

THESIS

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AN ECONOMIC ANALYSIS OF THE CARNATION INDUSTRY  
IN THE UNITED STATES

Submitted by  
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## Abstract of Thesis

### AN ECONOMIC ANALYSIS OF THE CARNATION INDUSTRY IN THE UNITED STATES

An economic analysis of the carnation industry in the United States was conducted by mail questionnaires surveying growers, shippers, and wholesalers.

Production costs, total revenues, investments, types of greenhouses, methods of financing, plant densities, flower yields, management and other cultural problems, and climatic factors were determined for seven production areas. Western production areas, such as California and Colorado were shown to have the advantages of higher production, producing at relatively less cost per unit, and capabilities of supplying all national markets by fast air and truck freight. Older established eastern areas were shown to be stabilizing or decreasing carnation production because of western area competitive advantages and improved transportation.

A general flow pattern of carnations during seasons of the year was determined between production areas and market areas. The western production areas supply the main volume of carnations sold in all sections of the country, except the Northeast. Shipping prices and wholesale market prices were shown to vary with geographical region, being somewhat lower on the west coast and in the New York area. Essentially, carnation prices appear to be quite stable,

there being a winter and spring price and a lower summer price.

Problems of the industry, as reported by participants in the survey are many. Predominating was the need for uniform grading, more consistent supply, less transportation delays, better handling and less storage of flowers for holidays.

The need for more economic information for management decision making was emphasized.

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## Chapter I

### INTRODUCTION

#### The Problem

Limited economic information is available on production and marketing of carnations for the entire United States. Since carnation production has expanded rapidly in recent years, there are many questions concerning the immediate future.

Rapid expansion and dynamic changes in competitive production and marketing creates problems of decision making by all segments of the industry. Carnations have moved into second place in value among all cut flowers (55). Shifts of production to more suitable climatic areas, marked advances in transportation, cultural technology, and aggressive merchandising are some of the key factors related to this expansion of carnations.

Growers in older production areas are concerned about how much longer they can compete with higher yields, higher quality, and cheaper prices from the newer areas. Growers in all areas are faced with problems of increasing land values, taxes, production costs, and zoning restrictions. In many areas the labor supply is critically short, and facilities have been made obsolete because of rapid

changes in technology.

Growers must make decisions on whether to stabilize their operations, rebuild or expand at their present locations, relocate in the same general area or a completely different area, convert to another crop, or go out of business altogether.

Competition between older carnation production areas and new areas is becoming more intense. The future of each area and their effects on each other are not fully understood. Information is needed so growers, shippers, and wholesalers may assess the factors causing changes in each area. This knowledge could then be applied to the management decisions that will have to be made for the best interest of their future enterprises.

### Objectives

The objectives of this research are to:

1. Determine and compare production costs, investments, yields, and climatic factors of the major carnation production areas of the United States.

2. Determine the seasonal flow pattern of carnation blooms from the major production areas to market areas, the methods of transportation, and the relationship of prices received by growers with prices at the wholesale market.

3. Evaluate the major economic factors for each production area and make predictions for future trends of

the industry.

4. Propose a method for producers to utilize knowledge of current economic factors in constructive management decision making.

#### Definitions of Terms

For the purpose of this survey, the following terms are defined:

Producer--a commercial grower of carnation blooms.

Shipper--a receiver of carnation blooms from producers for distribution to wholesalers.

Wholesaler--a receiver of carnation blooms from shippers or producers for distribution to retailers.

Production Area--a geographical region where a concentration of carnation blooms are produced.

Market Area--a geographical region which receives carnation blooms for consumption.

Bloom--a commercial cut carnation stem and flower.

Enterprise--a commercial carnation greenhouse production range.

Space Unit--square feet of bench, square feet of greenhouse, or acre.

Flow Pattern--movement of carnation blooms from production areas to market areas.

Flower Yield--amount of carnation blooms produced per space unit.

Gross Return or Total Revenue--amount of dollars a producer receives for sale of carnation blooms.

Management--the performance of directing or administering the enterprise.

## Chapter II

### REVIEW OF LITERATURE

#### History of the Flower Industry in the United States

Only crude information is available on greenhouse crops prior to 1949. Fossum (12) attempted to consolidate pertinent census facts prior to that year. He states that in 1890 there were less than 5,000 greenhouse establishments in the country, and by 1950 the number approached 19,000. Many of the greenhouses reporting produced vegetable crops and then converted to flowers, particularly about the time of World War I and later. Apparently there is no record of the area and value of specific flower crops prior to 1950.

Fossum (13) using the 1950 census figures, showed that wholesale value of carnations in the U. S. was about \$21 million in 1949. About 58 percent was produced by specialized establishments reporting more than \$25,000 annual business.

From 1949 to 1959, commercial production of all cut flowers in the U. S. expanded at the rate of about 1½ percent per year (8, 10). While wholesale prices of all flowers remained nearly stable, the wholesale value increased from \$121 million in 1949 to \$142 million in



1959 (8). Total wholesale value of carnations increased from about \$21 million in 1949 to \$31 million in 1959, a 50 percent gain (8). Carnations are now the second most important cut flower produced, with chrysanthemums first (55). While the production of all cut flowers increased at the rate of 1½ percent per year during this decade, carnations increased at about 5 percent per year.

#### Production Trends by Areas

Carnation production has increased most rapidly in California and Colorado (8). In 1949 these two states accounted for less than 30 percent of U. S. production; in 1959, California and Colorado raised half of the nation's carnations (8, 10). During this decade, the northeastern states experienced a moderate increase of from 3 to 17 percent, while Illinois reported a 36 percent decrease (8, 10). Colorado increased production by 151 percent and California, 169 percent (8). The first special cut flower survey of selected states by the U. S. D. A. Crop Reporting Board for 1956 reported a wholesale value of carnations of \$2 million for California, \$4.7 million for Colorado, and \$1.6 million for Illinois. That report also indicated individual establishments were larger in California and Colorado (47).

The survey for 1957 showed California's wholesale carnation value increased to \$4.8 million; Colorado to \$5.1 million; while Illinois declined to \$1.4 million. Sales per producer also increased (48).

In 1961, California sales increased to \$6.4 million,

surpassing Colorado now up to \$5.9 million, and Illinois decreased further to \$1.3 million (49). For 1964, California sales reached \$9.2 million, Colorado \$7.2 million, and Illinois was down to \$1 million (50).

The latest report for 1965 production shows California well in the lead and still increasing with a carnation production value of \$10.5 million, Colorado at \$7.4 million, and Illinois still lower at \$0.8 million. Other states, now included in the survey, showing slight increases from 1964 to 1965 were Massachusetts, Pennsylvania, and Ohio. Other states showing decreases along with Illinois were New York, New Jersey, Indiana, and North Carolina (51).

Consistently, in all surveys since 1956, California has received the lowest price per bloom, while states such as Colorado, Ohio, Indiana, Pennsylvania and North Carolina are in the higher price category. Illinois, New Jersey, New York, and Massachusetts tend to command a medium wholesale price.

#### Characteristics of Production Areas

California - California is a surplus-producing area. The proportion of cut flowers sold out of state accounted for 68 percent of the total flower crop in 1950 (31). Flower production in Northern California is concentrated in the San Francisco Bay area with new expansion taking place south along the coast from Half Moon Bay to Watsonville. In Southern California, areas of production

are situated at Los Angeles and San Diego County and also near Ventura and Santa Barbara.

Parvin (personal communication) presented a report at the American Carnation Society meeting in 1966 showing that present greenhouse carnations in California occupy 183 acres in the north and 150 acres for the south, for a state total of 333 acres. From this total area an estimated 280.6 million blooms are produced per year at a value of \$14.7 million. These figures were compiled by county agents in close contact with growers.

Although the greatest expansion of carnation production has taken place in Northern California, a substantial industry has developed in San Diego County in Southern California. Besemer and Phelps (1) stated that there was only one grower in San Diego County in 1949. By 1957 there were 25 growers with more than 40 acres. A 1964 Agricultural Crop Report (32) showed 48 acres producing 61.3 million blooms at a wholesale value of \$3.4 million for the San Diego Area.

Accurate flower yield figures are seldom reported. Complications arise on whether the figures are related to greenhouse or bench area and whether they are total blooms produced or blooms sold. Based on Parvin's recent report, Northern California growers produce about 20 saleable blooms per square foot of greenhouse area or about 35 flowers per square foot of bench.

A study in San Diego County (2) showed about 48

saleable blooms per square foot of bench per year. A 1958 production cost study for San Diego County (1) showed annual production costs of nearly \$20,000 per acre, or 45.8 cents per square foot of greenhouse area, and 3.9 cents per bloom. This is the only known record of California production costs. Because of climatic differences, Northern California costs could be different from San Diego.

Average wholesale prices of California carnations were listed by the U. S. D. A. surveys as 4.7 cents per bloom in 1957 and 5.3 cents in 1965 (48, 51).

Colorado - Colorado carnation production is concentrated in the four-county area around Denver with some at Colorado Springs and other points in Eastern Colorado. Based on the number of plants reported in the U. S. D. A. survey for 1965 (51), a calculated figure by the author would indicate about 110 acres of carnations for Colorado.

Holley (22) reported 1955 production costs and flower yields for three Colorado growers. The costs varied from about \$1.80 to \$2.37 per square foot of bench space. The cost per bloom ranged from 5.6 to 7.2 cents. Labor and management represented about 60 percent of total production costs. The flower yield for Colorado at that time was 29.0 to 32.8 blooms per square foot of bench space.

The U. S. D. A. surveys show a Colorado wholesale price per bloom of 8.7 cents in 1957 and 8.0 cents in 1965 (48, 51).

Pennsylvania - New York - New Jersey - Pennsylvania ranked 6th in carnation production among states in 1949. Seeley (40) reported that of 331 growers only 6 were carnation specialists producing an average of 550,000 blooms per year. The other 325 growers averaged 67,000 blooms per grower per year. Pennsylvania ranked 4th in carnations by 1959, when ten counties produced more than a million blooms each (54).

According to the U. S. D. A. survey for 1965 (51), Pennsylvania and New Jersey showed a slight increase in carnation production, while New York had a decrease. Characteristic of these states are many small growers who may grow several other greenhouse crops along with carnations. Many small growers retail a large percent of their flowers while larger carnation establishments sell a greater percent by wholesaling (30).

No flower yield figures are available, but Shanks and Link (41) from nearby Maryland reported that 38.2 to 40.7 saleable blooms could be produced per square foot of bench space per year.

Wholesale prices per bloom reported by the U. S. D. A. survey for 1965 were 8.6 cents for Pennsylvania, 7.8 cents for New Jersey, 7.2 cents for upstate New York, and 6.5 cents for Long Island (51).

Massachusetts - Most Massachusetts carnations are produced around Boston. Jarvesoo (24) stated that in 1949 Massachusetts was the leading state producing 19 percent of

the U. S. carnations. For 1965, the U. S. D. A. survey shows Massachusetts third in number of carnation plants but fourth (behind Pennsylvania) in value of sales at wholesale of \$2.8 million (51).

Carnations are the leading flower crop in Massachusetts with about two-thirds being shipped out of the state (25). The average greenhouse area for 89 growers was about 34,000 square feet with an average yield of about 457,000 blooms per year (24). This indicates a yield of about 25 blooms per year per square foot of bench area.

Koths (28) states that Connecticut growers need about 36 blooms per square foot of bench per year to make a good profit. White (56) reported that 1950 production costs for Northeast carnation growers averaged \$1.72 per square foot of bench space and income \$2.19. This study showed 32 percent of costs for labor and a net profit of 13.7 percent. In another report (57), White surveyed 22 Massachusetts growers. Production costs were 86.5 percent of income, providing a net profit of 13.5 percent on sales.

Midwest - There is no concentrated area of carnation production in the midwest. Growers are scattered over several states and supply local markets only. Many of the establishments are small, few specializing in carnations as the sole crop produced.

The U. S. D. A. annual surveys have not consistently included midwest states for reporting carnation production and sales. Illinois has been used each year and has shown

a steady decline from a wholesale value of \$1.6 million in 1956 to \$0.8 million in 1965, a decrease of about 50 per cent (47,51). Indiana also shows a decrease from 1964 to 1965, while Ohio shows a slight increase (50, 51).

Wholesale price per carnation bloom in Illinois was reported 7.0 cents for 1956 and also for 1965 (47, 51). In Ohio the price per bloom was 9.0 cents in 1964 and 9.6 cents in 1965 (51). In Indiana the price per bloom was 9.7 cents in 1964 and 10.8 cents in 1965 (51).

North Carolina - Virginia - This is a small producing area consisting of several growers who supply local markets along the Atlantic seaboard. According to the U. S. D. A. survey for 1964 and 1965, North Carolina ranks 9th among 11 states in wholesale value of carnations. An increase was shown from \$0.9 million in 1964 to the 1965 value of \$1 million. The wholesale price per bloom was listed at 9.3 cents in 1964 and 9.0 cents in 1965 (51). The author has not been able to locate references on costs and flower yields for North Carolina and Virginia.

#### Wholesale Marketing

Dewey (8) states: "That although 1949 to 1959 was a period of rising production costs, the fact that the production of carnations and chrysanthemums increased substantially, while their wholesale prices remained unchanged, demonstrates the economic force of technological innovations in the cut-flower industry. Well-developed

wholesale marketing systems are indicated because flowers have moved in increasing volumes from distant to urban markets."

Moore (34) reported for 1955 that carnations accounted for 10 percent of total wholesale dollar volume in the New York market and 16 percent of flowers and pot plants sold at wholesale in Chicago. A second report (33) indicated that over 50 percent of all flowers received in these two cities came from within a 149 mile radius. Also, 85 percent of all flowers obtained by wholesalers were on a consignment basis.

Fitzpatrick (11) found for the 1950 to 1954 period an average wholesale price in New York City of 6.5 cents per bloom and annual receipts averaging 22 million blooms.

Jarvesoo (26) indicated that Massachusetts wholesalers obtain virtually all of their carnations from local growers, and that about 40 percent are used locally and about 60 percent are shipped out-of-state, mainly on the Atlantic seaboard, to up-state New York, Ohio and Michigan. He further stated that carnations from California do appear on holidays, but their volume represents only a fraction of one percent. The Boston wholesale market handled about \$8 million worth of floricultural products and supplies a year (45). From 1954 to 1959, wholesalers in the Northeastern U. S. showed volume increases of 24 percent for carnations (16).

Rada (38) reported on flower wholesaling in



Southern California using mostly 1956 data. He stated that at that time the wholesale value of floral crops in Southern California amounted to \$18 million and that 88 percent were produced locally and 12 percent were imported; also, 68 percent were sold locally and 32 percent were sold out of the area. Sales out of the area were increasing more rapidly than local sales.

DeWerth, et al. (6) gave the percent of flower and pot plant imports from producing areas to retail outlets in Texas. California supplied 43.4 percent; Colorado, 30.2 percent; Florida, 24.5 percent; and Minnesota, 1.9 percent.

#### Grading

Due to the current mobility of cut flowers from production areas to distant markets, grading standards have become more important. Proposed U. S. Cut Carnation Grades have been published (15). Two studies (18,21) in the Northeast examined the economics of grading flowers with the objective of raising grower income and establishing common understanding on the wholesale markets.

#### The Consumer Market

The future of flower marketing is favorable. The Census of Business Statistics indicates that retail sales by florists have increased at a rate of 7 percent annually since 1948. This is greater than the rate of growth by the entire economy (29). One estimate (36) shows that sales by retail florists should increase from the present \$1.3

billion to \$2 billion by 1975. Another report (53) concludes that retail florist sales have increased 60 percent from 1960 to 1965. Projecting a 5 percent annual increase would bring retail sales to almost \$2.3 billion in 1976 (29).

Buma (3) reports that California retail florist sales gained at the rate of 5.8 percent per year since 1949 but failed to keep up with personal incomes which were rising almost 8 percent per year. Per capita sales in constant dollars, although declining since 1949 to a low of \$2.52 in 1962, stabilized or rose slightly to \$2.63 in 1964.

