it will be called year zero. The first year that all three crops are produced will be referred to as year one. The following five-year projections for volumes, costs, and profits will start with the first full year of production, 1998. In year one, the cooperative will start production with the few experienced growers that currently exist in the region. Membership will be open to all growers, but priority for technical assistance will be given to producers with greater than five acres of irrigated crop.

The first two years of production will allow Extension agents and members to carry out variety field trials and will give growers an opportunity to become familiar with production issues by allowing them to observe the production of other more experienced farmers. This initial small acreage will also give growers additional time to purchase necessary farm and irrigation equipment, and to make arrangements for migrant labor. The cooperative's board of directors does not want the lack of proper planning or a first year's poor results to leave the co-op with an unfavorable reputation.

Production is expected to start in year one with 25 acres of tomatoes and 20 acres of peppers. In three years, the goal is to produce 100 acres of tomatoes and 80 acres of peppers. Based on past experiences, the participation of growers in the organizational meetings, and on estimates from the Southwest Virginia Agricultural Association, the expected acreage of each commodity during the first five years of production is presented in Table 1.2:

The expected quantity of produce to be marketed through the cooperative will depend on the acreage

Table 1.2 Yearly production estimates (acres)

	Tomatoes	Peppers	Pumpkins
Year 0	0	0	50
Year 1	25	20	60
Year 2	60	50	65
Year 3	100	80	70
Year 4	110	85	75
Year 5	120	90	80

planted and the yields obtained. Field trials conducted by Extension horticulturists have placed tomato yields at 2,000 boxes an acre, pepper yields at 800 bushels an acre, and pumpkin yields at 2,750 units per acre. All three of these estimates could be obtained by experienced growers during good years, but more conservative estimates will also be calculated to allow for such variables as drought, pest problems and inexperience. Yields are impossible to predict and will vary from year to year and from farmer to farmer. The primary source of yield estimates is Virginia Cooperative Extension Publication 438-898, "45 Selected Costs and Returns Budgets for Horticultural Food Crops Production/Marketing." The cost and yield estimates presented in this publication were obtained from trials conducted with farmers in Southwest Virginia and on the Virginia Tech experimental station, thereby ensuring that the results obtained are very applicable to the region of interest in this study.

Another factor to consider when estimating yields is the percentage of top quality No. 1 grade produce. The cooperative should establish as a priority to market top grade produce, and as a secondary objective to market No. 2 grade produce to food processors. Due to the lack of production experience, it is difficult to estimate exact quantities per acre of variable grade produce. Due to this difficulty, a range of three yield possibilities will be calculated, with high, medium and low level estimates. The yield that will be obtained by local growers should fall somewhere in this range. While 2,000 boxes per acre of tomatoes is attainable during good seasons, using the more conservative estimates will prepare the cooperative for the higher costs faced during less productive seasons.

A sensitivity analysis showing the range of potential yields for each crop is presented in Table 1.3.

Table 1.3 Range of potential yield estimates by graded produce:

TOMATOES					
High		Medium		Conservative	
No. 1	No. 2	No. 1	No. 2	No. 1	No. 2
2,000	0	1,750	250	1,500	500

Range of potential yield estimates by graded produce:

PEPPERS					
High		Medium		Conservative	
No. 1	No. 2	No. 1	No. 2	No. 1	No. 2
800	0	725	25	650	150

Range of potential yield estimates by graded produce:

PUMPKINS							
High		Medium				Conservative	
No. 1	No. 2	No. 1	No. 2	No. 1	No. 2	No. 1	No. 2
2,750	0	2,400	0	2,050	0		

The estimated acreage calculations presented in Table 1.2 coupled with the range of yields by graded produce presented in Table 1.3 are used to calculate expected weekly production over the first five years of the project. As a matter of production and marketing strategy, an equal acreage of produce will be harvested each week. Based on the budget constraints faced by the cooperative management, grading and packing machinery, and cooling space will be minimized to keep costs low. This budget constraint obligates the cooperative to smooth out production over a longer period of time and prohib-

its any production above the capacity of the cooperative warehouse.

During the first year of production when acreage estimates are only 25% of the projected goals for the third year, each crop will be harvested over a shorter two-week period. This shorter harvesting window is needed to maintain daily volumes at large levels, to have trucks leaving the co-op docks with full loads, and to keep co-op expenses at a minimum. As the volume of production grows according to the schedule presented in Table 1.2, the harvesting windows will be extended to four and five weeks for each commodity. With the larger acreage expected in later years, risk is reduced by harvesting over a longer period of time, higher volumes can be maintained, and more time may be needed to grade and market the larger quantity of produce brought in to the cooperative.

Production estimates by graded yield are presented in Table 1.4. Production volumes are expected to quadruple between the first and third years of production. The levels of produce estimated for year three are the long-term levels that the cooperative needs to sustain in order to cover costs, meet market requirements, and keep the facility operational and growing for a long period of time.

Production estimates by graded yield have been presented, although it is recommended that the cooperative focus its marketing strategy on high-grade No. 1 produce (section 3.6). The ability to develop a market for produce that does not meet the top grade requirements has been identified as an important component for achieving profitable returns for the growers (Coale et al 1996). Although secondary markets such as food processors or fruit stands may be necessary to obtain high returns, the phase one study determined that these markets are very competitive and in many cases saturated and therefore was unable to identify any interested purchasers. As a result, the following revenue and profitability analyses assume that only top grade produce is sold and that no secondary markets exist.

The five-year production estimates presented in Table 1.5 summarize the average acreage and yield estimates presented in Table 1.4. These averages are the figures that are used to compute the revenue, total charge to growers, and profitability estimates which are summarized in Tables 1.7, 1.9, and 1.11.

Table 1.4 Average production estimates by graded yield

TOMATOES

		week 1	week 2	week 3	week 4	week 5	TOTAL	
		3-Aug	4-Aug	1-Sep	2-Sep	3-Sep		
YEAR 1	Acres		12	13			25	Acres
	Boxes No. 1	0	21,000	22,750	0	0	43,750	Boxes No. 1
	Boxes No. 2	0	3,000	3,250	0	0	6,250	Boxes No. 2
YEAR 2	Acres		20	20	20		60	Acres
	Boxes No. 1	0	35,000	35,000	35,000	0	105,000	Boxes No. 1
	Boxes No. 2	0	5,000	5,000	5,000	0	15,000	Boxes No. 2
YEAR 3	Acres	25	25	25	25		100	Acres
	Boxes No. 1	43,750	43,750	43,750	43,750	0	175,000	Boxes No. 1
	Boxes No. 2	6,250	6,250	6,250	6,250	0	25,000	Boxes No. 2
YEAR 4	Acres	25	25	25	25	10	110	Acres
	Boxes No. 1	43,750	43,750	43,750	43,750	17,500	192,500	Boxes No. 1
	Boxes No. 2	6,250	6,250	6,250	6,250	2,500	27,500	Boxes No. 2
YEAR 5	Acres	25	25	25	25	20	120	Acres
	Boxes No. 1	43,750	43,750	43,750	43,750	35,000	210,000	Boxes No. 1
	Boxes No. 2	6,250	6,250	6,250	6,250	5,000	30,000	Boxes No. 2

based on 1750 box yield of No.1 and 250 box yield of No. 2's

PEPPERS

		week 1	week 2	week 3	week 4	week 5	TOTAL	
		2-Jul	3-Jul	4-jul	1-Aug	2-Aug		
YEAR 1	Acres		10	10			20	Acres
	Bu. No. 1	0	7,250	7,250	0	0	14,500	Bu. No. 1
	Bu. No. 2	0	750	750	0	0	1,500	Bu. No. 2
YEAR 2	Acres		15	20	15		50	Acres
	Bu. No. 1	0	10,875	14,500	10,875	0	36,250	Bu. No. 1
	Bu. No. 2	0	1,125	1,500	1,125	0	3,750	Bu. No. 2

YEAR 3	Acres		20	20	20	20	80	Acres
	Bu. No. 1	0	14,500	14,500	14,500	14,500	58,000	Bu. No. 1
	Bu. No. 2	0	1,500	1,500	1,500	1,500	6,000	Bu. No. 2
YEAR 4	Acres	5	20	20	20	20	85	Acres
	Bu. No. 1	4,000	16,000	16,000	16,000	16,000	68,000	Bu. No. 1
	Bu. No. 2	0	0	0	0	0	0	Bu. No. 2
YEAR 5	Acres	10	20	20	20	20	90	Acres
	Bu. No. 1	8,000	16,000	16,000	16,000	16,000	72,000	Bu. No. 1
	Bu. No. 2	0	0	0	0	0	0	Bu. No. 2

yrs 1-3 based on 725 & 75 bu. yields of No. 1 & No. 2 produce

yrs 4-5 based on 800 bu. yield of No. 1s

PUMPKINS

		week 1	Week 2	TOTAL	
		3-Oct	4-Oct		
YEAR 0	Acres	25	25	50	Acres
	Pumpkins	51,250	51,250	102,500	Pumpkins 2,562 Bins
YEAR 1	Acres	30	30	60	Acres
	Pumpkins	61,500	61,500	123,000	Pumpkins 3,075 Bins
YEAR 2	Acres	32.5	32.5	65	Acres
	Pumpkins	73,125	73,125	146,250	Pumpkins 3,656 Bins
YEAR 3	Acres	35	35	70	Acres
	Pumpkins	78,750	78,750	157,500	Pumpkins 3,937 Bins
YEAR 4	Acres	40	40	80	Acres
	Pumpkins	90,000	90,000	180,000	Pumpkins 4,500 Bins
YEAR 5	Acres	40	40	80	Acres
	Pumpkins	100,000	100,000	200,000	Pumpkins 5,000 Bins

yrs. 0-1 based on 2050 pumpkin yields

yrs. 2-4 based on 2250 pumpkin yields

yr. 5 based on 2500 pumpkin yields

An estimate of 40 pumpkins per bin is used

Table 1.5 Quantity Estimates Based on Various Yields

Production estimates based on expected acreage and a range of potential yields.

Tomatoes (25 lb. box)					
Acres	Yield			Range of Production	
	1,500	1,750	2,000	Min	Max
25	37,500	43,750	50,000	37,500	50,000
50	75,000	87,500	100,000	75,000	100,000
75	112,500	131,250	150,000	112,500	150,000
100	150,000	175,000	200,000	150,000	200,000
125	187,500	218,750	250,000	187,500	250,000

Peppers (1 1/9 Bu.)					
Acres	Yield			Range of Production	
	650	800	900	Min	Max
20	13,000	16,000	18,000	13,000	18,000
40	26,000	32,000	36,000	26,000	36,000
60	39,000	48,000	54,000	39,000	54,000
80	52,000	64,000	72,000	52,000	72,000
100	65,000	80,000	90,000	65,000	90,000

Pumpkins (units)					
Acres	Yield (Pumpkin)			Range of Production	
	1,800	2,250	2,500	Min	Max
50	90,000	112,500	125,000	2250	3125
60	108,000	135,000	150,000	2700	3750
65	117,000	146,250	162,500	2925	4062
70	126,000	157,500	175,000	3125	4375
80	144,000	180,000	200,000	3600	5000

[†] Bins

Table 1.6 Five Year Production Forecasts

Year 0	Acres	Total Units
Peppers (1 1/9 bu.)	0	0
Tomatoes (25# box)	0	0
Pumpkins (bins)	50	2,812

Year 1	Acres	Total Units
Peppers (1 1/9 bu.)	20	16,000
Tomatoes (25# box)	25	43,750
Pumpkins (bins)	60	3,075

Year 2	Acres	Total Units
Peppers (1 1/9 bu.)	50	40,000
Tomatoes (25# box)	60	105,000
Pumpkins (bins)	65	3,656

Year 3	Acres	Total Units
Peppers (1 1/9 bu.)	80	64,000
Tomatoes (25# box)	100	175,000
Pumpkins (bins)	70	3,937

Year 4	Acres	Total Units
Peppers (1 1/9 bu.)	85	68,000
Tomatoes (25# box)	110	192,500
Pumpkins (bins)	80	4500

Year 5	Acres	Total Units
Peppers (1 1/9 bu.)	90	72,000
Tomatoes (25# box)	120	210,000
Pumpkins (bins)	80	5,000

Section 1.4: Forecast of Cooperative Revenue

Weekly and annual revenue for the cooperative over the first five years will be calculated based on the expected acreage and volumes specified in Tables 3-5, and on price and cost estimates from secondary sources³.

Tomatoes and Peppers

During the first year of production, the cooperative expects to start production with just a few of the more experienced producers in the region. Current production in the region is estimated at approximately 35 acres of tomatoes and 25 acres of green peppers, of which 25 and 20 is expected to be sold through the co-op during the first year. Based on the estimate of 25 and 20 acres respectively, the cooperative expects to market 43,750 boxes of No. 1 tomatoes and 14,500 bushels⁴ of peppers in its first full year of production. This estimate is based on the conservative assumption of 1,750 boxes of tomatoes harvested per acre of production and 725 bushels of green peppers per acre. The second year production is expected to include several new producers and increase local production to 60 acres of tomatoes, which will provide the cooperative with a total of 105,000 boxes of No. 1 grade produce, and 50 acres of peppers, which will produce 36,250 bushels.

The cooperative has established its third year of operation as a target date to reach the levels of production that are deemed necessary for the long-term sustainability of the project. Many of the members of the organizing committee feel that 100 acres of tomatoes and another 80 acres of peppers is needed in order to be able to cover the fixed costs of operating and sustaining the cooperative over a long period of time. After the third year estimates are reached, it becomes more difficult to forecast future trends due to uncertainty caused by the region's lack of experience.

The volume projections presented in this bulletin use a 5-10% annual growth rate of production for each year after the targeted third year. There is sufficient interest from local growers, land available, and sources of water in the region to support these forecasted levels of production, but the major factor that will ultimately determine future grower participation will be the profitability obtained by the grower/members during the first three years of operations. If the growers are able to meet quality standards and the cooperative structure is able to

obtain a high price for the locally grown produce, many more cautious and conservative farmers will likely join the cooperative. If the returns to growers are low, it will diminish interest and reduce the number of producer/members in the cooperative. Financial projections have been made based on historic price data, but the high variability of vegetable prices makes it impossible to forecast future returns to growers with any substantial degree of certainty.

Pumpkins

Pumpkin production estimates are presented in Table 1.6. Production of pumpkins is expected to rise from 2,812 bins in 1997 to 5,000 bins after five years. This estimate has been calculated based on producer participation in the Pumpkin Association meetings and estimated yield calculations supplied by horticultural experts. Acreage is expected to start at 50 acres in year zero and level off at approximately 80 acres after year 5.

The nature of a farmer cooperative is to provide "at-cost" services to its members, such as the grading, packing and marketing of the members' produce. The cooperative is expected to handle this at-cost accounting by selling all of the No. 1 produce that they can market, and to use this sales revenue to cover their costs of operation, depreciation, and future growth, and return the remainder of the revenue to the participating producers as their return. This "at-cost" form of charging the growers does not guarantee a fixed price to the growers upon taking possession of their produce. The cooperative has the obligation first, to pay its fixed expenses and cover its operating costs, and second, to pay the producers the remaining revenues after expenses have been met. Payment procedures will be discussed in the organizational issues section in Chapter Three.

The amount of gross sales revenue entering the cooperative will depend on the quantity of produce sold and the price obtained for the product. The quantity sold factor is in most part under the control of the cooperative and its members. At the beginning of every planting season, the cooperative should have signed marketing agreements between the growers and the co-op management that specify the exact acreage that will be committed to market through the cooperative. Other factors besides the acreage planted that will influence produce volumes have been discussed above and include yields, and quality of produce. The other variable, prices, is much less under the control of the cooperative and

³ secondary sources include USDA Market News Service price data & VA. Tech horticultural budgets

⁴ when referring to peppers "bushel" refers to the standard 1 1/9 bu. used for peppers.

depends on market conditions such as national supply, type of purchaser, volumes sold, extra services provided, and consumer demand.

Due to both the unknown quality and volumes of the cooperative grown produce, and the volatility of horticultural prices in general, a range of low, medium, and high prices will be calculated in order to present the entire potential range of cooperative revenue that can be feasibly obtained during the first five years of operation. The price data used to calculate this range of potential revenue has been obtained from USDA/Agricultural Marketing Service publications that present terminal market prices between 1992-95 for the Atlanta, Cincinnati, Baltimore, and Columbia, South Carolina, markets.

Terminal market price data are used to estimate potential prices for vegetable produce because it is the most reliable source available. Terminal markets account for less than 40% of the total volume of fresh produce shipped, with the largest portion of fresh produce being shipped directly to supermarket retailers. While terminal markets may fail to capture a large portion of produce shipped, the existence of numerous markets throughout the country, and the up-to-the-minute availability of their produce prices, allows them to serve as a reliable gauge of national produce prices.

The importance of terminal markets has diminished in the last 40 years with the growth of the large supermarket chains. Supermarket chains generally pay higher prices to shipping-point markets to ensure a constant flow of high quality produce. Terminal markets have increasingly become a secondary market for large fresh produce shippers, and therefore, generally pay a lower price than the supermarket chains pay for fresh produce. The use of regional terminal market prices may actually understate the prices that have been paid to growers of fresh produce.

The terminal market prices are an average obtained across the four markets located closest to Southwest Virginia. The prices (see Appendix 2) reflect an average over the entire period when Virginia produce can be feasibly harvested. The optimal harvesting windows for tomatoes and peppers were chosen based on the periods when prices have historically been highest.

Annual revenue calculations will be derived using the production estimates for each of the first five years presented in Table 1.5. These production

estimates are multiplied by the minimum, average, and high prices obtained from the USDA historic price data and the resulting yearly revenue figures are presented in Table 1.7.

The expected revenue estimates presented in Table 1.7 reflect the total value of sales obtained by the cooperative for all three products marketed. The total expected revenue is given as a range based on low, high, and average price estimates. Revenue is calculated from the total units of produce sold times the expected price paid for each unit. The total sales revenue provides a benchmark that can be used to estimate cooperative expenditures, charges to growers for the co-op services, and a potential range of profits to growers.

As new members join the cooperative during the second and third years of operation, acreage will expand and the volumes of produce will increase, thus raising total revenue. The greater the total revenue generated by the cooperative, the more additional resources become available for investing in the growth of the co-op or increased returns to the members. In year one with smaller acreage, the cooperative's total revenue is expected to be at \$825,300. In year three with the increased acreage, total revenue is expected to be around \$2,350,000. This additional \$1.5 million in revenue will help lower per unit charges to growers, and provide an opportunity for the growth of the co-op.

Section 1.5 Estimated Costs of Operating the Cooperative

The costs of operating the cooperative during each of the first five years will be estimated based on personnel, equipment and infrastructure requirements identified by the study team. The cooperative's board of directors will eventually make critical decisions that determine the exact operating costs of running the cooperative facility. At this point in time, the costs of operating the facility can only be estimated; the actual costs of contracting a manager, a broker, the rent to be paid, and the type of cooling technology that will be chosen are unknown. The cooperative organization is faced with an initial budget constraint that will restrict the number of technological and personnel alternatives that can be considered. The cost estimates presented here are based on shipping-point facilities of a similar nature to that of the proposed cooperative.

