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THE ECONOMIC FEASIBILITY OF PROCESSING SELECTED VEGETABLES IN NORTHEASTERN NORTH CAROLINA

U. S. DEPARTMENT OF AGRICULTURE • ECONOMIC RESEARCH SERVICE
In cooperation with
Florida Agricultural Experiment Stations University of Florida

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This technical assistance study was accomplished by professional consultants under contract with the Economic Development Administration, U.S. Department of Commerce. The statements, findings, conclusions, recommendations, and other data in this report are solely those of the contractor and do not necessarily reflect the views of the Economic Development Administration.

PREFACE

This research report presents the results of a study of the economic feasibility of processing fruits and vegetables in the Albemarle Area of northeastern North Carolina. The study was conducted by the Economic Research Service, U. S. Department of Agriculture, as a result of a request for technical assistance made by the Edenton-Chowan Planning Board, Edenton, N. C., to the Economic Development Administration, U. S. Department of Commerce. The Economic Development Administration provided a substantial share of the costs of the study.

Some of the important characteristics of the area and its resources are described in this report. Discussion of the product mix, procurement area for raw products, and size and location of plants--either freezing or canning--is included along with the criteria and other factors considered in making these selections.

In the analysis of processing feasibility, both freezing and canning plants are evaluated. Input requirements and their costs are given for each type of plant. Annual operating costs and returns were determined for each plant based upon the processing season for products produced in the Albemarle Area.

The report discusses problems associated with raw product procurement, methods of achieving market entry and its probable cost to a new firm, and other factors relevant to the success of a processing plant.

ACKNOWLEDGEMENTS

This report has been completed with the aid and cooperation of many organizations and individuals. Recognition cannot be given to all who have provided essential parts of the technical information required in the analysis. However, special recognition is due those who have made major contributions to this study.

The writer is indebted to A. K. Robins and Company, Inc., Baltimore, Md., American Can Company, Tampa, Fla., Edenton Construction Company, Inc., Edenton, N. C., St. Onge, Ruff, and Associates, York, Pa., Departments of Agricultural Economics and Agricultural Engineering, University of Florida, Gainesville; and the Departments of Economics, Food Science, and Horticultural Science, North Carolina State University, Raleigh, for their provision of plant layouts, cost data, and other technical and economic information.

The author is also indebted to R. H. Reed, Department of Agricultural Economics, University of Wisconsin (formerly with the Economic Research Service); M. R. Godwin, Department of Agricultural Economics, University of Florida; F. W. Williams, Florida Citrus Commission (formerly with the Economic Research Service); and W. T. Manley, L. C. Martin, and T. L. Brooks of the Economic Research Service, U. S. Department of Agriculture, for their assistance in planning and conducting the study.

SUMMARY

For years, northeastern North Carolina has produced fresh vegetables for market. Changes in the fresh vegetable marketing structure have occurred, however, and growers have been left in a relatively unfavorable position.

Can vegetable processing solve this problem? Specific objectives of this study were to answer these questions: (1) Would such a project be feasible? And (2) if so, what costs and returns could be expected from a freezing plant and a canning plant?

All fruit and vegetable crops technically feasible to produce in the area were considered. Each of these crops was evaluated in terms of the economic feasibility to produce, process, and market. A product mix composed of lima beans, southern peas, snap beans, and leafy greens (collards, kale, mustard, spinach, and turnips) was selected. This mix affords an 8-month processing season.

Since the exact amount of raw product to be expected from the area is uncertain, plans are presented here for a relatively small plant requiring from 5,000 to 5,500 acres of the crops to be included in the mix.

The city of Edenton is the suggested location for the processing plant. Edenton has unique advantages with respect to water supply and raw product procurement that are not found at any other location.

Assumed output of the freezing plant evaluated in this study is 12,966,000 pounds, and assumed output of the canning plant is 892,994 case equivalents of 24 No. 303 cans.

Capital requirements for the freezing plant are $1,548,645 for building and equipment, and $870,000 for operating. The canning plant requires $716,309 for building and equipment, and $750,000 for operating capital.

An analysis of costs and revenues for each plant indicates a net profit after taxes of $101,047 for the freezing plant and $35,905 for the canning plant. These results show that either plant is economically feasible. The freezing plant is preferable to the canning plant, if the larger capital requirement is available.

The freezing plant would have an annual payroll of $244,678 and employ 62 seasonal and 33 full-time workers. The canning plant's payroll would be $230,876, paid to 88 seasonal workers and 18 full-time employees. In man-year equivalents, the freezing and canning plants would employ 69 and 64 workers, respectively, in labor and management positions.

In establishing a freezing or a canning plant such as is envisioned in this study, a great many factors must be considered. Each of the factors considered in this report should be reevaluated before investing. Management capable of handling the problems of market entry, raw product procurement, and efficient plant operation are essential to the success of this investment.

THE ECONOMIC FEASIBILITY OF PROCESSING SELECTED VEGETABLES IN NORTHEASTERN NORTH CAROLINA

By James L. Pearson 1/

INTRODUCTION

Northeastern North Carolina (the Albemarle Area), like many other rural areas, feels the economic pressure of change. Ways to employ idle agricultural resources, particularly the labor resource, and to make more profitable use of currently employed resources are being sought.

Leaders in the area have described the problems facing the fruit and vegetable industry and suggested a possible solution. Their statement is as follows:

> One of the severe marketing problems for farmers in the area is widely fluctuating prices and incomes from marketing fresh vegetables. The area lies between other important vegetable producing areas to the north and to the south. For this reason, a slight change in timing of production among the areas can cause a serious price squeeze on the farmers of this North Carolina area. That is, their products can be moving to the market at the same time that products from competing areas also are moving in large volume to the same markets. At times, farmers in the area have been forced to market their products at extremely low prices. Reduced employment due to technology adds to the problem of low income.
>
> In this situation, processing outlets may prove to be beneficial both as an alternative outlet for fruits and vegetables grown in the area, and as a regular source of income for many producers. At present, no processing plants are located in the area, and farmers have no alternative but to market their products in fresh forms regardless of the price situation. A processing plant provides further direct employment on the farm, in the plant, and indirectly in other industries such as transportation, supplies, packaging, etc. 2/

This report presents an evaluation of the economic potential for the establishment of one or more fruit and vegetable processing plants in the area as suggested in the above statement.

1/ Agricultural Economist, Marketing Economics Division, Economic Research Service, and Assistant Agricultural Economist, Florida Agricultural Experiment Stations, University of Florida, Gainesville.

2/ Statement by Edenton-Chowan Planning Board, Edenton, N. C., in its application for technical assistance.

Objectives

The specific objectives of the study reported here were:

1. To determine if fruit and vegetable processing is economically feasible in northeastern North Carolina, and if so,

2. To determine the feasible number, size, type, and location of fruit and vegetable processing plants, and

3. To develop in detail the investment, building, equipment, labor, raw product, and operating costs of technically and economically feasible processing plants (freezing and canning), including estimates of probable returns to capital and management, labor, and growers.

General Approach

The approach used was to delineate the potential supply area and select the fruit and vegetable crops that seemed most suitable to produce, process, and market. After the product mix was selected, an appraisal of the potential production was made; then the number, size, type, and location of fruit and vegetable processing plants needed to process this supply were determined.

Consideration was given to both freezing and canning plants. Specifications for each type of plant were drawn up in consultation with manufacturers of food processing equipment, food processors, engineers, and other researchers. Input requirements and costs for each plant were determined. Investment in buildings and machinery and annual operating costs and returns for the expected outputs were then estimated to complete the study.

IMPORTANT CHARACTERISTICS OF THE ALBEMARLE AREA

The type of farming varies considerably over the area although corn and soybeans are, in most instances, the dominant field crops from the standpoint of acreage and income. The part of the area, roughly east of a line through Gates, Chowan, Washington, and Beaufort Counties (Dare County excluded), is predominantly a corn, soybean, and small-grain producing area. Vegetables (including potatoes) and a small amount of fruit are grown in the lower half of Currituck County and in small areas in each of the other counties.