Several surveys of retail florists have investigated various problems of financing, advertising, merchandising, and the effect of flower and pot plant sales by non-florist type outlets (9, 17, 19, 20, 37, 35).

#### Merchandising and Mass Markets

Surveys and tests on mass merchandising of flowers in "nonflorist" outlets indicate a potential for even greater expansion of carnations and other items (7, 14, 27, 35, 42). Consumer preference studies indicate a willingness to buy cut flowers and plants through mass market outlets (43,44).

Over 18 years ago, \$140 million of retail florist sales were accounted for by nonflorist outlets. By 1963, this increased to \$300 million worth of flowers a year, or 27 percent of all flower sales (52). Rochester, New York,

"nonflorist" outlets did 44 percent of the Easter pot plant business in 1962 (5). A similar trend is apparently developing with cut flowers.

#### Economics and Management Decisions

The author is not aware of a national study to evaluate the economic factors for a major cut flower crop. Several regional studies provide some information on production costs, wholesale prices, transportation, attitudes of growers, location problems, and other factors (24, 25, 30, 34). These studies were undoubtedly helpful to a local segment of the industry but have limited national applications.

Trotter (46) stated: "A sound research program in economics of floriculture is essential to the development of a more effective and efficient marketing system." Hudek (23) urged Colorado growers and wholesalers to set up a research program to investigate costs, evaluate business inputs, plant efficiencies, competition for markets, and other factors needed for modern management decisions.

At a recent floral industry meeting in Michigan, Martin (29) said: "The management and investment decisions and actions necessary to prepare for the 1970's require more complete economic information about the floral industry. Specifically, information is needed which would give a better understanding of costs and returns for firms at all levels of the industry--producing, wholesaling, and retailing. Such cost information is needed on a commodity

basis in order to give some insight about the future location for roses, carnations, chrysanthemums, and gladiolus. The effect of scale of operation on net returns also would be helpful."

Martin continued: "Information on the characteristics of demand for major commodities--including the extent to which they substitute for each other--is needed so that producers and shippers may work more effectively with transportation agencies, wholesalers, and retailers in developing sound marketing plans. Effective advertising, promotion, and merchandising programs require more accurate and timely information than is currently available with sufficient lead time to be useful in the many decisions, actions, and investments."

Wood (58), in discussing the California flower industry stated: "One of the major problems in cut flowers . . . in California is the absence of good, accurate data that will determine the extent of the industry and give some indication as to possible directions for the future . . . the absence of these data prohibit, or at least restrict, those in the industry from making sound decisions as to the future courses of action for the floriculture industry."

The cost of certain production factors, such as land, is not clearly understood. De Loach (4) states: "Land speculation is a factor of unknown importance in maintaining flower and nursery crop production on land

adjacent to or in metropolitan areas". He also indicates that growers can obtain long-time capital gains from holding land in urban areas and that these gains may offset any lack of income received from the greenhouse operations.

Reed (39) presented California growers with a formula to establish the agricultural value of land based on the type of enterprise. From this calculation, growers could determine when alternatives became necessary and take steps toward relocation, if that appeared to be the best alternative.

## Chapter III

### METHODS AND MATERIALS

#### General Design

To make comparisons and determine relationships of the economic factors of production, seven major carnation production areas were designated. These areas were as follows:

Southern California

Northern California

Colorado

Pennsylvania - New York - New Jersey

Massachusetts

North Carolina - Virginia

Midwest (Minnesota, Iowa, Missouri, Wisconsin,  
Illinois, Michigan, Indiana, Ohio)

Except for the Midwest, the areas are reasonably well defined, concentrated regions of specialized carnation production which are competitive with each other.

For obtaining data on shipments of flowers by shippers, the same production areas, as listed above, were used as points of departure.

To establish a seasonal flow pattern of carnations from producing areas to wholesale buyers, the United States

was divided into 9 geographical market areas as used by the U. S. Census. The market areas were as follows:

1. Pacific - Washington, Oregon, California, Alaska, Hawaii
2. Mountain - Montana, Idaho, Wyoming, Nevada, Utah, Colorado, Arizona, New Mexico
3. West North Central - North Dakota, Minnesota, Iowa, Kansas, Missouri, South Dakota, Nebraska
4. East North Central - Wisconsin, Michigan, Illinois, Indiana, Ohio
5. Middle Atlantic - New York, Pennsylvania, New Jersey
6. New England - Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island
7. South Atlantic - Maryland, Delaware, District of Columbia, West Virginia, North Carolina, South Carolina, Georgia, Florida
8. East South Central - Kentucky, Tennessee, Alabama, Mississippi
9. West South Central - Oklahoma, Arkansas, Louisiana, Texas
10. Outside the United States - Canada, Europe, and all other countries

#### Procurement of Data

Three mail questionnaires (see appendix) were used to obtain data as follows:

1. Producer's Questionnaire
  - a. Size of operation, number of plants
  - b. Type of greenhouse
  - c. Annual production costs
  - d. Capital investment costs
  - e. Flower yield

- f. Annual revenue
  - g. Marketing method
  - h. Marketing costs
  - i. Type of financing used
  - j. Production problems (cultural)
  - k. Production problems (community and government)
  - l. Growers opinions on questions important to the industry
2. Wholesaler's Questionnaire
    - a. Percent of carnations received from the 7 production areas at 7 demand periods of the year
    - b. Total unit receipts (boxes) each month
    - c. Average wholesale price at each of the 7 demand periods
    - d. Problems of wholesalers
3. Shipper's Questionnaire
    - a. Percent of carnations shipped to each of the 10 market areas at 7 demand periods
    - b. Total units shipped (boxes) each month
    - c. Average shipping price at each of the 7 demand periods
    - d. Problems of shippers

The questionnaires were sent to as many producers, wholesalers, and shippers for which addresses could be obtained. Mailing addresses were compiled from all potential sources, such as the American Carnation Society, the Society of American Florists, local growers association lists, and the Wholesale Florists Association of America. The original mailing included the questionnaire, plus a



cover letter (see appendix) of objectives for the study and explanation of the questionnaire, and a return addressed envelope with postage.

Returns were identified only by a geographical area letter or numeral. No signature or return address was required. Thus, the author had no way of identifying individuals or firms which returned the questionnaires. It was hoped that this confidential approach would increase response to the survey.

#### Time Schedule

December 1, 1965	all questionnaires (830) mailed
January 10, 1966	post card reminder to producers
February 10, 1966	letter reminder to all contacts
March 1, 1966	deadline for return of questionnaire
June 1, 1966	data summarized
July 7, 1966	report written
August 1, 1966	report mailed to all contacts

#### Summarization of Data

The questionnaires were dated and catalogued upon receipt by the author. The data were then transferred to master sheets for each subject of the questionnaire and by geographical areas. From these master sheets, data were totaled and averages developed for summary tables by which areas could be compared and conclusions developed.

Limitations

1. Survey not set up on statistical sampling basis.
2. No personal interviews were possible due to unavailable time, personnel, and travel funds.
3. Release time of questionnaire (December) a busy season for the flower industry, but author had no choice in time allowed for completing survey report.
4. Apparent reluctance of certain segments of the flower industry to divulge "privilege information" or the fact that many individuals simply "do not know" the information sought by the questionnaires.
5. Length of questionnaires burdensome for many individuals who refused to take the time to fill them out.
6. Many midwest and eastern growers who do not specialize in carnations, but grow several greenhouse crops, stated they were unable to separate data for carnations.

## Chapter IV

### RESULTS

Response to questionnaires varied between segments of the industry and by geographical areas. Wholesalers responded with a 31 percent return, producers returned 26 percent, and shippers 22 percent. Some of the returned questionnaires were not useable for all items requested. The response to the survey and the percent of useful questionnaires is listed in appendix Tables A, B, and C.

Incomplete questionnaires returned by producers were generally deficient where production and equipment costs were requested. Wholesaler and shipper questionnaires were occasionally incomplete where actual volume of flowers handled or estimated seasonal prices were wanted. Incomplete questionnaires were utilized in the summaries where data for an item were complete. Therefore, the summary tables used in the results are based on varying numbers of producers, wholesalers, or shippers reporting data for a particular item. This approach was used to derive average figures based upon the greatest number of participants.

As can be seen from Tables B and C, the percent of questionnaires returned of those mailed varied between

geographical areas. No useful questionnaires were returned by shippers and wholesalers for the Mountain market area which includes the Colorado production area. However, excellent questionnaires were returned from Colorado producers.

Change in Production Areas, 1955-1965

The net acreage of greenhouses in production increased from 1955 to 1965 for the growers reporting from each production area (Table 1). Northern California tripled its acreage, Southern California doubled, and Colorado increased by over 50 percent. Modest increases were reported by the growers participating in the survey for the eastern and midwestern areas.

Table 1. Acreage change indicated by the growers reporting from seven areas, 1955-1965.

Production area	No. growers reporting	Acres 1955	Acres 1965	Percent change
S. Calif.	11	16.1	29.1	+ 81
N. Calif.	13	5.7	20.8	+268
Colo.	21	12.5	18.8	+ 51
Penn.-N.Y.-N.J.	11	6.8	8.1	+ 18
Mass.	4	2.7	3.3	+ 20
N. Caro.-Va.	2	2.0	2.7	+ 30
Midwest	5	3.7	4.2	+ 13

### Plant Density per Space Unit

The average number of plants per space unit varied considerably from one area to another. Massachusetts has the highest density planting, averaging 3.8 plants per square foot of bench or about 108,000 plants per acre. Northern California reported the least dense planting of 2.3 plants per square foot of bench or about 61,000 plants per acre (Table 2).

Table 2. Average number of plants per space unit for seven carnation production areas.

Production area	No. growers reporting	Plants		
		Per square foot greenhouse	Per square foot bench space $\frac{1}{60}$	Per acre
S. Calif.	11	1.69	2.82	73,830
N. Calif.	13	1.40	2.34	61,091
Colo.	21	1.80	2.76	78,212
Penn.-N.Y.-N.J.	11	1.97	3.03	85,720
Mass.	4	2.47	3.80	107,669
N. Caro.-Va.	2	1.94	2.98	84,586
Midwest	5	1.72	2.65	75,000

$\frac{1}{60}$  percent of total greenhouse space used as bench space for California areas; 65 percent used for other areas.

### Types of Greenhouses

The types of greenhouses prevalent in each

producing area are shown in Table 3. The types are based primarily on types of covering: polyethylene film; rigid plastic, such as fiberglass or polyvinylchloride, and glass. California is predominantly polyethylene, while all other areas are typically glass. The use of some rigid plastic types is apparent in Colorado and North Carolina-Virginia.

Table 3. Type of greenhouses used for carnation production by growers reporting from seven areas.

Production area	No. growers reporting	Percent of each greenhouse type		
		Poly-ethylene	Rigid plastic	Glass <sup>1/</sup>
N. Calif.	11	82.6	0.0	17.4
S. Calif.	13	71.4	1.1	27.5
Colo.	21	.6	11.3	88.1
Penn.-N.Y.-N.J.	11	.6	0.0	99.4
Mass.	4	0.0	0.0	100.0
N. Caro.-Va.	2	6.0	20.0	74.0
Midwest	10	0.0	2.6	97.4

<sup>1/</sup>Most of the glass greenhouses in California and Colorado are continuous ridge-and-furrow type, whereas many growers in the eastern areas reported separate houses of the gable type.

### Annual Production Costs

The annual production costs, consisting of 10 items each as a percentage of total production cost, are indicated in Table 4.

Generally, the items follow a fairly consistent relationship as percentages for each of the areas. The combined labor and management cost is in the range of 55 to 60 percent of total costs for all areas except Massachusetts. Fuel costs are less in California (3.0 to 3.6 percent) and range from 7.3 to 10.7 percent for the other areas. Utilities, taxes, interest, and insurance are shown to be modest costs compared to the major costs such as labor, fuel, plants, supplies, and miscellaneous expenses.

### Average Annual Production Costs Per Unit

The actual dollar figure for annual production costs is represented for each producing area in Table 5. Depreciation is not shown. Although asked for on the questionnaires, the figure was too variable to be included here. Depreciation is readmitted as a cost in the final summary in Tables 19 and 20.

The production costs per acre are similar for all areas except Northern and Southern California, where they are lower. However, costs related to plants and blooms vary considerably from one production area to another.

Table 4. Production cost items, as a percent of total average annual production costs, for seven carnation production areas.

Production area	Percent of total annual production costs									
	Hired & family labor	Mgmt.	Fuel	Util. & water	Plants	Taxes	Sup-plies	Inter-est	Insur-ance	Other
S. Calif.	53.4	8.8	3.0	3.1	5.3	4.2	12.1	1.7	2.5	6.2
N. Calif.	48.3	16.6	3.6	3.0	7.5	2.9	12.5	2.2	1.7	1.6
Colo.	44.3	15.2	8.1	4.2	3.4	5.1	9.3	3.0	2.2	5.2
Penn.-N.Y.-N.J.	43.7	15.2	8.0	2.9	8.1	3.4	9.6	1.1	2.2	5.9
Mass.	33.7	10.2	10.7	3.1	8.8	4.7	4.5	2.2	2.0	20.2
N. Caro.-Va.	33.4	23.4	7.3	3.1	6.7	3.8	6.1	3.3	2.1	10.7
Midwest	37.7	18.4	7.9	3.2	8.6	4.4	4.6	2.6	3.3	9.4



Table 5. Average annual production costs per specified unit, in dollars, for seven carnation production areas (depreciation not included).

Production area	Per square foot greenhouse	Per square foot bench $\frac{1}{60}$	Per acre	Per plant	Per bloom
S. Calif.	.592	.986	25,779	.342	.026
N. Calif.	.691	1.152	30,106	.493	.032
Colo.	1.245	1.915	54,214	.693	.057
Penn.-N.Y.-N.J.	1.289	1.983	56,160	.655	.067
Mass.	1.275	1.962	55,609	.501	.083
N. Caro.-Va.	1.291	1.986	56,301	.666	.067
Midwest	1.321	2.032	57,543	.767	.081

$\frac{1}{60}$  percent of total greenhouse space used as bench space for California; 65 percent used for other areas.

#### Approximate Greenhouse and Land Investments, 1955 and 1965

Difficulty was experienced in obtaining representative figures for greenhouse and land values (Table 6). Values reported varied considerably between growers in any one area. General relationships can be noted, particularly between California, where the land values appear to be highest and greenhouse construction costs lowest, and the rest of the country where land values tend to be somewhat lower and greenhouse construction costs higher.

Table 6. Approximate capital investments in dollars for land and for greenhouses, 1955 and 1965 <sup>1/</sup> for seven carnation production areas.

Production area	Land costs per acre		Greenhouse construction per square foot	
	1955	1965	1955	1965
S. Calif.	5,000	10,000	.10 - .15	.25 - .30
N. Calif.	3,000	10,000	1.00	2.00
Colo.	2,000	5,000	2.50	4.00
Penn.-N.Y.-N.J.	1,000	3,000	3.00	4.00
Mass.		3,000		
N. Caro.-Va.	200	300		
Midwest	1,500	4,000	2.50	4.00

<sup>1/</sup>Costs in this table are based on the most frequent or typical costs reported by growers. Costs for Southern California are for wooden structures and polyethylene film. Costs for the other areas are for glass greenhouses.

Average Capital Investments for Equipment and Buildings, Percent of Total

Equipment costs, as percentages of total equipment investment, appear to be more variable from area to area than were production costs (Table 7). Heating equipment is the major equipment item. Boiler costs are about 25 percent of all equipment costs in each producing area. In addition to the boiler, the heat distribution system cost varies from

11 to 19 percent of the total equipment costs. Fertilizer injectors and tractors represent lesser equipment costs. Grading sheds, other buildings, and other equipment, such as fans, vehicles, and pumps make up most of the balance of capital investments.

Data were insufficient to obtain representative equipment costs for Pennsylvania - New York - New Jersey and North Carolina - Virginia.

#### Average Equipment and Buildings Investment per Space Unit

When total equipment investments are expressed in dollars per acre or other space unit, there is considerable variation between production areas (Table 8).