The largest unknown cost is that of salaries for personnel. At this time it is unknown if the cooperative will hire both a manager and a broker. The

Figure 1.1 Factors Affecting Cooperative Revenue

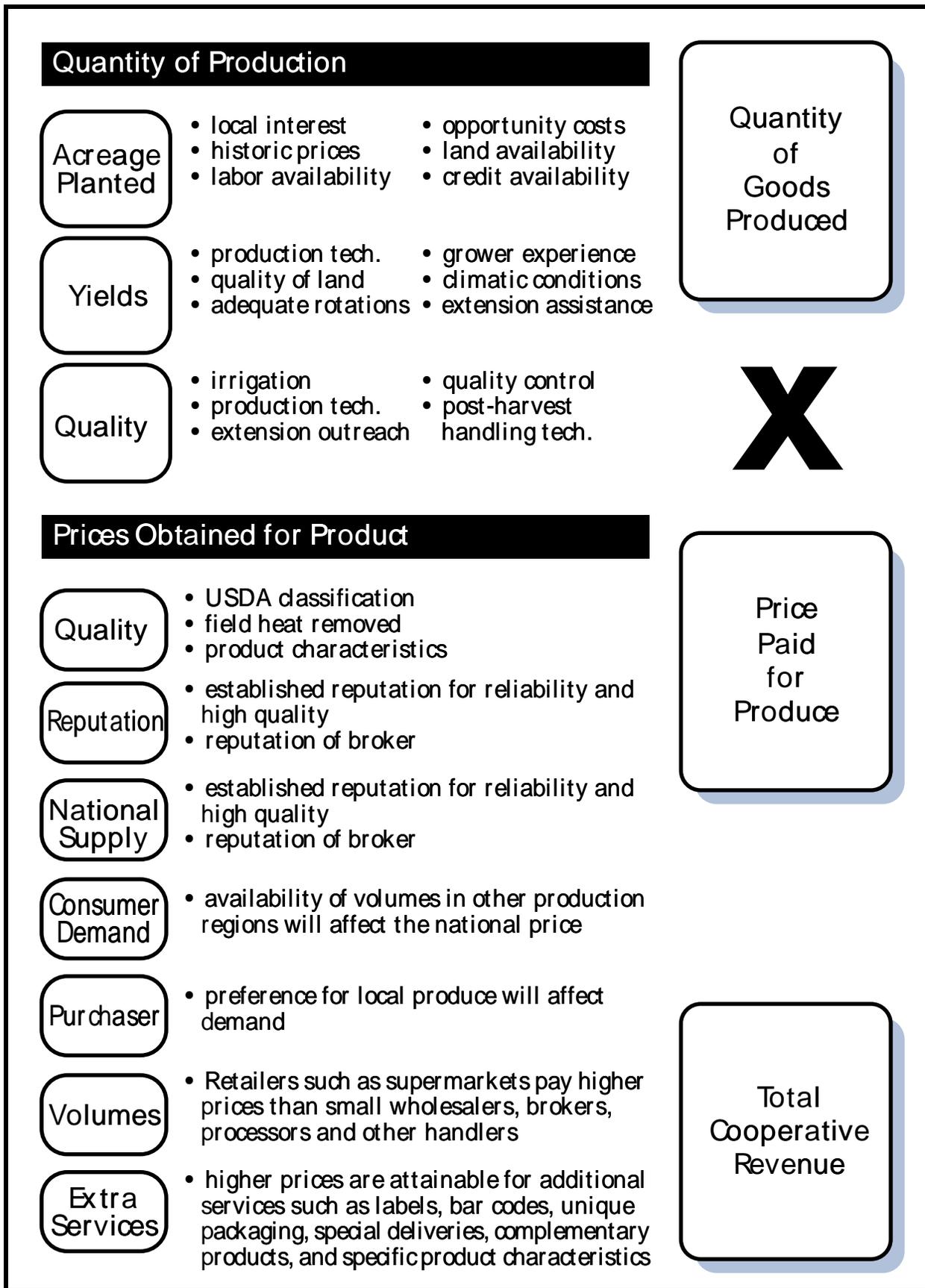


Table 1.7 Annual Sales Revenue Estimates

Year 0					
	Acres	Total Units	Prices		
			min.	max.	average
Revenue					
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					
	Acres	Total Units	Prices		
			min.	max.	average
Revenue					
Peppers (1 1/9 bu.)	20	16,000	\$93,440	\$185,280	\$128,800
Tomatoes (25# box)	25	43,750	\$210,875	\$ 544,687.50	\$360,500
Pumpkins (bins)	60	3,360	\$ 154,560	\$ 557,760	\$336,000
Total Revenue					\$ 825,300
Year 2					
	Acres	Total Units	Prices		
			min.	max.	average
Revenue					
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					
	Acres	Total Units	Prices		
			min.	max.	average
Revenue					
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					
	Acres	Total Units	Prices		
			min.	max.	average
Revenue					
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					
	Acres	Total Units	Prices		
			min.	max.	average
Revenue					
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					\$ 2,810,000

Phase One study emphasized the importance of a professional broker working for the cooperative. Many of the past cooperative efforts have suffered problems because of the lack of a professional marketing specialist. Purchasing agents have ranked the inability to meet market requirements and bad business practices as the two major reasons why they do not buy Southwest Virginia produce. Both of these factors are the responsibility of the broker, which may be the single most important position within the cooperative organization. Finding markets for the produce, bargaining on behalf of the growers, and communicating with the purchasers are the responsibilities of the broker. Due to budget constraints faced by the cooperative, the board of directors may attempt to consolidate the positions of manager and broker into a single function. If this is the case, they may save money on personnel costs, but it will be at the expense of efficiency losses.

Another alternative to employing a marketing specialist is the possibility of renting the services of a professional broker. It is possible to contract food brokering services for a specified period of time. The advantage of this alternative is that costs can be minimized, because a broker will only have to be paid for the time actually under contract. The negative aspect of this arrangement is the lack of a year round specialist with direct ties to the project. A temporary broker may lack the incentive to perform many of the additional marketing tasks outlined in the job description and his future is not necessarily tied to the long term success of the cooperative. There is an obvious trade-off between the efficiency of a full-time cooperative broker and the cost savings of renting temporary, part-time food broker services.

The costs of running the cooperative will be divided into variable and fixed costs. The variable costs represent the specific costs of grading, packing, cooling, and transporting a grower's produce. These variable costs will be charged to each producer on a per unit basis. The costs that are included in the variable costs include: the price of a box, depreciation on machinery, the cost of warehouse labor, the cost of a USDA approved inspector, and the cost of transporting the produce. The price charged to a grower for these variable expenses should be "at-cost," just sufficient for the cooperative to cover these specific costs of receiving, preparing, and transporting the produce.

The expenses termed as fixed costs include all the expenses of operating the facility beyond the variable costs of grading, packing and shipping produce. The fixed operating costs include the salaries of a man-

ager, broker, and secretary, the costs of renting the warehouse, office expenses, utilities, and all operating expenses. An additional per unit charge to growers, beyond the variable costs of grading and packing, must be applied to each unit of produce marketed in order to cover these fixed costs. The total amount of fixed costs must be estimated by the manager in his annual operating budget and approved by the board of directors. The total amount of production will be estimated based on pre-planting marketing agreements and the total fixed costs will be divided by total units of production to determine the per unit charge needed to cover total fixed operating expenses.

Variable expenses are estimated at \$2.00 per box of tomatoes. These costs can be broken down into \$.85 for the cost of a new box with company logo, and \$1.15 for grading, hauling and packing expenses. The variable costs for peppers is \$2.40 and breaks down as \$1.10 for a new box with company logo, and \$1.30 for the costs of grading, packing and hauling peppers.

The variable expenses of marketing pumpkins differ somewhat from the other two products because grading, cooling, and packaging are less of an issue for Halloween pumpkins which is not an edible product. The pumpkins should be graded in the field by producers and washed and stored indoors at the co-op facility. The cost of a new pumpkin box is the largest variable expense. A new box generally holds between 35 to 45 pumpkins, depending on their size, and weighs between 750-800 pounds. The cost of a new box ranges from \$9 to \$12 each depending on the quantity purchased and the degree of labeling. Box lids are needed when bins are stacked in a truck, costing an additional \$1.50 each. Unlike tomato and pepper boxes, pumpkin bins can be reused. Pumpkins are generally displayed in large open spaces, and do not have to look as fresh as edible products; therefore, new bins aren't needed as an advertising tool. While pumpkin bins will have the cooperative logo displayed on the side of the bin, the bin itself serves more as a protective device while transporting and displaying the pumpkins. The durable construction of pumpkin bins may allow them to be reused several times, but for the sake of our conservative estimates we will assume that one new bin must be purchased for every 40 pumpkins. The variable cost of marketing a bin of pumpkins is assumed to be \$12.25. This cost can be broken down to \$9.50 for a bin, \$0.75 for a lid (for half of the bins), \$1.00 for washing and packing and labor, and \$1.00 for transportation.

Total annual fixed expenses are estimated at a range between \$66,500 and \$108,400. A ceiling of

\$108,000 has been placed on annual expenses so that the cooperative's budget constraint is not surpassed. The cooperative has obtained a loan for start-up expenses through the Southwest Agricultural Association which the co-op will be obliged to pay back. A conscious effort is being made throughout this study to keep expenses low and minimize fixed, sunken costs, so that the cooperative will have the flexibility to modify operations, expand, or change locations to meet changing needs as the project develops during the initial years. As of this printing, the cooperative's board of directors still needs to prioritize its basic needs and develop a budget that meets both their short and long-term goals, while remaining within their budget.

Table 1.8 Fixed Operating Expense Estimates

	Minimum	Maximum
manager	35,000	40,000
broker		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 on office and warehouse equipment	7,500	12,500
	66,500	108,400

The cooperative will need to charge the growers for the services of marketing their produce. The amount charged to the growers will have to be sufficient to cover the actual costs of grading, packing, cooling, and transporting the produce (i.e., variable costs), as well as the costs of renting the facility, paying the personnel salaries, and paying utilities (i.e. fixed costs). The charge to growers will be on a per unit of produce basis. The manager will prepare an operating budget detailing the total expected expenditures for the year. Based on the marketing agreements signed during the previous winter, estimates of total produce volumes that need to be marketed will be calculated. The manager will then divide the expected amount of total fixed costs, divided by the number of units to be marketed by the cooperative to obtain a charge to growers for each unit of produce marketed. This charge to cover fixed costs will be added to the variable charges of marketing produce in order to established the

annual total charge to growers for marketing their produce through the cooperative.

The larger the volume of produce marketed through the cooperative, the smaller the per unit cost charged to each grower for using the services of the co-op. This fact again emphasizes the importance of large volumes. Large volumes of produce are important both for meeting purchasing agent requirements, and to keep the per unit costs charged to growers low. Due to the lack of experienced horticultural producers in the study region, the participation of new growers is going to depend on the profitability of producing horticultural goods. The greater the volume sold through the co-op, the lower the per unit costs charged to growers. The lower the costs of using the cooperative's marketing services, the more attractive it will be to become a member of the co-op. The estimates of the fixed, variable, and total costs of using the cooperative for various levels of production are derived in Appendix 1 and summarized in Tables 1.9 and 1.10.

At the time of this printing, it is still too far in the future to predict with exact certainty the volume of produce that will be marketed through the co-op and the total fixed costs that will be faced by the cooperative and its members. A budget has been prepared using both low and high estimates of the cooperative's total fixed costs. This budget of fixed expense estimates is presented in Table 1.8. The expense categories listed in Table 1.8 are very broad and aggregated and only serve the purpose of presenting a range of cost options that the co-op will face. The actual costs faced by the cooperative will depend on specific decisions taken by the cooperative's board of directors, but should fall between the minimum and maximum cost estimates presented in Table 1.8. These cost estimates, as well as the estimates for production volumes presented in Tables 1.5 and 1.6, have been used in Appendix 1 to help estimate the per unit costs that must be charged to growers for the marketing services provided by the co-op.

Acreage estimates presented in Table 1.2 were used to help determine the quantity of produce that would be marketed through the co-op. The conservative, moderate and optimistic yield possibilities from Table 1.3 were used to determine high and low estimates for potential volumes of produce to be marketed through the co-op. Table 1.4 shows the average production estimates that were used to calculate the per unit price that would be charged to growers for each

unit of produce they sold through the cooperative. Appendix 1 provides four different estimates based on conservative and optimistic yields, and based on low and high fixed cost estimates. The results summarizing the range of per unit costs to growers are presented in Table 1.9 for each of the co-op's first five years of operation.

In year zero, where only pumpkins are expected to be produced, no attempt has been made to determine the charge to producers to cover fixed costs. At the time of this writing, it has not been determined the degree to which an investment in fixed costs such as personnel, rent, machinery, and equipment will be made for year zero. If a manager is hired and office space is rented, the pumpkin producers cannot be held solely responsible for covering these entire first year costs. A considerable portion of the work of the manager during the first year will be to develop markets for future years' tomato and pepper crops; therefore, some of these initial year's costs must be passed on to tomato and pepper producers using the co-op services in future years.

In year one, with the small acreage allotments, the additional charge to growers above the variable costs of selling the produce varies between \$.95 and \$2.04 per unit. The small acreage produced during the first full year of production results in a high initial charge of marketing produce passed on to the growers. In year three when the cooperative reaches its expected production capacity of 100 acres of tomatoes, 80 acres of green peppers, and 70 acres of pumpkins, the per unit costs charged to growers drops to between \$0.25 and \$0.53. Comparing the difference in tomato costs between year one and year three for the more conservative high fixed cost estimates, the charge to growers is \$1.51 higher per unit to members in the first year compared to the third year. In the case of tomatoes, the savings to growers from the lower charges that result from higher volumes in year three could result in an additional \$2,543 of profit per acre for the producers.

The per unit charges to growers for each of the first five years are calculated in Appendix 1, using minimum and maximum fixed cost estimates as well as optimistic and conservative yield estimates. The results of Appendix 1 are summarized and presented in Table 1.9. This Table shows the range of costs to producers for marketing various volumes of produce through the cooperative.

Table 1.9 Range of per unit charges to growers for fixed expenses

year	total acreage	min per unit charge	Max per Unit charge
1	105	\$0.95	\$2.04
2	175	\$0.40	\$0.86
3	250	\$0.25	\$0.53
4	275	\$0.23	\$0.48
5	290	\$0.21	\$0.45

The per unit charges to growers for fixed expenses are added to the variable costs of grading, packing, and marketing the produce, and the total charges to growers are presented in Table 1.10. The total charges presented in Table 1.10 will be subtracted from the price per unit of produce obtained by the cooperative, and the remainder will be returned to the growers as sales revenue.

Table 1.10 Total unit charges by product to cover variable and fixed expenses

	Year	min per unit charge	max per unit charge
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	\$4.447
	2	\$2.80	\$3.26
	3	\$2.65	\$2.93
	4	\$2.63	\$2.88
	5	\$2.61	\$2.85
pumpkins	1	\$13.20	\$14.29
	2	\$12.65	\$13.11

(bins)	3	\$12.50	\$12.78
	4	\$12.48	\$12.73
	5	\$12.46	\$12.70

The volume of produce marketed through the cooperative will affect the price charged to farmers for selling their produce. As the volume of produce marketed through the co-op increases, the total cost of producing and marketing the farmers' goods will decrease. Different levels of profitability to growers for varying levels of production are calculated in Appendix 2.

Section 1.6 Financing Future Growth

The initial investment in infrastructure, cooling, and grading equipment should be sufficient to meet projected expansion and increased volumes of produce up to levels estimated for the third year of operations. Beyond these levels estimated for the third year, the co-op must establish a long-term business plan with long-term objectives for future operations. The board of directors and co-op manager, acting on behalf of the region's producers, must make decisions on the future growth of the organization.

The major issues about future growth are related to the number of members to accept, the volumes of produce that can be marketed, expansion into other produce alternatives, diversification into processing or other value-added manufacturing, expansion into the retail industry, and the purchase of a self-owned building. All future growth related to large expenditures in capital equipment and infrastructure will be financed through retained earnings.

Retained earnings are a per unit charge taken from the pool of revenue that exists after paying operating costs and that would normally be returned to the producer/members as their sales revenue for selling produce through the cooperative. Any retention of this revenue would diminish the returns to the growers and lower their annual profits. Due to the direct impact that retained revenues have on the producers, the members would have to vote on any issue related to the future growth and expansion of the cooperative.

As the volume of produce increases, the per unit retention for any proposed expansion or growth will decline. It may be possible in future years, as new members join the co-op, to continue to charge members at the same levels as the initial years,

even though the per unit costs of marketing larger volumes is lower. If these initial year revenues are satisfactory to the members, the decreased per unit costs of marketing larger volumes may be retained and used to finance future growth.

The question of growth most likely will not be an issue until the third or fourth year of operations when the co-op reaches its targeted level of production. There is still a large amount of uncertainty involved in the creation of this cooperative and many farmers have a "wait and see" attitude. If prices received by growers during the first years are favorable, then a large number of passive growers may rush to join the cooperative, while if negative climatic or market conditions hit the co-op in its initial years, many potential members may avoid joining the association.

If conditions are favorable during the initial years and the co-op desires to expand production beyond the projected third year levels, the grant awarded to the Southwest Virginia Agricultural Association will be available as a revolving loan fund to finance future opportunities for growth. The cost of obtaining this loan will always be tied to the prime rate and be comparable to the existing market rate at the time of request. The advantage of this fund is that the conditions may be less strict and provide more flexibility to the cooperative to meet the terms of the agreement and pay back the loan. The cooperative has the incentive to pay back all loans promptly in order to continue to have access to this fund in the future.

Section 1.7 Expected Returns to Growers

The importance of producing and marketing large quantities of produce can be seen in Tables 1.10 and 1.11. These tables show the differences in cost of production for a range of possible production scenarios. A range of potential production and marketing costs are presented in Table 1.11. The range of overall costs to growers has been derived from three different yield scenarios (Table 1.3) and two different fixed cost scenarios (Table 1.8).

Since exact yields are unknown, the per unit cost of produce varies depending on the overall quantities marketed through the co-op, and prices oscillate from year to year and vary with quality and grade, a potential range of returns to growers has been calculated that incorporates fluctuations in all of these variables.

In Appendix 2.A it can be seen that the total 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 \$5.69 to \$7.52, depending on the quantity of goods produced by fellow growers. This difference in cost per box stems from the difference in marketing costs caused by total quantities sold through the cooperative. The difference in net profit per acre to a single tomato farmer can vary by as much as \$3,660 depending on the per unit price that the co-op must charge to cover its fixed expenses. The impact on Bell pepper growers is similar. For a grower who produces 725 bushels of peppers per acre, the total cost of producing and marketing a bushel can vary between \$6.58 and \$8.41 (see Appendix 2.B). This difference can add up to an additional \$1,248 of profit when the cooperative is marketing large volumes of produce, compared to the volumes anticipated for its first year of operations.

The information presented in Table 1.11 is important because it demonstrates how farmer cooperation can lead to substantially more profits per grower. By sharing the costs of the post-harvest

handling and marketing expenses, the farmers are able to generate returns much higher than they could obtain individually. Appendix 2 gives a full range of potential profits based on different yield, price, and cost estimates. Appendix 3 provides an estimate of potential profits based on “average” yield, cost, and price estimates and is summarized in Table 1.11.

It can be seen from Table 1.9 that as production increases from the first year to the third year, the costs of marketing produce will become less to the farmers on a per unit basis. Several assumptions are made in order to calculate the estimates in Table 1.11. In Appendix 2 uncertainty is dealt with by presenting a range of values for yield, operating costs, and prices. In Table 1.11 mean values for yield, price, and fixed cost estimates were used to simplify the tabulations. Table 1.11 was derived using yield estimates of 1,750, 725, and 2040 for tomatoes, peppers, and pumpkins, respectively. Fixed costs of \$87,450 per year were also assumed in deriving the calculations. In the case of tomatoes, the per unit costs of marketing produce in the fifth year was one dollar less per box in the fifth

Table 1.11 Expected Per Acre Profits for Various Levels of Production Volumes

Crop	Year	Acres	Total Boxes of Produce (co-op)	Total Cost per Unit ⁵	Expected Profit per Acre ⁶
Tomatoes	1	25	43,750	\$7.37	\$3,899.07
	2	60	105,000	\$6.57	\$5,305.53
	3	100	175,000	\$6.34	\$5,705.05
	4	110	192,500	\$6.31	\$5,757.50
	5	120	210,000	\$6.28	\$5,801.77
Peppers	1	20	16,000	\$7.76	\$1,259.58
	2	50	40,000	\$6.96	\$1,842.25
	3	80	64,000	\$6.73	\$2,007.77
	4	85	68,000	\$6.70	\$2,029.50
	5	90	72,000	\$6.67	\$2,047.84
Pumpkins	1	60	3,075	\$67.10	\$1,842.29
	2	65	3,656	\$66.30	\$1,887.30
	3	70	3,937	\$66.07	\$1,900.08
	4	80	4,500	\$66.04	\$1,901.76
	5	80	5,000	\$66.01	\$1,903.18

⁵ Cost of producing to grower and marketing to co-op

⁶ estimates derived using “average” price data

year as compared to the first year. This cost savings could translate into an additional \$2,000 profit per acre to each grower when the cooperative markets large volumes of produce in the fifth year. Additional profits per acre for peppers are \$700 in the fifth year of operation.

Section 1.8 Education

The success of the project will depend on getting a sufficient number of growers to participate in the cooperative so that the per unit costs of marketing produce can be minimized. In order to integrate the production of many new producers and maintain open communication with existing growers, the cooperative must perform a large educational outreach program to inform and train new and existing members. This educational effort is the primary reason that in the initial year (year zero) there will be no production and the cooperative personnel will be dedicated to grower outreach.

Grower outreach will have to be a joint effort between the cooperative board, the cooperative manager, and Cooperative Extension. Local producers must be informed about the objectives of the cooperative, they must be educated about the cooperative's business and marketing plan, and they must be instructed in proper production technologies that will ensure high quality produce. Due to the magnitude of this educational outreach effort, large-scale production of tomatoes and peppers will not begin until the following year. If the outreach program is successful, first year acreage may be larger than that estimated in Table 1.5, thus lowering the per unit costs to growers and raising their per acre returns.

Farmer outreach has already begun and has been taking place since the beginning of the Phase One study in May of 1996. Educational outreach may involve informing and recruiting new members or may involve training existing members. Educational and training outreach can be broken down into five primary methods. 1) Regional informational meetings, 2) On-farm field trials, 3) On-farm visits by co-op promoters, 4) Mass media publications, and 5) Field days.

The objective of regional informational meetings is to give growers located outside the nucleus of Scott county information related to the progress and development of the cooperative. The content of these meetings should be arranged by the board of directors and the co-op manager. It is also recommended that a committee be formed to concentrate

on recruiting, educating, and informing new and prospective members. This committee should consist primarily of successful growers and horticultural experts.

A regional meeting should take place in neighboring counties at central locations where it is easy and convenient for potential growers to attend. Local Extension agents should cooperate in identifying and contacting prospective growers and inviting them to attend the sessions, as well as taking care of arranging the facilities. The outreach committee will be responsible for the content of the sessions, whether they be focussed on recruitment, marketing, or technical issues related to production methods for the benefit of existing members.