The western half of Chowan County is unique in that a much larger variety of vegetable and field crops is grown there, including corn, soybeans, tobacco, small grain, cotton, and peanuts. Indications are that about 2,500 acres of commercial vegetables (melons and potatoes excluded) were grown in 1964. This included at least 15 different vegetable crops.

Almost all of these vegetables were grown for the fresh market, as they have been for many years.

Most of Gates, western Washington, Bertie, Hertford, Martin, and Beaufort Counties have relatively diversified farms. Major field crops include corn, peanuts, cotton, soybeans, and tobacco. Fruit and vegetable crops (except sweetpotatoes) are of minor importance in this area.

Total acreages of vegetables in the Albemarle Area have declined for several years. Irish potato acreage has dropped sharply over the last few years as a result of low prices. Some fresh market vegetable producers indicated that changes in the Nation's market structure have hampered their ability to market satisfactorily.

The Albemarle Area has a considerable amount of undeveloped land. Much of it is high in organic material and appears to be suited for vegetable production. However, virtually no information is available on the potential of this land for fruit and vegetable production. Adequate drainage is one of the major problems confronting developers if these soils are found to be otherwise suitable for vegetable production.

Some fruit and vegetable crops produced in the Albemarle area are subject to greater risks of adverse weather than is expected in late summer and early fall for most areas. Elizabeth City rainfall data for 1953 through 1962 show that 44.4 percent of the annual average rainfall came during July, August, September, and October.

SELECTION OF A FEASIBLE PRODUCT MIX FOR PROCESSING

To tentatively ascertain the feasibility of processing fruits and vegetables in the Albemarle Area, factors relating to production, processing, and marketing were considered. Production of fruits for processing does not appear to be economically feasible. Information available from production specialists prompted this decision early in the study.

Horticultural extension specialists at Raleigh and Plymouth, N. C., provided data on 23 vegetables that, from a primarily technical standpoint, can be grown in the area. These vegetables are: asparagus, beets, broccoli, cabbage, carrots, cauliflower, collards, cucumbers, green peas, Irish potatoes, kale, lima beans, mustard, okra, peppers, snap beans, southern peas, spinach, squash, sweet corn, sweetpotatoes, turnip greens, and tomatoes.

Each vegetable was evaluated in terms of the economic feasibility of production, processing, and marketing. The criteria used in evaluating each of these vegetables and selecting the product mix included:

1. Probable net returns from this use of land greater than from the least profitable current use of land suitable for vegetable production or a net farm income from multi-cropping with other

vegetable and field crops greater than from least profitable present use.

2. Relatively low susceptibility to adverse weather.

3. Production and harvest labor requirements generally consistent with trend toward mechanization of farming in the area.

4. Compatibility with other products in use of processing equipment and in achieving a long processing season.

5. Demand for finished product in expected market area adequate to absorb the annual pack with no appreciable price effects.

6. Market structure such that market entry by the new firm's product can be accomplished at reasonable costs.

7. Supplies of raw product expected to be adequate for needs of new plant in addition to those of processors currently procuring supplies from the area.

Use of these criteria permitted reducing the list of 23 vegetables to 8; these 8 make up the product mix. They are lima beans, southern peas 3/, snap beans, and leafy greens (collards, kale, mustard, spinach, and turnip greens).

The vegetables included in the product mix meet the selection criteria satisfactorily. None of these crops, when considered individually, is likely to displace many acres of the crops currently being grown. All do have potential, however, when taken in combination with other crops on a double- or triple-cropping basis. For example, one might double crop a nonlegume spring crop and fall snap beans, triple crop spring turnip greens, lima beans, and fall collards; or double crop a spring vegetable crop and soybeans.

The products are suitable for canning or freezing. A processing plant of either kind would require three preparation equipment lines. Lima beans and southern peas could be processed on the same equipment. All of the leafy greens could be run on one line. If it is not essential that each line be independent in its operation from all other lines, part of the equipment may be utilized more fully by using it in processing more than one product. This provides a means of reducing the size of investment and processing costs.

The proposed product mix affords an 8-month processing season. The harvest dates are as follows:

3/ Southern peas are also referred to as field peas and cow peas. Included in the southern pea category are blackeye, crowder, cream, and purple hull peas.

Crop	Harvest Date
Spring leafy greens	April 1-June 25
Spring snap beans	May 25-June 30
Green lima beans	July 1-August 15
Southern peas	July 10-October 15
Fall snap beans	September 20-October 31
Fall leafy greens	September 20-November 30

Harvest dates overlap to some extent requiring allocation of operating time for processing lines not designed to operate independently.

Each of the products in the mix has a fairly strong demand either nationally or regionally. Snap beans, lima beans, and some of the leafy greens are more closely identified with the national market. Southern peas and leafy greens such as collards are identified more closely with the southern market and are important consumer items in the South. Snap beans, lima beans, southern peas, and most of the leafy greens are also very strong items in the institutional trade.

SUPPLY PROCUREMENT AREA

Production of the raw products for the plant under consideration would probably be confined primarily to Chowan, Gates, Perquimans, Pasquotank, Camden, Currituck, Tyrrell, Washington, and Hyde Counties (fig. 1). The other counties in the Albemarle Area are not likely to produce vegetables in the product mix extensively because of the diversity of field crops currently produced with relatively high resource requirements and net returns per acre. In addition, nearby counties in Virginia are not likely to supply any of the raw products for processing.

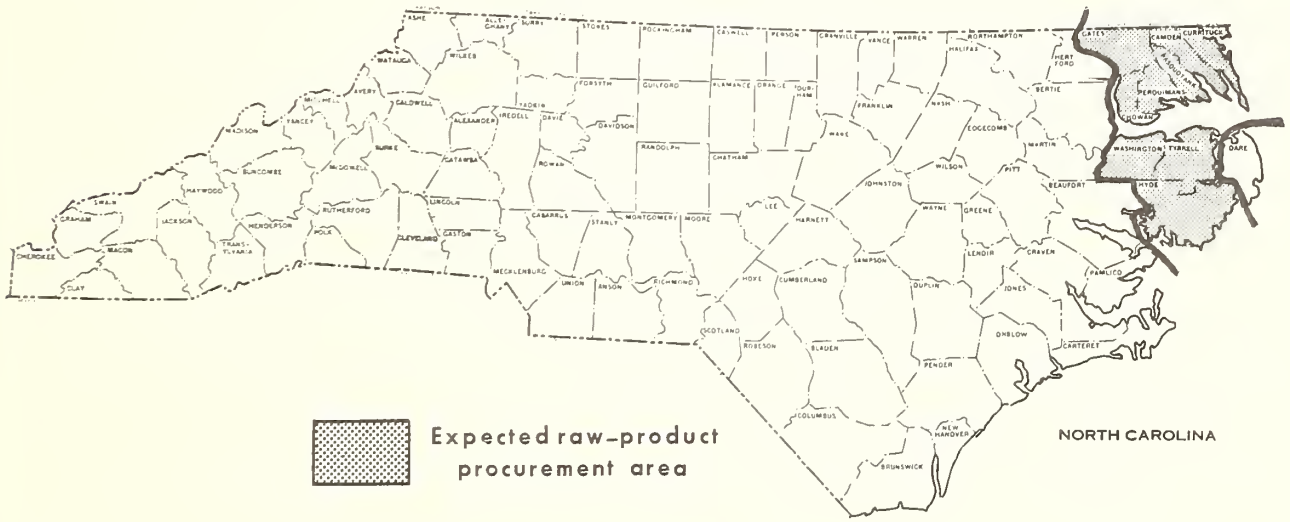

Figure 1

PLANT SIZE AND NUMBER

As stated previously, indications are that net returns on many farms could be increased by making adjustments in the cropping program to include one or more of the crops in the product mix. On the other hand, any projection of producer supply response is complicated by the fact that some farmers have goals that conflict with profit maximization. However, it is assumed that an adequate amount of each of the vegetable raw products would be produced to support one freezing or canning plant. Raw product requirements for a plant whose cost structure would be expected to be competitive would range from 5,000 to 5,500 acres of the crops in the product mix. An expansion in the processing capacity could be made as the area demonstrated its desire and ability to expand commercial vegetable production and produce vegetables for the processed market on a sustained volume basis.