As with production costs, California areas have smaller costs than midwestern and eastern production areas. It is interesting to note that the equipment investments per acre for California are approximately one-third to one-half of the equipment investment of the other areas.

#### Average Flower Production per Space Unit

Flower production is greatest in the three western production areas as shown in Table 9. On an acre basis, California and Colorado are nearly equal in productivity, each area approaching a million blooms per acre annually. Pennsylvania - New York - New Jersey and North Carolina - Virginia are similar with over 800,000 blooms per acre. The Midwest and Massachusetts produce at the lowest rates.

Table 7. Average capital investment for equipment and buildings as a percent of total equipment and buildings investment, for five carnation production areas.

Production area	Fertilizer injectors	Tractors	Boiler	Heat system	Unit heaters	Water system	Grading shed	Other bldgs.	Other <sup>1/</sup> equip.
S. Calif.	2.4	4.3	21.4	17.8	-	13.3	16.3	12.2	12.2
N. Calif. <sup>2/</sup>	1.8	6.9	25.2	19.1	-	4.2	24.1	14.2	4.5
N. Calif. <sup>3/</sup>	4.6	9.1	-	2.4	28.8	3.7	17.7	18.8	14.9
Colo.	1.8	4.7	27.5	19.0	3.1	10.3	8.1	8.0	17.6
Penn.-N.Y.-N.J.	1.1	4.5	28.8	17.7	0.3	6.4	15.0	12.0	14.2
Midwest	.54	3.4	22.8	10.9	0.4	4.8	13.9	36.5	6.8

<sup>1/</sup>Other equipment most frequently included vehicles, fans, sprayers, dusters, pumps, CO<sub>2</sub> equipment.

<sup>2/</sup>8 growers with boiler heating.

<sup>3/</sup>5 growers with unit-type heaters.

Table 8. Average equipment investment in dollars for six carnation production areas.

Production area	Per square foot greenhouse area	Per square foot bench area	Per acre
S. Calif. <sup>1/</sup>	.272	.453	11,832
N. Calif. <sup>2/</sup>	.381	.635	16,589
N. Calif. <sup>3/</sup>	.175	.291	8,385
Colo.	.928	1.428	40,451
Penn.-N.Y.-N.J.	1.222	1.880	53,185
Mass. <sup>4/</sup>	.978	1.505	42,682
Midwest <sup>4/</sup>	.6935	1.0670	30,228

<sup>1/</sup> Equipment investment about \$6,000 when heating not included; only about one-half of acreage in area is being heated to date.

<sup>2/</sup> Boiler-type heating.

<sup>3/</sup> Unit heater type heating.

<sup>4/</sup> Some costs omitted in reports, causing figure to be lower than would be expected.

#### Average Annual Gross Returns Per Unit

The average annual gross returns per unit are somewhat relative to the range of costs for each area (Table 10). Southern California had the smallest production cost and shows the smallest gross returns. This is followed by Northern California. Colorado, Pennsylvania - New York - New Jersey, and North Carolina - Virginia reported similar

Table 9. Average flower yield <sup>1/</sup> reported by growers in seven carnation production areas.

Production area	Per square foot greenhouse area	Per square foot bench area	Per acre	Per plant
S. Calif.	21.33	35.54	929,411	12.76
N. Calif.	21.52	35.87	937,864	15.35
Colo.	21.71	33.40	945,612	12.09
Penn.-N.Y.-N.J.	19.28	29.66	839,287	9.79
Mass.	15.68	24.13	683,053	6.34
N. Caro.-Va.	19.40	29.84	845,864	10.00
Midwest	16.39	25.22	714,285	9.52

<sup>1/</sup>Yield primarily of blooms sold.

gross returns for all units. The Midwest with small per acre returns and the highest production cost, reported returns per bloom and per plant nearly equal to Pennsylvania - New York - New Jersey and North Carolina - Virginia. Massachusetts reported the lowest returns per acre, but on a per bloom basis the return is consistent with other eastern areas.

#### Marketing Methods

Of the growers reporting in the survey, there is considerable variation as to how flowers are sold. However, Table 11 indicates notable differences between areas. Both California areas are similar in that about two-thirds of

Table 10. Average annual gross dollar returns per unit reported by growers from seven production areas.

Production area	Per square foot greenhouse	Per square foot bench	Per acre	Per plant	Per bloom
S. Calif.	.902	1.504	39,323	.539	.048
N. Calif.	1.094	1.824	47,682	.781	.051
Colo.	1.759	2.706	76,615	.980	.081
Penn.-N.Y.-N.J.	1.788	2.750	77,829	.908	.093
Mass.	1.422	2.187	61,928	.575	.091
N. Caro.-Va.	1.767	2.719	77,068	.911	.091
Midwest	1.511	2.324	65,833	.878	.092

the growers depend on shippers to market their flowers. About one-fourth or one-third of the growers ship their own flowers, and a small percent market flowers locally.

Colorado is distinctive from all other areas in that the majority of growers market their flowers through associations.

The majority of carnations are marketed wholesale by the growers in Massachusetts and North Carolina - Virginia. Massachusetts also relies strongly on wholesale shippers and the local market. The Pennsylvania - New York - New Jersey growers appear to market over a third of their production by their own retailing. The Midwest indicates a reliance on wholesale shippers and the local markets.

Table 11. Marketing methods used by carnation producers in seven areas.

Production area	Percent of growers				
	Ship own (wholesale)	Sold by shipper	Local market	Coop or assoc.	Retail own
S. Calif.	25.0	62.5	12.5		
N. Calif.	38.5	61.5	(some)		
Colo.		47.6 <sup>1/</sup>		52.4	
Penn.-N.Y.-N.J.	27.0	27.0	9.0		37.0
Mass.	50.0	25.0	25.0		(some)
N. Caro.-Va.	70.0	30.0			
Midwest	6.7	54.4	33.3		5.6

<sup>1/</sup> Author suspects this figure might be high due to possibility of growers confusing this method with "co-op or association." Other figures also may be somewhat affected by misunderstanding of terminology.

#### Marketing Costs

The data in Table 12 represent averages of estimates by growers in the production areas on the cost to grade and bunch the standard market unit of 25 blooms. Also included in the table are average commissions paid to a shipper or wholesaler for selling flowers, or estimated percentage costs if growers sold through an association or sold their own merchandise.

Considerable variation exists on estimated costs to



grade and bunch carnations. The majority of the estimates indicate the cost at around 20 cents per bunch.

Some variation in selling commissions is apparent between areas, the range indicated being from 16 percent in Massachusetts to 22.5 percent in Southern California. The average cost to a grower selling his own flowers or marketing through an association are consistently lower than the cost where wholesalers or shippers perform this service.

Table 12. Costs of marketing reported by carnation producers in seven areas.

Production area	Percent		Dollars	
	Commission paid for selling	Cost to sell own, or by coop or assoc.	Ave. cost to grade/bunch 25 blooms	Range of grading costs per bunch
S. Calif.	22.5	17.5	.198	.10 - .40
N. Calif.	20.8	12.0	.207	.10 - .65
Colo.	18.4	18.8	.163	.06 - .25
Penn.-N.Y.-N.J.	20.0		.161	.08 - .29
Mass.	16.0	15.0	.137	.05 - .30
N. Caro.-Va.	20.0	15.0	.135	.10 - .17
Midwest	18.7		.192	.08 - .35

#### Methods of Financing Production Factors

Table 13 presents the methods of financing production factors indicated by a majority of growers reporting for each area. Certain methods predominate in all areas.

Table 13. Methods <sup>1/</sup> of financing land, equipment, supplies, and labor for seven carnation production areas (based on majority of growers reporting).

Production area	Land	Large equip.	Small equip.	Lumber	Plastic and glass	New green-houses	Grading shed and refig.	Sup-plies	Cut-tings	Labor
S. Calif.	B	BGS	G	G	G	GS	SGB	G	G	G
N. Calif.	B	B	G	G	G	BG	GB	G	G	G
Colo.	B	B	G	G	G	B	GB	G	G	G
Penn.-N.Y.-N.J.	B	B	G	G	G	B	GB	G	G	G
Mass.	B	B	S	S	S	B	B	S	S	G
N. Caro.-Va.	G	G	G	G	G	B	G	G	G	G
Midwest	B	BG	G	G	G	B	GB	G	G	G

<sup>1/</sup>B = bank loans, S = Supplier carries cost, G = grower, P = personal loans (letters placed in order of frequency where no clear majority)

Bank financing is usually relied upon for purchasing land, large equipment, new greenhouses, and grading sheds or refrigeration. Labor, supplies, plants and other items are usually financed by the grower.

Massachusetts growers indicated that suppliers were frequently relied upon to carry costs of supplies, plants, and other minor items, until paid for by the grower.

#### Production (cultural) Problems

Growers' opinions of the ranked importance of cultural problems vary considerably. By totaling individual point ratings, some indication of area problems could be determined. In Table 14, there is general agreement for all areas. Except for Southern California and Pennsylvania-New York - New Jersey, low light during part of the year was ranked first. All areas rated diseases and insects as being foremost problems. Excessive greenhouse temperature was generally ranked as an important problem; also, condensation in the greenhouse. Smog, nematodes, rodents, and birds were rated as less critical problems. Insufficient data were obtained from North Carolina - Virginia.

#### Outside (noncultural) Problems Affecting Production

The ranking of other problems affecting greenhouse production of carnations, indicated in Table 15, illustrates that growers in all areas are particularly conscious of rising costs. Labor costs and property taxes ranked highest. Labor quality and labor supply were also consistently rated

Table 14. Production (cultural) problems for seven  
carnation producing areas ranked by importance<sup>1/</sup>.

Problems	Rank <sup>2/</sup> Production areas						Rank <sup>2/</sup> all areas
	So. Cal.	No. Cal.	Colo.	Penn.- N.Y.-N.J.	Mass.	Mid- west	
Diseases	1	3	2	1	2	3	1
Insects	3	2	3	3	2	2	3
Water quality	4	9	7	8	4	9	6
Nematodes	11	11	11	10	8	11	11
Rodents, etc.	9	9	10	6	8	6	10
Smog	7	7	6	8	8	9	8
Soil drainage	10	8	7	6	7	7	8
Temp. too high	2	5	5	4	5	4	4
Temp. too low	4	5	7	11	8	7	7
Condensation	4	3	3	5	5	5	4
Low light	8	1	1	2	1	1	2

<sup>1/</sup>Growers rated each problem as 0 = no problem, 1 = some-  
times, 2 = serious. The aggregate of these ratings was used  
to rank the problems by importance from 1 to 11.

<sup>2/</sup>Several problems rated equally in aggregate, hence were  
given equal rank in the table.

high.

Rising supply costs and building restrictions were  
rated as problems in some cases. No room for expansion,  
vandalism, and complaints by neighbors were rated as the

least important problems. Insufficient data were obtained from North Carolina - Virginia.

Table 15. Outside problems affecting business for six carnation production areas, ranked by importance <sup>1/</sup>.

Problems	Rank <sup>2/</sup> Production areas						Rank <sup>2/</sup> all areas
	So. Cal.	No. Cal.	Colo.	Penn.-N.Y.-N.J.	Mass.	Mid-west	
Rising property taxes	2	1	2	3	1	1	2
Building restrictions	4	4	6	7	6	3	5
Neighbors complain	9	9	9	9	7	7	9
Vandalism	8	8	8	7	7	8	8
No room for expansion	7	7	5	6	7	8	7
Rising supply costs	6	6	2	5	5	6	5
Labor supply	4	5	7	4	1	5	4
Labor quality	2	3	4	2	1	1	3
Rising labor costs	1	2	1	1	1	3	1

<sup>1/</sup> Growers rated each problem as 0 = no problem, 1 = sometimes, 2 = serious. The aggregate of these ratings was used to rank the problems by importance from 1 to 9.

<sup>2/</sup> Several problems rated equally in aggregate, hence were given equal rank in the table.

### Factors Important to Business Success

Although some overlapping and misinterpretation may exist in the six factors presented from which growers were asked to make a choice of two, there are notable differences. Again in Table 16 (as in Table 15) growers appear to place emphasis on costs and prices. Efficiency of production, listed as "increased production per unit plus reduced costs" rated as the leading factor likely to improve carnation operations. "Higher flower prices" was rated a close second.

A "good advertising program" was rated third for improving business. "Larger sales at current prices," "cheaper and better transportation," and "selling through an association" (if not already) were relatively unimportant to growers in all areas.

### Grower Opinions on Questions Important to the Industry

As shown in Table 17, the majority of western, Midwest, and North Carolina - Virginia growers reporting in the survey indicated they would be willing to relocate their greenhouses if necessary. Massachusetts and Pennsylvania - New York - New Jersey growers generally indicated unwillingness to move.

Western growers (California and Colorado) apparently are optimistic that carnation expansion can continue in their own areas and remain profitable in the immediate future. The two growers reporting from the North Carolina - Virginia area also indicated expansion of carnations there was possible.

Table 16. Grower rating of factors important to business success <sup>1/</sup>.

Factors	Production areas							Total
	So. Cal.	No. Cal.	Colo.	Penn.- N.Y.- N.J.	Mass.	N.Caro. -Va.	Mid- west	
Good advertising program	1	7	3	2	1	1	2	17
Larger sales at current prices	2	1	3	2	0	1	1	10
Higher flower prices	7	6	13	5	3	1	6	41
Selling through an association	2	2	1	2	0	0	2	9
Cheaper and better transportation	1	2	5	0	1	0	1	10
Increased production per unit + reduced costs	7	8	13	9	3	1	7	48

<sup>1/</sup> Growers were asked to check 2 of the 6 listed factors.

Figures in table are total choices made for each factor.

About equally divided opinion was indicated about local expansion in Pennsylvania - New York - New Jersey, Massachusetts, and the Midwest. Growers in all areas expressed strong optimism that carnation production could continue to expand nationally. Reactions were mixed regarding competition between areas. Northern California

Table 17. Grower opinions on questions important to the industry.

Questions <sup>1/</sup>	Production areas							
	So. Cal.	No. Cal.	Colo.	Penn.- N.Y.- N.J.	Mass.	N.Caro. -Va.	Mid- west	
1. Would you be willing to re-locate your business?	yes	5	9	20	3	0	2	8
	no	4	4	0	7	3	0	2
2. Do you think carnation production can expand in your area profitably?	yes	6	9	19	6	2	2	5
	no	0	3	1	5	1	0	4
3. Do you think carnations can be expanded nationally?	yes	6	10	18	6	4	2	9
	no	1	2	2	1	0	0	0
4. Do you feel your area is being hurt by competition from other carnation areas?	yes	6	2	15	9	3	1	8
	no	4	11	5	2	1	1	1
5. If yes (on 4), what areas are hurting yours?	Calif.			13	4	2	1	4
	Colo.		1					
	No. Calif.	3						
	Cal. & Colo.				5	1		4

<sup>1/</sup>All questions not answered in every report; thus totals vary.



was the only area which did not strongly indicate that it was being hurt by competition from other areas. Most growers in all the other areas felt inter-area competition was a factor affecting their particular situation. Colorado listed California as competition. The Midwest and eastern areas indicated that both Colorado and California were strong competition.

#### Estimated Investments and Depreciation

Table 18 was assembled to establish approximate average investments and depreciation per acre for the seven U. S. carnation production areas. The investment values are based on representative figures reported by growers in the survey for new greenhouse construction, the present value of new benches (redwood or similar) and the present value of equipment and other buildings. Land values, as reported by growers, were extremely variable; thus arbitrary values of \$10,000 per acre were used for California and \$5,000 for all other production areas.

The total investments essentially fall into three groups: 1) Southern California with \$48,896 per acre; 2) Northern California, with \$121,209 per acre; and 3) the other areas all in excess of \$220,000 per acre. The investment in greenhouse construction causes the major difference in total investments between production areas (Table 18). California growers also reported a smaller average investment per acre for equipment and other buildings.

Table 18 is required to analyze returns to land,

Table 18. Estimated investments (current) and depreciation of greenhouses, benches, and other buildings per acre of seven U. S. carnation production areas.