On-farm trials may be the most effective tool for both recruiting new members and educating existing members. The ability to see a horticultural "good" produced by a farmer under conditions similar to ones own can be much more convincing than hearing about such production. Field trials will help provide essential information on optimal varieties, planting dates, and other technical issues. Field trials also will serve as a tool to help educate growers. The ability to visit and see irrigation equipment, harvesting techniques, transplant methods, and new farm machinery should improve farmers' technical skills. Field trials may also provide a source of produce for test marketing at various retail outlets.

On-farm visits by cooperative promoters may be necessary to recruit new members and educate existing members. Individual visits may be costly but may also be the most influential and effective tool available to co-op management. Most farm visits will be made by Virginia Cooperative Extension agents working with the co-op, or by the cooperative's manager. A personal visit has the advantage of minimizing the amount of time the grower must be away from his work, while demonstrating maximum interest on behalf of the cooperative.

The distribution of information through mass media publications may be the most effective way of disseminating information to the largest audience with minimal effort. As of this date, the cooperative steering committee has used local newspapers, radio broadcasts, and a co-op newsletter to inform regional producers about the progress of the cooperative. The publication of newspaper articles and radio broadcasts ensures that all community members are informed about the co-op's developments

without discrimination against non-agricultural producers. This method serves both as an informational tool and as a marketing tool for future sales.

The cooperative newsletter will be more specifically addressed to co-op members and participants. The newsletter should be used to remind growers of critical production dates such as spraying and harvesting schedules. The newsletter should also be used to disseminate information on new production techniques, alternative varieties, post-harvest handling developments, and price information. The newsletter will also inform the members about internal organization issues such as changes in personnel, modifications in the bylaws, and topics of discussion for future meetings.

The last method of educational and training outreach should consist of periodic field days for members and prospective members. A field day should focus on production issues such as new equipment, uses of irrigation, and new harvesting techniques. A field day will help educate growers to produce higher quality products and ensure market developments are being met, while at the same time contributing to internal organizational harmony by creating a social environment where its members can interact.

It is important to emphasize the role of education and training outreach in determining the success of the cooperative. Two of the most common factors that have contributed to past cooperative failures have been the inability to meet market standards and poor internal communications. Educational outreach should address both of these critical issues, it should be used as a tool to ensure production techniques are being used that will ultimately lead to a high quality product, and it should lead to sound internal communication that ensures growers, management, and the board of directors are all working toward a single common goal.

Chapter 2

Facilities and Equipment

Section 2.0 Introduction

The shipping-point market facility and equipment specifications have been designed to specifically meet the needs of the Southwest Virginia Vegetable Cooperative. The cooperative organizing

committee is faced with several constraints including limited funding, a small pool of potential growers which is geographically dispersed, and a history of past failed cooperative efforts. The facilities and equipment study specifically recognizes these limitations and has designed a facility layout that addresses these special considerations.

One of the key considerations in designing the facilities and equipment part of this study was the limited resources of the cooperative association. Most of the construction and equipment needs presented in this study are the low cost, low tech approaches to vegetable marketing. Another key consideration has been flexibility and mobility. The cooperative should minimize its investment in fixed costs and emphasize variable cost approaches when possible. For example, renting equipment such as coolers or packing lines in the initial years may minimize sunken costs and provide greater flexibility for future years. The co-op should have as a long term goal to own a facility of its own. Therefore, the more flexible and mobile the operation, the greater the possibility will be of changing locations into a permanent structure in future years.

The facilities and equipment that are required for the receiving, processing, packaging, and storing of the initial product mix of tomatoes, peppers, and pumpkins are specified in detail below. The size and configuration of the facilities as well as the equipment depend upon the amount of products harvested. General specifications for both facilities and equipment will be given for a range of production magnitudes so that long-range plans can be made that include the production goals set out in Table 1.3

The storage requirements for pumpkins are rather simple. Pumpkins should be stored in environments with temperatures of 50-60° F and 85-90 % relative humidity; it is important that they never be stored in environments with temperatures lower than 40° F. It is recommended that pumpkins be cleaned using water and hand brushes and stored inside the open warehouse or any other suitable structure that prevents exposure to the natural elements.

There are several basic assumptions related to production estimates that have been necessary to make in order to simplify the facility and equipment specifications. It is assumed that all peppers will be harvested before the tomatoes so that processing and storage requirements for the two crops will never overlap. It is also assumed that the tomatoes and peppers will be planted so that a steady, uni-

form rate of harvesting will be realized during each week of the harvesting period. A packed yield of 25 ton/acre for tomatoes and 10 ton/acre for peppers is assumed. The boxes are assumed to contain 25 lbs. for both tomatoes and peppers. It is assumed that there are 80 boxes of tomatoes and 48 boxes of peppers per pallet. The boxes are assumed to have a 5% open area for pre-cooling air movement.

Produce will be handled on pallets or pallet bins when possible. The individual boxes should not be handled after they are packed on the processing line and placed on the pallet. All storage and loading on trucks should be done with full pallets. Transportation and handling of pallets instead of individual boxes should minimize damage occurring to produce as a result of handling.

The size of the cold storage room will be the larger space requirement for either tomatoes or peppers. Initially, it appears that a larger harvesting rate of tomatoes is planned than for peppers. In this case, the size of the cold room must be large enough to accommodate the tomato harvest, realizing that there will be excess capacity for the pepper harvest.

The cold storage room specified in this study is sized to accommodate two days of production and a minimum of two truckloads of palleted product, assuming 20 pallets per load. The cold room also has an integrated forced air pre-cooler that will permit an additional cold storage of two truckloads in an emergency where unforecasted produce is harvested and brought in for marketing. While the pre-cooling space may become available if an oversupply occurs, refrigerated trucks should be the first choice for emergency cold storage, permitting the continued use of the pre-cooler.

Section 2.1 Facility

It is assumed that the currently identified tobacco warehouse or a similar structure will be used to receive, process, package, and store all products prior to shipping. The processing line will be located inside the structure. The line components will be temporarily positioned in place during the harvesting season so that the components can be removed for compact storage at the end of the production and processing season. Minimizing the square footage utilized during the season when produce is not being received will help keep the expense for rent to a minimum. The cold room will be constructed inside the structure as described below. During the off-season, this room may be used

for storage of any kind requiring either refrigeration or no refrigeration.

Section 2.2 Receiving

Peppers and tomatoes can be delivered from the production field to the facility in either bulk pallet bins, boxes, or other containers. Pumpkins can be delivered in any bulk manner. The following facility recommendations specifically apply to the tobacco warehouse in Webber City, which at the time of this printing has been identified as the probable location of the cooperative's facility. All receiving and shipping should occur at the left entrance "A" of the warehouse (see Figure 2.1) using either the loading dock or the entrance next to the loading ramp. If there is a line of trucks waiting to discharge their product, the product should be covered to protect it from solar radiation. It is also possible to enter entrance "B." Use of this latter entrance might be beneficial if there is a long line of delivery trucks, permitting the trucks and their products to be sheltered from the sun. To allow for either delivery system, the receiving water flume should be designed and constructed in a mobile fashion so that it can be pivoted to accommodate the use of multiple entry points.

Section 2.3 Processing Line

There are many possible types of processing lines that can meet the needs of the cooperative, for which all components can be easily purchased from manufacturers' catalogs.

Recommended processing line

One possible line consists of a receiver belt onto which the product is dumped as it is brought to the warehouse. TEW Manufacturing Corporation of Penfield, NY, manufactures a line of equipment that serves as an example. The line could start out with a Series 2450 receiver that is 24.5 in. wide with an extended length of 12 feet, followed by a washer, a water absorber, a waxer, an inspection conveyor, several sizing units, and a rotary end packing table. The processing line should be located in the warehouse as indicated in Figure 2.1 and Figure 2.2. Figure 2.3 provides an illustration of a typical processing line comparable to the type needed to meet the needs of the cooperative association.

A processing line such as the one outlined immediately above would cost about \$14,110 for a line capacity of 5,000 lbs. of either tomatoes or peppers per hour (see Table 2.1). A line of this size

would be satisfactory for the first year and even possibly the second year since the line would have to be operated at full capacity for 8 and 10 hours respectively to process the tomatoes production of 25 and 35 tons per year. A line of this capacity would be sufficient for up to 80 acres of peppers per year if a daily line operation of 10 hours is used. As production of tomatoes increases over 30 acres per year, additional parallel lines would have to be added to meet the needs.

Alternative processing line

The above system is simple and is recommended for the initial years of operation. However, it would be possible to design a system that would potentially assure higher quality product, but at a cost that would be about two times greater for the fixed equipment costs and about three times greater for the annual operating costs. In this more elaborate and costly system, all vegetables are dumped initially into a water flume in which they are washed and transferred hydraulically to elevators which carry them onto the sorting and sizing conveyors. Some form of a gentle agitator, like a long brush, might have to be incorporated on the surface of the flume to enhance the cleaning of the product. Less than 1 % of the total weight of received product can be assumed to be soil and other dirt on the product, but the flume will have to be cleaned of silt each day. The flume will have a water circulating system to convey the product and will include a filter that must be cleaned to the manufacturer's specifications. Provisions must be made to dispose of the silt and dirt. It would be desirable to have the water temperature in the receiving flume elevated 5-10°F above that of the product for tomatoes only to assure a higher quality product. This would require a heater for the flume water. The washing of tomatoes in cool water may cause the fruit to absorb dirty water thereby potentially contaminating the product. Washing tomatoes in water warmer than the fruit will lessen the chance of contamination.

An inclined conveyor consisting of an open-chain belt with flights attached conveys the floating product from the surface of the flume to the sorting conveyor. Water will have the opportunity to flow from the product through the conveyor while the product is being transported.

It might be necessary to include a water eliminator or absorber between the inclined conveyor and the sorting conveyor that will remove any excess water from the product's surface before it enters the

sorting conveyor. A high-velocity fan or a mechanical water absorber will remove any excess water from the product's surface.

The sorting and packing table is integrated and consists of either one 4-foot wide solid rubber belt or two parallel 2-foot wide belts each 20-30 feet long. Stations for workers to manually sort undesirable product from good product and to pack boxes are provided at three-foot intervals. Plastic bins are provided for discarded product. Fluorescent lighting should be provided immediately over the sorting table covering the complete length of the line. Proper lighting is essential so that minute variances in color can be detected by the workers who sort manually.

Sizing of product will depend on the market demands and consistency of the product as it comes from the field. If manual sizing is desired, it is recommended that two parallel 18-inch wide rubber conveyors be used for sorting with a 12-inch rubber conveyor placed between them longitudinally. This will provide two sizes if sorters select the size of smaller numbers and place them on the center 12-inch conveyor. If two or more sizes are wanted and manual sizing is not adequate, a sizing unit is recommended. With a sizing unit, all product would pass through the sizer after the sorters have discarded all undesirable product.

Another manual sorting procedure would consist of people located along both sides of the sorting conveyor and picking the product from the conveyor directly into 25-lb boxes at their stations. Several work stations on both sides of the line at the beginning of the sorting conveyors should be dedicated towards removing all undesirable product. Automatic sizers might be used at this point. Each person can be expected to fill one box every two minutes. It should be possible to vary the velocity of the conveyor to match the packers' skill and speed. The conveyor velocity range will depend on the product throughput and the number of people packing. For example, a 30-acre production level yielding 40,000 lbs. of tomatoes per day and packing for 8 hours per day would require a minimum of 7 packers. For 4 and 6 hours of packing this same product each day, 13 and 10 packers respectively are needed. In addition, one person is required on each side of the sorting conveyor to collect the full boxes and stack them on pallets.

If manual packing is not used, an alternative packing scheme is for the product to go directly into boxes placed on scales after all undesirable product

is discarded on the sorting conveyor. At least two weighing stations are needed so that one box is being filled while the other full box is replaced with an empty one. These weighing stations are designed such that the product is automatically diverted to the empty box after the preset weight has been added to the other box. An adequate supply of boxes must be available to the people weighing and boxing or this may lead to a bottleneck in line operation. A critical line shutdown must be located within reach of the boxers so that if the need arises, the process can be stopped quickly.

It is recommended that pallets be placed close to the packers so that full boxes of product can easily be stacked on them. Pallets must be moved immediately to the pre-cooler after filling to maintain product quality.

It is also possible to use readily available sorting and packing lines. Figure 2.3 contains one such line that included the washer, sizing units, and packing stations. This particular design has a smaller capacity than specified above, but these systems could be used in parallel to give the required capacity while providing greater processing flexibility.

Section 2.4 Cold Room

The cold room will help maintain quality after the field heat has been removed from the product and will provide capacitance in the marketing of the product. The goal will be to market the product in a timely fashion, so the cold storage volume will be kept as small as possible and therefore built to store the product for a maximum period of two days. The cooperative should have as a goal to ship the produce out in less than 24 hours from the time it arrives at the warehouse. It is assumed that the total production period for tomatoes and peppers is 30 days during the first two years, and the periods do not overlap. A fixed pre-cooler section of 660 sq. ft is provided inside the cold room that can also be used for cold storage in an emergency.

The temperature maintained inside the cold room should be 55-65°F for tomatoes and 45-50°F for peppers, with a relative humidity of 85-95 %. The refrigeration system should be specified to meet those ranges of temperatures. There should be multiple refrigeration units maintaining the desired temperature in the cold room. One unit should be sufficiently large to (1) remove heat of respiration of the product, (2) remove the heat that is transferred into the cold room through the walls and ceiling, and (3) remove the heat that enters through air

infiltration as a result of taking product in and out of the cold room. Other units should be available to provide the much higher refrigeration load of pre-cooling.

The suggested location of the cold room in the warehouse is marked in Figure 2.1 and Figure 2.2. Table 2.1 includes the required cold room size as a function of annual production. Figures 2.4 and 2.5 contain the plan and elevation views of the cold room showing the pre-cooler and suggested storage procedure. It is recommended that the initial outside size of the cold room be 70 ft long, 21.5 ft wide, and 9 ft high. One entrance to the cold room is recommended initially, but as the room is enlarged to accommodate increased production, additional entrances must be provided. Estimated costs for constructing the cold room also are included in Table 2.1 as a function of annual production.

Table 2.1 shows the cold room square footage requirements and refrigeration costs for various production quantities. Columns 1 and 2 show the acreage amounts forecasted for tomatoes and peppers that correspond to the expected growth during the first five years of operations. Column 3 provides the total number of boxes of produce expected, based on average year yields of 2,000 boxes/acre of tomatoes and 800 boxes/acre of peppers. Column 4 breaks down total production into total number of pallets. Column 5 takes the total number of pallets and equally distributes them over the number of days that the harvest is expected to last in order to determine the number of pallets that must be cooled and shipped daily. Column 6 assumes that a maximum period of two days will be allowed for the produce to remain in cold storage. Column 7 calculates the length of the cold room based on the square footage requirement needed to meet the two-day storage period given in column 6. Column 8 estimates the cost of building the cold storage room according to the length estimates given in column 7. Columns 9 and 10 estimate the refrigeration requirements of the cold room without and with precooling respectively. The final column estimates the total cost of installing a cold room refrigeration system capable of cooling the acreage given in columns 1 and 2.

The cold room wall and ceiling construction details can be found in Figure 2.6. While it would be easier and quicker to construct the cold room using lockable insulation panels with aluminum skin, the cost is prohibitive given the budget constraint faced by the cooperative. Used panels could not be located at the time of this printing, but would

Table 2.1 Cold Room and Refrigeration Costs

Tomatoes Yearly acres	Peppers Yearly acres	Yield, 25-lb boxes	Total Pallets Tomatoes, 80 boxes Peppers, 48 boxes	2-Day Pallets Filled Daily	Storag Area * sq. ft	Cold-Room Length ft	Cold Room Construction Cost \$	Cold Room Refrig. No pre-cooling ton	Cold Room Refrig. Total ton	Cold Room Refrig. Cost(Installed) \$
25		50000	625	20.8	1577	72	3252	3.0	15.0	25,000
30		60000	750	25.0	1760	80	3553	3.0	15.0	25,000
50		100000	1250	41.7	2493	113	4754	3.0	22.0	32,000
60		120000	1500	50.0	2860	130	5355	4.0	22.0	32,000
75		150000	1875	62.5	3410	155	6256	5.0	22.0	32,000
100		200000	2500	83.3	4327	197	7757	5.0	22.0	32,000
150		300000	3750	125.0	6160	280	10761	5.0	22.0	32,000
	30	24000	500	16.7	1393	63	2952	3.0	15.0	25,000
	60	48000	1000	33.3	2127	97	4153	3.0	22.0	32,000
	80	64000	1333	44.4	2616	119	4954	4.0	22.0	32,000
	100	80000	1667	55.6	3104	141	5755	4.0	22.0	32,000

Tomato Yield, ton/acre	25	Processing Line Components	Cost, \$	Capacity	5,000 lbs/hr
Pepper Yield, ton/acre	10				
Number of harvest days		Receiver belt conveyer	1800		
	Tomatoes	30	Washer	1500	
	Peppers	30	Water absorber	1260	
Pallets per truck	20		Inspection table	1500	
Tomatoes, 25-#boxes/pallet	80		Sizers, 3	3200	
Peppers, 25-lb boxes/pallet	48		Side conveyors, 3	1350	
Fixed Cold Room Width, ft	22		Waxer	2300	
Fix Precooling Area, sq ft	660		Rotary packing table	1200	
Total			14,110		

* 2-Day Storage Area = (Pallets Filled Daily) x (16 sq ft per Pallet) x (2 Days) + Pre-Cooling Area + 6-foot Aisle
 where Pallets Filled Daily = (Yearly Production, lbs) / [(Number of harvest days) x (lbs per box) x (boxes per pallet)] and the area
 for the 6-foot Aisle = (Pallets Filled Daily) x (2 days) x (Pallet Width) x (Aisle Width) / (Number of Pallets Across Storage Room)

For example, if there are 100 acres of tomatoes produced annually, the 2-Day Storage Area is calculated as follows:
 2-Day Storage Area = [(100 acres) x (50,000 lb/acre) x 16 sq ft per Pallet x 2 days] / [(30 days) x (25 lbs per box) x (80 boxes per
 pallet)] + 660 sq ft + (83.3 Pallets per day) x (2 days) x (4 ft) x (6 ft) / 4 Pallets

be a possible low cost alternative. A continuous plastic vapor barrier should be used on all walls and ceiling.

It is recommended that Styrofoam insulation panels with foil surfaces and an insulation thickness of 0.75 in. be applied to the existing inside wall of the warehouse to form one side of the cold room. The other three walls are made of 8 in. x 16 in. cinder blocks with their interior cavities filled with vermiculite or polystyrene. The walls should be 9 ft high to accommodate full pallets and fork lifts. Insulation panels like those placed on the existing wall at the tobacco warehouse should be used on the inside of the three cinder-block walls after the continuous plastic moisture vapor has been applied.

Since the cold room is constructed inside another structure, a suspended ceiling can be used. Panels like those used on the walls and the vapor barrier are suspended on the ceiling rails supported by wires attached to the ceiling of the warehouse. Glasswool insulation mats with an R rating of 30 are placed above the supported ceiling. The ceiling can also be constructed using 21.5-ft long Metwood 2 x 6's on which panels like those used on the wall are attached to the underside below the vapor barrier. Glasswool insulation mats with an R rating of 30 are placed between the Metwood joints.

All interior joints of the cold room walls and ceiling should be taped with aluminum duct tape. A mechanical door to the cold room is recommended initially, but as product increases and access to the room increases, a vinyl strip door is recommended.

An estimate of the cost of constructing the cold room is found in Table 2.1 (column 8) with the cost of refrigeration listed separately (column 11) and not included in the cold room construction costs. The data show that the construction costs range from \$2,375 to \$7,922 for annual tomato production acreage of 25 to 150 acres. If peppers alone are grown, the cold construction costs are \$2,153 to \$4,224 for annual pepper production acreage of 30 to 100 acres. For example, if 50 acres of tomatoes are produced along with 30 acres of peppers the same season, a cold storage room 21.5 feet wide and 113 feet long is needed. Since we recommend that tomatoes and peppers not be harvested during the same period, the larger space requirement of the two commodities dictates the size of the cold storage room.

Description of Cold Room Costs and Product Capacity

Year three has been established as the target year in terms of obtaining forecasted production volumes. The cold room storage must be adequate to meet production estimates for year three. The cost of building and equipping the facility with the dimensions adequate for year three must be used to forecast the expected returns on the investment. Since the production of tomatoes and peppers has been staggered to prevent an overlapping of produce arriving to the facility, the capacity of the facility must be set at the greater of the two products at any one point in time. Table 1.1 shows that in year three the co-op expects to market 100 acres of tomatoes and 80 acres of peppers.

The 100 acres of tomatoes will be harvested over a four-week period; therefore, the capacity of the facility must be able to handle 25 acres of tomatoes in a one-week period. Table 2.1 shows that the cold room size capable of providing a two-day cold storage for 25 acres of tomatoes over a one-week period must be 4,327 square feet. This square footage is large enough to accommodate the approximately 83 pallets that will be filled each day. The cost of constructing a cold room facility of this size would be approximately \$7,757. The cost of installing the refrigeration equipment capable of cooling the produce to the specified levels would cost an additional \$32,000. The total cost of the cold room construction and refrigeration equipment would be approximately \$39,757.