PLANT LOCATION

The city of Edenton in Chowan County is considered to be the most desirable location for the processing plant. Edenton is approximately 5 miles from the most accessible road connecting Washington, Tyrrell, and Hyde Counties with the counties north of the Albemarle Sound.

Vegetable processing plants require large amounts of potable water. Geologists of the U.S. Geological Survey indicate that 100-150 foot wells in the Albemarle Area frequently produce water containing impurities that would require treatment before being used in a vegetable processing plant. Throughout most of the area, the water obtained from deeper wells contains chloride concentrations in excess of 250 parts per million. The city of Edenton and areas in its immediate vicinity have sufficient amounts of good-quality water that can be obtained from deep wells to supply the proposed processing plant.

Probably the greatest disadvantage of the Edenton location is the distance that producers in the southern half of Currituck County must transport their products.

PLANT SPECIFICATIONS

Assumptions

Input requirements and cost estimates for processing the proposed product mix in a freezing or a canning plant were subject to the following assumptions:

1. The three basic product lines are not operated independently; consequently, only one product can be processed at a time.

2. All raw product is procured locally.

3. When harvest periods overlap, snap beans and lima beans hold

priority over leafy greens and southern peas.

4. All products are mechanically harvested.

5. Lima beans, southern peas, and snap beans are harvested with a snap and lima bean harvester, using bulk pallet boxes for plant delivery.

6. Plant capacity and labor are used efficiently.

7. Plants operate on a 7-day week basis when enough product is available, and average operating $4\frac{1}{2}$ days per week during the harvest season. Two 10-hour shifts can be used when practical from a production and marketing standpoint.

8. Fixed costs can be equitably allocated to individual products on a proportion-of-pack basis.

9. Total output is divided among container sizes in accordance with current market demand of approximately 75 percent retail and 25 percent institutional.

10. Finished product sales are uniformly distributed throughout the year with adequate storage provided for the inventory.

Processing Capacity

Equipment manufacturers, processors, engineers, and other industry representatives were consulted in estimating hourly capacity rates for each type of plant. Information was also available from earlier research. Factors affecting the estimates included the product mix, container sizes, and expected annual hours of operation, in total and for each product.

The expected hourly output of the freezing plant was set at 6,000 pounds for lima beans, southern peas, and snap beans, and 4,500 pounds for leafy greens. The expected hourly rate of output for the canning plant, in equivalents of cases containing 24 No. 303 cans was set at 365 cases for lima beans and southern peas, 475 cases for snap beans, and 265 cases for leafy greens. Each of these output rates reflects at least a 10-percent allowance for unavoidable delays and abnormal product quality.

FREEZING PLANT COSTS AND RETURNS

Operation

The freezing plant considered in this study is designed to receive lima beans, southern peas, and snap beans in pallet bulk boxes (fig. 2). These products pass through standard preparation equipment and are individually quick-frozen (I.Q.F.). Freezing actually begins in a refrigerated flume as the vegetables are being conveyed from the preparation line to the fluidized-bed freezer. After freezing, the product is pneumatically conveyed

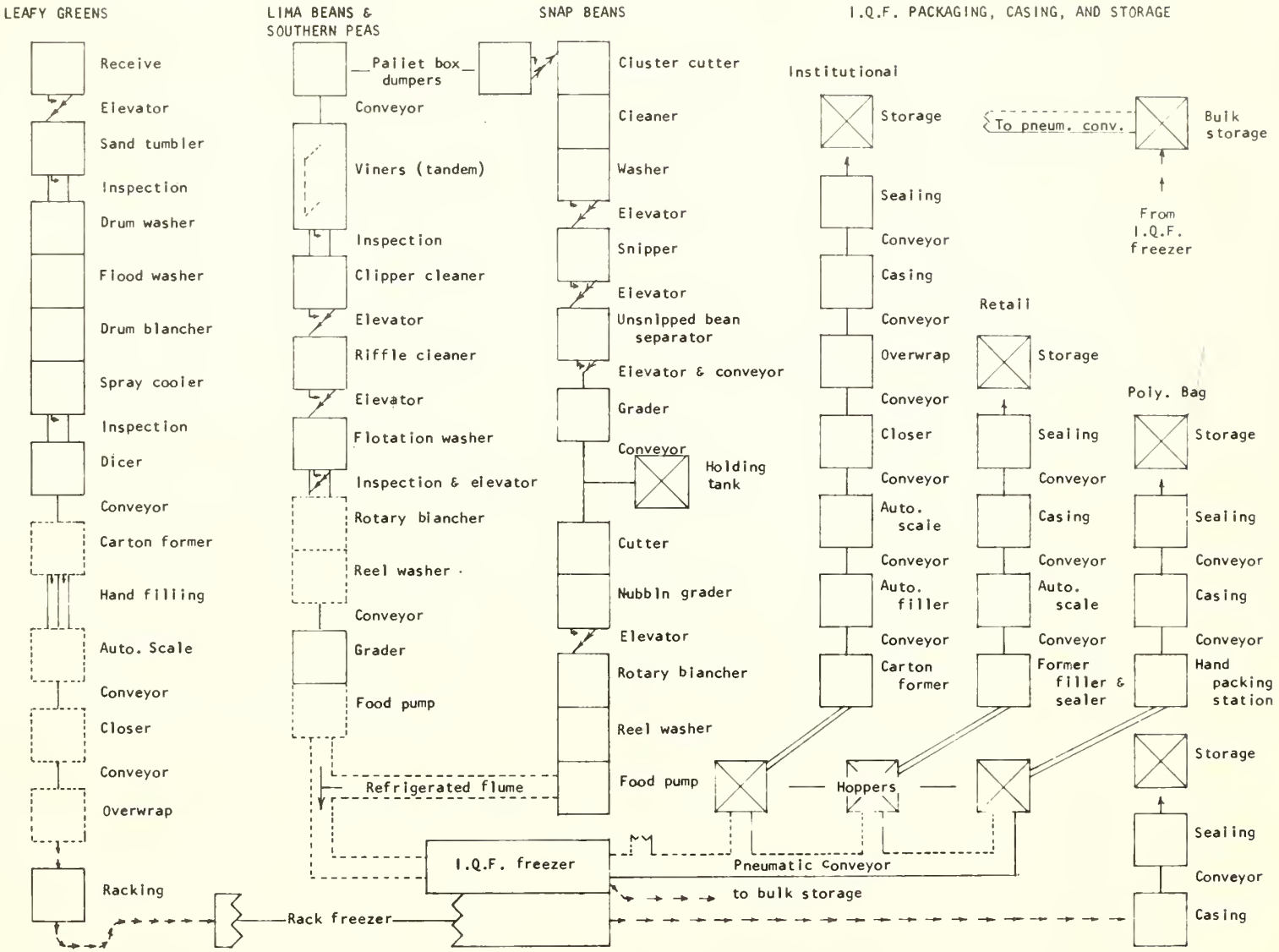

Figure 2. Stages of Preparation, Freezing, Packaging, Casing, and Storage of Lima Beans, Southern Peas, Snap Beans, and Leafy Greens.

to the packaging lines or dumped directly into bulk pallet containers holding 1,200 to 1,400 pounds of product and placed in storage.

Packaging I.Q.F. products is done by taking them direct from the freezer or by removing them in bulk containers from storage. I.Q.F. products may be packaged in institutional cartons, retail cartons, or polyethelene bags. The carton lines are completely automatic except that the case-filling operation is manual. The polyethelene bag line is a manual operation intended to meet minimal market requirements of 10 to 15 percent of the retail pack, initially. As the demand for the firm's products packed in polyethelene bags increases, a mechanical line may become economically feasible.