Investments and depreciation per acre	Production areas						
	S.Calif.	N.Calif.	Colo.	Penn.- N.Y.-N.J.	Mass.	N.Caro.- Va.	Midwest
Greenhouses <sup>1/</sup> depreciation	\$21,780 2,178	\$87,120 4,356	\$174,240 8,712	\$174,240 8,712	\$174,240 8,712	\$174,240 8,712	\$174,240 8,712
Benches <sup>2/</sup> depreciation	7,500 750	7,500 750	7,500 750	7,500 750	7,500 750	7,500 750	7,500 750
Equipment, other buildings <sup>3/</sup> depreciation	9,616 481	16,589 829	40,451 2,023	53,185 2,659	42,682 2,134	45,496 2,275	34,196 1,710
Land <sup>4/</sup>	10,000	10,000	5,000	5,000	5,000	5,000	5,000
Total investment <sup>5/</sup>	48,896	121,209	227,191	239,925	229,422	232,236	220,936
Total depreciation	3,409	5,935	11,485	12,121	11,596	11,737	11,172

<sup>1/</sup> \$.50/sq.ft. for S. Calif., \$2.00/sq.ft. for N. Calif., \$4.00/sq.ft. for other areas. Depreciation at 10% for S. Calif., 5% for all other areas.

<sup>2/</sup> \$7,500/acre, depreciated at 10% for all areas.

<sup>3/</sup> Average equipment and other buildings investments per acre, reported by growers, depreciated at 5%.

<sup>4/</sup> \$10,000/acre for S. and N. Calif., \$5,000/acre for all other areas.

<sup>5/</sup> Land, equipment, and all structures.

capital, and management as a percent of total investment (Tables 19 and 20).

Financial Summary per Carnation  
Enterprise by Production Areas

Table 19 summarizes the financial situation of an average enterprise for each of the seven U. S. carnation production areas, and also on a per acre basis for all items and on a per bloom basis for total revenue, cash costs and a return to fixed factors. The data used for the analysis in this table were obtained from 42 selected growers who reported complete data for all items necessary for the summary.

California enterprises have the lowest revenues per acre and per bloom and also the lowest costs and investments. California enterprises, however, show the highest rates of return to land, capital, and management as a percent of total investment. Colorado, Pennsylvania - New York - New Jersey, and North Carolina - Virginia enterprises operate at a higher level of revenues, costs and investments per unit. The rate of returns to land, capital, and management vary primarily due to some differences in cash costs relative to revenue.

Massachusetts and Midwest enterprises had smaller revenues per unit than other eastern areas and relatively higher cash costs. Massachusetts shows no returns to land, capital and management. No contribution is made to depreciation and only a partial return for family living. The

Table 19. Average revenues, costs, and investments and return to land, capital, and investment for average enterprises in seven U. S. carnation production areas.

Average for enterprise	Production areas						
	So. Calif.	No. Calif.	Colo.	Penn.-N.Y.-N.J.	Mass.	No. Ca.-Va.	Mid-west
Total revenue	\$185,768	\$ 83,878	\$ 56,929	\$ 65,043	\$ 46,430	\$102,500	\$ 43,054
Total cash costs <sup>/1</sup>	111,417	45,603	32,033	39,141	44,273	54,880	29,765
Return to fixed factors	74,351	38,275	24,896	25,902	2,157	47,620	13,289
Family living <sup>/2</sup>	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Return to land, capital, mgmt.	70,351	34,275	20,896	21,902	negative	43,620	9,289
Depreciation <sup>/3</sup>	16,465	10,683	8,269	10,182	9,509	15,610	7,262
Return to land, capital, mgmt. after depreciation	53,886	23,592	12,627	11,720	negative	28,010	2,027
Value of total investment <sup>/4</sup>	142,234	118,096	83,589	102,868	96,113	157,762	66,929
6% of total investment	8,534	7,085	5,016	6,172	5,767	9,466	4,016
Internal rate of return <sup>/5</sup>	37.9%	20.0%	15.1%	11.4%	negative	17.8%	3.0%
<u>Average per acre and per bloom</u>							
Total revenue, per acre	\$ 38,441	\$ 46,599	\$ 79,068	\$ 77,432	\$ 56,622	\$ 77,068	\$ 66,237
per bloom	.0393	.0485	.0801	.0928	.1008	.0911	.0857
Total cash costs <sup>/1</sup> , per acre	23,056	25,335	44,490	46,597	53,992	41,263	45,792
per bloom	.0236	.0264	.0451	.0559	.0961	.0488	.0592
Return to fixed factors, per acre	15,385	21,264	34,578	30,835	2,630	35,805	20,445
per bloom	.0157	.0221	.0350	.0369	.0047	.0423	.0265
Family living <sup>/2</sup> , per acre	828	2,222	5,555	4,762	4,878	3,008	6,154
Return to land, capital, mgmt., per acre	14,557	19,042	29,023	26,073	negative	32,797	14,291
Depreciation <sup>/3</sup> , per acre	3,409	5,935	11,485	12,121	11,596	11,737	11,172
Return to land, capital, mgmt. after depreciation, per acre	11,148	13,107	17,538	13,952	negative	21,060	3,119
Value of total investment <sup>/4</sup> , per acre	29,448	65,609	116,096	122,462	117,211	118,618	102,968
6% of total investment	1,767	3,936	6,966	7,348	7,033	7,117	6,178
Internal rate of return <sup>/5</sup>	37.9%	20.0%	15.1%	11.4%	negative	17.8%	3.0%
Number of growers reporting	4	8	16	7	2	2	3
Average acres per enterprise	4.83	1.80	.72	.84	.82	1.33	.65

<sup>/1</sup>Hired labor, fuel, utilities, plants, taxes, supplies, insurance, miscellaneous.

<sup>/2</sup>Assumed, based on minimum standard per family of \$4,000.

<sup>/3</sup>Based on estimated investments and depreciation per acre (Table 18), converted to an enterprise basis for Tables 19 and 20.

<sup>/4</sup>Land valued at \$10,000 per acre for California areas and \$5,000 per acre for all other areas. The improvements are valued as in <sup>/3</sup> but assumed to be depreciated by half.

<sup>/5</sup>The return to land, capital, and management as a percent of total investment.

Midwest enterprises show a positive but small return to land, capital, and management.

Financial Summary per Carnation  
Enterprise by Size for the U.S.

In addition to analyzing the financial situation per enterprise and per acre or per bloom by production areas (Table 19) the same 42 U. S. carnation growers were re-grouped as small, medium, or large enterprises. Nearly equal representation of growers from each production area was achieved for each enterprise size group. This arrangement meant that a California grower placed in the "small" group might be equal in size or larger than an eastern area grower placed in the "large" group, etc. The objective was to analyze this cross section of U. S. carnation growers to determine if relative size of enterprises caused differences in financial success.

Table 20 summarizes the financial situation of the three size groups for an average enterprise, as well as on a per acre basis for all items; and on a per bloom basis for total revenue, cash costs, and a return to fixed factors. The small and medium sized enterprises appear to produce about the same returns to land, capital, and management as a percent of total investment. It appears that little contribution is made for management by these two groups. The large enterprises indicate a substantial return on investment allowing for increased payments for management or family living.

Table 20. Average revenues, costs, and investments and return to land, capital, and management for 42 U. S. carnation enterprises grouped by size.

<u>Average per enterprise</u>	<u>Size of enterprise</u>		
	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Total revenue	\$29,939	\$52,602	\$135,634
Total cash costs <sup>/1</sup>	17,709	34,752	77,700
Return to fixed factors	12,230	17,850	57,934
Family living <sup>/2</sup>	4,000	4,000	4,000
Return to land, capital, mgmt.	8,230	13,850	53,934
Depreciation <sup>/3</sup>	4,703	7,638	16,852
Return to land, capital, mgmt. after depreciation	3,527	6,212	37,082
Value of total investment <sup>/4</sup>	48,701	77,354	111,688
6% of total investment	2,922	4,641	6,701
Internal rate of return <sup>/5</sup>	7.2%	8.0%	33.2%
<u>Average per acre and per bloom</u>			
Total revenue, per acre	\$60,989	\$53,202	\$ 56,310
per bloom	.0776	.0686	.0548
Total cash costs <sup>/1</sup> , per acre	36,075	35,148	32,258
per bloom	.0459	.0453	.0314
Return to fixed factors, per acre	24,914	18,054	24,052
per bloom	.0317	.0233	.0234
Family living <sup>/2</sup> , per acre	8,148	4,046	1,661
Return to land, capital, mgmt., per acre	16,766	14,008	22,391
Depreciation <sup>/3</sup> , per acre	9,580	7,725	6,996
Return to land, capital, mgmt. after depreciation, per acre	7,186	6,283	15,395
Value of total investment <sup>/4</sup> , per acre	99,209	78,236	46,368
6% of total investment	5,952	4,694	2,782
Internal rate of return <sup>/5</sup>	7.2%	8.0%	33.2%
Number of growers reporting	11	16	15
Average acres per enterprise	.49	.99	2.41

<sup>/1</sup>Hired labor, fuel, utilities, plants, taxes, supplies, insurance, miscellaneous.

<sup>/2</sup>Assumed, based on minimum standard per family of \$4,000.

<sup>/3</sup>Based on estimated investments and depreciation per acre (Table 18), converted to an enterprise basis for Tables 19 and 20.

<sup>/4</sup>Land valued at \$10,000 per acre for California areas and \$5,000 per acre for all other areas. The improvements are valued as in <sup>/3</sup> but assumed to be depreciated by half.

<sup>/5</sup>The return to land, capital, and management as a percent of total investment.

## Chapter V

### RESULTS--SHIPPERS AND WHOLESALERS

Shippers in five areas provided information on volume of carnations and percentages shipped to market areas as well as average shipping prices for each of seven demand periods of the year.

Colorado did not respond to the survey. The Midwest area was not surveyed since it is believed that most growers serve local markets.

#### Average Annual Percent of Carnations Shipped from Production Areas to Market Areas

Table 21 shows that California shipped carnations to some extent to all marketing areas of the United States and also outside the United States. Carnations produced in Southern California are mainly exported to the East North Central, Middle Atlantic, South Atlantic, and West South Central market areas. About 12 percent of Southern California production is sold within its own market area (California, Oregon, and Washington). Northern California shippers indicated that less than 2 percent of their volume is sold within their own market area. The major markets for Northern California are the West North Central, East South Central and West South Central areas.

Table 21. Percent of carnations shipped from production areas to market areas---average for seven demand periods of the year.

Shipping area	Market area									
	Pacific	Mountain	W. North Central	E. North Central	Middle Atlantic	New England	South Atlantic	E. South Central	W. South Central	Outside U. S.
S. Calif.	11.9	7.9	4.5	23.8	17.7	1.4	10.5	5.2	16.0	1.1
N. Calif.	1.3	4.8	17.3	8.3	8.3	5.8	9.0	14.1	22.7	8.3
Penn.- N.Y.-N.J.					85.0		15.0			
Mass.					74.0	26.0				
N. Caro.- Va.							100.0			

Shippers in Pennsylvania - New York - New Jersey indicated that they sold 85 percent of their carnations in their own marketing area and shipped 15 percent into the South Atlantic area.

Massachusetts shipped 74 percent into the Middle Atlantic market area and sold 26 percent in their own market (New England). North Carolina - Virginia shippers sold all their flowers in their own marketing area (South Atlantic).

Percent of Total Volume Shipped from  
Production Areas Each Month

The percentage of the annual volume of carnations



shipped monthly from the production areas can be compared in Table 22. There is variation between areas as to high or low volume months. The eastern production areas ship carnations primarily by truck or bus and also by parcel post. No information was reported from Colorado or the Midwest.

Southern California ships its heaviest volume in March, April, and May. Northern California ships heavily in August, September, November, and December. Pennsylvania - New York - New Jersey ships the most in May and June. This is also true for Massachusetts. Maximum shipping months for North Carolina - Virginia are April, May, and September.

Low volume shipping months are September and October for Southern California; January, February, and March for Northern California; August and September for Pennsylvania - New York - New Jersey and Massachusetts; and November and December for North Carolina - Virginia.

#### Average Seasonal Shipping Prices from Production Areas

The average shipping prices from production areas (Table 23) indicate two main points. First, the California areas ship at essentially the same prices, which are usually lower than those of eastern shipping areas. Pennsylvania - New York - New Jersey area winter prices are about 40 percent higher than California's, while North Carolina - Virginia prices are nearly twice that of California's. Second, all shipping areas show a similar pattern for the

Table 22. Percent of total volume shipped from production areas by months.

Shipping area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
S. Calif.	6.4	7.4	11.7	14.0	12.6	7.9	7.2	6.2	5.0	5.6	6.5	9.4
N. Calif.	4.6	5.0	5.8	6.8	9.3	9.0	7.8	10.1	10.1	9.4	10.3	11.8
Penn.-N.Y.-N.J.	9.2	9.9	7.9	8.2	10.3	11.9	9.9	4.9	5.3	6.1	7.1	9.2
Mass.	9.3	9.7	9.7	9.7	12.5	12.1	7.0	5.6	1.8	7.9	6.7	7.9
N.Caro.-Va.	6.3	6.4	8.2	10.4	11.4	8.7	8.5	8.5	12.2	9.1	5.3	4.8

year--essentially a "high" price during winter and spring and a "low" price from Memorial Day through summer. No data were available for Colorado, Massachusetts, and the Midwest.

Table 23. Average shipping prices, in cents per bloom, for seven periods of the year.

Period	Shipping areas			
	S. Calif.	N. Calif.	Penn.- N.Y.-N.J.	N. Caro. -Va.
Christmas	10.0	10.2	14.0	20.0
Valentine's Day	10.0	10.2	13.5	19.0
Easter	10.0	10.3	14.0	19.0
Mother's Day	10.0	10.3	14.5	18.0
Memorial Day	8.0	8.7	7.5	13.5
June	7.7	7.0	5.0	9.0
July-September	6.0	7.0	5.0	9.0
Percent shipped to wholesalers	98.3	83.3	88.5	100.0

Primary Transportation Methods from  
Shipping Points to Market Areas

The primary transportation methods used to ship carnations to market areas are shown in Table 24. The "long-distance" shippers in Northern and Southern California rely primarily on air transportation. However, trucks or combinations of air and trucks are used into the southern market areas such as East South Central, West South Central,

and parts of the Mountain area.

Table 24. Principle transportation methods <sup>1/</sup> from shipping points to market areas.

Shipping area	Market area									
	Pacific	Mountain	W. North Central	E. North Central	Middle Atlantic	New England	South Atlantic	E. South Central	W. South Central	Outside U. S.
S. Calif.	AT	AT	A	A	A	A	A	A	AT	A
N. Calif.	AT	AT	A	A	A	A	A	AT	AT	A
Penn.- N.Y.-N.J.					T		TB			
Mass.					TRP	TRP				
N. Caro.- Va.					TB		TB			

<sup>1/</sup>A = air, T = truck, R = rail, B = bus, P = parcel post.

Wholesale Volume of Carnations and  
Average Annual Percentage Received  
by Market Areas from Production Areas

Table 25 gives the number of boxes (about 600 flowers per box) of carnations received annually by the wholesalers for each market area reporting in the survey. The volume of boxes reported here does not represent the total volume that the market areas receive. The percentages of receipts from production areas are based on the reported volume. The receipts of carnations by wholesalers corresponds generally with the market areas shipped to by

Table 25. Wholesale volume of carnations and average percent received by market areas from production areas.

Market areas	Volume <sup>1/</sup> in boxes	Percent received from production areas						
		S. Calif.	N. Calif.	Colo.	Penn.- N.Y.- N.J.	Mass.	N.Caro.- Va.	Local Growers
Pacific	44,984	3.5	84.9	0.3				11.4
W. North Central	12,060	10.4	23.1	58.9				7.6
E. North Central	8,775	11.7	48.5	12.8				27.0
Middle Atlantic	108,546	15.6	14.4	9.4	32.0	8.9	6.3	13.4
New England	2,020	3.9	1.8			91.1		3.2
South Atlantic	15,140	12.2	33.2	27.6	13.0	3.3	5.8	4.9
E. South Central	11,389	7.4	48.2	27.9		0.1		16.4
W. South Central	9,751	18.3	38.8	42.7				0.2

<sup>1/</sup>Volume represents quantities received only by the wholesalers reporting in the survey. Boxes average about 600 blooms each.

production areas. The percentages of volume shipped and volume received cannot be compared directly. However, receipts by wholesalers in market areas confirm most of the major markets for the production areas. Each market area receives a high percentage of total volume from its own production area, if one exists within the market area. The northeast areas receive a high percent of their carnations from local growers and nearby producing areas.