The physical capacity of the cold room and processing line can be checked using Table 2.1. In year three production is forecasted to reach optimal levels of 100 acres of tomatoes and 80 acres of peppers. If we assume the very optimistic yield estimate of 2,000 boxes per acre, 100 acres of tomatoes implies the production of 200,000 boxes of tomatoes. A single pallet holds 80 boxes of tomatoes which converts into a total production of 2,500 pallets of tomatoes over the four-week period. The cooperative is expected to operate 30 days a month which converts to an average of 83.3 pallets of production per day. A conservative approach is used to assume that the product will be stored for two days. Ideally, the co-op will try to ship the product out to retailers the very same day that it arrives, but two day delays are common in the produce supply industry, and therefore the conservative approach is used in this study.

A two-day storage implies that there must be cold room space for up to 167 pallets of tomatoes. A single pallet occupies 16 square feet which implies that a total cold room storage area of 2,666 square feet is needed. The cold room structure must also include room for a six-foot isle and pre-cooling space. A six-foot isle would require 660 square feet. The pre-cooling area would simply be an area of the cold room near a cold air blower that can be covered with a canvas to allow forced air to be circulated among the produce. The pre-cooling area can also be used as storage space in cases where no additional product with field heat has arrived to the facility. The estimate of 4,327 square feet of cold room space is more than adequate to hold a two-day supply of product, an isle, and pre-cooling space.

In cases where the product may not all ripen according to the pre-specified schedule and larger than anticipated volumes arrive to the co-op for processing, there remains an extra capacity at the facility to allow for this excess. In order to accommodate any production in excess of the 167 pallets anticipated for two-day storage, the pre-cooling space can be used for storage, and the 660 square feet of isle can be converted into cooling space. In the case where production exceeds the allotted excess capacity built into the cold room, product can be placed in trucks with cold storage capacities or mobile refrigeration units can be rented on short-term basis to meet the temporary storage need.

The costs of purchasing packing and grading equipment with a capacity to handle 25 acres of tomatoes in a one-week period are given in the lower portion of Table 2.1. The processing line will consist of a receiver belt conveyor, washer, water absorber, inspection table, three sizers, three side conveyors, waxer, and a rotary packing table. The total cost of all the necessary processing line components is \$14,110. The total cost of equipping the facility, including the costs of constructing the cold room and refrigeration unit, would be \$50,510.

The total cost of \$50,510 for equipment and construction must be paid out during the first year. The cooperative is expected to borrow the necessary funds from the Southwest Agricultural Association and pay back the loan over a five-year period. The annual cost of purchasing the equipment and building the cold storage would be approximately \$10,000 a year plus the cost of interest, which should be between 9% and 10%. The annual \$10,000 principle payment plus the 10% interest payment are included as fixed cost expenses in

Table 1.8. These fixed cost expenses are used to calculate the expected returns to growers during each of the first five years of operation of the cooperative.

Section 2.5 Pre-cooler

An airblast pre-cooler is recommended. The general details are included in Figures 4 and 5. In Figure 2.5, a partial false wall, 7.5 ft high, is constructed of either cinder blocks or wood and is located 1.5 ft from the right wall. The wall extends from one side-wall to the other. A fan that can deliver 15,000 cfm at 0.75 in. of water, static pressure, is mounted in the partial wall in such a way that it circulates air from the main room into the space behind the wall and out into the main room again.

A 10-ft wide, 30-ft long plastic-weighted cover is on a roller mounted on the partial wall above the fan. When product is placed initially in the cold room to remove the field heat from the product, 10 pallets of boxed product are placed in two rows perpendicular to the partial wall and separated by a 2-ft space. The plastic cover is unrolled over the two rows of pallets on down to the floor and secured. All pallets must be sealed so that air cannot pass through them. The supplementary refrigeration units are turned on along with the pre-cooler fan mounted in the partial wall. Cold air in the cold room will be drawn through the boxes of product into the space between the two rows of pallets, through the fan and into the area behind the partial wall and back into the cold room.

A small refrigeration unit will maintain the desired cold room storage temperature for the product. When product is added to the cold-room to remove its field heat, the larger refrigeration units will provide the cooling needed to accomplish the pre-cooling in a 2-3 hour period. The cooled product will then be placed in the storage area and additional product placed in the pre-cooler section for removal of its field heat. A proper refrigeration design based on estimated heat loads will reduce the temperature of the product to the cold room storage temperature during the 2-3 hour pre-cooling period. The heat transfer mechanism within the product requires a high level of refrigeration for effective temperature change, so that sufficient heat can be removed during the precooling cycle, so that the temperature of the product will equilibrate to the cold room temperature over the forced air cooling cycle.

Lighting

Lighting will be required in the access areas of the structure, over and around the receiving and processing line, and in the cold storage room. Lighting levels specified by the Illumination Engineering Society standards for fruit and vegetable sorting lines, warehouses, and cold storage rooms should be used. In order to meet these standards, at least 1,000 lx over the sorting and packing lines and 200-300 lx will be required in the other areas, including the cold room.

Refrigeration

The refrigeration requirement for the cold room is uncertain at this time and is primarily dependent upon the annual production, daily harvesting rate, and daily marketing rate. Exact levels of grading and storage capacity will not be known until growers have signed marketing agreements and a specified production scheduled has been defined. Even with all pre-harvest precautions, changes in prices and market demands as well as weather conditions may cause the levels of produce arriving at the facility's docks to vary during any given day.

The heat loads in this cold room design are due to (1) heat transmission through the walls and ceiling, (2) field heat contained in the product that must be removed to reach the desired storage temperature, (3) heat of respiration of the warm and pre-cooled product, (4) evaporator coils defrost energy, (5) pallet and container temperature reduction to storage temperature, and (6) service load resulting from heat of the interior lights, air leaks, human heat generation, exchange of air during access to the room. The heat transmission load for the cold room is relatively small because the cold room is to be constructed inside an existing building that will reduce the radiation heat loads. Transmission load represents about 0.5 - 0.7% of the total refrigeration load in the cold room. Field heat represents the largest load and is about 95.1 – 95.7 % of the total load. Heat of respiration load is assumed to be about 0.8 – 1.0 % of the total heat load. Respiration of tomatoes is 6610 Btu/ton/24 hrs at an average storage temperature of 66°F (average of entering temperature, assumed to be 75°F, and the storage temperature, assumed to be 58°F) and the respiration of peppers is 9408 Btu/ton/24 hrs under the same conditions. Defrost loads can be about 1 - 1.2 % of the total. Pallet and product containers temperature reduction load is about 1 % of the total. Service loads can be expected to represent about 1 % of the total load.

Refrigeration requirements are found in Table 2.1. The values included in the table should be reevaluated after the final production figures are identified and the rate of marketing the product is decided. Little refrigeration is required to maintain the cold room temperature since the room is located inside another structure. Table 1 shows that the cold room refrigeration needs, without pre-cooling, for 50 acres or less of annual tomato or pepper production, are expected to be 3.0 tons in order to maintain the desired storage temperatures. Above these production levels, the required structure size increases to the point where the transmission losses and heat of respiration require at least 5.0 tons of refrigeration to maintain storage temperature for the production from 150 acres of tomatoes.

The greatest refrigeration requirement is for pre-cooling, and pre-cooling is one of the most important requirements for maintaining a high quality of vegetable. The total cold room refrigeration requirements are presented in Table 1 for pre-cooling, as well as for maintaining the temperature inside the cold storage room. These values must be evaluated again after the final production magnitude and marketing scheme is defined. It is recommended that the refrigeration system consist of several small, independent units. The one small unit of 3.0 to 5.0 tons should be sized to maintain the cold room temperature. Other units of approximately 7.5 tons each should be selected to give the pre-cooling capacity that is needed at the selected annual production level. Multiple units will provide greater flexibility for temperature control and for meeting needs during the failure of any refrigeration units. The cost of refrigeration shown in Table 2.1 includes the estimated installation costs that are usually 30-40 % of the unit cost.

Refrigeration units capable of cooling the specified volumes require about 7 horsepower each having a typical 208-volt, 3-phase power supply. Controls, power supplies, and other installation costs are included in the cold room refrigeration costs that range from \$25,00 to \$32,000. Operating costs need to be calculated after the production and marketing schemes are defined.

Section 2.6 Product Flow

The previous five sections of this chapter describe the facilities and equipment that will be used to receive, grade, pack, cool, and ship the produce. This section brings together all of the previous mentioned elements and presents the proper order

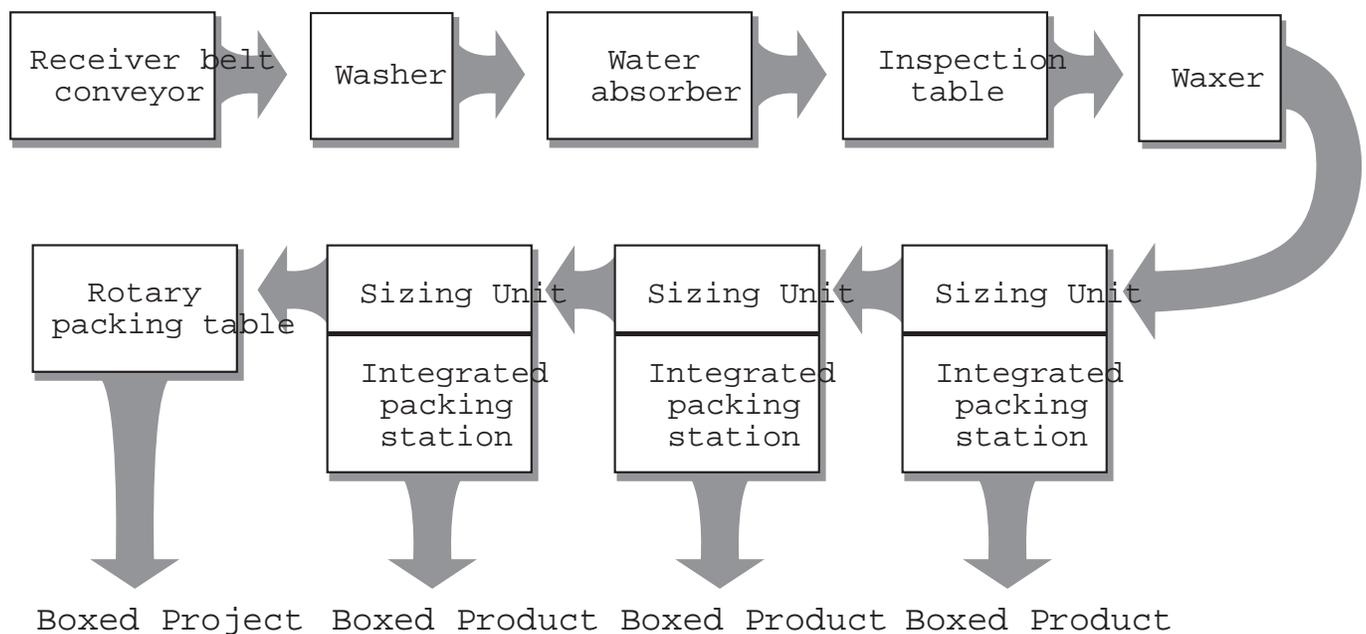
of the equipment use and describes the entire preparation process from receiving to shipping. Figure 2.1 will provide a graphic example of the process being described below.

The specified produce will be brought to the warehouse by the individual growers in large wooden bins specified and provided for by the Co-op organization. The produce will be unloaded onto a conveyor belt that will carry the produce to the washer. It is at this point that the Inspector will select a sample of the grower’s produce to be graded. From the washer the produce moves to a water absorber that will remove any remaining moisture from the produce. The produce will continue to flow along the line to the next station where the inspec-

tion takes place. The produce will be inspected to ensure that produce that does not meet the pre-specified standards such as color, shape, or ripeness will be removed from the grading process.

The remaining produce will flow through the grading tables where it is sized and placed into boxes. Different types of sizing units have been discussed above, but in all likelihood, during the initial years of the cooperative all sizing will be done manually by trained workers. The workers will select the fruit that meets the specified dimensions and place them in boxes. These full boxes of graded produce will flow to a rotary packing table where they are stacked on pallets and placed in the pre-cooling facilities.

Figure 2.0 Process Flow Chart for Packing Line



Note:

Consider the packing line requirements when 100 acres of tomatoes and 80 acres of peppers are produced in one year. The tomatoes are harvested over a 30-day period that is different from the 30-day period over which the peppers are harvested. There would be 167,000 lbs of tomatoes harvested per day over the 30-day tomato-harvesting period. There would be 53,000 lbs of peppers harvested over a different 30-day harvesting period.

A single line of above units has the capacity of approximately 5,000 lbs of product per hour. It is recommended that two parallel packing lines be purchased for the year during which this production is realized and these two lines be operated at least 16 hours per day to process the 167,000 lbs of tomatoes per day. These same two packing lines could process the expected daily production of 53,000 lbs of peppers in an 8-hour processing day.

As Table 2.1 shows, each packing line is expected to cost about \$14,110. The estimated costs for the two packing lines needed when there are 100 acres of tomatoes and 80 acres of peppers produced is \$28,000.

Figure 2.1 Warehouse with processing line and cold room

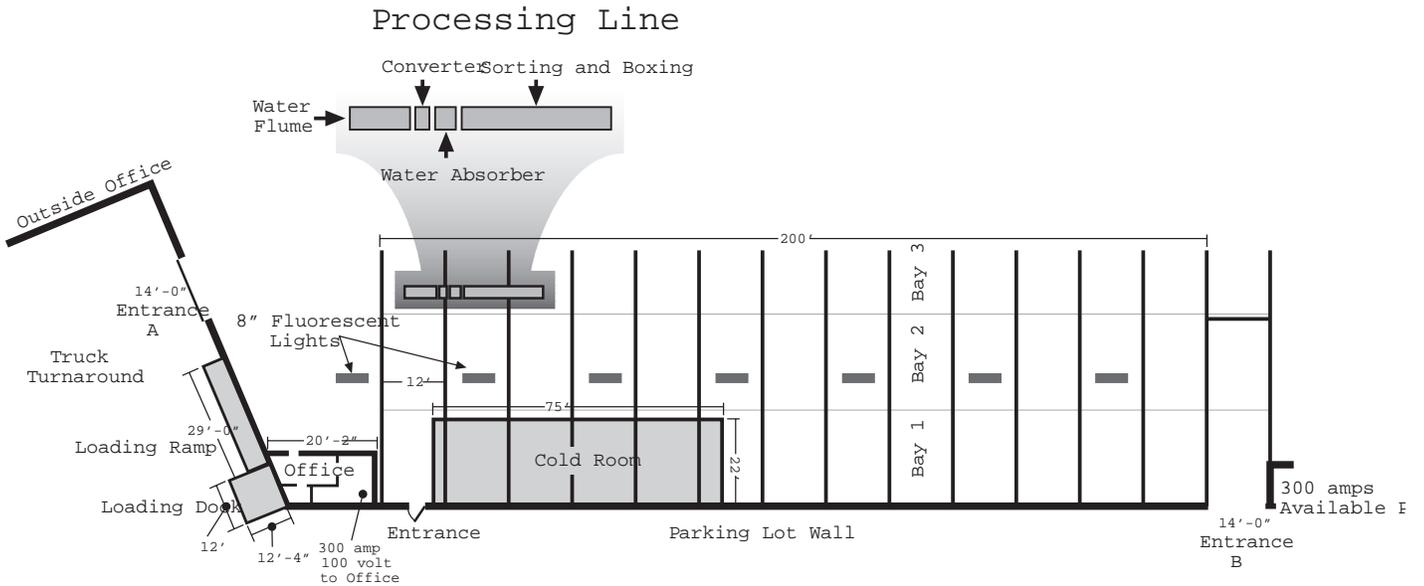


Figure 2.2 Elevation view of processing line and cold storage room

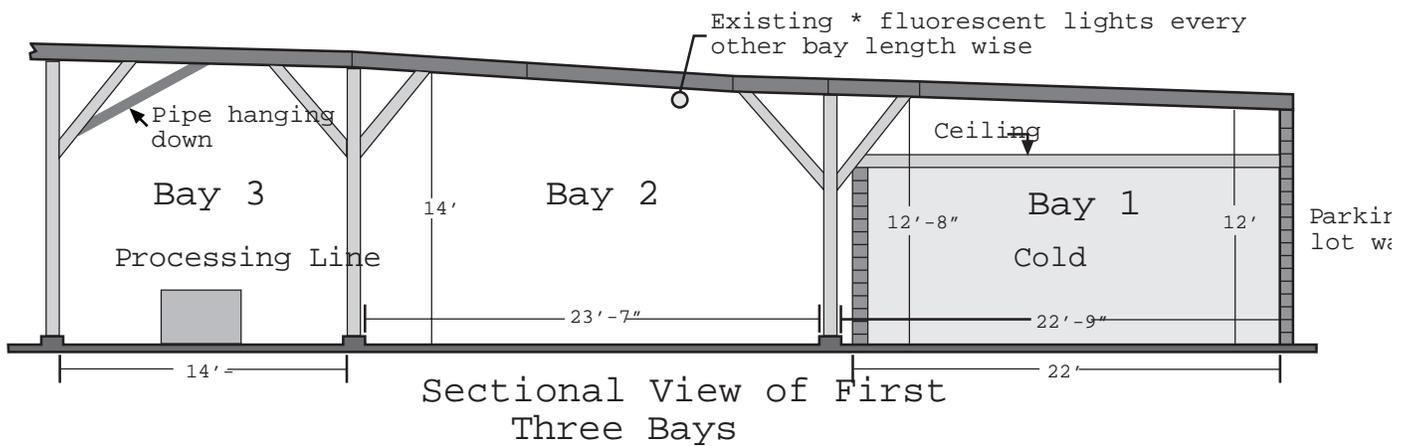


Figure 2.3 Alternative small washing, sorting, and packing line.

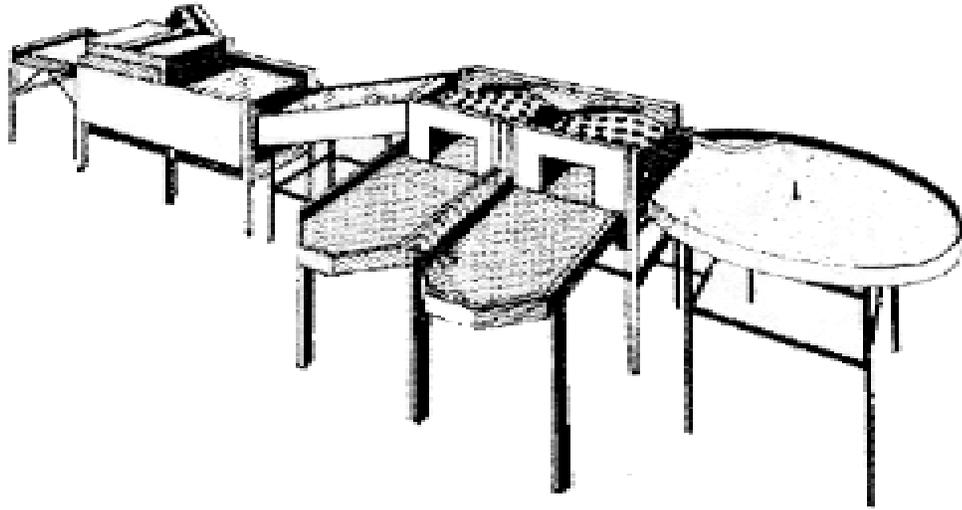


Figure 2.4 Cold room, plan view.