Leafy greens are received in bulk and manually unloaded directly onto the processing line. Processing is done on standard preparation equipment. The product moves directly from the preparation line to the packaging line in leaf or chopped form. Most of the equipment used in the packaging line is taken from the I.Q.F. institutional package line. Cartons are formed, closed, check weighed, and overwrapped by automatic machines, but are filled by hand. This line can handle retail or institutional cartons except that an additional overwrap machine is required for the retail cartons.

The filled cartons of leafy greens are placed in racks manually and then transported to the tunnel or blast freezer for freezing. After freezing, the racks are then transported to the casing line where they are emptied and the product cased and put on pallets for freezer storage.

Expected output of the freezing plant operating 2,296 hours is 12,966,000 pounds (table 1). This is composed of 3,360,000 pounds of lima beans, 1,056,000 pounds of southern peas, 6,120,000 pounds of snap beans, and 2,430,000 pounds of leafy greens. This amount of product would require 7,907 tons of raw product.

Table 1.--Proposed freezing plant: Annual operating time, raw product requirements, finished product yield, and output for processing selected vegetables, Edenton, N. C., 1965

Product	Days per year 1/	Hours per day	Hours per year	Raw product requirements 2/		Finished product yield (as percentage of raw product)	Expected output rates of finished product	
				Hourly	Annual		Hourly	Annual
				Tons	Tons	Percent	Pounds	1,000 pounds
Lima beans	28	20	560	3/ 3.15	1,764	96	6,000	3,360
Southern peas	22	8	176	3/ 3.15	554	96	6,000	1,056
Snap beans	51	20	1,020	4.05	4,131	74	6,000	6,120
Leafy greens	54	10	540	2.70	1,458	83	4,500	2,430
Total	155	--	2,296	--	7,907	--	--	12,966

1/ Assumes an average operating week of 4.5 days.
2/ 90 percent of rated capacity. Loss of 10 percent assumed because of unavoidable delays and abnormal product quality.
3/ Shelled basis.

Investment in Buildings and Equipment 4/

In estimating building and equipment requirements for the freezing plant, all components were itemized. This permitted a detailed compilation of the replacement costs. The total investment is estimated to be $1,548,645, of which about 40 percent is for buildings and the remainder for machinery and equipment (table 2).

Table 2.--Proposed freezing plant: Investment in buildings and equipment for processing selected vegetables, Edenton, N.C., 1965

Item	Size, capacity, or number	Replacement cost	Allocation of replacement cost 1/			
			Lima beans	Southern peas	Snap beans	Leafy greens
			Dollars			
Buildings:						
Processing 2/	100'x228'x14'	132,743	34,380	10,885	62,655	24,823
Freezer storage	200'x150'x20'	360,000	93,240	29,520	169,920	67,320
Dry storage	60'x100'x20'	22,440	5,812	1,840	10,592	4,196
Packaging I.Q.F.	40'x100'x14'	16,000	4,144	1,312	7,552	2,992
Boiler & mech.	50'x75'x14'	14,025	3,632	1,150	6,620	2,623
Refrigerated dock	1800 sq. ft.	13,000	3,367	1,066	6,136	2,431
Office	60'x60'	29,160	7,552	2,391	13,764	5,453
Well, building, pump, & tank	400 g.p.m.	30,300	7,848	2,484	14,302	5,666
Truck scale	50 ft.	14,500	3,755	1,189	6,844	2,712
Other	--	5,000	1,295	410	2,360	935
Subtotal	--	637,168	165,025	52,247	300,745	119,151
Equipment:						
Preparation	--	210,132	36,667	11,515	129,639	32,311
Freezing	--	239,000	55,926	17,447	101,575	64,052
Refrigeration	--	221,000	57,239	18,122	104,312	41,327
Packaging & casing 3/	--	117,307	23,869	7,493	43,465	42,480
Boiler	90 b.hp.	13,620	3,527	1,117	6,429	2,547
Fork trucks	2	18,317	5,293	1,667	9,635	1,722
Trucks	2	5,500	1,424	451	2,596	1,029
Pallets	5,500	19,250	4,986	1,578	9,086	3,600
Pallet boxes	360	4,446	1,418	445	2,583	--
Bulk I.Q.F. containers	4,538	30,405	9,699	3,041	17,665	--
Pallet racks	--	15,000	3,885	1,230	7,080	2,805
Other 4/	--	17,500	4,532	1,435	8,260	3,273
Subtotal	--	911,477	208,465	65,541	442,325	195,146
Total	--	1,548,645	373,490	117,788	743,070	314,297

1/ Allocation based on proportion of annual pack involved.
2/ Includes preparation and freezing, and for leafy greens, packaging and casing.
3/ Some equipment leased.
4/ Includes office, shop, laboratory, and sewage equipment.

4/ No attempt has been made to include land costs. Sites were available for a processing plant in and around Edenton at varying costs when this study was made. Architectural, engineering, and legal fees, if any, connected with the initial investment were not included in the estimates of investment cost.

All buildings and equipment are assumed to be new with the exception of four stationary viners used to separate lima beans and peas from their pods. Replacement costs for these are based on rebuilt viners adapted for shelling lima beans and southern peas after the pods have been removed from the vine. Except for the freezer storage and office buildings, reinforced concrete floors, concrete block walls, and insulated metal roofs with structural steel supports are specified. The office building is of masonry construction with finished interior walls and air conditioning. Building costs include plumbing, electrical wiring, lighting, heating, and ventilation. Replacement costs for machinery and equipment include charges for transportation and installation.

Fixed and Variable Costs

Annual fixed costs for the freezing plant are $240,285 (table 3). These overhead costs are depreciation on buildings and equipment, interest on average annual investment in buildings and equipment, taxes, and insurance.

Variable costs--the direct expenses of raw product, processing, transportation, and sales for the expected annual pack--total $2,168,415. After raw product, the largest among these items of variable costs is packaging material. Boxes for the retail and institutional pack, overwrap, polyethelene bags, I.Q.F. bulk container liners, and shipping cartons are included in packaging. Labor costs, transportation costs for distribution of finished product, and sales expenses follow in that order. (See table 3 for breakdown of fixed and variable costs by individual product.)

Operating Capital

An item that is extremely important to any business venture but frequently overlooked in planning is operating capital. Assuming that sales are evenly spread over a 12-month period, the amount of operating capital required is largely equal to the cost of producing the average monthly inventory of finished product. Gross value of the average monthly inventory was used to estimate operating capital requirements. This estimate was used instead of inventory production costs, since needed operating capital also must cover advances to producers of raw products, inventories of supplies, accounts receivable, and contingencies. On this basis, average monthly operating capital needs of the freezing plant are around $870,000. In the course of a year, the range is from a low of $372,000 for May to a high of $1,470,000 for October.

Gross Revenue

Expected gross revenue for the freezing plant totals $2,602,128 and is based on delivered finished product prices. The prices used are those generally prevailing in the Southeast for nonadvertised brands (table 4).

Net Revenue

Net revenue is gross revenue less the costs of processing, raw product procurement, selling, and transportation. Estimated annual net revenue is $193,428 (table 5). Expressed as a percentage of investment and operating capital, this is a net profit rate of 8 percent per annum before deduction of State or Federal income tax.

Table 3.--Proposed freezing plant: Fixed and variable costs (delivered basis) for processing selected vegetables, Edenton, N.C., 1965

Cost category	Lima beans	Southern peas	Snap beans	Leafy greens	Total
			Dollars		
Fixed costs:					
Buildings 1/	11,007	3,485	20,060	7,947	42,499
Equipment 1/	26,386	8,295	55,887	25,340	115,908
Interest 2/	11,158	3,536	22,202	9,563	46,459
Taxes and Insurance 3/	8,497	2,693	16,929	7,300	35,419
Total fixed costs	57,048	18,009	115,078	50,150	240,285
Variable costs:					
Processing:					
Management 4/	10,741	3,401	19,574	7,755	41,471
Seasonal labor 4/	19,700	6,173	37,493	27,417	90,783
Other labor 4/	28,668	8,994	52,277	22,485	112,424
Packaging material	117,908	37,057	214,761	78,419	448,145
Utilities, fuel, and gasoline	5,782	1,818	12,490	5,695	25,785
Insurance and inventory taxes 5/	7,518	2,605	8,796	1,635	20,554
Maintenance & repairs 6/	11,683	3,687	29,023	9,091	53,484
Product damage 7/	7,526	2,302	12,791	3,402	26,021
Interest on operating capital 8/	20,692	6,553	23,140	5,208	55,593
Miscellaneous 9/	18,162	5,523	31,368	9,244	64,297
Subtotal	248,380	78,113	441,713	170,351	938,557
Raw product 10/	282,240	88,640	454,410	53,950	879,240
Transportation 11/	50,400	15,840	91,800	36,450	194,490
Sales 12/	45,159	13,812	76,745	20,412	156,128
Total variable costs	626,179	196,405	1,064,668	281,163	2,168,415
Total	683,227	214,414	1,179,746	331,313	2,408,700

1/ Depreciation computed at 6.67 percent of replacement costs for buildings and 12.5 percent for equipment.