The East North Central area, with Chicago as a hub, receives over 25 percent of its carnation volume from local growers, nearly 50 percent from Northern California, and about 12 percent each from Southern California and Colorado. The West North Central and West South Central areas receive about 50 percent of their carnations from Colorado, with the balance coming from Northern California, and to some extent from Southern California. No data were available from the Mountain area.

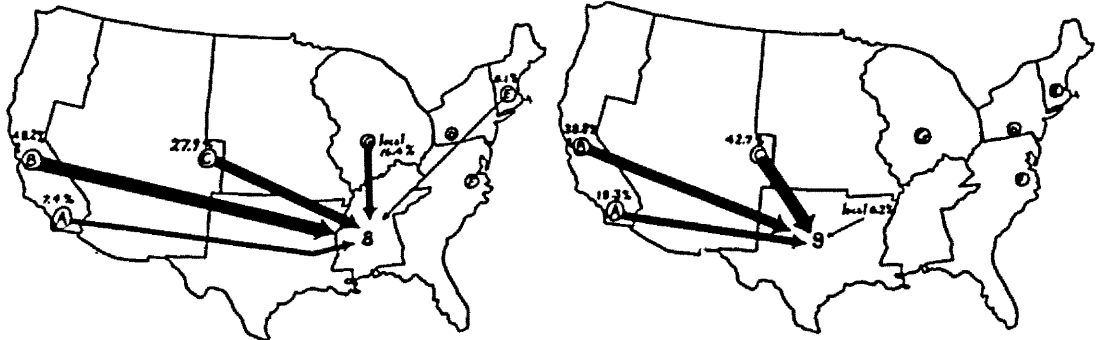
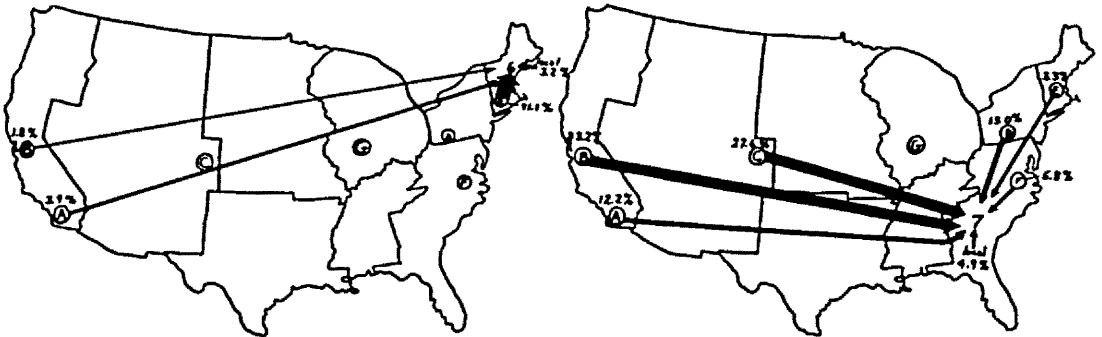
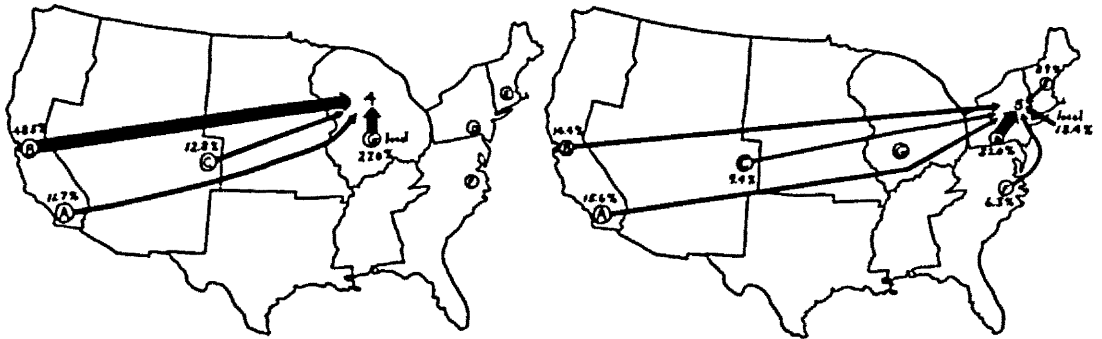
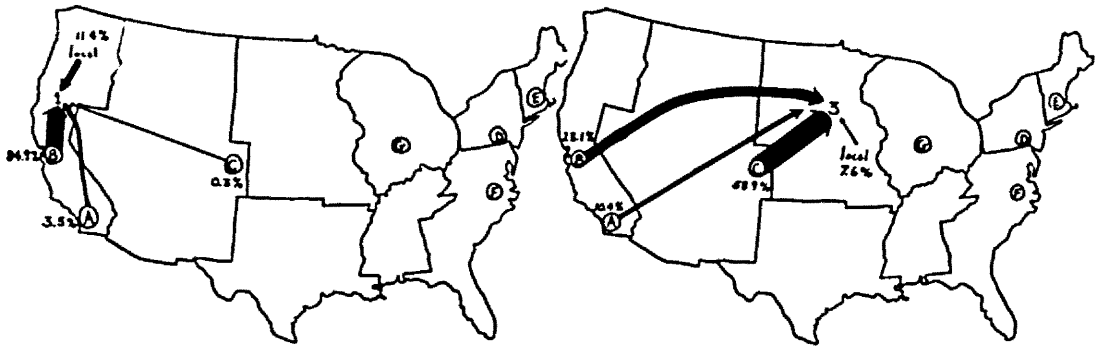


Figure 1. Percent wholesale carnation receipts by eight market areas from production areas based on volume for seven demand periods of the year.

The following letters have been used to represent production areas received from in Figure 1:

- A - Southern California
- B - Northern California
- C - Colorado
- D - Pennsylvania - New York - New Jersey
- E - Massachusetts
- F - North Carolina - Virginia
- G - Midwest





Percent of Carnations Received  
Seasonally by Market Areas  
from Production Areas

The market area receipts for seven periods of the year are shown in Table 26 as a percentage of total receipts. Two things are indicated by the table. First, the market areas maintain a rather constant percentage of receipts from a production area for the major holidays. This would indicate reasonably stable channels of buying. Second, if percentages received shift from one source to another, it occurs frequently in July to September. Northern California provides a higher percent of the July-September flowers. In most cases a slight increase also comes from Southern California during the summer period. Local production for most market areas is lower during the summer period.

Average Seasonal Wholesale Prices  
for Market Areas

The average wholesale price for each market area (based on wholesalers responding to the survey) for seven periods of the year is summarized in Table 27. Three conditions are evident from this table. First, wholesale prices are similar for Christmas, Valentine's, Easter and Mother's Day in any one market. Second, prices generally are lower in the Pacific, Mountain, and New England market areas than they are in other areas. Third, there are essentially two wholesale prices for the year--a higher price in winter and spring, and a lower summer price. This

Table 26. Percent of carnations received by market areas  
at seven periods from production areas.

Period	Production areas						
	So. Cal.	No. Cal.	Colo.	Penn.- N.Y.- N.J.	Mass.	N.Caro.- Va.	Local
Pacific Market Area:							
Christmas	4.3	87.9	1.0				6.8
Valentine's Day	2.8	87.3					9.9
Easter	4.6	83.8					11.6
Mother's Day	4.1	86.5					9.4
Memorial Day	3.6	83.0	1.0				12.4
June	2.0	81.4					16.6
July-September	3.0	84.2					12.8
West North Central Market Area:							
Christmas	10.6	22.1	58.7				8.6
Valentine's Day	7.6	19.0	62.1				11.3
Easter	12.9	20.5	56.8				9.8
Mother's Day	10.8	22.1	56.5				10.5
Memorial Day	10.3	21.8	58.6				9.2
June	9.5	26.9	60.1				3.5
July-September	11.1	29.2	59.5				0.2
East North Central Market Area:							
Christmas	13.3	49.8	15.2				21.7
Valentine's Day	14.6	46.6	13.3				25.5
Easter	13.8	45.8	15.4				25.0
Mother's Day	12.9	49.6	16.2				21.3
Memorial Day	10.4	45.8	10.0				33.8
June	7.9	48.3	10.0				33.8
July-September	8.8	53.7	9.2				28.3
Middle Atlantic Market Area:							
Christmas	17.6	12.8	10.5	32.5	9.6	6.4	10.4
Valentine's Day	15.3	12.0	11.8	32.8	9.3	6.4	12.3
Easter	15.4	12.0	12.5	32.3	8.9	6.4	12.5
Mother's Day	13.6	12.8	11.8	33.2	8.9	6.4	13.2
Memorial Day	11.4	12.5	6.8	35.4	9.6	6.4	17.8
June	17.5	14.6	6.8	32.1	8.6	6.4	13.9
July-September	18.2	23.9	5.4	25.7	7.5	5.4	13.9

Table 26. (Con't) Percent of carnations received by market areas at seven periods from production areas.

Period	Production areas						
	So. Cal.	No. Cal.	Colo.	Penn.- N.Y.- N.J.	Mass.	N.Caro.- Va.	Local
New England Market Area:							
Christmas					95.0		5.0
Valentine's Day	2.5				92.5		5.0
Easter	5.0				92.5		2.5
Mother's Day	5.0				92.5		2.5
Memorial Day	5.0				90.0		5.0
June	5.0	5.0			87.5		2.5
July-September	5.0	7.5			87.5		
South Atlantic Market Area:							
Christmas	11.3	29.4	30.2	14.0	5.3	4.4	5.3
Valentine's Day	10.9	29.0	25.8	16.3	4.6	6.7	6.7
Easter	12.1	29.2	27.8	14.9	4.3	6.3	5.3
Mother's Day	12.4	27.3	29.8	14.6	3.6	7.0	5.3
Memorial Day	12.5	33.2	21.4	17.8	2.8	7.0	5.3
June	11.8	36.0	29.6	10.3	1.6	6.3	4.4
July-September	14.6	48.2	28.2	3.0	1.1	2.6	2.2
East South Central Market Area:							
Christmas	5.7	45.4	30.2				18.7
Valentine's Day	4.6	41.7	31.5				22.1
Easter	6.9	42.8	28.7				21.5
Mother's Day	5.9	42.5	28.4		0.6		22.5
Memorial Day	6.4	46.8	26.4				20.4
June	10.0	55.4	25.3				9.3
July-September	12.4	62.7	24.5				0.3
West South Central Market Area:							
Christmas	16.8	33.5	49.3				0.4
Valentine's Day	17.3	36.8	45.5				0.4
Easter	18.1	36.7	44.8				0.4
Mother's Day	18.8	39.1	41.7				0.4
Memorial Day	18.5	42.1	39.4				
June	18.5	40.8	40.7				
July-September	19.6	42.9	37.5				

generally associates with shipping prices shown in Table 23. Some areas maintain a higher summer price than others. Market areas West North Central, East South Central and West South Central show a more uniform price for all periods. New England indicated the greatest price fluctuation from summer to winter.

Table 27. Average seasonal wholesale prices in cents/bloom for market areas.

Period	Market areas								
	Pacific	Mountain	W. North Central	E. North Central	Middle Atlantic	New England	South Atlantic	E. South Central	W. South Central
Christmas	13.0	14.5	18.0	18.0	18.2	16.0	18.9	18.2	17.3
Valentine's Day	11.8	14.5	17.6	17.7	18.1	15.0	19.3	17.6	17.0
Easter	11.8	14.5	17.3	17.8	18.0	15.0	18.0	18.0	16.9
Mother's Day	12.3	14.5	17.4	18.3	15.9	16.0	18.0	17.9	17.2
Memorial Day	10.2	10.0	13.7	13.2	11.3	9.0	14.5	13.6	15.5
June	9.1	10.0	13.1	12.1	10.0	6.0	12.9	13.5	14.5
July-September	8.6	9.0	13.2	10.8	8.8	6.0	12.5	13.6	14.0

## Chapter VI

### RESULTS--ADDITIONAL PROBLEMS OF THE CARNATION INDUSTRY

In addition to the choices of various problems for ranking in the questionnaire, several others were noted by growers. An open listing section was provided for shippers and wholesalers in their questionnaires. Many of these written-in problems are realistic, and it is interesting to note the recurrence of certain ones, especially from shippers and wholesalers.

#### Additional Problems Expressed by Growers

1. Erratic market
2. Airline connections
3. Expansion in other areas
4. Expansion by "poor" growers in own area
5. Lack of good market for "lower" quality flowers
6. Price of flowers too low
7. Smog-producing industry moving into area
8. Labor union activity
9. Distance from marketing center (of shipping points)
10. Management--need for greater application
11. Retail florist (not trying to move enough flowers)

12. Double commissions--one wholesaler selling to another
13. Cost of marketing
14. Difficulty in obtaining good bank loans
15. Price of flowers does not keep pace with the economy
16. City complains (unsightliness of greenhouse)
17. Neighbors dumping trash on property
18. Taxes in general
19. Cost of new construction

One grower mentioned that New Jersey had passed a law to assess land only at farm values, which lessened the tax burden for growers.

An interesting comment coming from a Massachusetts grower is quoted as follows: "We have taken all but 8,000 square feet out of carnation production. We have opened a wholesale and retail garden center business. Carnations are no longer as profitable as what we are now doing."

#### Additional Problems Expressed by Shippers

Number in parenthesis represents the times item was mentioned.

1. Transportation delays and lack of space (4)
2. Having quality carnations all year
3. Prices too low relative to costs (2)
4. Lack of production (quantity) at peak demand periods
5. Poor handling by carriers

6. Lack of uniform grade standards and enforcement
7. Too much emphasis on increasing production and not enough on marketing and advertising
8. Price differential too large between consumer and grower
9. Trying to make a fair return on investment plus salary

#### Additional Problems Expressed by Wholesalers

Number in parentheses represents the times item was mentioned.

1. Lack of uniform grading (21)
2. Shortage of color selection, especially holidays (19)
3. Storing flowers too long, especially holidays (16)
4. Transportation delays (10)
5. Damage from poor packing and handling (9)
6. Lack of keeping quality (7)
7. Lack of consistent pricing by shippers (7)
8. Poor crop timing (5)
9. Direct selling to retailers and lack of commitments with wholesalers (4)
10. Lack of communication and cooperation with airlines (4)
11. Local (midwest and east) quality off in summer (2)
12. Freight too high on western carnations (2)



13. Insufficient number of adequately trained, responsible, capable personnel (1)
14. Large shippers rob airplane space from smaller shippers (1)
15. Need more improved varieties (keeping) (1)

## Chapter VII

### RESULTS--CLIMATIC FACTORS OF PRODUCTION AREAS

Monthly records of percent possible sunshine and mean temperature were tabulated (from the U. S. Weather Bureau publication "Climatological Data for the United States by Sections") for a ten-year period, 1956 to 1965. The cities with available information to represent the carnation production areas are given in Table 28.

The ten-year average of monthly temperatures for production areas is given in Table 29. In order to estimate when cooling or heating would generally be required for any month, the mean temperatures were calculated for two hypothetical "ideal carnation days". A "cool day" of 24 hourly temperatures ranges from a low of 50°F. at night to a high of 75° in the afternoon with a 24-hour mean of 62.4°. A "warm day" ranges from a low of 54° to a high of 82° with a 24-hour mean of 67.9°.

Using the mean temperatures for the "ideal carnation days" a monthly mean temperature below 62.4° would be expected to require heating. If the monthly mean exceeds 67.9°, cooling would be needed. Therefore, Table 29 also indicates theoretical requirements for cooling or heating for each month in a given production area. Daily temperature

Table 28. Cities used for temperature and percent sunshine records to represent seven carnation production areas.