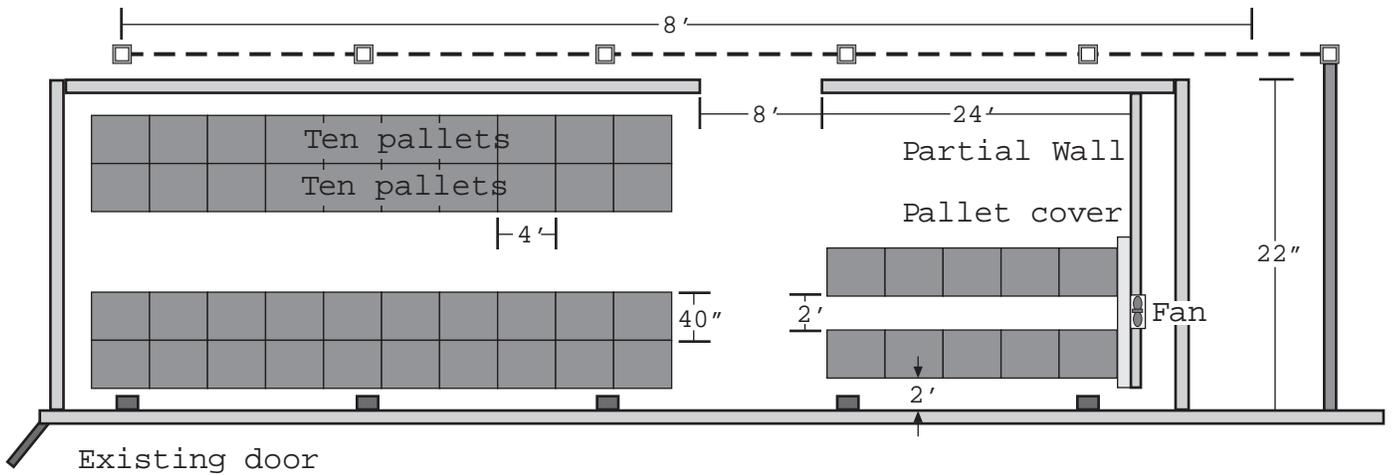


Figure 2.5 Cold room, elevation view

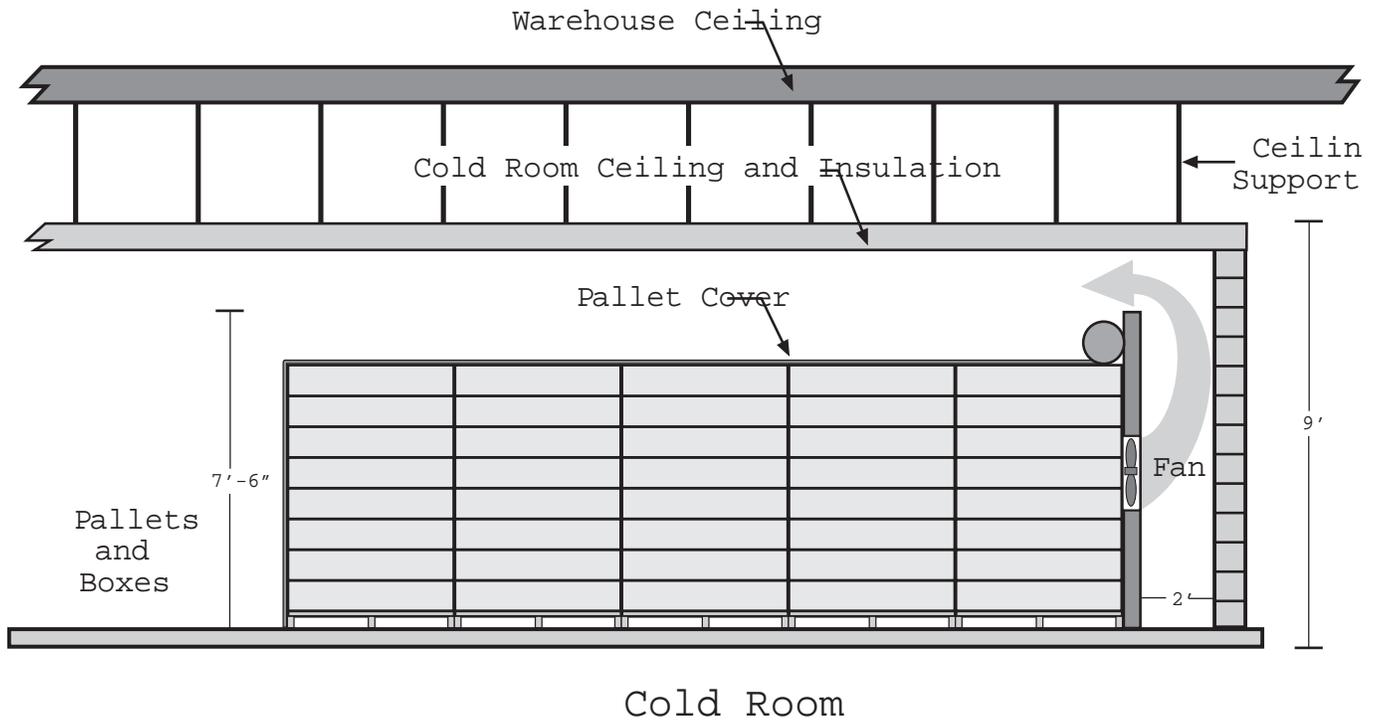
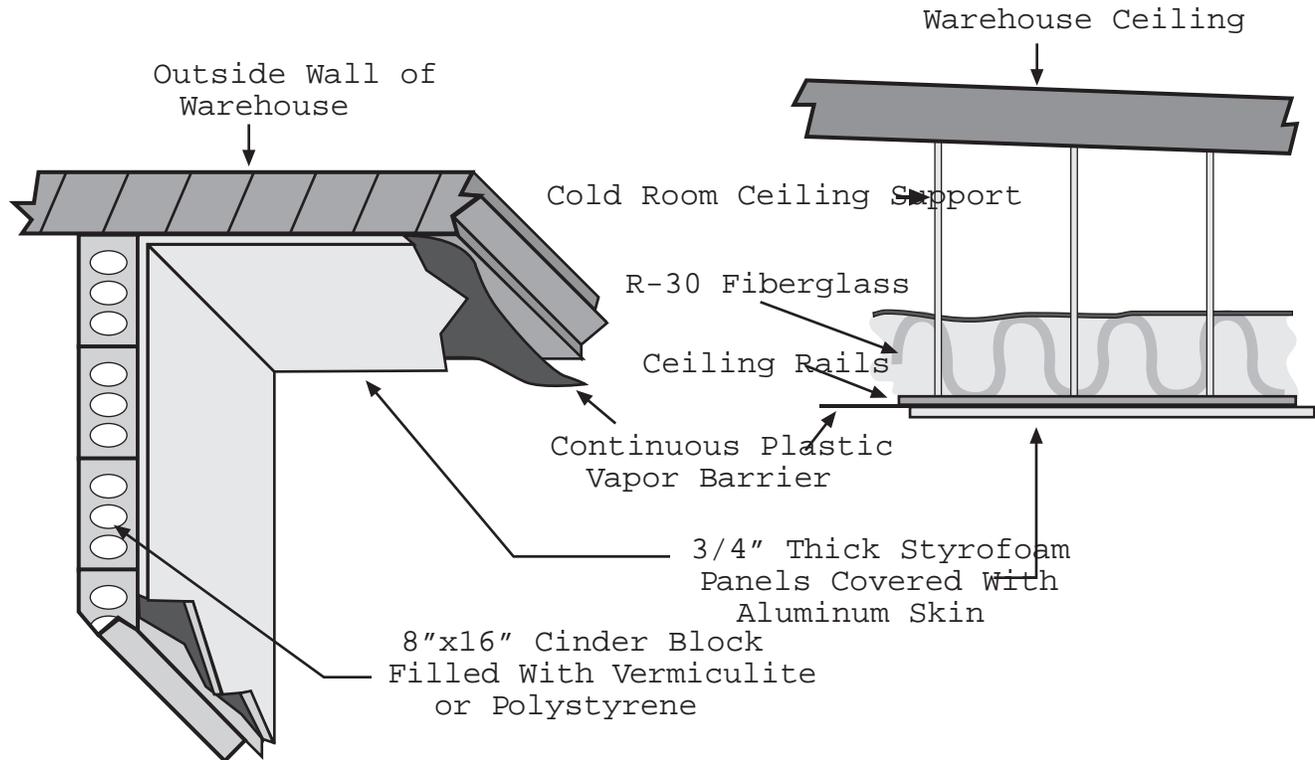


Figure 2.6 Cold room wall and ceiling construction



Chapter 3

Organizational Development

Section 3.0 Introduction

During the Phase One feasibility analysis of the shipping-point market project, Extension agents, growers, marketing specialists, horticulturists, and produce purchasers were interviewed in order to help evaluate the feasibility of expanding horticultural production in the region and breaking into larger retail markets. Growers and Extension agents both listed the lack of an adequate marketing infrastructure as one of the major constraints to expanding horticultural production, while horticulturists, marketing experts, and produce purchasers listed substandard quality, inadequate post-harvest handling, and poor business practices as the primary barriers to penetrating these larger markets.

The financial grant awarded by the USDA to the Southwest Agricultural Association, which is earmarked for the assembly of a shipping-point market, directly addresses the lack of marketing infrastructure constraint. The organizational issues outlined in this chapter are designed to specifically address the key organizational factors that have previously prevented regional producers from meeting industry quality standards and marketing requirements.

Past attempts within the Commonwealth of Virginia to organize growers into horticultural farmer cooperatives have failed in relatively short periods of time. In most cases, financial grants were obtained in order to provide local producers with the marketing infrastructure necessary to grade, pack, cool, and transport produce at levels acceptable to industry standards. In these previous efforts, the farmer cooperatives did not fail due to infrastructure constraints, but failed because important industry standards were not met. The failure to meet industry standards will result in lower prices paid to farmers for their produce. Some of the major factors listed by participants in the previous cooperative efforts as contributing to the failure of past cooperative failures include:

- failure to use irrigation,
- inability of growers to properly remove field heat,
- internal management problems,

- increasing tobacco prices,
- lack of professional marketing services,
- failure to properly plan an adequate business strategy,
- lack of grower commitment,
- low prices paid to growers, and
- bad business practices.

Bad business practices refer to improper packaging, poor communications with produce purchasers, inadequate cooling, substandard physical characteristics, and inadequate deliveries as judged by produce purchasers.

The objective of this section is to address the major organizational shortcomings that have been observed from these previous co-op attempts and to develop an organizational structure that takes specific precautions to address all of the major factors that have been identified as contributing to the past failures. The results of the Phase One study determined that there was an interest by major supermarket retail chains to purchase Virginia-grown produce if the producers could meet their strict volume, variety, size, color, shape, packaging, grading, cooling, and delivery requirements. Horticultural experts have verified the ability of the region to grow high quality produce that meets the standards required, but acknowledge that in order to meet the volume and post harvest handling requirements, a major effort to organize and coordinate the large number of small, dispersed producers is essential. This study proposes a plan for organizing and coordinating these interested producers.

The Phase One study (Coale et al, 1996) emphasizes the need to form a farmer cooperative that incorporates a sufficiently large number of growers who together will provide the association with enough acreage to meet the large retail outlets' volume requirements, while minimizing the per unit costs charged to the co-op members. A cooperative association is needed to organize and coordinate the interested horticultural producers in a manner that will allow the group as a whole to use the shipping-point facility in the most optimal manner, which should lead to meeting industry standards. A farmer cooperative should—as its primary focus—offer “at-cost” marketing services to grower/members and thereby maximize their returns.

The coordination of a large number of growers who are dispersed over a five-county region requires considerable effort and attention. The careful coordination of growers is needed to ensure that all producers are growing the same varieties, following the same production technologies, conforming to pesticide and irrigation applications, planting and harvesting on designated dates, following specified post-harvest handling methods, and complying with established delivery requirements. The failure to ensure the coordination of growers and their compliance to the cooperative's established production and handling requirements will result in the production of a substandard quality product that will not obtain the highest potential returns for the co-op members.

Due to the importance of properly organizing, coordinating, and educating the growers, the first year of operations will be considered an organizational year with emphasis placed on establishing a sound organizational structure, developing a well thought out business plan and marketing strategy, and educating the growers about the objectives and requirements of the cooperative.

Section 3.1 Steering Committee

Through the efforts of Southwest Virginia Cooperative Extension agents, informational meetings have been organized and agricultural producers have been invited to discuss the possibility of expanding horticultural production and marketing in the region, the construction of a shipping-point market, and the need to form an agricultural cooperative. From these informational meetings, a steering committee was formed to pursue these specific issues in greater detail.

The steering committee discussed important issues and nominated and elected a group of individuals to serve as an interim board of directors. This elected group of individuals is made up of community leaders, current and potential growers, Extension agents, marketing specialists, and other interested citizens, and has become a working committee that addresses the principal issues of forming an agricultural cooperative and becoming a legally incorporated association. The interim board has formed into subcommittees that address the primary issues of drafting the articles of incorporation⁷, writing the cooperative's by-laws⁸, and putting together a business plan.

⁷The articles of incorporation are presented in Appendix 1

⁸The by-laws are presented in Appendix 2

⁹see Appendix 5 for full Mission Statement

Section 3.2 Purpose of Mission Statement⁹

The purpose of a mission statement is to outline the primary goals and objectives of the project. The mission statement provides justification for the project and specifies a direction the project will follow in pursuit of its objectives. In the case of Southwest Virginia, there are two major objectives: 1) to increase farmers' family incomes, which should lead to economic development in the region, and 2) to make a supply of locally grown horticultural produce available in Virginia supermarkets to Virginia consumers.

Public funds are being used to finance the cooperative's start-up costs; therefore, there must be some public benefit provided from the existence of the co-op. The public benefit in this case is the reallocation of public funds to a region of the country with the potential for economic growth. This national reallocation of funds has as an objective to overcome an existing market failure, thereby allowing local producers the opportunity to increase family incomes. An increase in family incomes for a substantial number of local residents should provide an economic boost to the local economy. This is the reason that the mission statement specifies as an objective (see Appendix 4) "*... any current funding, and funding obtained in the future, will be used for the overall benefit of the Southwest Virginia region. The greatest benefit is obtained by assisting the maximum number of local producers to increase their agricultural income.*"

The second objective stated in the mission statement, "*to create a supply of local produce available to Virginia consumers in Virginia supermarkets,*" is another public benefit. Previous studies and surveys have shown that there is a demand for Virginia grown produce by local consumers, but that very little is available. One of the objectives of this project is to create a source of production that will be able to supply the produce that meets consumer demand. The use of funding to help create a supply that meets consumer demand is a benefit to the Virginia consumer.

The mission statement details the manner in which these two major objectives will be achieved. The funding will be used to form a farmer cooperative that will support local growers in the production and marketing of locally grown produce. The cooperative will provide both a physical infrastruc-

ture; such as a warehouse, grading and packing equipment and cooling facilities, as well as a managerial infrastructure; such as a manager to coordinate activities, a board of directors to establish policies, and a broker to establish markets for the regional produce.

Section 3.3 The Cooperative's Organizational Structure

Bylaws are an instrument that specifies much of the cooperative's legal structure. The bylaws stipulate why and how the cooperative will operate. The major provisions detailed in the bylaws include membership eligibility, election of directors, annual meetings, officers' duties, voting rights, dues, capital investments, and dividend payments. The specific nature of the services that will be performed by the cooperative, the obligations of the members, and a specific marketing strategy are not specified in the bylaws. The strategy implemented by the cooperative was to draft the bylaws in such a manner that maximum flexibility was provided to the cooperative association and that maximum authority was given to the board of directors. The bylaws specify that operations will be carried out according to details presented in the business plan and the marketing agreement. It will be much easier to amend the business plan and marketing agreement as more members join the cooperative than to modify the bylaws.

The bylaws stipulate that the board of directors will be the decision making entity that sets policy, defines short and long-term objectives, defines membership, oversees management, and is responsible for the efficient operation of the cooperative. The bylaws drafted and presented in Appendix 5 stipulate that the board of directors will have between 12 and 18 members. The bylaws ensure that the size of the board remains large. A minimum of 12 directors is considered necessary in these first few years of operations, due to the large number of organizational tasks that must be carried out during the initial stages of development. A large board of directors makes it easier to create executive committees focussed on addressing specific tasks such as writing a marketing agreement, drafting a business plan, hiring a manager, drafting a financial plan, carrying out a market study, implementing a farmer outreach program, obtaining budget estimates, and purchasing supplies and equipment. Many of these tasks will need to be carried out just once and a large number of directors allows for the easy division and delegation of these numerous

tasks. Once the organizational structure has been designed and is running smoothly, the cooperative should be able to operate equally efficiently with a smaller board of directors.

Section 3.4 Temporary Committees

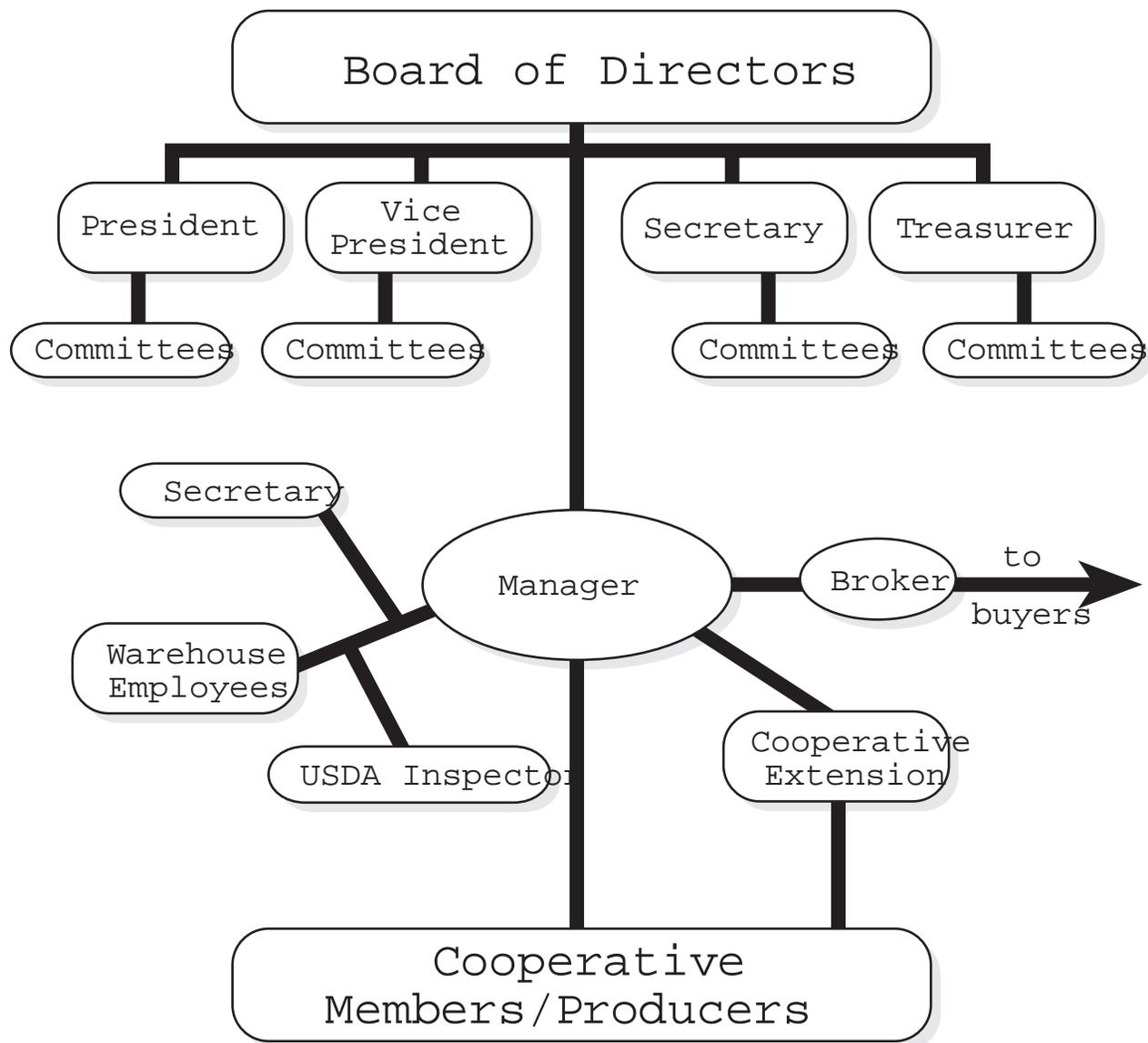
Several committees have been established from among the interim board to address issues relevant to legally incorporating the association and initiating operations. These initial committees consist of a bylaws committee, a business plan committee, a budget committee, a retail market committee, a market strategy committee, a financial plan committee, and an operational plan committee. Once the initial annual assembly of members takes place and a permanent board has been elected, it will be important to establish new permanent committees designed to address medium to long-term issues. Additional committees should be formed to assign responsibility for gathering information relevant to certain aspects of producing and marketing horticultural produce. These more permanent committees are discussed in greater detail in the following section.

Section 3.5 Organizational Structure

The important issues in designing the optimal organizational structure of the cooperative are related to defining the roles and responsibilities of each co-op member and employee. The specific job descriptions will be discussed in section 3.5. At this time it is important only to recognize the specific positions that exist within the organization, how they relate to each other, and how they will ensure that the proper flow of information from consumer to producer takes place.

The key components that make up a cooperative are members, board of directors, officers, manager, broker, secretary, and employees. Within the board of directors there should be certain committees that address specific issues. Many of these specific issues are long term planning issues and technological advancements that occur over time. The purpose of creating these committees is to designate responsibility to specific groups for the acquisition of specific information. By assigning the responsibility of acquiring information to an individual or a group, one can make sure that these issues are constantly being addressed and do not fall by the wayside. These committees are different from those of the steering committee in that they are permanent committees designed to monitor long-term

Figure 3.1 Organizational Structure of Cooperative



issues. They are not committees that have been formed to attend to initial organizational issues, but have been formed to provide long-term stability to the cooperative.

There are five long-term issues that the committees must specifically address. They are:

- production technology
- post-harvest handling technologies
- labor issues
- marketing strategy, and
- budgetary issues.

The committee responsible for the production technology should be led by a horticulturist, and specifically, the Cooperative Extension Specialist, if possible. Other members with horticultural expertise or access to horticultural information resources should also participate in the committee. The responsibility of this group should be to research and study issues related to new advancements in agricultural production technologies. This group should try to stay up to date in horticultural issues such as crop varieties, planting techniques, irrigation and farm equipment, chemical applicants, fertilizer practices, and other technical issues.

Agricultural practices may or may not change rapidly over time. This group should focus on

becoming aware of technological changes as they occur in the industry. Some practical methods of maintaining up to date information include: consulting with university horticulturist, subscribing to horticultural publications, searching the internet, or visiting other production regions and projects.

It is important to closely watch horticultural technologies so that the cooperative can take advantage of new techniques to improve qualities, lengthen shelf-life, lower costs, increase profits, and remain competitive. The failure to adapt new practices quickly could potentially force the cooperative out of business.

The committee designed to keep up to date on post-harvest handling technologies has many of the same responsibilities as the previous committee. This group should be headed by an agricultural engineer or some person in the industry of buying and selling post harvest handling machinery. The focus of this group is to ensure that the cooperative possesses the equipment required to meet market standards. As standards change, the technology required to meet the new standards may also change. New technologies can lead to producing more attractive produce or lowering the costs of processing at current standards. The failure to keep up to date on new technologies can give a competitive advantage to the competition and cause buyers to prefer other suppliers' produce over the cooperative's.