2/ Interest on investment computed at 3 percent of replacement cost.

3/ Taxes computed at 0.74 percent of replacement costs for buildings and 0.82 percent of equipment replacement costs. Insurance computed at 1.5 percent of building and equipment replacement costs.

4/ Includes fringe labor costs at 8.4 percent of payroll where applicable.

5/ Inventory taxes computed at 0.84 percent of Dec. 31 inventory. Insurance computed at 1.5 percent of average monthly inventory value.

6/ Maintenance costs estimated at 1.5 percent of replacement cost of buildings and equipment. Repair costs estimated at 0.4 percent of equipment replacement cost per 100 hours of annual operation.

7/ Estimated at 1 percent of annual pack.

8/ Assumes inventory turnover once annually. Interest estimated at 6 percent of gross value of average month's inventory.

9/ Office supplies, telephone, janitorial supplies, and contingencies estimated at 2 percent of annual gross revenue. Also includes inspection fees and purchase of glycol.

10/ Prices per ton of raw product delivered to the plant: $160 for lima beans and southern peas (shelled basis), $110 for snap beans, $45 for spinach, and $35 for other leafy greens.

11/ Estimated at 1.5 cents per pound of annual pack.

12/ Estimated at 6 percent of annual gross revenue.

Table 4.--Proposed freezing plant: Prices and gross revenue from processing selected vegetables, Edenton, N. C., 1965 1/

Product	Total pack	Retail				Institutional		Total revenue
		Box		Bag		Percentage of pack	Price per lb.	
		Percentage of pack	Price per lb.	Percentage of pack	Price per lb.			
	1,000 pounds	Percent	Dollars	Percent	Dollars	Percent	Dollars	Dollars
Lima beans	3,360	65	0.23	10	0.22	25	0.21	752,640
Southern peas	1,056	65	.23	10	.21	25	.19	230,208
Snap beans	6,120	65	.22	10	.21	25	.18	1,279,080
Spinach	486	75	.15	0	--	25	.11	68,040
Leafy greens	1,944	75	.15	0	--	25	.11	272,160
Total	12,966	--	--	--	--	--	--	2,602,128

1/ Prices include transportation charges. Price data were obtained from Quick-Frozen Foods, Vols. 25-28, E. W. Williams Pub., Inc., New York, N. Y., 1962-65, and from brokers, processors, and retail chains.

Table 5.--Proposed freezing plant: Total costs, gross revenue, and net revenue for processing selected vegetables, Edenton, N. C., 1965

Product	Costs						Gross revenue	Net revenue
	Fixed 1/	Variable (delivered basis)				Total		
		Processing	Raw product	Sales	Transportation			
	Dollars							
Lima beans	57,048	248,380	282,240	45,159	50,400	683,227	752,640	69,413
Southern peas	18,009	78,113	88,640	13,812	15,840	214,414	230,208	15,794
Snap beans	115,078	441,713	454,410	76,745	91,800	1,179,746	1,279,080	99,334
Spinach	10,030	34,070	13,140	4,082	7,290	66,262	68,040	1,778
Leafy greens	40,120	136,281	40,810	16,330	29,160	265,051	272,160	7,109
Total	240,285	938,557	879,240	156,128	194,490	2,408,700	2,602,128	193,428

1/ Excludes annual land charges.

COSTS AND RETURNS, CANNING PLANT

Operations

In the canning plant, the raw product is received in the same fashion as in the freezing plant. The preparation line for snap beans is slightly different, to handle whole snap beans in addition to the cuts (fig. 3). After each product has gone through the preparation line, it is conveyed to a common can-filling area. The product is placed in No. 303 cans, No. 10 cans, or both, by means of hand-pack fillers. These are the most important can sizes for the vegetables in the product mix.

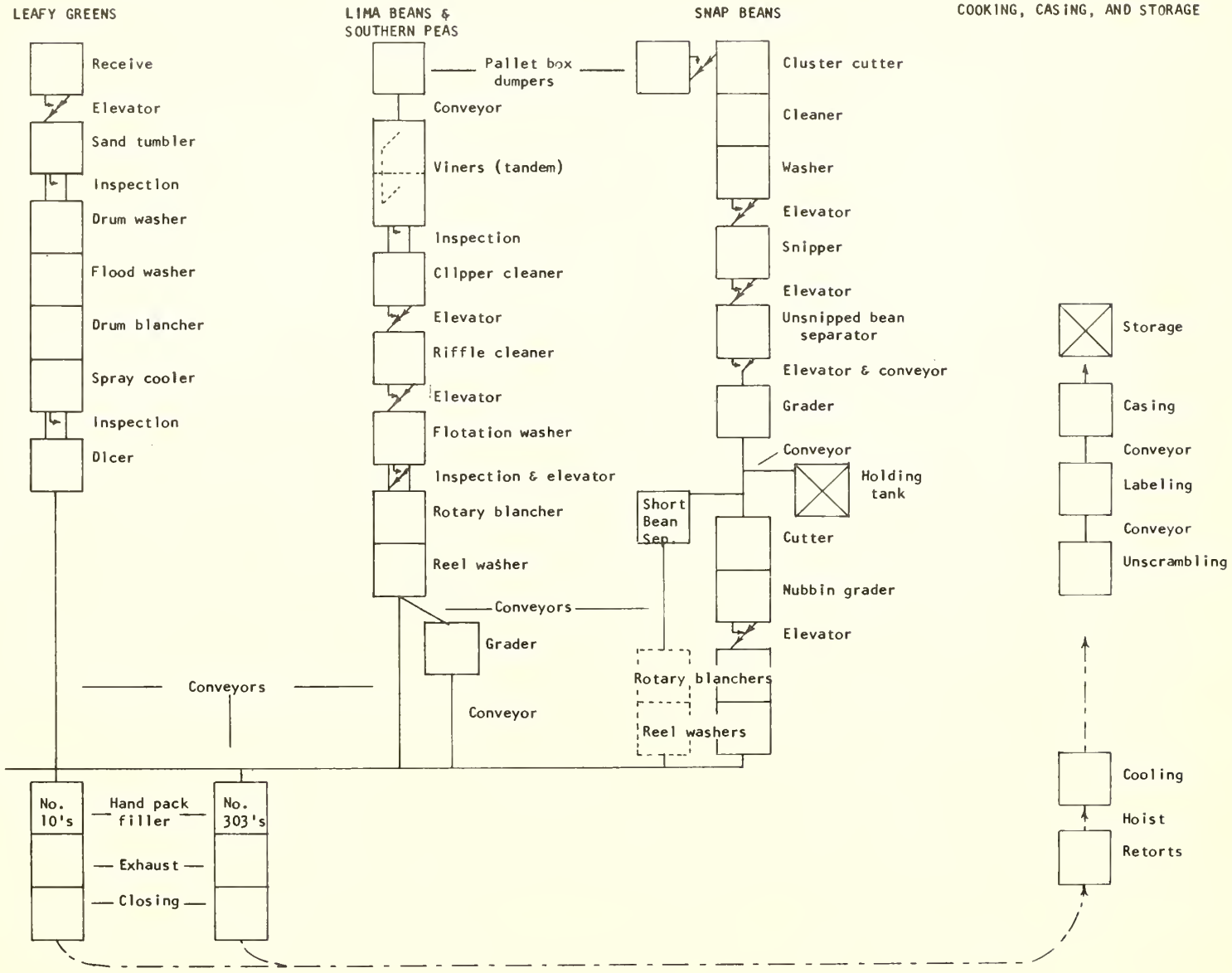

Figure 3. Stages of Preparation, Processing, Casing, and Storage of Lima Beans, Southern Peas, Snap Beans, and Leafy Greens.