Production area	City	Elevation above sea level--feet	Degrees latitude	Degrees longitude
S. Calif.	San Diego, Calif.	19	32.44	117.10
N. Calif.	San Francisco, Calif.	8	37.37	122.23
Colo.	Denver, Colo.	5,292	39.46	104.53
Penn.-N.Y.-N.J.	Philadelphia, Pa.	13	39.53	75.14
Mass.	Boston, Mass.	15	42.22	71.02
N. Caro.-Va.	Greensboro, N. C.	891	36.05	79.57
Midwest	Indianapolis, Ind.	793	39.44	86.16

variations would demand cooling and heating within the same day (24 hours) in many situations. The total annual heating and cooling requirements explain part of the variation in production costs for the areas.

Table 30 shows the annual mean temperatures for the ten years, 1956 to 1965, and the ten-year mean temperature for each production area. The years are designated "warm" (above average) or "cool" (below average).

Table 31 gives the average monthly percent possible sunshine for the ten-year period, 1956 to 1965. The six "lightest" and six "darkest" months are indicated for each area. It is interesting to note that the "darkest" months in the western areas are not much darker than the "lightest" months in the eastern areas.

The average annual percent possible sunshine for the ten-year period, 1956 to 1965, is presented in Table 32. The years are designated as above average or below average for each area. A positive correlation of .78 was found between percent possible sunshine and mean carnation yield for the production areas (Figure 2). Colorado has the highest percent possible sunshine and the highest flower production per acre. Second with production and sunshine is Northern California, and third in both sunshine and production is Southern California. The eastern areas do not associate production and sunshine as well; but as a group, both their production and amount of sunshine are lower than in the west.

Table 29. Mean temperatures for seven U. S. Carnation production areas. Average per month over 10 years (1956-1965).

Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
S. Calif.	+ 56.98	+ 57.74	+ 58.72	+ 61.42	63.38	65.81	<u>69.92</u>	<u>71.87</u>	<u>70.73</u>	67.26	+ 61.39	+ 58.14
N. Calif.	+ 48.62	+ 52.14	+ 53.02	+ 55.93	+ 57.85	+ 61.72	62.74	63.87	64.18	+ 61.45	+ 54.66	+ 49.29
Colo.	+ 28.77	+ 31.80	+ 36.05	+ 47.17	+ 58.28	67.38	<u>72.95</u>	<u>71.63</u>	+ 62.10	+ 53.04	+ 39.27	+ 33.23
Penn.- N.Y.-N.J.	+ 30.36	+ 32.79	+ 40.20	+ 52.39	62.67	<u>71.22</u>	<u>75.11</u>	<u>73.37</u>	67.22	+ 55.78	+ 45.80	+ 34.07
Mass.	+ 28.49	+ 29.60	+ 37.04	+ 47.50	+ 58.69	<u>67.96</u>	<u>72.57</u>	<u>71.22</u>	64.20	+ 54.73	+ 45.31	+ 32.54
N. Caro.- Va.	+ 36.91	+ 40.14	+ 45.85	+ 57.74	67.54	<u>73.44</u>	<u>76.23</u>	<u>75.96</u>	<u>69.18</u>	+ 58.28	+ 49.40	+ 39.65
Midwest	+ 26.05	+ 29.78	+ 37.99	+ 52.00	62.96	<u>71.00</u>	<u>73.62</u>	<u>72.60</u>	66.57	+ 55.59	+ 42.27	+ 30.36

+ = months requiring heating

\_ = months requiring cooling

Table 30. Mean annual temperatures for seven U. S. carnation production areas for 10 years (1956-1965).

Area	'56	'57	'58	'59	'60	'61	'62	'63	'64	'65	10-year average
S. Calif.	<u>63.13</u>	<sup>+</sup> 64.20	<sup>+</sup> 65.48	<sup>+</sup> 65.74	63.61	<u>63.50</u>	<u>62.10</u>	<u>63.60</u>	<u>62.15</u>	<u>62.58</u>	63.61
N. Calif.	<u>56.09</u>	<sup>+</sup> 57.42	<sup>+</sup> 60.07	<sup>+</sup> 59.30	<u>57.00</u>	<u>57.12</u>	<u>55.84</u>	<u>56.39</u>	<u>56.40</u>	<u>55.55</u>	57.12
Colo.	<sup>+</sup> 51.65	<sup>+</sup> 50.24	<sup>+</sup> 51.34	<u>49.95</u>	<u>49.67</u>	<u>48.83</u>	<u>49.65</u>	<sup>+</sup> 50.73	<u>49.66</u>	<u>49.63</u>	50.13
Penn.- N.Y.-N.J.	<sup>+</sup> 54.18	<sup>+</sup> 55.15	<u>52.62</u>	<sup>+</sup> 55.54	<u>52.81</u>	<u>52.74</u>	<u>52.10</u>	<u>51.91</u>	<sup>+</sup> 54.08	<u>52.99</u>	53.41
Mass.	<sup>+</sup> 50.86	<sup>+</sup> 52.52	<u>49.99</u>	<sup>+</sup> 51.77	<sup>+</sup> 51.40	<sup>+</sup> 51.01	<u>49.83</u>	<sup>+</sup> 51.03	<u>50.15</u>	<u>49.60</u>	50.81
N. Caro.- Va.	<sup>+</sup> 58.31	<sup>+</sup> 58.76	<u>56.17</u>	<sup>+</sup> 58.46	<u>56.55</u>	<u>57.34</u>	<u>57.07</u>	<u>56.10</u>	<sup>+</sup> 57.83	<sup>+</sup> 58.60	57.52
Midwest	<sup>+</sup> 52.89	<sup>+</sup> 52.50	<u>50.13</u>	<sup>+</sup> 52.65	<u>50.44</u>	<u>51.17</u>	<u>51.54</u>	<u>50.05</u>	<sup>+</sup> 53.12	<sup>+</sup> 52.80	51.73

+ = warm years (above average)

\_ = cool years (below average)

Table 31. Percent possible sunshine for seven U. S. carnation production areas.  
10-year average by months (1956-1965).

Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
S. Calif.	71.3	70.2	69.5 ////	66.1 ////	58.9 ////	55.0 ////	71.2	69.3 ////	74.3	70.0 ////	71.6	74.2
N. Calif.	58.0 ////	64.8 ////	72.0	76.8	71.5	74.8	66.8 ////	69.3 ////	72.5	71.4	67.0 ////	61.7 ////
Colo.	75.4	68.4 ////	68.4 ////	64.2 ////	63.5 ////	71.5 ////	73.2	74.4	75.9	75.9	68.4 ////	73.1
Penn.- N.Y.-N.J.	55.7 ////	49.7 ////	55.4 ////	57.4 ////	61.4	65.6	60.5	62.2	62.5	63.9	54.4 ////	51.3 ////
Mass.	57.9 ////	61.3 ////	58.9 ////	57.8 ////	65.0	66.7	65.9	66.7	64.6	64.2	54.5 ////	56.5 ////
N. Caro.- Va.	59.7 ////	57.2 ////	60.6 ////	64.5	67.0	64.1	62.9 ////	68.2	65.2	67.7	61.0 ////	60.1 ////
Midwest	49.0 ////	50.6 ////	53.6 ////	58.8 ////	65.8	70.1	68.9	73.0	71.5	65.3	50.1 ////	45.1 ////

//// = darkest months

Table 32. Percent possible sunshine for seven U. S. carnation production areas--  
average annual (1956-1965).

Area	'56	'57	'58	'59	'60	'61	'62	'63	'64	'65	10-year average
S. Calif.	70.4	63.1 ////	72.4	69.1	70.6	68.5	63.6 ////	70.0	68.4	68.0 ////	68.46
N. Calif.	70.7	64.9 ////	66.8 ////	78.7	65.8 ////	71.6	65.1 ////	67.4 ////	72.7	64.7 ////	68.88
Colo.	73.0	64.5 ////	68.5 ////	68.4 ////	72.9	69.5 ////	72.3	75.5	74.3	71.0	71.02
Penn.- N.Y.-N.J.	54.0 ////	56.9 ////	59.2	58.7	60.3	61.1	56.4 ////	60.6	59.5	56.3 ////	58.33
Mass.	62.0	66.4	58.4 ////	60.2 ////	62.8	59.6 ////	61.4 ////	62.5	61.2 ////	61.9	61.66
N. Caro.- Va.	64.5	63.8	69.5	68.4	67.6	64.0	55.4 ////	61.6 ////	57.0 ////	58.8 ////	63.18
Midwest	58.0 ////	55.5 ////	60.5	60.3	63.5	55.9 ////	59.5 ////	65.5	62.2	60.3	60.15

//// = years below average



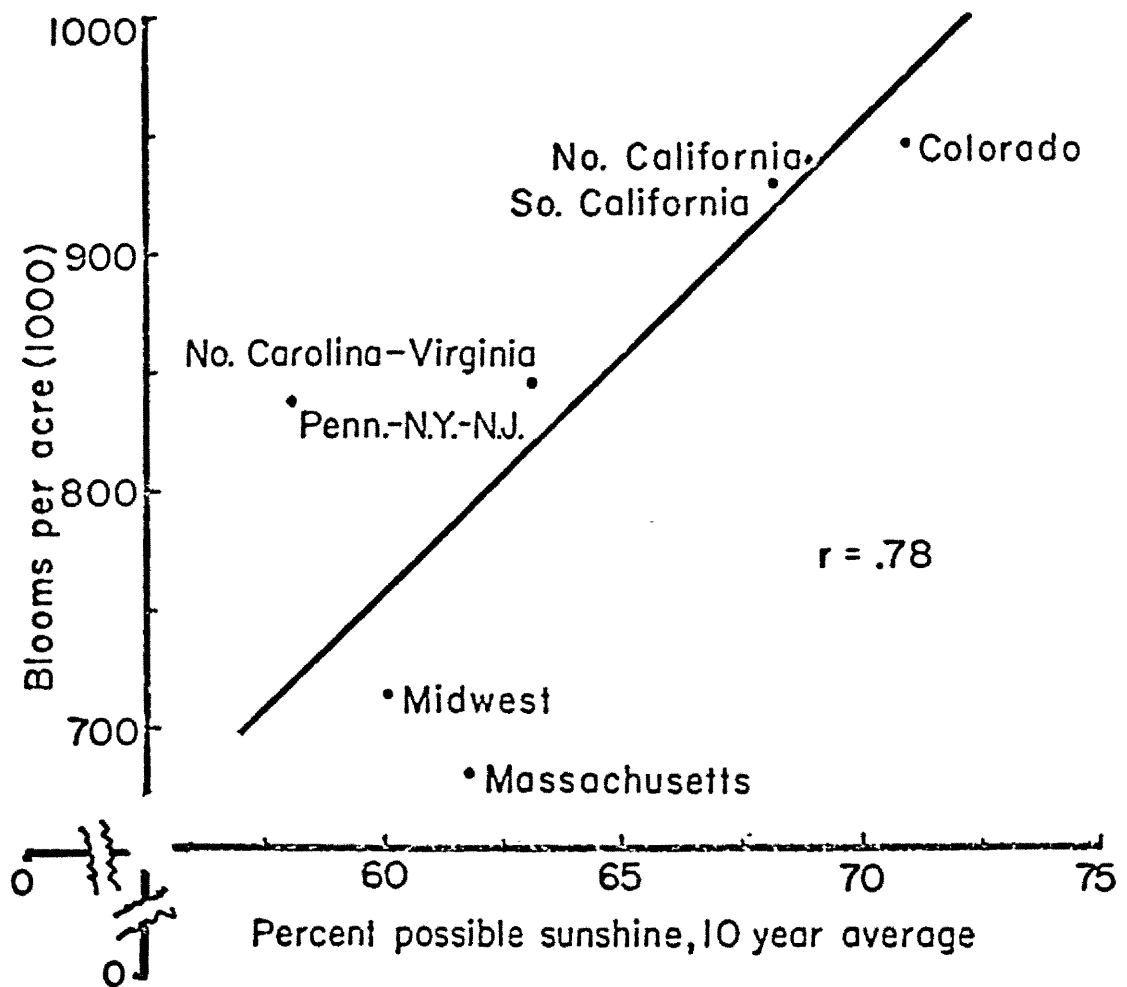


Figure 2. Relationship of average yields per acre and percent possible sunshine for seven carnation production areas.

## Chapter VIII

### DISCUSSION AND CONCLUSIONS

#### Response to Survey

A mail survey of the floriculture industry does not produce exceptionally gratifying results. However, the response to this survey was as good or better than others that have been attempted. Apparently, members of the industry are generally reluctant to divulge competitive or private information, even with the strict assurance of confidential treatment.

Most of the participants that completed and returned questionnaires provided what appeared to be accurate and reliable information. It was apparent that some growers kept excellent cost accounts, while others had only a relative idea of their business transactions.

The author is of the opinion that many growers, wholesalers, and shippers did not respond because (1) they simply do not have accurate records, (2) it was too much trouble to fill out a lengthy questionnaire, or (3) just plain lack of interest or confidence that this type of survey could produce useful information for their industry. The author relied upon his working knowledge of the carnation industry to judge which questionnaires were most

worthy for summary calculations, and he is confident that the summarized results show reasonably accurate relationships of factors for the U. S. carnation industry at the present time.

#### Factors Affecting Production Changes

National carnation production has increased and continues to increase rapidly. Accounting for the consumption of the larger supply of carnations leads to some surmise. Since carnations have moved up to second place among all florist crops, it appears that they might be taking some sales away from other types of flowers. Increased population is definitely a factor. However, the flower industry is not making notable advances in increasing per capita sales of fresh flowers.

Western areas, such as California and Colorado are responsible for most of the increase in carnation production. The U. S. D. A. cut flower survey shows that from 1956 to 1965 the value of California carnations increased 150 percent and Colorado 57 percent. For growers participating in the report concerned here, 11 Southern California growers increased their acreage 81 percent from 1955 to 1965, 13 Northern California growers increased acreage by 268 percent, and Colorado growers increased acreage by 51 percent. These increases follow the pattern of the U. S. D. A. cut flower surveys.

California has the greatest production advantages of any U. S. areas. The mild climate of coastal locations in

the vicinity of San Francisco, Santa Barbara, Los Angeles, and San Diego are ideal for "natural" carnation culture. Growers in Southern California reported investments averaging only \$49,000 per acre for a plastic film type greenhouse, benches, heating system, and other equipment. Northern California growers reported investments per acre which amount to about \$121,000. These investments are one-fourth to one-half of those in all other carnation production areas, which exceed \$220,000 per acre.

In relation to climate, light quantity determines the productivity of flowers to a large extent. Figure 2 in the results shows a significant correlation of percent possible sunshine and yield of carnations in the various areas. Colorado, reported the highest yield per acre and receives the highest percent of sunshine, followed closely by California. Productivity per unit is a key factor in decreasing costs per unit and increasing income.

The average California carnation producing unit is larger, newer, and frequently specialized in carnations only. For those reasons, California producers can readily take advantage of changes in technology, particularly labor saving devices. New growers in expanding areas can construct their greenhouses according to latest designs and plan for installation of automatic watering systems, fertilizer injection, and more efficient heating and cooling. Southern California carnation growers have a further advantage of mobility. The simple wooden frame, plastic

film covered greenhouse structures prevalent in that area can be used for a few years and relocated or rebuilt on new property. Relocation enables growers to make new land investments and update their facilities.

Colorado carnation producers also have a climatic advantage over eastern areas. As mentioned, a high percent of possible sunshine is a key factor to increased productivity per unit and flower quality throughout the year. This is particularly true in winter when decreased production and quality occur in eastern areas. However, Colorado producers must construct more substantial and costly greenhouses, similar to eastern requirements. The investments for equipment and other buildings are also higher than in California and similar to the east. Colorado growers have probably benefited more than any other group by organizing into associations to coordinate both growing and marketing functions and to support local research. As in California, the majority of Colorado enterprises are newer and often specialized in carnations, thus designed for the latest technology and efficiency of production.