The committee in charge of labor issues will have as its major objective to attend to all issues related to recruiting, housing, and taking care of migrant labor. The use of migrant labor is relatively new to the region and unknown to many Southwest Virginia growers. Because of the newness of the issue, and much uncertainty related to managing migrant labor, a special committee needs to be formed to address these issues on behalf of the growers.

Migrant labor can satisfy all labor needs for the region's growers. Crews of migrant laborers can be recruited in almost any size. Due to the nature of tomato, pumpkin and pepper production, which requires relatively large amounts of labor at planting and harvest time, and much less during other phases of production (see appendix 5), there is a potential for cost savings through sharing labor crews.

Labor crews can be shared with proper planning. If planting dates are staggered so that when some growers require large quantities of labor, others need relatively little labor, crews can be shared and

costs greatly reduced. In order for some form of labor sharing to take place, a committee must be formed that addresses the needs of the growers and coordinates among them to maximize the utilization of the available labor.

Another need for this labor coordinating group is to assist growers with labor housing and care issues. Many Southwest Virginia growers have expressed the concern that they do not possess adequate living quarters that meet federal standards for migrant workers. The requirements for housing migrant labor include minimum square footage per worker, treated running water, safety devices, minimum nutritional standards, and other requirements that many local growers cannot meet. The role of the organizing committee will be to coordinate living arrangements between growers who possess adequate housing and those who do not. The committee must make sure that all growers are properly charged or compensated, depending on whether they provide or use housing services.

Due to the nature of migrant labor and the lack of experience in the region, there is a need for a central organizing committee to address these special labor issues and stay informed about new developments and regulations that may occur in the industry.

A committee needs to be formed to address marketing issues. This committee should be headed by the broker and any directors or members who have marketing experience. The focus of this committee should be to gather information related to changing consumer preferences, retail trends, industry requirements, and any new developments that may occur in the marketing of fresh produce.

It is important for these marketing issues to be constantly addressed and frequently updated. The inability to recognize industry standards has been discussed as a reason contributing to past failures. As consumer preferences change or as the retail and marketing network changes, the cooperative must quickly adapt to these new developments in order to remain competitive. The ability to adapt quickly to changes in market structure or consumer demand may mean the chance to earn excess profits as a new entrant, while a slow adjustment may lead to losing market share.

Some of the tasks required of this marketing committee may include reading food-retail magazines, interviews with purchasing agents, visits to retail outlets, and consumer surveys. The ability to

recognize and react quickly to changing trends and consumer demand may be the difference between success and failure.

The last essential committee should be the budget committee, headed by the cooperative's treasurer. This committee should make sure that the cooperative is earning, saving, and investing sufficient funds to meet its long-term goals and objectives. It will closely monitor the price charged to growers, and the retainer from the growers, in order to ensure that the cooperative possesses adequate equity.

This committee will also be responsible for preparing medium and long-term budgets related to the objectives of the co-op. As the cooperative identifies long-term goals, such as the purchase of a new building, modern equipment, a truck, new coolers, or any other long-term investment, the committee will have the responsibility of finding the best price and assure that savings are adequate to cover these costs.

Each of these essential committees should periodically report to the board of directors during the monthly board meeting. The manager should be present and a discussion should be held as to the relevance of any newly reported developments. It is important to keep the entire board, Extension, management and broker up to date in all aspects of production and marketing so that the cooperative can function efficiently.

The primary role of these committees is to ensure a proper and adequate flow of information within the cooperative structure. By assigning specific duties and responsibilities of obtaining information to the designated committees, the co-op should be assured that the lack of information will not be a cause for the decline of the co-op. By discussing the findings of the groups at periodic board meetings, the co-op can ensure that there is an adequate exchange and flow of information among all components of the co-op. Informational committees will be the tool that this co-op uses to break up the historic problem of poor internal communications and ensure that consumer preferences are made known at both extremes of the production and marketing network.

Section 3.6 Business Plan

The business plan is the map or blueprint that the co-op will follow in attempting to reach its objectives. The business plan should be the result of

a strategic planning analysis that considers short, medium and long-term goals. The business plan will act as a guide, specifying exact actions that must be taken in order to obtain the cooperative's objectives. The business plan should consider the strategic planning framework and the Phase One study in deciding the steps that the cooperative should follow.

The business plan should include certain elements. It should start by defining the cooperative's principal objective. This can be accomplished by summarizing the mission statement. The co-op strives to increase family farm incomes and create a supply of locally grown produce by offering regional growers the necessary marketing infrastructure to break into the fresh produce industry.

The second major step is to determine a specific product mix. The cooperative's product mix refers to the combination of crops that will be produced by the growers and marketed through the cooperative. Initially, the cooperative will produce and market string-weave tomatoes, green bell peppers, and Halloween pumpkins. The choice of product mix was based on grower acceptance, purchasing agent interest, and the financial feasibility study conducted during Phase One of the Southwest Virginia Shipping-point Market project. 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, because they are not labor intensive, and because they are a good late season complement to the other earlier summer crops. A detailed discussion of the cooperative's optimal product mix is presented in Section 1.1. The feasibility analysis, volume estimates, and income estimates presented in Appendices 1-3 are based on this three crop product mix.

The next step in developing a business plan should be to determine a marketing strategy. The cooperative directors must determine a strategy for marketing produce in order to design and develop the co-op to carry out the necessary functions. Depending on the target purchaser chosen, the quality and standards of the produce as well as packing, grading and delivery requirements will vary. The co-op management must first identify the target market in order to identify the necessary tasks needed to penetrate this market and to create a structure that addresses these tasks. The optimal marketing strategy based on the Phase One analysis is outlined below in section 3.6.

The other primary components of the business plan include establishing short, medium, and long-term goals, preparing profiles on the major competitors, and outlining a specific marketing strategy for each individual product. The business plan should be thorough and contain the input from all six skilled professional groups, growers, Extension agents, marketers, management, engineers, and purchasers. If the business plan is well thought out, discussed, and explained to the members, it should minimize the probability of an unforeseen event from negatively impacting the cooperative's operation.

Section 3.7 Marketing Strategy

The marketing strategy that best allows the cooperative to obtain the objectives outlined in the mission statement is to concentrate production on a few high volume crops such as tomatoes, peppers and pumpkins, and to sell them directly to large supermarket chains located in and around the state of Virginia. Supermarket chains are the primary retailers of fresh produce, selling more than 82% of all fresh produce retailed in the United States. Other advantages of marketing to supermarket chains include their reported interest in selling Virginia grown produce, their desire to purchase large volumes, their willingness to purchase a narrow product mix, the fact that all deliveries will be made to centrally located warehouses, their desire to establish long-term relationships, and their history of paying higher prices than wholesale buyers.

Supermarket chains are the optimal purchasing source that will allow the cooperative to meet the objectives established in the mission statement. The cooperative should maintain their focus on meeting supermarket chain standards and requirements as they continue to develop their business plan. Many decisions will have to be made in reference to issues such as the acquisition of cooling, grading, and packing equipment, warehouse space, transportation, warehouse location, product mix, and crop varieties. The co-op management and board of directors should keep in mind the primary marketing strategy of the cooperative when addressing these questions.

The cooperative should design its internal structure to increase the probability of meeting the market requirements of the large supermarket chains, while remaining flexible enough to supply other secondary sources. Breaking in as a supplier of the large supermarket chains may take a few

years while the cooperative establishes itself as a reliable producer and supplier of high quality produce. Test marketing, advertising, and establishing new relationships with produce buyers will be necessary before the supermarket chains make a long-term commitment to the cooperative as a source of supply for their retail outlets. During the initial years of operations, the cooperative must have additional outlets willing to purchase large volumes of produce. The primary sources that meet this need may be food service firms and small wholesalers.

Food servicers and wholesalers generally do not pay the same high prices nor purchase the large volumes of produce that supermarket chains demand, but they are generally flexible enough to consider various suppliers and may be able to move substantial volumes of the cooperative's produce. The cooperative broker should spend time developing relationships and test marketing produce with both of these sources in order to establish secondary markets for produce during the initial years, until longer-term more permanent relationships can be established with the supermarket chains.

Local outlets such as independent grocers, roadside stands and direct retail sales should also be explored in order to absorb a certain percentage of the cooperative's produce. While in many cases, supplying these small retailers generates logistical delivery and payment difficulties, these retailers may provide a source of income to the co-op during the first years of operations while the co-op works on establishing the longer term relationships. Selling produce locally may also be an effective method of advertising the co-op produce and building up brand name recognition among local consumers.

Another major factor that must be considered as part of the cooperative's marketing strategy is finding a food processor willing to purchase the product that does not meet top grade standards. A large volume of product may not meet the strict physical characteristics demanded by the large retailers, but may still appeal to food processors who generally possess less stringent requirements on physical characteristics such as size and shape. The ability to generate supplementary income from non No.1 graded produce may be an essential component to generating the high revenues needed to maintain the participation of the region's growers.

Section 3.8 Marketing Agreement

The marketing agreement is a contract that is signed between the producers and the cooperative organization. In the marketing agreement the obligations of both parties are specified, the rules for participating as a member of the cooperative are laid-out, and details about specific operations of the cooperative are explained.

The specific obligations outlined in the agreement that are the responsibility of the cooperative include the following: The co-op agrees to market all No.1 grade produce, to provide information on technical production issues to growers, supply producers with certain factors of production, receive, wash, grade, pack and cool all produce, transport produce to buyers, and pay the growers for their produce. The specific responsibilities of the growers included in the agreement are to maintain communication with cooperative management, purchase all specified inputs from the co-op, sell all specified acreage to co-op, produce certain varieties, meet marketing standards, irrigate produce, follow production “package” and meet designated delivery obligations.

The major reason cited for the failure of past cooperative efforts has been the inability to meet market standards and requirements. The cause of this failure has been the inability to design an internal information system that allows consumer preferences to flow from one extreme of the marketing network to the other extreme where they can be included in the growers’ production technology. The cooperative must identify the specific variety, color, size and shape characteristics of each product, as well as the volume, packaging, delivery, and business requirements demanded by the industry buyers. The cooperative must then translate these market requirements into a production and post harvest handling technology that will ensure that growers will produce a product that meets industry standards.

The marketing agreement is the major tool used by the cooperative to ensure that the growers produce a product that meets the desired market standards. Attached to the agreement as an appendix is the exact quality standards that must be met. The grower will be able to study the specified quality standards in order to fully understand the characteristics of the products that they must produce. The cooperative will have no obligation to market produce that does not meet these standards; therefore, they will be able to avoid past problems

related to selling substandard produce which led to acquiring a poor reputation.

Internal conflicts over the quality of growers’ produce is frequently debated; therefore, in order to avoid internal problems, a neutral USDA approved inspector will be contracted to sample and grade each grower’s produce as it arrives at the warehouse docks. Typically, an inspector randomly chooses a few boxes of produce from the grower’s delivery and runs them through the grading process. Based on the grade of this sample, the inspector assigns a grade to the overall shipment. Additionally, based on the percentage of No. 2s and culls that are removed from the sample, an overall quantity estimate is assigned to the produce based on the “entering” weight of the produce, and then estimating a final quantity amount based on the inspector’s grade and percentages assigned to the shipment.

The issue of “risk sharing” must be voted on by the members, incorporated into the cooperative bylaws, and specified within the Marketing Agreement. The major issue that must be resolved is the question of assigning an “average” price to the produce sold through the cooperative. There are three basic options that have been identified through interviews with management and representatives of other horticultural co-ops. 1) All produce delivered to and sold through the co-op during the entire year can be pooled together and the overall average price obtained throughout the year can be paid equally to all growers. 2) All produce delivered to the co-op and sold during a given week can be pooled and the price paid equally to each grower based on that weekly average. 3) Each individual shipment can be traced throughout the marketing process and the exact price obtained for each individual’s produce can be paid to that individual.

The first method of pooling all produce and paying the same price to all members has the advantage of providing the maximum insurance against tragedies such as a “bottoming-out” of prices to the point where they are lower than the cost of production, and against the possibility that a shipment is lost due to the failure of the co-op to find a market for it. In the case of one of these tragic scenarios, all growers will share the loss equally, and no individual will have to bear the entire cost. The disadvantage of this method is that there is no incentive to apply additional effort to deliver the produce at predetermined dates where prices are historically higher.

The second method has the advantage of providing some insurance against low prices and product deterioration by sharing price risk with a number of growers on a weekly basis, while also creating an incentive for producers to deliver their produce within the timeframe when prices are historically higher. Considering the fact that the recommended harvest window in Southwest Virginia is six weeks, pooling on a weekly basis will always insure that a large number of growers will be sharing the risk. The third method places all risk on the individual grower. A fortunate grower may benefit from a high price but will have no protection against selling his produce on a day when the market is saturated. With this method there are also additional costs of accounting associated with tracing an individual grower's shipment throughout the entire delivery and marketing process.

The second method of pooling produce on a weekly basis is recommended for the Southwest Virginia Cooperative. The benefits of this method are shared risk, an incentive to produce during certain weeks of the year, and easier accounting procedures. This method has also been recommended by several successful cooperatives and is therefore the suggested method of pooling for the co-op in question.

Included as a second appendix will be the production package or technological specifications. The production package will specifically detail all technical steps that must be taken in order to produce a product that meets the predetermined quality standards. The production technology will be developed by horticulturists and Extension agents, with the help of experienced growers, in order to develop the technology that will provide the growers with the highest probability for meeting quality standards. The development of the production package is thus the way in which the horticultural expertise needed to be successful is incorporated into the organization. The production package should be designed in such a way that a producer with absolutely no previous experience can follow the specifications and produce a high quality product.

Some of the specifications outlined in the production package include: land preparation, use and timing of chemical applications, irrigation schedules, weeding methods, pesticide use, and harvesting procedures. Insuring that all growers use the same seeds and inputs and follow the same technical procedures should guarantee a high quality, homogeneous product that can be assembled and

sold as a large volume of a single, uniform product. Without specified varieties and production methods, the growers may produce a wide range of varying product that can't be marketed together and thus prohibits the cooperative from meeting large volume requirements.

The marketing agreement also insures that all parties fully understand their role, and this understanding should facilitate the smooth operation of the cooperative. The obligations of the growers and the co-op management are specified, which insures that all participants know their role. This agreement and the written obligations of each party will help alleviate the coordination problem that has greatly contributed to the failure of the region to expand horticultural production. The transaction costs of coordinating the large number of small producers will be minimized once a document specifying each party's obligations is signed. The need and cost to communicate among growers and the cooperative will be minimized by following the specifications outlined in the marketing agreement. Each grower will possess the required technology and be able to concentrate on the administration of his or her farm, while the cooperative will be able to concentrate on the post-harvest handling and marketing tasks.

The final objective of the marketing agreement is to specify delivery and payment procedures. The knowledge that growers will sell all their produce to the cooperative, and that the cooperative has marketing experts working full time to obtain the best price for the members, will reduce uncertainty among the growers; this should lead to greater regional participation and expanded acreage being produced. Since there are virtually no prespecified purchasing contracts in the fresh produce industry, the cooperative cannot guarantee a specific price for the produce that they market. The cooperative, like all large and small producers, is subject to the market price at the time of the sale. The cooperative cannot guarantee the growers a specific price, but can guarantee them a competitive price based on the conditions of the market.

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Appendix 1 Calculations showing per unit charges to growers to cover fixed expenses

Year 0

	Acres		Yield			Units						
			conservative	average	optimistic	conservative	average	optimistic				
Tomatoes	0		1,500	1,750	2,000	0	0	0				
Peppers	0		650	725	800	0	0	0				
Pumpkins ^a	50		45	56.25	62.5	2250	1812	3125				
	Unit	Estimated range of production		Variable Cost per unit	Total Var. costs		Fixed Costs		'Additional charge' per unit 'to cover fixed costs (MIN)		Additional charge per unit 'to cover fixed costs (MAX)	
		low	high		low	high	min.	max.	low	high	low	high
Tomatoes	Box	0	0	\$2.00	0	0	N/A	N/A	N/A	N/A	N/A	N/A
Peppers	bushel	0	0	\$2.40					"	"	"	"
Pumpkins ^a	bin	2250	3125	\$12.25	\$27,562	\$38,281			"	"	"	"
Total									N/A	N/A	N/A	N/A

a=bins

Year 1

	Acres		Yield			Units						
			conservative	average	optimistic	conservative	average	optimistic				
Tomatoes	25		1,500	1,750	2,000	37,500	43,750	50,000				
Peppers	20		650	725	800	13,000	14,500	16,000				
Pumpkins ^a	60		45	56.25	62.5	2700	3075	3750				
	Unit	Estimated range of production		Variable Cost per unit	Total Var. costs		Fixed Costs		'Additional charge' per unit 'to cover fixed costs (MIN)		Additional charge per unit 'to cover fixed costs (MAX)	
		low	high		low	high	min.	max.	low	high	low	high
Tomatoes	box	37,500	50,000	\$2.00	\$75,000	\$100,000	\$66,500	\$108,400	\$1.25	\$0.95	\$2.04	\$1.55
Peppers	bushel	13,000	16,000	\$2.40	\$31,200	\$38,400	"	"	"	"	"	"
Pumpkins ^a	bin	2,700	3,750	\$12.25	\$33,075	\$45,937	"	"	"	"	"	"
TOTAL		53,200	69,750		\$139,275	\$184,337		Total	66,500	66,500	108,400	108,400

Year 2

	Acres	Yield			Units							
		conservative	average	optimistic	conservative	average	optimistic					
Tomatoes	60	1,500	1,750	2,000	90,000	105,000	120,000					
Peppers	50	650	725	800	32,500	36,250	40,000					
Pumpkins ^a	65	45	56.25	62.5	2925	3656	4062					
	Unit	Estimated range of production		Variable Cost per unit	Total Var. costs		Fixed Costs		'Additional charge' per unit 'to cover fixed costs (MIN)		Additional charge per unit 'to cover fixed costs (MAX)	
		low	high		low	high	min.	max.	low	high	low	high
Tomatoes	box	90,000	120,000	\$2.00	\$180,000	\$240,000	66,500	108,400	\$0.53	\$0.40	\$0.86	\$0.66
Peppers	bushel	32,500	40,000	\$2.40	\$65,000	\$96,000			"	"	"	"
Pumpkins ^a	bins	2925	4062	\$12.25	\$35,831	\$49,759			"	"	"	"
TOTAL		125,425	164,062		\$280,831	\$385,759	Total	66,500	66,500	108,400	108,400	

Year 3

	Acres	Yield			Units							
		conservative	average	optimistic	conservative	average	optimistic					
Tomatoes	100	1,500	1,750	2,000	150,000	175,000	200,000					
Peppers	80	650	725	800	52,000	58,000	64,000					
Pumpkins ^a	70	45	56.26	62.50	3125	3937	4375					
	Unit	Estimated range of production		Variable Cost per unit	Total Var. costs		Fixed Costs		'Additional charge' per unit 'to cover fixed costs (MIN)		Additional charge per unit 'to cover fixed costs (MAX)	
		low	high		low	high	min.	max.	low	high	low	high
Tomatoes	box	150,000	200,000	\$2.00	\$300,000	\$400,000	66,500	108,400	\$0.32	\$0.25	\$0.53	\$0.40
Peppers	bushel	52,000	64,000	\$2.40	\$124,800	\$153,600			"	"	"	"
Pumpkins ^a	bins	3125	4375	\$12.25	\$38,281	\$53,593			"	"	"	"
TOTAL		205,125	268,375		\$463,081	\$247,193	Total	66,500	66,500	108,400	108,400	

Year 4

	Acres	Yield			Units		
		conservative	average	optimistic	conservative	average	optimistic
Tomatoes	110	1,500	1,750	2,000	165,000	192,500	220,000
Peppers	85	650	725	800	55,250	61,625	68,000
Pumpkins ^a	80	45	56.25	62.50	3600	4500	5000

	Unit	Estimated range of production		Variable Cost per unit	Total Var. costs		Fixed Costs		'Additional charge' per unit 'to cover fixed costs (MIN)		Additional charge per unit 'to cover fixed costs (MAX)	
		low	high		low	high	min.	max.	low	high	low	high
Tomatoes	box	165,000	220,000	\$2.00	\$330,000	\$440,000	66,500	108,400	\$0.30	\$0.23	\$0.48	\$0.40
Peppers	bushel	55,250	68,000	\$2.40	\$132,600	\$163,200			"	"	"	"
Pumpkins ^a	bins	3600	5000	\$12.25	\$44,100	\$61,250			"	"	"	"
TOTAL		223,850	293,000		\$506,700	\$664,450		Total	66,500	66,500	108,400	108,400

Year 5

	Acres	Yield			Units		
		conservative	average	optimistic	conservative	average	optimistic
Tomatoes	120	1,500	1,750	2,000	180,000	210,000	240,000
Peppers	90	650	725	800	58,500	65,250	72,000
Pumpkins ^a	80	45	56.25	62.50	3600	4500	5000