Filled cans are cooked in vertical retorts and then cooled in a water cooling canal. Next they are labeled and cased or placed bright (unlabeled) in unsealed cases, put on pallets, and then stored. Cans placed in cases bright are removed from storage and labeled as sales are made.

Expected output of the canning plant operating 2,296 hours is 892,994 case equivalents of 24 No. 303 cans (table 6). A major share of this output is snap beans with 482,156 cases, followed in order by lima beans with a pack of 204,379 cases, leafy greens with 142,226, and southern peas with 64,233 cases. This size pack would require 7,907 tons of raw product.

Investment in Buildings and Equipment 5/

The total initial investment required for the canning plant is estimated to be approximately $716,309 (table 7). A little over half of this amount is for the equipment.

Replacement costs of all buildings and equipment are for new items with the exception of four stationary viners. These are assumed to be rebuilt viners adapted for shelling lima beans and southern peas after the pods have been removed from the vine. Transportation and installation costs are included in replacement costs for machinery and equipment.

The building specifications call for reinforced concrete floors, concrete block walls, and insulated metal roofs with structural-steel supports, except in the office building, which is of masonry construction with finished interior walls and air conditioning. All building costs include plumbing, electrical wiring, lighting, heating, and ventilation.

Fixed and Variable Costs

Annual fixed costs for the canning plant total $103,503 (table 8). Included in this category of costs are depreciation on buildings and equipment, interest on average annual investment in buildings and equipment, taxes, and insurance.

Variable costs, or the direct expenses of raw product, processing, and sales for the expected annual pack, total $2,223,500 (table 8). This includes all variable costs. Largest among these items is the cost of raw product at $879,240, but containers (cans and shipping cartons) and labels are a close second at $794,095. These are followed in order by labor costs and sales expenses to round out the larger expense items.

Operating Capital

Based on the assumption that sales are evenly distributed throughout the year, estimated average operating capital requirements per month total approximately $750,000 for the canning plant. This is the gross value of the average monthly inventory. The range is from a low of $321,455 in May to a high of $1,311,760 in October.

5/ Excludes land costs and any architectural engineering and legal fees connected with the initial investment.

Table 6.--Proposed canning plant: Annual operating time, raw product requirements, finished product yield, and output for processing selected vegetables, Edenton, N.C., 1965

Product	Days per year 1/	Hours per day	Hours per year	Raw product requirements 2/		Output rates, case equivalents of 24 No. 303 cans		
				Hourly	Annual	Per ton	Hourly	Annual
				Tons	Tons	Cases	Cases	Cases
Lima beans	28	20	560	3/ 3.15	1,764	115.9	365.0	204,379
Southern peas	22	8	176	3/ 3.15	554	115.9	365.0	64,233
Snap beans	51	20	1,020	4.05	4,131	116.8	472.7	482,156
Leafy greens	54	10	540	2.70	1,458	97.6	263.4	142,226
Total	155	--	2,296	--	7,907	--	--	892,994

1/ Assumes an average operating week of 4.5 days.
2/ 90 percent of rated capacity. Loss of 10 percent assumed because of unavoidable delays and abnormal product quality.
3/ Shelled basis.

Table 7.--Proposed canning plant: Investment in buildings and equipment for processing selected vegetables, Edenton, N. C., 1965

Item	Size, capacity, or number	Replacement cost	Allocation of replacement cost 1/			
			Lima beans	Southern peas	Snap beans	Leafy greens
			Dollars			
Buildings:						
Processing	100'x228'x14'	136,355	31,225	9,818	73,632	21,680
Warehouse	100'x276'x20'	103,198	23,632	7,430	55,727	16,409
Office	60'x60'	29,160	6,678	2,100	15,746	4,636
Well, building, pump, and tank	400 g.p.m.	30,300	6,939	2,181	16,362	4,818
Truck scale	50 ft.	14,500	3,320	1,044	7,830	2,306
Other	--	5,000	1,145	360	2,700	795
Subtotal	--	318,513	72,939	22,933	171,997	50,644
Equipment:						
Preparation	--	217,805	39,270	12,335	134,143	32,057
Cooking & can handling	--	99,765	22,846	7,183	53,873	15,863
Boiler	300 b.hp.	22,500	5,152	1,620	12,150	3,578
Fork trucks	2	12,780	3,195	1,010	7,553	1,022
Trucks	2	5,500	1,260	396	2,970	874
Pallets	5,000	17,500	4,008	1,260	9,450	2,782
Bulk pallet boxes	360	4,446	1,209	378	2,859	--
Other 2/	--	17,500	4,008	1,260	9,450	2,782
Subtotal	--	397,796	80,948	25,442	232,448	58,958
Total	--	716,309	153,887	48,375	404,445	109,602

1/ Allocation based on proportion of annual pack involved.
2/ Includes office, shop, laboratory, and sewage equipment.

Table 8.--Proposed canning plant: Fixed and variable costs (f.o.b. basis) for processing selected vegetables, Edenton, N.C., 1965

Cost category	Lima beans	Southern peas	Snap beans	Leafy greens	Total
			Dollars		
Fixed costs:					
Buildings 1/	3,647	1,147	8,600	2,532	15,926
Equipment 1/	10,119	3,180	29,056	7,370	49,725
Interest 2/	4,921	1,547	11,604	3,417	21,489
Taxes and insurance 3/	3,747	1,178	8,836	2,602	16,363
Total fixed costs	22,434	7,052	58,096	15,921	103,503
Variable costs:					
Processing:					
Management 4/	9,497	2,986	22,394	6,594	41,471
Seasonal labor 4/	31,760	9,994	63,931	31,213	136,898
Other labor 4/	12,024	3,780	28,354	8,349	52,507
Containers and labels	178,926	56,233	435,049	123,887	794,095
Utilities, fuel, and gasoline	5,825	1,832	11,365	5,842	24,864
Insurance and inventory taxes 5/	6,578	2,259	7,868	1,405	18,110
Maintenance and repair 6/	5,143	1,617	14,564	3,074	24,398
Product damage 7/	6,599	1,991	12,349	2,937	23,876
Interest on operating capital 8/	17,074	5,419	18,424	3,977	44,894
Salt	2,570	808	6,039	1,798	11,215
Miscellaneous 9/	14,389	4,357	27,505	6,701	52,952
Subtotal	290,385	91,277	647,843	195,777	1,225,282
Raw product 10/	282,240	88,640	454,410	53,950	879,240
Sales 11/	32,994	9,957	61,743	14,684	119,378
Total variable costs	605,619	189,874	1,163,996	264,411	2,223,900
Total	628,053	96,926	1,222,092	280,332	2,327,403

1/ Depreciation computed at 5.0 percent of replacement costs for buildings and 12.5 percent for equipment.

2/ Interest on investment computed at 3 percent of replacement cost.

3/ Taxes computed at 0.74 percent of replacement costs for buildings and 0.82 percent of equipment replacement costs. Insurance computed at 1.5 percent of building and equipment replacement costs.

4/ Includes fringe labor costs at 8.4 percent of payroll where applicable.

5/ Inventory taxes computed at 0.84 percent of Dec. 31 inventory. Insurance computed at 1.5 percent of average monthly inventory value.

6/ Maintenance cost estimated at 1.5 percent of replacement cost of buildings and equipment. Repair costs estimated at 0.4 percent of equipment replacement cost per 100 hours of annual operation.

7/ Estimated at 1 percent of annual pack.

8/ Assumes inventory turnover once annually. Interest estimated at 6 percent of gross value of average month's inventory.