Rapid transportation, especially air and refrigerated trucks, is undoubtedly the key factor to expansion of carnations in Colorado and California. As indicated by percentages of total receipts purchased by wholesalers from producers, California and Colorado carnations are shipped to all major markets of the United States. Based on wholesalers reporting in this survey, western carnations are the

main source of supply for all market areas except the Northeast. Furthermore, population growth in the west could also improve the local markets for Colorado and California carnations.

According to the U. S. cut flower surveys, and also shown in the results of this report, California carnation growers consistently obtain a lower average price per bloom. This lower average price can be largely attributed to higher transportation costs due to greater distance to markets. Also, as indicated by wholesaler receipts from production areas (Table 26), California tends to be the main source of imported carnations in the summer season when market prices are at their lowest.

Eastern carnation areas are, for the most part, stabilizing or decreasing production because of competition from western areas with climatic and cost advantages. Nevertheless, highly efficient eastern growers may continue to compete where they have a well-developed local market, or are growing some carnations as an accommodation item to satisfy a market demand for several cut flower and pot plant items. Many growers may have overcome their capital investments years ago and have a closer contact with their markets. Disadvantages of many eastern growers are that technological advances have made their facilities obsolete, and climatic limitations restrict competition for quality and quantity during certain seasons of the year. Many eastern growers apparently have decided to convert to more profitable crops;

pot plants and bedding plants are good examples. Garden centers are becoming popular throughout the country, and where location is ideal are natural extensions of a wholesale flower growing operation.

### Economic Analysis of Carnation Enterprises

An economic analysis of any single carnation production area presents numerous difficulties. Factors influencing the comparison of financial situations for several carnation enterprises are the many characteristics of individual firms. The most notable variations are size and relative efficiency, location, age of facilities, age and desires of the operator, and surrounding economic forces. There is always some element of doubt on the ability or sincerity of growers to contribute accurate data for a survey analysis. Even if absolutely reliable data can be obtained, the researcher must cope with wide variations in land values, age and relative values of capital investment, and depreciation rates. A realistic return to land, capital, and management expressed as a percent of total investment in land and improvements, is somewhat difficult to establish for a single enterprise and even more difficult to obtain as an average for several enterprises. However, where economic differences were hypothesized between carnation production areas of the United States, this analysis of financial situations for average enterprises in each area supports the hypothesis.

Tables 19 and 20 illustrate the relative financial differences per average enterprise and per acre or per bloom between production areas and between sizes of enterprises. The high internal rates of return of 37.9 percent for Southern California and 20 percent for Northern California carnation enterprises substantiates the rapid expansion of these areas.

The format of the summary tables is organized so that the reader can make his own decisions as to what portions of the internal rate of return can be regarded as a payment for management or family living. For example, by subtracting the "expected" return of 6 percent on total investment of \$1,767 per acre for Southern California (Table 19) from the return to land, capital and management after depreciation (\$11,148) the resulting \$9,381 represents a return to management. Adding this to the family living allowance of \$828 per acre, the total of \$10,209 may be regarded as the "net income" per acre to the operator for family living and management. Similarly, the "net income" per acre per operator would be \$11,393 for Northern California; \$17,127 for Colorado; \$11,366 for Pennsylvania - New York - New Jersey; and \$16,951 for North Carolina - Virginia.

The analysis of Massachusetts and Midwest enterprises indicate a different financial situation. Massachusetts, even if depreciation is considered not applicable as a cost, still shows no contribution for family living or



management, with a 6 percent return on investment. This would indicate that growers are "living off their depreciation" or actually incurring a loss from carnation growing. However, the author suspects that the data provided by the growers from Massachusetts are partially in error. The production of blooms per acre is not as high as it should be, if correlated with percent possible sunshine (Figure 2). A higher yield of blooms per acre would increase the total revenue. Also, the average cash costs per acre seem higher than they should be.

The Midwest enterprise analysis indicates that no contribution is made for management with a 6 percent return on investment. If depreciation is not considered, then a contribution for management of \$8,113 exists for a total "net income" per enterprise acre of \$14,267 including family living.

For the purpose of analyzing average enterprises, several decisions had to be made to obtain total investments for land and structures and the rate of depreciation to use. Land values are extremely variable, depending on location. Land values reported by growers in the survey ranged from \$200 to over \$100,000 per acre. Average land values used in the summary tables were \$10,000 per acre for California production areas and \$5,000 per acre for all other areas. Investments for greenhouses were based on what the majority of growers in the survey considered it would cost for new construction. Therefore, a figure of 50 cents per square

foot of ground covered was used for Southern California, \$2 for Northern California, and \$4 for the other areas. A standard value of \$7,500 per acre or \$1 per linear foot for a 42-inch-wide bench was used for all areas. The remaining capital investments include equipment and other buildings which were reported by growers.

Depreciation is one of the most difficult problems to handle in a cost analysis. The rates used in the analysis are realistic for very recent enterprises but not for older operations. Many eastern and midwest growers possibly do not have depreciation any longer unless it is considered as a reserve for replacement of facilities.

The value of the total investment of land, and all improvements used in the summary is reasonably realistic. The new value of all improvements (greenhouses, benches, equipment, and other buildings) was reduced by half to represent an average condition of new and old enterprises. Of course, the value of land remains at its full assumed value.

Land value appreciation, particularly in encroaching urban areas, may possibly offset the depreciation of improvements. This may be a factor to explain why growers in some locations can continue to operate despite the fact that their return on investments seems low. The value of land in California, and possibly other areas too, could well be much higher, and a carnation enterprise would still show a good return on investment.

The size of a carnation enterprise appears to be related to financial success. The analysis in Table 20 illustrates that small (one-half acre) and medium (one acre) enterprises, as a cross-section of all U. S. production areas, return between 7 and 8 percent of the investment to land, capital, and management. If a 6 percent return to land and improvements was acceptable, then the small enterprises would make a contribution to management and family living of about \$4,605 and the medium enterprises \$5,571. The large enterprises (2.4 acres) return about 33 percent of the investment to land, capital, and management. This allows for a much larger contribution of \$30,381 for management for large enterprises plus the \$4,000 allowed for family living.

### Financing

Although the majority of growers reporting in this survey indicated bank financing is used for major capital items, the author's knowledge of the industry leads to the conclusion that bank financing for carnation growers needs improvement.

Bankers frequently state their cases against investment in carnations as follows:

1. Greenhouses have single-purpose use.
2. Management or business organization of many greenhouse operations is not set up for continuation.

3. Instability is due to annual fluctuation of flower prices.

The bankers' ideas contain some worthwhile instruction for the carnation industry. Greenhouses are single purpose in a sense of being designed only to grow plants. However, a greenhouse business properly organized and managed and in the right location can usually return a profit on the investment comparable to or better than many other normal business ventures. A greenhouse business can frequently overcome the capital investments in 5 or 10 years, a shorter period of time than some types of businesses. Well managed, a greenhouse operation has many alternatives for various crops.

The bankers' strongest reason against financing may be that of improper management or business organization for continuation of the business. Growers might consider this point and seek legal advice for corporate arrangements to strengthen this position.

Instability due to annual fluctuation of flower prices is only partially true. The nature of holiday demands is not understood by many outside the flower industry. Prices are very stable from year to year. Prices of carnations are showing greater stability as western production areas increasingly influence the market with more consistent seasonal production, quality, and a tendency toward slightly lower but firm pricing.

The carnation industry and other phases of the total flower industry must organize, publicize, and thereby strengthen the relationships with bankers and other lending sources on the potential of flower production.

### Marketing Problems

Several problems needing solution for marketing carnations were clearly indicated in this survey and have also been mentioned by other writers. Uniform grading, on a national basis, was most frequently mentioned by wholesalers as a possible way to improve marketing of carnations. Crop timing and color assortment must also be improved by growers so that the market demand can be met more consistently with a supply of fresh flowers. Cut flower storage is partially effective to regulate supply but cannot be abused. Packing and handling carnations by all phases of the industry from growers to consumers was also indicated as needing further improvement. Transportation delays continue to be a problem, but they will lessen as technology improves. Increased communication and cooperation with transportation firms should be undertaken by the carnation industry.

### Management

Cultural problems are no longer of primary concern in carnation production. The author could cite several examples of recently successful growers who had little or no background in cultural techniques but have exceptional

managerial ability. Management is becoming more important in today's economy.

Management decisions frequently require records. Carnation growers could improve their management by striving to keep better records of investments, costs, returns, flower yields, and cultural information.

Management requires constant reappraisal, projection of future trends, and evaluation of alternatives. Time is a factor related to selection of alternatives. Growers must constantly determine their costs and profits. Alternatives are numerous; sell out and reinvest capital in more lucrative enterprise, sell out and retire, change to a more profitable crop, relocate in the same general area, modernize the present facilities, relocate in a more progressive area or climate, transform the business to some other form such as a garden center, or hire a good manager, etc.

### The Future

Forecasting the future is sometimes dangerous, but challenging! It is reasonably safe to say that if the carnation industry in the United States continues to expand and thrive, it will be because many of the problems outlined in this report are solved. Strong industry leadership and organizational influences to promote marketing research and the development of detailed economic information will increase the potential.

All indications concerning technology in transportation lead to the conclusion that movement of goods will

become cheaper and worldwide. The U. S. carnation industry must consider the possibility of competition not only within the national boundaries but from the many other "natural carnation producing areas" of the world.

The time may come when worldwide production can be systematically regulated so that unlimited supplies of carnations and other flowers can be imported at extremely competitive costs and distributed through mass merchandising outlets. Are U. S. growers going to be a part of this economic system or sit by and watch it happen?

If one thinks in space technology terms, carnation production could conceivably reverse direction and be accomplished right at the market center. Greenhouses of today's concept may disappear and carnations might be produced in multi-story "factories," under artificial light or reflected natural light in a completely controlled environment. Or, carnation cut flowers could be harvested "tight" in distant areas, bulk-loaded into enormous "opening and conditioning" chambers and sent to market agents for packaging and distribution.

Only a progressive industry can survive in the economy of today. The members must think big and train and utilize the best managerial talent possible.

Regardless of any deficiencies this survey and report may contain, it is hoped that its attempt will stimulate the carnation industry and allied floricultural organizations to invest in time, money, and personnel to

undertake more thorough economic analyses of the flower industry.



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## LITERATURE CITED

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## APPENDIX

Table A. Response to questionnaires for producers, wholesalers and shippers.

	Number mailed	Percent returned	Percent useful for summary
Producers	381	25.7	17.6
Wholesalers	376	30.8	24.7
Shippers	<u>73</u>	21.9	17.8
Total	830		

Table B. Response to questionnaires for producers and shippers by production areas.

Area	Producers			Shippers		
	Number mailed	Number useful	Percent useful	Number mailed	Number useful	Percent useful
S. Calif.	31	11	35.5	16	4	25.0
N. Calif.	97	13	13.4	22	3	13.6
Colo.	96	21	21.9	6	0	0.0
Penn.-N.Y.-N.J.	60	11	18.3	11	2	18.2
Mass.	28	4	14.3	12	2	16.7
N. Caro.-Va.	6	2	33.3	6	2	33.0
Midwest	63	5	7.9	--	--	----
Total	<u>381</u>	<u>67</u>		<u>73</u>	<u>13</u>	



Table C. Response to questionnaires for wholesalers by marketing areas.

Area	Number mailed	Number useful	Percent useful
Pacific	34	10	29.4
Mountain	18	0	0.0
N. West Central	34	13	38.2
N. East Central	72	12	16.7
Middle Atlantic	62	14	22.6
New England	28	2	7.1
South Atlantic	53	18	34.0
S. East Central	34	11	32.4
S. West Central	41	13	31.7
Total	376	93	

## C O L O R A D O   S T A T E   U N I V E R S I T Y

Fort Collins, Colorado 80521

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Department of Horticulture

Enclosed is a questionnaire which is being sent to carnation handlers in the major production areas in the United States. The objective is to obtain information on the economic factors that influence the carnation industry nationwide. This analysis is being undertaken as part of a Master's Degree program by me, Seward T. Besemer, graduate student at Colorado State University.

I think you will agree that a better understanding of the economic factors of the carnation industry will enable growers, shippers, and wholesalers to make sound, future decisions. I hope you will take this analysis as seriously as I am.

Further elaboration of the objectives and methods of developing the data will follow in the introduction of the questionnaire.

You are not required to sign your name or in any way identify your questionnaires. I have no way of knowing who returns the questionnaires. The identity of your figures will be lost in totals and averages in the final report.

Please fill out your questionnaire and return by February 1, 1966 so I can achieve a representative sampling of the industry. A return addressed envelope with postage is enclosed for your convenience.

Thank you very much for your assistance.

Sincerely,

Seward T. Besemer

fs

Enclosures

AREA \_\_\_\_\_

## PRODUCER'S QUESTIONNAIRE:

## ANALYSES OF THE CARNATION CUT FLOWER INDUSTRY

## INTRODUCTION:

The objective of this questionnaire is to determine economic factors that affect the activity of the greenhouse carnation cut flower industry in the United States. Factors to be evaluated include production costs, investment costs, yield of flowers, and the seasonal flow pattern of carnation flowers from five major producing areas to ten marketing areas in the nation.

A complete report of results of this study will be available to all participants in the fall of 1966. The quality of this report will depend on the cooperation of members of the flower industry to conscientiously provide the information requested and return all questionnaires.

This analysis is being completed as part of a Master's Degree program by Seward T. Besemer, graduate student, at Colorado State University.

## THE QUESTIONNAIRE:

1. Three types of questionnaires will be used: (1) for producers, (2) for shippers, and (3) for wholesale houses. You will receive only one questionnaire.
2. The questionnaires have been designed as simply as possible for your convenience and also to obtain the necessary information to make the study useful to the industry.
3. The information requested in the questionnaires must be filled in completely and as accurately as is humanly possible.
4. The nearer to 100 percent return of the questionnaires, the more representative the study will be.
5. February 1, 1966 is the deadline for return of all questionnaires.
6. The questionnaires will be kept absolutely confidential. No code is being used to identify persons or firms returning questionnaires. The "AREA" designation in the top, left-hand corner of the first page refers only to

a broad geographical section of the United States.

7. Please answer all questions in the questionnaire. If you do not have definite answers in some cases, estimate to the best of your ability.

A. SIZE OF OPERATION (Greenhouse area in production)

1. Present size, 1965.

Fill in blank for acres or number of square feet of ground area, whichever is easier.

Ground area covered by greenhouses; 1965

\_\_\_\_\_ acres or \_\_\_\_\_ No. sq. ft.

2. Past size

<u>Year</u>	<u>Acres</u>	OR	<u>No. sq. ft.</u>
1960	_____		_____
1955	_____		_____
1950	_____		_____
1945	_____		_____

3. Present number of plants in production in your range.

\_\_\_\_\_ plants.

## B. TYPE OF GREENHOUSE AT PRESENT

(If your range consists of more than one type of greenhouse, write areas of each in blank spaces.)

- |  | <u>Check one (X)</u> |
|--|----------------------|
| 1. Sawtooth, polyethylene plastic                    | _____                |
| 2. Ridge and furrow, polyethylene plastic            | _____                |
| 3. Sawtooth, rigid plastic (PVC,<br>fiberglass etc.) | _____                |
| 4. Ridge and furrow, rigid plastic                   | _____                |
| 5. Sawtooth, glass                                   | _____                |
| 6. Ridge and furrow, glass                           | _____                |
| 7. Other materials or design (explain)               | _____                |

## C. PRODUCTION COSTS (ANNUAL)\*

\*NOTE: All costs for one year. List costs based on your total operation.