	Unit	Estimated range of production		Variable Cost per unit	Total Var. costs		Fixed Costs		'Additional charge' per unit 'to cover fixed costs (MIN)		Additional charge per unit 'to cover fixed costs (MAX)	
		low	high		low	high	min.	max.	low	high	low	high
Tomatoes	box	180,000	240,000	\$2.00	\$360,000	\$480,000	66,500	108,400	\$0.27	\$0.21	\$0.45	\$0.34
Peppers	bushel	58,500	72,000	\$2.40	\$140,400	\$172,800			"	"	"	"
Pumpkins	bins	3600	5000	\$12.25	\$44,100	\$61,250			"	"	"	"
		242,100	317,000		\$ 544,500	\$ 714,050		Total	66,500	66,500	108,400	108,400

Appendix 2.A Range of returns to growers for various levels of production (Tomatoes)

No. 1 Yield (boxes) (per acre)				Total Revenue* <i>high price**</i>	Total Revenue <i>Ave. price</i>	Total Revenue <i>low price</i>	Production Cost per box		
2000	1750	1500	# 1's	\$13.66	\$9.60	\$5.91	2000	1750	1500
							\$3.48	3.98	4.64
*				\$27,320	\$19,200	\$11,820	6960	6960	6960
	*			\$ 23,905	\$ 16,800	\$ 10,342	6960	6960	6960
		*		\$ 20,490	\$ 14,400	\$ 8,865	6960	6960	6960

* revenue = yield times price

6960=total prod. costs/acre

Total per acre costs of marketing produce

Yield	Total Fixed & Variable charges for operating the plant (per box)					
		\$2.21	\$2.45	\$2.53	\$2.86	\$2.95
2000	4,420	4,900	5,060	5,720	5,900	8,080
1750	3,867.5	4,287.5	4,427	5,005	5,162.5	7,070
1500	3,315	3,675	3,795	4,290	4,425	6,060

price level	Expected profit based on 2,000 box yield per acre					
High	\$15,940	\$15,460	\$15,300	\$21,583	\$14,460	\$12,280
AVE	\$7,820	\$7,340	\$7,180	\$6,520	\$6,340	\$4,160
Low	\$440	-\$40	-\$200	-\$860	-\$1,040	-\$3,220

price level	Expected profit based on 1,750 box yield per acre					
High	\$13,078	\$12,658	\$12,518	\$12,128	\$11,813	\$10,343
AVE	\$5,973	\$5,553	\$5,413	\$5,023	\$4,708	\$3,238
Low	-\$485	-\$905	-\$1,045	-\$1,623	-\$1,780	-\$3,688

price level	Expected profit based on 1,500 box yield per acre					
High	\$10,125	\$9,855	\$9,735	\$9,240	\$9,105	\$7,470
AVE	\$4,125	\$3,765	\$3,645	\$3,150	\$3,015	\$1,380
Low	-\$1,410	-\$1,770	-\$1,890	-\$2,385	-\$2,520	-\$4,155

Per unit cost to producers

	Per box costs of production and marketing					
		\$2.21	\$2.45	\$2.53	\$2.86	\$2.95
2000	\$5.69	\$5.93	\$6.01	\$6.34	\$6.43	\$7.52
1750	\$6.19	\$6.43	\$6.51	\$6.84	\$6.93	\$8.02
1500	\$6.85	\$7.09	\$7.17	\$7.50	\$7.59	\$8.68

- per box cost of processing & marketing produce \$1.20

- cost of box \$.80

- total per unit cost of marketing produce \$2.00

* Revenue equals yield times price

** High price is maximum price obtained for single week between 1992-95

Appendix 2.B Range of returns to growers for various levels of production (Peppers)

No. 1 Yield (bushels)			Total Revenue * high price**	Total Revenue Ave. price	Total Revenue low price	Production Cost per bushel		
800	725	650	\$13.13	\$9.50	\$6.97	800	725	650
			\$3.60	\$3.97	\$4.43			
*			\$10,504	\$7,600	\$5,576	2878	2878	2878
	*		\$9,521	\$6,887	\$5,054	2878	2878	2878
		*	\$8,536	\$6,175	\$4,531	2878	2878	2878

Revenue = yield times price

Total per acre costs of marketing produce

Yield	Total Fixed & Variable charges for operating the plant (per bushel)					
	(per bushel)		(at different profit margins)			
	\$2.61	\$2.65	\$2.93	\$3.26	\$3.35	\$4.44
800	2,088.0	2,120.0	2,344.0	2,608.0	2,680.0	3,552.0
725	1,892.3	1,921.3	2,124.3	2,363.5	2,428.8	3,219.0
650	1,697.5	1,722.5	1,904.5	2,119.0	2,177.5	2,886.0
price level	Expected per acre profit based on 800 bushell yield per acre					
High	\$5,538	\$5,506	\$5,282	\$7,879	\$4,946	\$4,074
Ave.	\$2,634	\$2,602	\$2,378	\$2,114	\$2,042	\$1,170
Low	\$610	\$578	\$354	\$90	\$18	-\$854
price level	Expected per acre profit based on 750 bushell yield per acre					
High	\$4,749	\$4,720	\$4,517	\$4,278	\$4,213	\$3,422
Ave.	\$2,117	\$2,088	\$1,885	\$1,646	\$1,581	\$791
Low	\$283	\$254	\$51	-\$188	-\$254	-\$1,044
price level	Expected per acre profit based on 800 bushell yield per acre					
High	\$3,960	\$3,934	\$3,752	\$3,538	\$3,479	\$2,771
Ave.	\$1,601	\$1,575	\$1,393	\$1,178	\$1,120	\$411
Low	-\$44	-\$70	-\$252	-\$467	-\$525	-\$1,234

Per unit cost to producers

	Per box costs of production and marketing					
	\$2.61	\$2.65	\$2.93	\$3.26	\$3.35	\$4.44
800	\$6.21	\$6.25	\$6.53	\$6.86	\$6.95	\$8.04
725	\$6.58	\$6.62	\$6.90	\$7.23	\$7.32	\$8.41
650	\$7.04	\$7.08	\$7.36	\$7.69	\$7.78	\$8.87

Notes

- per bushel cost of processing and marketing produce \$ 1.20

- cost of box \$ 1.10

- total per unit cost of marketing produce \$ 2.15

Appendix 2.C Range of returns to growers for various levels of production (Pumpkins)

Yield (bins)			Total Revenue <i>high price</i>	Total Revenue <i>Ave. price</i>	Total Revenue <i>low price</i>	Cost of producing bin Pump.		
45	56	62	\$166.00	\$100.00	\$46.00	45 \$48.29	56 \$53.46	62 \$66.53
*			7,470	4,500	2,070	2,994	2,994	2,994
	*		9,296	5,600	2,576	2,994	2,994	2,994
		*	10,292	6,200	2,852	2,994	2,994	2,994
Total Fixed & Variable cost of operating (per Bin)								
Yield	\$12.46	\$12.50	\$12.65	\$13.11	\$13.20	\$14.29		
45	560.70	562.5	569.25	589.95	594.20	643.05		
56	697.76	700	708.40	734.16	739.20	800.24		
62	772.52	775	784.30	812.82	818.40	885.98		
Expected per acre profit based on yield of 45 bins/acre								
Price level								
High	\$3,915	\$3,914	\$3,907	\$6,882	\$3,882	\$3,833		
Ave.	\$945	\$944	\$937	\$916	\$912	\$875		
Low	-\$1,485	-\$1,487	-\$1,493	-\$1,514	-\$1,517	-\$1,554		
Expected per acre profit based on yield of 52 bins/acre								
Price level								
High	\$5,604	\$5,602	\$5,594	\$5,568	\$5,480	\$5,502		
Ave.	\$1,908	\$1,906	\$1,898	\$1,872	\$1,867	\$1,806		
Low	-\$1,116	-\$1,118	-\$1,126	-\$1,152	-\$1,157	-\$1,218		
Expected per acre profit based on yield of 62 bins/acre								
Price level								
High	\$6,525	\$6,523	\$6,514	\$6,485	\$6,480	\$6,412		
Ave.	\$2,433	\$2,431	\$2,422	\$2,393	\$2,388	\$2,320		
Low	-\$915	-\$917	-\$926	-\$955	-\$960	-\$1,028		
Per unit cost to producers								
	\$12.46	\$12.50	\$12.65	\$13.11	\$13.20	\$14.29		
2000	\$60.75	\$60.79	\$60.94	\$61.40	\$61.49	\$62.58		
1750	\$65.19	\$65.96	\$66.11	\$66.57	\$66.66	\$67.75		
1500	\$6.85	\$79.03	\$79.18	\$79.64	\$79.73	\$80.82		

Appendix 3. Estimates of Expected Profits for First Five Years of Operations (Average Values)

Year	Prod	Marketing through Co-op (per unit)				cost prod (per unit)	total cost prod&mkt (per unit)	expected profit
		fixed costs	var. cost	fixed charge	charge total			
Tomato								
1	43,750	\$87,450	\$2.00	\$1.39	\$3.39	\$3.98	\$7.37	\$3,899.07
2	105,000	\$87,450	\$2.00	\$0.59	\$2.59	\$3.98	\$6.57	\$5,305.53
3	175,000	\$87,450	\$2.00	\$0.36	\$2.36	\$3.98	\$6.34	\$5,705.05
4	192,500	\$87,450	\$2.00	\$0.33	\$2.33	\$3.98	\$6.31	\$5,757.50
5	210,000	\$87,450	\$2.00	\$0.30	\$2.30	\$3.98	\$6.28	\$5,801.77
Peppers								
1	16,000	\$87,450	\$2.40	\$1.39	\$3.79	\$3.97	\$7.76	\$1,259.58
2	40,000	\$87,450	\$2.40	\$0.59	\$2.99	\$3.97	\$6.96	\$1,842.25
3	64,000	\$87,450	\$2.40	\$0.36	\$2.76	\$3.97	\$6.73	\$2,007.77
4	68,000	\$87,450	\$2.40	\$0.33	\$2.73	\$3.97	\$6.70	\$2,029.50
5	72,000	\$87,450	\$2.40	\$0.30	\$2.70	\$3.97	\$6.67	\$2,047.84
Pumpkins								
1	3075	\$87,450	\$12.25	\$1.39	\$13.64	\$53.46	\$67.10	\$1,842.29
2	3656	\$87,450	\$12.25	\$0.59	\$12.84	\$53.46	\$66.30	\$1,887.30
3	3937	\$87,450	\$12.25	\$0.36	\$12.61	\$53.46	\$66.07	\$1,900.08
4	4500	\$87,450	\$12.25	\$0.33	\$12.58	\$53.46	\$66.04	\$1,901.76
5	5000	\$87,450	\$12.25	\$0.30	\$12.55	\$53.46	\$66.01	\$1,903.18

Notes

- Production estimates derived from Table 1.5 using average quantities
- Fixed costs of operating facility assumes \$80,000 (average of Minimum and Max estimates of Table 1.8)
- Cost of producing based on average yield estimates presented in Table 1.3¹⁰
- Expected profit derived using average price data for years 1992-95 from selected terminal markets¹¹

¹⁰ Virginia Cooperative Extension Horticultural Budgets

¹¹ USDA/AMS/Fruit and Vegetable Division/Market News Branch-Wholesale Mkt. Prices 1992-95

Appendix 4

Mission Statement

MISSION STATEMENT

The principal mission of the Southwest Virginia Vegetable Association is to support Southwest Virginia growers in the production and marketing of horticultural produce which is aimed at increasing family incomes and stimulating economic development in the region. Expanding horticultural production will create a supply of locally grown produce that will be sold to wholesale and retail outlets in the Virginia and surrounding states region.

Producers, Extension agents, and agricultural leaders in Southwest Virginia have recognized the importance of diversifying agricultural production in the region. Southwest Virginia lags behind the state and national averages in most important economic categories. Several studies have forecasted the decline in profitability of the region's traditional agricultural activities. This cooperative effort is designed to offer a complementary agricultural production practice, through the diversification into and expansion of horticultural production, that will allow local producers to increase farm incomes. Increasing family incomes will contribute to the overall economic development of the region.

The specific role of the Association in fulfilling these objectives is through the provision of marketing services to its members. These marketing services will assist local growers in preparing their produce to meet industry standards, thus making them more appealing to both wholesale and retail buyers. The marketing services offered by the Association will be in two forms, the provision of 1) physical and 2) managerial infrastructure.

Physical infrastructure provided by the Association consists of: a warehouse, machinery, and other equipment. The services provided from these structures include: washing, grading, packing, storing, cooling, and transporting members' produce. The physical structures provided by the Association have as an aim to prepare the members' produce in the necessary physical form demanded by produce purchasers and to obtain the highest price for its members.

Managerial services provided by the cooperative refer to organizational and technical assistance provided by key personnel contracted by the board

of directors, such as a manager, broker, and horticulturist. The specific objectives of these personnel are to provide organizational assistance, coordinate production efforts, purchase supplies at wholesale prices, gather information on the latest production and post-harvest handling technologies, establish relationships with produce buyers, define quality standards, and bargain on behalf of its members to obtain the highest price for its produce.

The board of directors will set policies and hire personnel which will improve operations and contribute to the region gaining a larger market share as a supplier of fresh horticultural produce in the Virginia and surrounding state area. Policies set by the board will have as an objective to improve the marketing infrastructure, both physical and managerial, which will benefit local producers and assist them in making their produce more attractive and more valuable to local buyers.

The Association will have as a marketing strategy to produce and supply high quality No. 1 grade fresh produce to large wholesalers and large supermarket chain buyers located within a four hour drive of the Gate City headquarters. Within this four hour radius, several supermarket chains have more than a dozen central warehouses which purchase fresh produce and ship it out to its retail locations. There are fourteen major buyers located within this four hour radius that serve over 2,700 retail outlets totaling nearly six billion dollars in food sales.

Funding provided by the Rural Business Cooperative Service, and any other national or state funding obtained in the future, will be used to the overall benefit of the Southwest Virginia region. Maximum benefit is obtained by assisting the maximum number of local producers to increase their agricultural income. Active members will participate in annual meetings to develop goals and set policies that will provide them with the maximum benefit.

Appendix 5 Bylaws

BYLAWS¹²

Clinch Mountain Cooperative , INC.

ARTICLE I – NAME AND OBJECTIVE

Section I - Name

The name of this corporation shall be Clinch Mountain Cooperative, Inc.

Section II - Objective

The purpose of this corporation, herein after called cooperative, shall be to serve the interests of farmers and farm families in Southwest Virginia and upper east Tennessee by purchasing, grading, processing, advertising, and marketing farm produce; by providing education and technical assistance to farmers; by providing equipment and supplies to farmers; by providing processing, grading, packing, and sales space to farmers; and by any other activities intended to support and promote agriculture, rural and family life.

ARTICLE II – MEMBERSHIP

Section I - Eligibility

Qualifications - the corporation shall have two classes of members:

A. Regular Members

Any person, firm, partnership, corporation or association including landlords and tenants and share tenancy who is a grower or shipper of agricultural products and those actively engaged in the plant production industry in a direct manner may become a member of the corporation subject to the approval of the board of directors by agreeing to comply with the by-laws and marketing agreement of the corporation. Members shall have full voting rights and shall have one and only one vote in any and all questions. Partnerships and corporations shall have one vote by duly authorized representative.

B. Associate Members

Any person, firm, partnership, corporation or association interested in the general welfare of the vegetable industry in Virginia may become an associate member of the corporation subject to the

approval of the board of directors and by agreeing to comply with the by-laws and marketing agreement of the corporation. Any person representing departments of agriculture, universities, extension service involved in production or marketing research or assistance or in any other way attempting to aid growers, shippers or processors of vegetables may become an auxiliary member of the corporation subject to the approval of the board of directors and by agreeing to comply with the by-laws and marketing agreement of the corporation. Associate members shall have no voting rights.

All applications for membership must be approved by the board of directors. Membership status is effective as of the time the board approves the application for membership.

Section II - Good Standing of Members

Any regular or associate member shall be in good standing when his dues shall have been paid in full, have otherwise fully complied with the cooperative's articles and by-laws, and meets such other uniform conditions as may be prescribed by the board of directors.

Section III - Membership Resignation or Termination

Any member may withdraw from the cooperative by submitting to the office of the association a resignation in writing. A member shall be deemed to have withdrawn from the association and to have forfeited all rights and privileges upon failure to pay membership dues within 30 days after the expiration of their respective membership year. The membership year is based on the calendar year. Upon termination of membership in the cooperative, all rights and interest of such member in the cooperative shall cease.

In the event the board of directors of the cooperative shall find, following a hearing, that a member has ceased to be an eligible member due to violations of the articles of incorporation, by-laws, marketing agreements, or any other obligations uniformly enforced by the board of directors, the cooperative may suspend such member's rights as a member and terminate the membership. A suspended or terminated member shall have no rights or privileges on account of any stock held, nor vote or voice in the management or affairs of the cooperative other than the right to participate in accordance with law in case of dissolution.

¹² These bylaws were written by a sub-committee of the Southwest Virginia Vegetable Cooperative which has formally adopted the name of Clinch Mountain Cooperative. The authors of this research document were just some of the participants of the sub-committee, the others were: Dick Austin, Charlie, Henry Snodgrass, Mike Cassell, I.E. Horton, and Jack Berry

Section IV - Membership Certificates

Each regular member or associate member shall be issued an initial membership certificate in a form prescribed by the board of directors. It shall remain in effect as long as the member shall qualify as indicated in Section I of Article II, entitled Membership of these by-laws.

ARTICLE III – DUES

The membership dues for each class of membership shall be set or prescribed by the board of directors subject to the approval of the regular members. Dues for regular members and associate members shall be payable annually and due on Jan. 1st of each year.

ARTICLE IV – MEETINGS

Section I - Annual Meetings

The annual meeting of the association shall be held at such time as may be fixed by the board of directors. Notice of the time of each annual meeting shall be mailed to each director, to each individual member and to each associate member at least ten days in advance thereof.

Section II - Special Meeting

Special meetings of the Association may be called by the president or by a majority of the board of directors upon written request to the secretary. Notice of all special meetings shall be sent to each individual member and associate member at least 10 days in advance of each meeting. In case of special meetings, such notice shall state the object of the meeting and the subject or subjects to be considered.

Section III - Voting.

Unless otherwise stated in the articles of incorporation, or these by-laws, or required by applicable law, all questions shall be decided by a vote of a majority of the members voting thereon. Voting by proxy is not permitted.

Section IV - Quorums

At annual assembly meetings of the cooperative, a quorum of the board, and 10% of the members of record on the day of notification, shall constitute a quorum.

Section V - Presiding Officer

The president shall preside at all meetings. In his absence the Vice-president shall preside at the

meeting. In absence of both President and Vice-president, those officers present shall elect a presiding officer protem from among those present.

ARTICLE V – BOARD OF DIRECTORS

Section I. - Number and Qualification of Directors

The Cooperative shall have a board of directors consisting of not less than 12 nor more than 18 people. The number shall be established at annual meetings; though the number may not be reduced in a manner that forces any Director from the Board prior to the expiration of his/her term.

Section II. - Election of Directors

The directors consisting of the first board of directors shall hold office until the first meeting of the members of the Cooperative. At the first annual meeting, directors shall be elected by the members as follows: one third (1/3), or as nearly maybe, of the directors shall be elected for one year, one third (1/3), or as nearly maybe, of the directors shall be elected for two years, and one third (1/3), or as nearly maybe, of the directors shall be elected for three years. At each annual meeting of the members thereafter directors elected to fill vacancies caused by vacancies and expiration of terms of office shall be elected for terms of three years each.

Section III. - Quorum

The presence of one third (1/3) of the board of directors shall constitute a quorum at any meeting of the board.

Section IV. - Notice of board meetings

Oral or written notice of each meeting of the board of directors shall be given each director by or under the supervision of the secretary of the association not less than five days prior to the time of the meeting, but such notice may be waived by all the directors and appearance at a meeting shall constitute a waiver of notice thereof.

Section V. - Meetings

Regular meetings of the board shall be held at such times and places as the board shall determine. Meetings maybe held by conference call or other electronic means. Special meetings of the board of directors shall be held as determined by the board.

Section VI. - Vacancies

Whenever a vacancy occurs in the board of directors, other than the expiration of a term of office, a nominating committee will be formed to elect a new director to fill the vacancy until the next annual meeting of the members. An objective of the nominating committee will be to ensure that all counties have an adequate representation on the board of directors.

Section VII. - Executive Committee

If need be, the board can empower an executive committee comprised of the cooperative officers to act for the board of directors in the interim between board meetings. All such actions shall be ratified and approved at the next board meeting. The executive committee shall develop and recommend for board approval annual and long range plans and objectives.

Section VIII. - Voting.

Unless otherwise stated in the articles of incorporation, or these by-laws, or required by applicable law, all questions shall be decided by a vote of a majority of the directors voting thereon. Voting by proxy is not permitted.

ARTICLE VI – DUTIES OF DIRECTORS

Section I. General Duties:

It shall be the duty of the Board of Directors to supervise the affairs of the Cooperative and to actively pursue its objectives. It shall adopt rules and regulations for the conduct of its business as it shall deem advisable. It shall carry out the policies of the Cooperative as determined by the members from time to time at regular and specific meetings. It shall be empowered to direct the affairs of the Cooperative, to have charge of the disbursement of its funds, to act as judge of the qualifications of all applications for membership, and to employ and appoint such persons and agents as may be necessary and as funds will permit. The board may require adequate bond of any officer, employee or agent handling funds for the Cooperative.