9/ Office supplies, telephone, janitorial supplies, and contingencies estimated at 2 percent of annual gross revenue. Also includes inspection fees and rental of salt tablet dispensers.

10/ Prices per ton of raw product delivered to the plant were $160 for lima beans and southern peas (shelled basis), $110 for snap beans, $45 for spinach, and $35 for other leafy greens.

11/ Estimated at 5 percent of annual gross revenue.

Gross Revenue

The gross revenue from the annual pack of the proposed canning plant is estimated at $2,387,561 (table 9). Prices used were f.o.b. plant and are based on generally prevailing prices in the Southeast for unadvertised brands.

Net Revenue

Net revenue for the canning plant is estimated at $60,158 (table 10). This is gross revenue minus costs of raw product procurement, processing, and sales. This amount of net profit expressed as a percentage of investment and operating capital gives a 4 percent rate of net profit before any State or Federal income tax is deducted.

Table 9.--Proposed canning plant: Prices and gross revenue from processing selected vegetables, Edenton, N. C., 1965 1/

Product	Total pack		Price per case		Total revenue
	24/303's	6/10's	24/303's	6/10's	
	Cases	Cases	Dollars	Dollars	Dollars
Lima beans	153,328	31,472	3.22	5.28	659,888
Southern peas	48,189	9,891	3.26	4.25	199,133
Snap beans	362,202	73,950	2.66	3.67	1,234,854
Spinach	21,298	4,406	2.42	2.82	63,966
Leafy greens	85,190	17,626	2.20	2.40	229,720
Total	670,207	137,345	--	--	2,387,561

1/ Price data were obtained from Canner-Packer, Vols. 131-133, Triad Publishing Co., Chicago, Ill., 1962-1964; and from brokers, processors, and retail chains.

Table 10.--Proposed canning plant: Total costs, gross revenue, and net revenue (f.o.b. basis) for processing selected vegetables, Edenton, N. C., 1965

Product	Costs					Gross revenue	Net revenue
	Fixed 1/	Variable (f.o.b. basis)			Total		
		Processing	Raw product	Sales			
	Dollars						
Lima beans	22,434	290,385	282,240	32,994	628,053	659,888	31,835
Southern peas	7,052	91,277	88,640	9,957	196,926	199,133	2,207
Snap beans	58,096	647,843	454,410	61,743	1,222,092	1,234,854	12,762
Spinach	3,184	39,155	13,140	2,937	58,416	63,966	5,550
Leafy greens	12,737	156,622	40,810	11,747	221,916	229,720	7,804
Total	103,503	1,225,282	879,240	119,378	2,327,403	2,387,561	60,158

1/ Excludes annual land charges.

Costs and revenues for the freezing and canning plants discussed in this study are typical of plants that have been in operation long enough to overcome the problems frequently associated with a new plant. Costs associated with entry into the highly competitive processed vegetable market are not included.

Selling Costs

The sales costs listed in table 3 for the freezing plant, and table 8 for the canning plant, assume a 3-percent brokerage fee. Very few firms of this size can market their products more economically through direct sales than through brokers. A processor may have arrangements with his brokers to allow certain direct sales; however, the cost of such sales is assumed to be approximately equal to the brokerage fee.

It has become commonplace among processors to give a discount for cash payment within 10 days of delivery. Freezers usually give a 2-percent cash discount, while canners more commonly give a 1.5-percent discount. These discounts were included as a part of selling costs.

An additional selling cost allowance was made to provide for other selling costs normally incurred by processors. These include such things as additional broker services, promotional allowances, and special discounts. One percent and 0.5 percent of gross sales were charged to the freezing and canning plants, respectively. This makes the overall charge of 6 percent of gross sales for the freezing plant and 5 percent of gross sales for the canning plant to cover selling costs incurred under normal marketing conditions.

Market Entry

Costs of market entry for a new plant are affected largely by the nature and type of firm operating the plant and the method of sales chosen. These costs range in size from those of a national processor of a product with an established brand name and a strong demand to those of a new firm with a single plant entering the market in direct competition with nationally and regionally advertised processor brands and private brands. The following discussion is largely couched in terms of a new firm with a single plant.

A firm entering the processed vegetable market for the first time has the following sales alternatives: (1) Processing under contract for an established food processor, (2) packing under the private labels of food distributors, (3) selling under its own label, or (4) some combination of these. In this study, it is assumed that a combination will be used; that is, the product will be sold under the firm's own unadvertised label, and also, to some extent under private labels and other processors' labels. Such an approach opens several sales avenues and, thus, provides the processor with greater flexibility in dealing with each of these markets. A

processor relying solely on sales under another processor's label or a distributor's label can have a very favorable arrangement. Nevertheless, he may be at the same time in a vulnerable bargaining position. Certain price concessions can almost become mandatory when contracts are renegotiated and alternative outlets are not readily available.

The problem of market entry in selling the finished product under labels of other firms is largely a matter of price, assuming that other usual conditions are met. These conditions include specifications for quality, container types and sizes, quantity, and delivery schedule. Furthermore, a new firm must demonstrate its competence to meet contractual obligations.

Entry of a firm into the market with its own branded products, even though they are not advertised, is likely to be more costly as well as more challenging than other sales alternatives. The first expense is that of developing brand names and designing labels. Highly competent assistance is needed to assure maximum benefits, since package appearance has considerable influence on the buying decision of the customer.

The cost of market entry is not likely to come cheap. Very few marketing firms are interested in stocking new brands because of display and storage space restrictions. Adding a new brand of a particular product usually means dropping one or more other brands. Consequently, in order to induce marketing firms to change, there must be an economic incentive.

Market entry success with the type of brands proposed in this study revolves around the question of the form and extent of the economic incentive necessary for obtaining satisfactory market entry. It goes almost without saying that product quality must be as good as, or better than, comparable brands to start with. Several techniques of market entry may be employed. One that is fairly common is an introductory offer of one case of merchandise free with each 10 cases purchased. This may be coupled with a cooperative advertising allowance. The advertising allowance would continue after the introductory free case offer was withdrawn. Such an allowance would apply to retail items and probably range from 5 to 10 cents per dozen packages for all items. A special advertising allowance of 15 to 20 cents per dozen for selected items may be offered on a carefully planned basis during the first few weeks. Some charge for this type of activity was included in the regular selling costs. This would permit a gradual phasing of the market entry activities into the regular selling program after the first few months in the market. Exact amount of time required cannot be specified, since it varies by type of marketing firm and location.

Another approach to market entry is lower prices than other processors charge for their brands. Some aspects of the previously described approach are likely to be included, too, but to a lesser extent. The lowering of price 1 cent per pound for frozen items or 10 cents per case for canned items should facilitate selling a considerable amount of the product. Such a price reduction might need to be applied to certain key items or varied among products. This program would need to be closed out discreetly.

Price retaliation by established processors should be considered when lower prices are used as an introductory measure. Prices of brands distributed by larger firms over a greater geographic area than that contemplated for this plant are not as likely to be lowered however, because Federal statutes prevent retaliation by firms through lowering prices in the affected markets only. Therefore, to meet the competition, a larger established firm would have to lower its prices over its entire distribution area, with considerable losses in revenue.

The techniques mentioned in this section are some that may be employed in order to gain satisfactory entry into the market. Emphasis should be placed on the fact that obtaining such a position will probably be quite costly. For example, if the entire first year output of the freezing plant were sold for 1 cent less per pound, this would amount to almost $130,000 in terms of lost revenues. Likewise, 10 cents off each case for the canning plant would amount to a loss of approximately $80,000. One clear implication of this discussion is the need for a good management team to handle the complex problems of market entry for a new firm.

RAW PRODUCT PROCUREMENT

Success in operating a processing plant is often associated with the raw product. Not only is the potential for an adequate supply at a reasonable cost necessary, but there are also related factors of equal importance. The raw vegetable products must move to the plant in a manner that permits the most efficient harvesting and processing possible.

Production of the bulk of the raw product needs of the proposed plant would be expected to take place under contract with individual growers. Contracts are in the best interest of both parties. They enable the processor to more closely regulate supply, and the grower is guaranteed a market before new resources are committed to the production of any vegetable crop. It is important that varieties and cultural practices be specified so as to provide the processor with raw product from varieties best suited to the area for processing and uniformly high in quality and yield. Planting dates must be specified after careful planning to provide for a steady flow of raw product in keeping with the processing plant production schedule. These matters, just as is true for marketing, require capable management with experience and know-how for accomplishing the above objectives.

It is not unlikely that for the first 1 or 2 years some portion of the raw product supplies will need to be grown by the processor on leased land. An arrangement of this type would help guarantee supplies in the needed amount and quality; it would, at the same time, permit using the growing crops for demonstrational purposes in influencing potential growers in the area.

CONSIDERATIONS FOR PROCESSORS

A number of other things affect the feasibility of investing in one of

the proposed processing plants. The first of these is the possibility of processing other products. Many other vegetables are grown in the area for the fresh and the processed markets. Once a plant has been established, circumstances may warrant adding other equipment lines. Carrots seem to offer a great deal of potential. A carrot line would open up the possibility of processing some of the other root crops. Where machinery requirements are not too great in terms of costs, and processing time is available, other products may be added as warranted by market conditions and availability of raw product.

Consideration should be given to bringing raw product from other areas during the times when local products are not available, provided costs and market conditions justify such moves. A canning plant might find it economical to process dry beans and peas during the winter months. Since Edenton is located on Albemarle Sound, a plant there might find a potential for seafood processing.

CONSIDERATIONS FOR NONPROCESSOR GROUPS

Research to develop new and improved varieties of vegetables for processing and to improve cultural practices would be helpful to prospective processors and growers. A more comprehensive analysis than has been made in this area heretofore is needed of the costs and returns for the many crop and livestock enterprise alternatives, in order to arrive at the most profitable enterprise combinations. Due allowance should be made in the analysis for multicropping.

Any inclination on the part of growers to look upon a processing plant as merely an alternative to the fresh market should be dispelled. Plants of the type proposed in this study cannot be operated profitably when they must wait for a fresh market price break before they can begin processing. Neither can they utilize the culls from a fresh market operation. A well-managed processing plant is discriminating in its raw-product selection, since it must maintain a fairly rigorous quality-control program over its finished product.

AREA BENEFITS

One of the intents of this study was to measure net returns to vegetable processing and gross returns to the farm and labor resources. No attempt has been made to measure the secondary effects of the proposed processing facility on the area's overall economy.

Either of the plants envisioned here would provide employment on both an annual and a seasonal basis.

The freezing plant employs 28 seasonal workers for lima beans and southern peas, 29 for snap beans and leafy greens for institutional use, and 36 for leafy greens in retail packages. During the 5 months that 2 shifts operate, a total of 58 to 60 seasonal workers are required (table 11). Most

of the seasonal workers are unskilled and the others largely semiskilled. The packaging operation, planned to operate on a single-shift basis with the workers transferring to leafy greens packaging when that line is in operation, employs 14 workers on an annual basis. Nineteen additional full-time and 2 part-time employees make up the remainder. This latter group includes management, office workers, laborers, and other personnel. Total employment on an annual basis is 67 man-year equivalents. The annual payroll, including fringe benefits, for the freezing plant totals $244,678. A breakdown of this sum is as follows: Management, $41,471; seasonal labor, $90,783; and

The canning plant employs, on each shift, 38 workers for lima beans and southern peas, 43 for snap beans, and 39 for leafy greens. Since two shifts operate for about 5 months, this totals 76 to 86 seasonal workers (table 11). The services of 18 additional employees are utilized on an annual basis and 2 on a part-time basis; these include management, office personnel, laborers, and other personnel. In man-year equivalents, total employment is 64. Annual payroll including fringe benefits for the canning plant totals $230,876. A breakdown of these expenses is as follows: Management, $41,471; seasonal labor, $136,898; and other employees, $52,507. (See table 11 for wage and salary rates.)

Raw product requirements for each of the plants are the same. A total of 7,907 tons of raw product from 5,202 acres is needed annually (table 12). The net annual land requirements are considerably less than 5,202 acres, since a substantial amount of double cropping is envisioned. Annual gross returns to growers and their resources are $879,240. In actual practice, gross returns to growers would not be a net addition to gross farm revenue for the area, as acreages of other crops could be expected to change.

Table 11.--Proposed freezing and canning plants: Estimated labor and management requirements and costs, Edenton, N. C., 1965

Type of employee	Hourly workers, hourly wage rate of--						Salaried employees
	$1.25	$1.40	$1.50	$1.60	$1.75	$3.00	
	Number						
Freezing plant:							
Seasonal labor...	38	8	6	6	2		
Full-time labor..	15	5	2			3	
Other.....							1/ 2
Full-time office.	1						1
Part-time office.	2						
Management.....							2/ 4
Canning plant:							
Seasonal labor...	58	4	14	8	2		
Full-time labor..	5	5					
Other.....							1/ 2
Full-time office.	1						1
Part-time office.	2						
Management.....							2/ 4

1/ Mechanic at $5,000 and shipping clerk at $4,200.
2/ Manager at $20,000, production manager at $10,000, plant superintendent at $5,000, and field superintendent at $5,000.

Table 12.--Proposed processing plant: Raw product requirements, acreage required, and gross revenue to growers, Albemarle Area, N.C., 1965

Product	Product requirements	Yield per acre	Acreage needed 1/	Price per ton	Gross revenue
	Tons	Tons	Acres	Dollars	Dollars
Lima beans 2/....	1,764	1.0	1,764	160	282,240
Southern peas 2/.	554	0.6	923	160	88,640
Snap beans.....	4,131	2.0	2,065	110	454,410
Spinach.....	290	2.5	116	45	13,140
Leafy greens.....	1,168	3.5	334	35	40,810
Total.....	7,907	--	5,202	--	872,240

1/ Annual land requirements are less because of double cropping.
2/ Shelled basis.

FEASIBILITY

Estimates of net income before corporate income taxes have provided some indication of economic feasibility of establishing a processing plant. A better insight into this matter can be obtained by looking at profits after taxes. The relative profitability of the two types of plants is as follows:

Item	Freezing	Canning
	Dollars	Dollars
Net income before corporate income taxes 1/	193,428	60,158
Corporate income taxes 2/	92,381	24,253
Net income (profit)	101,047	35,905
	Percent	Percent
Profit rate based on initial investment	6.5	5.0
Profit rate based on total assets employed 3/	4.2	2.4
Profit rate based on gross sales	3.9	1.5

1/ See footnotes 2 and 8 of table 3 for explanation of handling of interest charges.

2/ Includes Federal and North Carolina corporate income taxes, but no allowance is made for the 7-percent investment credit allowed for qualified new equipment and used equipment.

3/ Total assets are composed of initial investment capital and operating capital.

Based upon this analysis, either plant might be considered feasible. With no restrictions on capital, the freezing plant is clearly preferable to the canning plant. However, the availability and cost of capital for initial investment and operating expenses will influence the choice. Operating capital needs are only slightly higher for the freezing plant ($870,000) than for the canning plant ($750,000). But investment capital, excluding land costs, required to build and equip the freezing plant amounts to $1,548,645, compared with $716,309 for the canning plant.

Many factors must be considered in determining the feasibility of an investment. The costs and returns developed for these two plants reflect conditions that existed in the industry in 1965. One should be cognizant

of the area's disadvantages as well as its advantages, for the projected net returns reflect more or less average conditions. It was pointed out earlier that the area is subject to heavy fall rains. Fruit and vegetable processing plants are unusual in that weather extremes may restrict supplies or harvesting operations to such an extent that plants may be closed for prolonged periods. Prices of finished products may drop to unprofitable levels in some years because of larger than usual supplies. Hence, net returns can be fairly variable from year to year and additional capital may be needed to continue operations following unprofitable periods of operation. If the decision is made to invest in one or the other of the plants, it should be made only after a careful reexamination of each of the factors considered in this study.

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