Section II. - Management of Business:

The board of directors shall have general supervision and control of the business and the affairs of the association and shall make all rules and regulations not inconsistent with law, the articles of incorporation, or by-laws for the management of the

business and the guidance of the members, officers, employees, and agents of the cooperative.

Section III. - Employment of Manager:

The Board of Directors shall have power to employ, define duties, fix compensation, and dismiss a manager with or without cause at any time, The board shall authorize the employment of such other employees, agents, and counsel as it from time to time deems necessary or advisable in the interest of the cooperative, The manager shall have charge of the business of the cooperative under the direction of the board of directors.

Section IV. - Bonds and Insurance:

The board of directors shall require the manager and all other officers, agents, and employees charged by the cooperative with responsibility for the custody of any of its funds or negotiable instruments to give adequate bonds. Such bonds, unless cash security is given, shall be furnished by a responsible bonding company and approved by the board of directors, and the cost thereof shall be paid by the cooperative.

The board shall provide for the adequate insurance of the property of the cooperative, or property which may be in the possession of the cooperative, or stored by it, and not otherwise adequately insured, and, in addition, adequate insurance covering liability for all accidents to all employees and to the public. The board shall also provide for director's liability insurance, protecting the directors from legal liability against unauthorized actions of the cooperative.

Section V. - Accounting System and Audits:

The board of directors shall have installed an accounting system which shall be adequate to meet the requirements of the business and shall require proper records to be kept of all business transactions. At least once each year the board of directors shall secure the services of a competent and disinterested public auditor or accountant, who shall make a careful audit of the books and accounts of the cooperative and render a report in writing thereon, which report shall be submitted to the directors and the manager of the cooperative and made available to the members of the cooperative. This report shall include at least a balance sheet showing the true assets and liabilities of the cooperative, and an operating statement for the fiscal period under review.

ARTICLE VII – OFFICERS

Section I - Election of Officers

The board of directors shall meet within two (2) weeks after each annual election and shall elect by ballot a president, vice-president, secretary, and treasurer, each of whom shall hold office until the election and qualification of a successor, unless removed by death, resignation, or for cause. The president and vice president shall be members of the board of directors. The secretary and treasurer need not be directors or members of the cooperative. Officers shall serve a one year term.

Section II - Duties of the President

The president shall preside at all meetings of the Cooperative and of the board of directors. He shall faithfully execute the orders of the board and of the executive committee and shall perform such other duties as are customarily performed by such officer. He shall appoint with the advice and consent of the responsible vice president, members to standing committees. He shall appoint a nominating committee and may appoint special committees as in his judgment he may deem necessary. He shall preside over the board of directors in the hiring of the cooperative manager and supervise the activities of the manager.

Section III - Duties of the Vice President

The Vice president shall perform the duties of the President in his or her absence and other such duties as assigned by the board of directors.

Section IV - Duties of the Secretary

The secretary shall keep a complete and accurate record of all proceedings of the association and the board of directors and shall have general charge and supervision of the books and records of the association. He shall give all notices required by law and by these by-laws and shall make a full report of all matters and business pertaining to his office to the board as they may require, and to the members at their annual meeting. He shall keep complete membership records. If an executive committee is formed, he shall act as Secretary of the Executive Committee. He shall make all reports required by law and shall perform such other duties as may be required of him by the association or the board of directors. The secretary shall keep the corporate seal and all books of blank certificates, complete and countersign all certificates issued, and affix the corporate seal to all papers requiring a seal. Upon the election of his successor, the secretary shall turn

over to him all books and other property belonging to the association that he may have in his possession.

Section V - Duties of the Treasurer

The treasurer shall propose and provide the board of directors with an annual budget and financial statements. He/she shall receive all money paid to the association and deposit same in the name of the association with depositories designated by the board of directors and shall disperse money only as directed by the board of directors. He shall carefully account for all transactions and make full report of same to the annual meeting or at any time upon the demand of the president or the board of directors, a copy of which report will be filed with the secretary. The treasurer shall furnish bond if required by the board of directors, the expense of same to be paid by the association and his books shall be audited annually by a competent accountant or an adult committee approved by the board. The treasurer shall maintain trade liability insurance coverage for the association and its members.

Section VI - Duties of Manager:

The manager shall perform such duties and shall exercise such authority as the board may from time to time vest in him. Under the general supervision of the board, the manager shall have general charge of the ordinary and usual business operations of the cooperative including purchasing, marketing and handling of all products and supplies handled by the association. He shall render annual and other statements in the form and in the manner prescribed by the board. He shall employ, supervise, and dismiss any and all employees of the association.

ARTICLE VIII – OPERATION AT COST AND MEMBER'S CAPITAL

Section I. Operation at Cost

The association shall at all times be operated on a cooperative service-at-cost-basis for the mutual benefit of its member patrons.

Section II. Margin Allocation

In order to induce patronage and to assure that this association will operate at a service-for-cost basis in all its transactions with its members, the association is obligated to account on a patronage basis to all member patrons on an annual basis for all amounts received from business conducted with

members on a patronage basis, over and above the costs of providing such services, making reasonable additions to reserves, and redeeming capital credits. Such allocation shall be on the basis on the volume (or dollar value) of product marketed through (and/ or purchased from) the association.

The association is hereby obligated to pay all such amounts to the patrons in cash or by credits to a capital account of each member patron.

Section III. Per Unit-retains

Each member also agrees to provide capital in such amounts as determined by the board of directors based on physical units of product marketed through the association. Such per-unit retains shall be allocated to the member's capital credit account.

Section IV - Dividends

No dividends shall be paid on any capital credits.

ARTICLE IX – AMENDMENTS

Section I

These by-laws may be amended at any annual general assembly meeting of the cooperative membership upon affirmative vote of 2/3 of the members present. Previous notice of such meeting, including the text of proposed amendments, must be given in writing to each member not less than ten days prior to such meeting.

Section II

ARTICLE X – FISCAL YEAR

The fiscal year of this association shall commence on the first day of January of each year and shall end on the last day of December of the same year.

ARTICLE XI – DISSOLUTION

Upon dissolution, after all debts and liabilities of the association shall have been paid, and all capital furnished through patronage shall have been retired without priority on a pro rata basis, the remaining property and assets of the association shall be distributed among the members and former members in the proportion which the aggregate patronage of each member bears to the total patronage of all such members insofar as practicable, unless otherwise provided by law.

ARTICLE XII – INDEMNIFICATION

The cooperative shall indemnify its officers, directors, employees, and agents to the fullest extent possible under the provisions of the Virginia State Law as it may be amended from time to time.

Appendix 6 Marketing Agreement

MARKETING AGREEMENT



This Agreement, made as of this _____ day of _____, 199____, by and between _____, herein referred to as “producer,” and **Name of Cooperative, Inc.**, an agricultural cooperative having office at _____ **ADDRESS** _____ Gate City, Virginia, herein referred to as “Cooperative.”

RECITALS

- A. **Name of Cooperative Inc.** is an agricultural cooperative organized under the laws of the State of Virginia.
- B. Producer is member/ associate member/ non-member _____, of the Cooperative who produces: T omatoes/ Green Bell Peppers/ Pumpkins/ Other _____.
- C. Producer has paid his/her dues in full, has invested \$_____ into the equity of the Cooperative and possesses a membership certificate. This entitles Producer to all the benefits of membership in the Cooperative as long as Producer complies with the Articles of Incorporation and bylaws of the Cooperative and the provisions of this agreement.

In consideration of the mutual covenants and obligations contained herein, the parties agree as follows:

Section 1. - Sale of Produce:

Producer agrees to plant _____ acres of Tomatoes, Green Bell Peppers, Pumpkins, Other _____, located at _____ and sell 100% of the No. 1 quality produce harvested from this acreage directly through the Cooperative. This agreement is intended by the parties to pass an absolute title of the produce to the Cooperative upon delivery by the Producer to the Cooperative. The product shall be at the risk of the Producer until such time that it has been delivered to the Cooperative Headquarters, graded and entered into the ledger entitled “*Member’s Produce Received*.” This ledger specifies the quantity received from the grower and will be signed by Producer and Cooperative Manager. Producer is responsible for the cost of transporting product to the cooperative headquarters.

Section 2. - Cooperative Obligations:

Upon receiving the product from the Producer, and both parties having signed the “receipt of shipment,” the Cooperative will provide the services of grading, packing, cooling, storing, and marketing of the product.

Upon completing the grading and packing process and the final inspection of product, the quantity of product remaining that has passed inspection will be entered into the Manager's "*Members' Produce Received*" ledger, which establishes the legal acceptance of product. Producer has the right to be present at the time of grading or inspection. All decisions or interpretations related to quality standards and volume belong to the Manager, and Producer agrees to accept Manager's grading decisions. If Producer is not present at time of inspection, he can telephone the Manager to learn the quantity of produce entered into the "*Members' Produce Received*" ledger.

If while in storage at Cooperative, product deteriorates due to being delivered to cooperative in an over-ripe condition or with an unacceptably short shelf-life, to the point where it can not be sold it will be re-graded, and a new quantity will be entered into the "*Members' Produce Received*" ledger. This process can be repeated as many times as need be until the product is sold. Upon sale of the product, by Cooperative to a third party, a final entry will be made in the ledger specifying the final volume of Producer product marketed by Cooperative. The Cooperative is only responsible for paying Producer for the quantity of product it was able to sell, and not for volume of product received. Upon Cooperative selling the product, the Cooperative will pay Producer for the product sold according to the pricing policy and payment schedules specified below.

Cooperative will take all necessary precautions to ensure that deliveries are coordinated with growers and with buyers to minimize time from product harvest to delivery to buyer.

Section 3. - Quality Standards:

Cooperative will only market product that meets predetermined quality standards. Cooperative is responsible to attach as Appendix 1. to this Agreement at the time of signing, specifying quality standards for each of the products it agrees to market. The quality standards will include: size specification, color specification, shape specification, specifications for field-heat removal, ripeness specifications, and other specifications as pertain to each specific commodity. Cooperative will follow USDA standards in setting the product specifications.

Cooperative has no obligation to market No. 2 product that does not meet No 1 quality standards outlined in Appendix 1. of this Agreement. The

location of markets for product that does not meet the established specifications for No. 1 produce, is a secondary objective of Cooperative, but Management's focus and priority will be first on marketing the No. 1 product and secondly on marketing No. 2 product.

Section 4. - Production Practices:

Producer agrees to follow all technological production practices specified by Cooperative. Cooperative management will prepare a manual of specified production practices, herein called "production package," and attach it to this Agreement as an Appendix at the time of signing. Production issues that will be specified in the "production Package include: where to purchase transplants, where to purchase seeds, variety to be planted, irrigation schedules and specifications, chemical application specifications, planting dates, harvesting procedures, and any other requirements and methods that Cooperative's horticultural representatives deem important for meeting specified quality standards.

Producer will irrigate his/her crop according to the specifications laid-out in the "production package." Failure by Producer to irrigate, or follow specifications in the "production package" will nullify this Agreement and remove Cooperative's obligation to accept the specified product at its headquarters.

Section 5. - Producer Inputs:

Cooperative may stipulate in the "production package" that Producer purchase specific inputs (i.e. seeds, fertilizer, pesticides, etc.) from Cooperative. Upon signing the Marketing Agreement, Producer agrees to purchase the designated inputs at-cost in the quantities that correspond to the acreage committed for sale to Cooperative as defined in this Agreement. Cooperative may require Producer to purchase from Cooperative when Cooperative can achieve a cost savings for Producer by purchasing such inputs in large quantities. Producer agrees to pay for all inputs ordered, on or before the day Producer receives them. Producer must pay all costs of transporting inputs from Cooperative location to Producer farm.

Section 6 - Communication Obligations:

Upon planting the crop, Producer will once every thirty (30) days call the cooperative Manager, and report on the progress of his/her crop. This 30 day Progress Report will include: description of physical

quality of product, report of problems, estimate of expected yield, estimate of harvest date, and request for technical assistance if needed.

At least ten (10) days before harvest, Producer will notify Manager of expected harvest date. Two days before delivery, Producer will make the “final notification” and confirm final delivery date and time with cooperative Manager. Any changes in date or time following the “final notification” must be made by Producer as early as possible. Any additional costs incurred by Cooperative due to failure of Producer to comply with “final notification” dates and times, will be deducted from Producer’s payment. Management must notify Producer upon receiving the product, that an additional expense has been incurred, and will be deducted from Producer’s payment.

Section 7 - Payment to Producer:

The Cooperative may at anytime pool any or all product of Producers with any other Producer’s product of a similar kind and grade. All Product received at the Cooperative between Monday morning (at beginning of office hours) and the following Sunday night (end of office hours) will be pooled. Producer shall receive for its product, a unit price equal to the average net unit price obtained for the pooled product during the designated pooling week, less deductions authorized in Section 10 of this Agreement.

Cooperative shall pay the amount due Producer, less deductions authorized in Section 10 of this Agreement, not more than 40 days after delivery of product to Cooperative or Cooperative’s prescribed buying location.

or

When in judgment of the Manager and approved by Treasurer, Cooperative has sufficient equity and savings, Cooperative may make an advance payment to Producer of 60% of the current market price (or some other percentage as deemed acceptable by the Manager) in the area for product of like kind, grade, and quality not more than 10 days after delivery of product to Cooperative or Cooperative’s prescribed buying location. From the remaining 40%, Cooperative’s costs of operation and equity retain, as specified by Board of Directors, will be deducted with the remaining amount being paid to Producer in a period not to exceed 40 days.

Section 8. - Delivery:

All product shall be delivered by Producer at Producer’s expense at the earliest reasonable time after harvesting, or at such time as called for by Cooperative following the regulations on Producer communications stipulated in Section 5 of this Agreement. Producer shall deliver product to Cooperative’s principle place of business or to one of Cooperative’s authorized buying locations as prescribed by Cooperative. The Cooperative will use its best efforts to locate buying conditions within a reasonable distance from Producer’s farm.

Section 9. - Inspection and Grading:

Prior to acceptance by Cooperative, all product shall be inspected and graded according to quality standards and specifications established in Appendix 1 of this Agreement and according to USDA standard rules and regulations. The Cooperative will hire a USDA approved Inspector with no ties to the co-op in order to sample and grade arriving produce. The Inspector will assign a grade to the produce and it will then be pooled with produce from other growers that meets the same grade. Producer has the right to be present at the time of grading or inspection. All decisions or interpretations related to quality standards and volume belong to the Inspector, and Producer agrees to accept Inspector’s grading decisions. If Producer is not present at time of inspection, he can telephone the Manager to learn the quantity of produce entered into the “*Members’ Produce Received*” ledger.

If product deteriorates (due to failure to meet established shelf-life standards) to the point where it can not be sold while in storage and under the possession of Cooperative, it will be re-graded, and a new quantity will be entered into the “*Members’ Produce Received*” ledger. This process can be repeated as many times as need be until the product is sold. Upon sale of the product by Cooperative to a third party, a final entry will be made in the ledger specifying the final volume of Producer product marketed by Cooperative. The Cooperative is only responsible for paying Producer for the quantity of product it was able to sell, and not for volume of product received.

Section 10 - Deductions:

Cooperative agrees to market product for Producer as set forth in section 1 and to pay Producer on a per unit basis according to pooled pricing method set forth in section 7. the amount obtained

less the following deductions authorized by Producer:

- a) An amount to be determined annually by the board of directors, in the sole discretion of the board, to meet the general contingencies of the business of the Cooperative including salaries and operating expenses.
- b) A \$_____ per _____ (unit) capital retain deduction by the Cooperative on the purchase price of each unit of product marketed for Producer. The capital retain may be used to purchase new equipment, hire new personnel, on research and development, returned to Producer, or for any other expenses that promote the long-term operation of the Cooperative, as determined annually by the board of directors, in the sole discretion of the board.

Section 11 - Liquidated Damages:

The remedy at law would be inadequate and it would be impracticable and difficult to determine the actual damages to the Cooperative should the Producer fail to deliver the product covered by this Agreement. Therefore, regardless of the cause of such failure, Producer agrees to pay to the Cooperative for all such product delivered or disposed of by Producer, other than in accordance with the terms of this Agreement, a sum equal to 50% of the fair market value of the product at the close of business on the day the product should have been delivered to the Cooperative, as liquidated damages for the breach of this agreement.

All parties agree that this agreement is one of a series dependent for its true value on the adherence of all the contracting parties to all of the agreements, but the cancellation of any other similar agreement or the failure of any of the parties thereto to comply therewith shall not affect the validity of this agreement.

Failure to deliver the product committed herein due to ACTS OF GOD shall not constitute a breach of this agreement.

Section 12 - Specific Performance:

Producer agrees that in the event of a breach or threatened breach by Producer of any provisions of this marketing agreement regarding delivery of product, the Cooperative shall be entitled to a preliminary restraining order and an injunction to prevent breach or further breach hereof and to a decree of specific performance hereof. The parties

agree that this is a contract for the purchase and sale of personal property under special circumstances and conditions and that the Cooperative may, but shall not be obligated to, go into the open markets and buy product to replace any Producer may fail to deliver.

Section 13. - Legal Costs and Expenses:

If the Cooperative brings any action whatsoever by reason of a breach or threatened breach of this agreement, Producer shall pay to the Cooperative all court costs, costs for bonds, travel expenses and all other expenses arising out of or caused by the litigation, including reasonable attorney's fees expended or incurred by Cooperative in such proceedings, and all such costs and expenses shall be included in the judgment.

Section 14 - Termination and Renewal:

After all agreements of this marketing agreement have been completed, concluding with the final payment of Cooperative to Producer for product accepted, this marketing agreement is terminated. It is mutually agreed that each proceeding year a new marketing agreement must be signed by both parties to renew contractual obligations.

Section 15. - No Contrary Agreements:

Producer warrants that producer has not contracted to sell, market, consign or deliver and will not contract to sell, market consign or deliver any of product named under this agreement, during the term of this agreement to any person, firm or corporation, contrary to this agreement. Producer may grow additional acreage of similar product to be marketed independently outside the Cooperative, when these additional contractual agreements do not interfere with Producer's ability to comply with this agreement and supply the Cooperative with quantity of product specified in Section 1 of this Agreement.

Section 16. - Forfeiture of Membership:

Violation of this agreement in any material respect by Producer shall be grounds for the Board of Directors to terminate Producer's membership in the Cooperative.

Section 17. - Assignment:

This agreement may be assigned by the Cooperative in its sole discretion. Producer may assign this agreement, but only upon written authorization granted by the board of directors of the Cooperative.

Section 18. - Entire Agreement:

It is agreed that the articles of incorporation, and the by-laws of the Cooperative, now and hereafter in effect, and this marketing agreement constitute the entire agreement between Cooperative and Producer, and that there are no oral or other conditions, promises, covenants, representations, or inducements in addition to, or at variance with, any terms of this agreement.

Section 19. - Governing Law

This agreement shall be governed by the laws of the State of Virginia.

IN WITNESS WHEREOF, these parties have executed this agreement as of the day, month, year above written:

Producer

Clinch Mountain Cooperative, Inc.

By _____
President

Attest: _____
Secretary

Appendix 1. To Marketing Agreement ***

Quality Standards

***this is an example

Tomatoes

- Variety: Mountain Spring
- Kind: String-weave Vine-ripened
- Color: dark red
- Size: extra large
- shape: uniform and round
- harvest: when pink: USDA color specified
- Post harvest handling: explain process
 - do not leave in sun
 - remove as much field heat as possible
- Other Specs: leave on green stems
- delivery: must be within 24 hours after start of harvest
- USDA Classification:
- Discoloration: less than 1 sq. inch of non red blotches on fruit

Green Bell Peppers:

- Variety:
- Kind:
- Color:
- Size:
- shape:
- harvest:
- Post harvest handling:
- Other Specs:
- delivery: must be within 24 hours after start of harvest
- USDA Classification:
- Discoloration: less than 1 sq. inch of non green blotches on fruit

Halloween Pumpkins:

- Variety: “ _____ ”
- Kind: Halloween
- Color: orange _____
- Size: specify diameter
- Weight: specify min. weight
- Shape: uniform and round
- Stem: leave on, min. 3 inch
- Discoloration: less than 10 sq. inch of non orange blotches on fruit
- Harvest: when _____
- Post harvest handling:
 - store in cool area
 - keep out of sun
- Other Specs: _____
- delivery: must be within 72 hours of harvesting
- USDA Classification: _____

*** The Appendix is designed to serve as an example, additional field trials and market development is needed to successfully determine the standards categorized above.

Appendix 2. To Marketing Agreement

Production Package

Example

- Planting Dates: - between April 1 and April 19, 1998
- Harvest dates: - between August 22 and September 15, 1998
- Preparation of land: -
- Herbicide kind: - brand names “ _____ ”
- Herbicide use: - “ application specifications”
- Rotations: - not after tobacco, peppers, etc. / good after corn, beans, etc.
- Transplants: - Co-op will purchase in bulk for members, XX needed per acre
- Planting depth:
- Spacing between rows:
- Fertilizer: - Co-op will purchase “name“ in bulk for °members
- Pesticides: - need to buy XX quantities of brands “Brand #1” or “Brand #2”.
- Pesticide use: - apply every XX days, following rains, when flowering, etc.
- Irrigation: - Drip irrigation with plastic mulch
- irrigation requirements: - when soil humidity falls below XX
- Weeding:
- Pruning:
- Harvesting:
- Other requirements:

Notes