<u>ITEM</u>	<u>DOLLARS PER YEAR</u>
1. Labor, per year	
a. Total hired labor	\$ _____
b. Value of your personal labor	\$ _____
c. Value of other family labor	\$ _____
2. Fuel (for heating), per year	\$ _____
3. Utilities (other than fuel), per year	\$ _____
4. Plants (cuttings), per year	\$ _____
5. Taxes (on greenhouse operation), per year	\$ _____
6. Supplies (other than plants or water), per year. (fertilizers, fungicides, insecticides, string, wire, repairs, etc.)	\$ _____
7. Depreciation, per year	\$ _____
8. Interest, per year	\$ _____
9. Insurance, per year	\$ _____
10. Water, per year	\$ _____
11. All other, per year	\$ _____

## D. CAPITAL INVESTMENT COSTS

1. Original investments (when you first built) YEAR \_\_\_\_\_

a. Land cost per acre \_\_\_\_\_

b. Greenhouse construction costs (use either by per acre or per sq. ft. ground covered)

	<u>Per Acre</u>	<u>Per Square Foot</u>
1. Labor	\$ _____	\$ _____
2. Materials	\$ _____	\$ _____

2. If you had to rebuild now in same area closeby:

a. What land price would you expect to pay now, per acre? \_\_\_\_\_

b. What greenhouse construction costs would you now expect to pay?

	<u>Per Acre</u>	<u>Per Square Foot</u>
1. Labor	\$ _____	\$ _____
2. Materials	\$ _____	\$ _____

3. Other capital equipment you own (fill in all blanks across)

<u>How Many</u>	<u>Equipment</u>	<u>Model, size, or make</u>	<u>New Cost</u>
_____	Fertilizer injectors	_____	\$ _____
_____	Tractor, 4-wheel	_____	\$ _____
_____	Tractor, tiller type	_____	\$ _____
_____	Boiler, (steam or hot water)	_____	\$ _____
_____	Heat distribution system (pipes, valves, thermostats)	_____	\$ _____
_____	Unit heaters	_____	\$ _____
_____	Water system	_____	\$ _____
_____	Grading shed	_____	\$ _____
_____	Other buildings	_____	\$ _____

## E. FLOWER PRODUCTION RATE

Using sales receipts, plus estimate of flowers not sold, what is your estimate of the following?

1. Total flowers produced per year (your operation) \_\_\_\_\_
2. Number of flowers per sq. ft. of bench area per year \_\_\_\_\_
3. Number of flowers per plant per year \_\_\_\_\_
4. What is your normal plant spacing? \_\_\_\_\_ inches by \_\_\_\_\_ in. (Describe if necessary)

## F. REVENUE

1. Based on your operation, what is your annual gross return (total sales) before costs? \$ \_\_\_\_\_
2. What is your estimate of average price received per flower sold on an annual basis? \_\_\_\_\_¢
3. What is your estimate of the percentage of flowers sold of what you produced? \_\_\_\_\_%

## G. MARKETING METHOD

How are most of your flowers sold?

Check One (X)

1. Ship your own flowers \_\_\_\_\_
2. A shipper sells your flowers \_\_\_\_\_
3. Take to local city flower market \_\_\_\_\_
4. Cooperative organization or association \_\_\_\_\_
5. Other (explain) \_\_\_\_\_



H. MARKETING COSTS

1. If you pay a commission for having your flowers sold, what percent of the flower price is that commission? \_\_\_\_\_%
2. If you sell your own flowers or through a cooperative group, what approximate percent of the flower price is that cost? \_\_\_\_\_%
3. What is your estimate of the cost to grade, bunch, and tie operation?
  - Per flower \_\_\_\_\_¢
  - Per bunch (of 25) \_\_\_\_\_¢

I. FINANCING

What sources of capital do you depend on for buying resources listed below? (Put one or more of the numbers for types of financing in blanks for resources)

Types of Financing

1. Bank loans
2. Suppliers carry cost, until paid
3. Cash
4. Personal loans (partners, friends, other growers, etc.)
5. Share crop or other deal for splitting profits

<u>Resources</u>	<u>Put one or more of above nos. in blank.</u>
1. Buying land	_____
2. Buying big equipment (boilers, tractors, trucks)	_____
3. Buying small equipment (injectors, tillers, etc.)	_____
4. Buying lumber	_____
5. Buying plastic or glass	_____
6. Building new greenhouses	_____
7. Building grading shed, refrigerators, etc.	_____
8. Buying supplies (fertilizer, wire, etc.)	_____
9. Buying cuttings	_____
10. Paying labor	_____

## J. PRODUCTION PROBLEMS (affecting plant growth)

Write ONE number only in the blanks as follows:

0 - no problem; 1 - problem sometimes;  
2 - serious problem.

1. Diseases \_\_\_\_\_
2. Insects \_\_\_\_\_
3. Water quality (salts) \_\_\_\_\_
4. Nematodes \_\_\_\_\_
5. Rodents, birds, etc. \_\_\_\_\_
6. Smog, or other air contaminant \_\_\_\_\_
7. Soil drainage \_\_\_\_\_
8. Greenhouse temperature too high \_\_\_\_\_
9. Greenhouse temperature too low \_\_\_\_\_
10. Condensation in greenhouse \_\_\_\_\_
11. Lack of light (part of year) \_\_\_\_\_

## K. OUTSIDE PROBLEMS AFFECTING YOUR BUSINESS

There are usually several community or government type problems that make it difficult to do business with a greenhouse operation.

Consider the problems below that may affect your costs and profits, or even your attitude.

Write ONE number in the blanks as follows:

0 - no problem; 1 - problem sometimes;  
2 - serious problem

1. Rising property taxes \_\_\_\_\_
2. Building permit restrictions  
(greenhouse) \_\_\_\_\_
3. Neighbors complain about smells, noise,  
dust, unsightliness of greenhouse, etc. \_\_\_\_\_
4. Vandalism (theft and destruction) \_\_\_\_\_
5. No room left to expand operation \_\_\_\_\_
6. Rising supply costs (lumber plastic,  
wire, etc.) \_\_\_\_\_
7. Labor
  - a. Supply of help \_\_\_\_\_
  - b. Quality of help \_\_\_\_\_
  - c. Rising labor costs (wage rate,  
insurance, etc.) \_\_\_\_\_
8. Others (you list)
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
  - e. \_\_\_\_\_

## L. SOCIAL AND PSYCHOLOGICAL ATTITUDES (Answer yes or no)

1. Do you enjoy the flower business? \_\_\_\_\_
2. If you had to relocate your greenhouse business, would you be willing? \_\_\_\_\_
3. Do you think carnation production can expand in your area profitably? \_\_\_\_\_
4. Do you think carnations can be expanded nationally? \_\_\_\_\_
5. Do you feel your area is being hurt by competition from other carnation production areas? \_\_\_\_\_  
If yes, what areas are hurting yours? \_\_\_\_\_
6. Which two factors below do you think would improve your own business most?

CHECK ONLY TWO OF THESE (X)

- a. Good advertising program \_\_\_\_\_
- b. Higher volume of sales at current flower prices \_\_\_\_\_
- c. Higher flower prices \_\_\_\_\_
- d. Selling through grower's association (if not already) \_\_\_\_\_
- e. Cheaper and better transportation connections \_\_\_\_\_
- f. Increased flower production per acre plus decreased production costs \_\_\_\_\_

AREA \_\_\_\_\_

### SHIPPER'S QUESTIONNAIRE:

#### ANALYSES OF THE CARNATION CUT FLOWER INDUSTRY

#### INTRODUCTION:

The objective of this questionnaire is to determine economic factors that affect the activity of the greenhouse carnation cut flower industry in the United States. Factors to be evaluated include production costs, investment costs, yield of flowers, and the seasonal flow pattern of carnation flowers from five major producing areas to ten marketing areas in the nation.

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#### THE QUESTIONNAIRE:

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6. The questionnaires will be kept absolutely confidential. No code is being used to identify persons or firms returning questionnaires. The "Area" designation in the top, left-hand corner of the first page refers only to

a broad geographical section of the United States.

7. Please answer all questions in the questionnaire. If you do not have definite answers in some cases, estimate to the best of your ability.

PLEASE READ INSTRUCTIONS BELOW CAREFULLY.

I. PERCENT FLOWERS SHIPPED

In order to determine in this study the "flow" of cut carnations from producing areas to market areas, a system of geographical sections has been devised for the United States.

The letter after "AREA" in the upper, left corner of the first page indicates the section from which you are shipping carnations. This does not identify your firm. All information, when compiled, will lose complete firm or personal identity as there will be several questionnaires from each "AREA".

Now, you, as a shipper, need to estimate the percentage (%) of carnations (not boxes or flowers, but percent) you ship to each of the ten (10) marketing areas listed for each seasonal period listed. Also, there is a section to indicate the usual type of transportation used for shipping to these areas.

Following is a list of the ten marketing areas. More than likely, you do not ship carnations to all areas; so, some answers may be 0 percent.

## MARKETING AREAS OF THE UNITED STATES

## AREA

1. PACIFIC  
Washington, Oregon, California, Hawaii, Alaska
2. MOUNTAIN  
Montana, Idaho, Wyoming, Nevada, Utah, Colorado,  
Arizona, New Mexico
3. WEST NORTH CENTRAL  
North Dakota, South Dakota, Minnesota, Nebraska, Iowa,  
Kansas, Missouri
4. EAST NORTH CENTRAL  
Wisconsin, Michigan, Illinois, Indiana, Ohio
5. MIDDLE ATLANTIC  
New York, Pennsylvania, New Jersey
6. NEW ENGLAND  
Maine, Vermont, New Hampshire, Massachusetts, Conn-  
ecticut, Rhode Island
7. SOUTH ATLANTIC  
Maryland, Delaware, District of Columbia, West Virginia,  
Virginia, North Carolina, South Carolina, Georgia,  
Florida
8. EAST SOUTH CENTRAL  
Kentucky, Tennessee, Alabama, Mississippi
9. WEST SOUTH CENTRAL  
Oklahoma, Arkansas, Louisiana, Texas
10. FOREIGN COUNTRIES  
Canada, Mexico, Europe, etc.

Below are listed the major flower-use seasons of the year. Under each "season" are listed the ten market areas by number (see page 3). Place in each blank to the right of each area number the percentage (%) of carnation flowers you ship to that area for the particular season. The left top corner is an example. The total in each season must add up to 100 percent!

(Example)		CHRISTMAS		VALENTINE DAY		EASTER	
AREA	%	AREA	%	AREA	%	AREA	%
1	5	1		1		1	
2	2	2		2		2	
3	10	3		3		3	
4	2	4		4		4	
5	0	5		5		5	
6	0	6		6		6	
7	1	7		7		7	
8	12	8		8		8	
9	68	9		9		9	
10	0	10		10		10	
TOTAL		100					

MOTHER'S DAY		MEMORIAL DAY		JUNE		JULY-SEPTEMBER	
AREA	%	AREA	%	AREA	%	AREA	%
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
10		10		10		10	
TOTAL							



II. TRANSPORTATION METHOD

Check below the main method of transportation used for the flowers you ship to the various marketing areas.

Place transportation method number after area blanks below.

TRANSPORTATION METHODS

1. Air
2. Truck
3. Rail
4. Air-truck combinations
5. Bus

<u>Market Area</u>	<u>Transportation Method (by number above)</u>
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____
9	_____
10	_____

III. TOTAL UNITS SHIPPED

What are your firm's total shipments of carnations (to all areas) in standard carnation boxes by months? If no exact records are available, estimate to your best ability.

<u>Month</u>	<u>Number of Boxes</u>
January	_____
February	_____
March	_____
April	_____
May	_____
June	_____
July	_____
August	_____
September	_____
October	_____
November	_____
December	_____
TOTAL FOR YEAR	_____

What is the "average" number of carnation flowers per standard box? \_\_\_\_\_

#### IV. AVERAGE SEASONAL SHIPPING PRICES

What is the "average" price at which you sell topgrade carnations to your customers (wholesale houses) during the seasons listed below?

Base your answers on "normal" years, or long-time averages.

<u>Season</u>	<u>Price per Carnation Flower</u>
Christmas	_____¢
Valentine Day	_____¢
Easter	_____¢
Mother's Day	_____¢
Memorial Day	_____¢
June	_____¢
July-September	_____¢

(a) If you ship to both retailers and wholesalers, about what percent of your total shipments is to  
retailers? \_\_\_\_\_%

wholesalers? \_\_\_\_\_%

(b) Do you normally charge a higher price to retailers?

(yes or no) \_\_\_\_\_

#### V. PROBLEMS OF SHIPPERS

List any problems you feel are vital in relation to carnation cut flower demand, quality, transportation problems, costs, etc., in general related to shipping to marketing areas.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

AREA \_\_\_\_\_

## WHOLESALE'S QUESTIONNAIRE:

### ANALYSES OF THE CARNATION CUT FLOWER INDUSTRY

#### INTRODUCTION:

The objective of this questionnaire is to determine economic factors that affect the activity of the greenhouse carnation cut flower industry in the United States. Factors to be evaluated include production costs, investment costs, yield of flowers, and the seasonal flow pattern of carnation flowers from five major producing areas to ten marketing areas in the nation.

A complete report of results of this study will be available to all participants in the fall of 1966. The quality of this report will depend on the cooperation of members of the flower industry to conscientiously provide the information requested and return all questionnaires.

This analysis is being completed as part of a Master's Degree program by Seward T. Besemer, graduate student, at Colorado State University.

#### THE QUESTIONNAIRE:

1. Three types of questionnaires will be used: (1) for producers, (2) for shippers, and (3) for wholesale houses. You will receive only one questionnaire.
2. The questionnaires have been designed as simply as possible for your convenience and also to obtain the necessary information to make the study useful to the industry.
3. The information requested in the questionnaires must be filled in completely and as accurately as is humanly possible.
4. The nearer to 100 percent return of the questionnaires, the more representative the study will be.
5. February 1, 1966 is the deadline for return of all questionnaires.
6. The questionnaires will be kept absolutely confidential. No code is being used to identify persons or firms returning questionnaires. The "AREA" designation in the top, left-hand corner of the first page refers only to

a broad geographical section of the United States.

7. Please answer all questions in the questionnaire. If you do not have definite answers in some cases, estimate to the best of your ability.

PLEASE READ INSTRUCTIONS BELOW CAREFULLY.

I. PERCENT FLOWER RECEIPTS:

In order to determine in this study the "flow" of cut carnations from producing areas to marketing areas, a system of geographical sections has been devised for the United States.

The number after "AREA" in the upper, left-hand corner of the first page indicates the marketing area in which you are located. This does not identify your firm. All information, when compiled, will lose complete firm or personal identity as there will be several questionnaires from each area.

Now, you as a wholesale buyer need to estimate the percentage (%) of carnations (not boxes or flowers, but percent) you buy, or receive from each of seven (7) producing areas listed for each seasonal period listed.

Following is a list of the seven producing areas for carnations to which you will have to refer by letter (A, B, C, etc.). It is likely you may not receive carnations from all of these areas, so some answers may be 0 percent.

PRODUCING AREAS:

- A. SOUTHERN CALIFORNIA (Los Angeles, Encinitas, Santa Barbara, etc.)
- B. NORTHERN CALIFORNIA (Mountain View, Redwood City, Salinas, etc.)
- C. COLORADO
- D. PENNSYLVANIA
- E. MASSACHUSETTS
- F. CAROLINAS - VIRGINIA
- G. OTHER (Not described above)

Below are listed the major flower-use seasons of the year. Under each "season" is listed the seven producing areas by letter (see page 2). Place in each blank to the right of each area letter the percentage (%) of carnation flowers you receive from that producing area for the particular season. The left, top corner is an example. The total in each season must add up to 100 percent!

(EXAMPLE)		CHRISTMAS		VALENTINE DAY		EASTER	
AREA	%	AREA	%	AREA	%	AREA	%
A	27						
B	18						
C	50						
D	0						
E	4						
F	0						
G	1						
TOTAL	100						

MOTHER'S DAY		MEMORIAL DAY		JUNE		JULY-SEPTEMBER	
AREA	%	AREA	%	AREA	%	AREA	%
A							
B							
C							
D							
E							
F							
G							
TOTAL							

II. TOTAL UNIT RECEIPTS

What are your firm's total receipts of carnations (from all areas) in standard carnation boxes by months? If no exact records are available, estimate to the best of your ability.

<u>Month</u>	<u>Number of Boxes</u>
January	_____
February	_____
March	_____
April	_____
May	_____
June	_____
July	_____
August	_____
September	_____
October	_____
November	_____
December	_____
Total for year	_____

What is the "average" number of carnation flowers per standard box? \_\_\_\_\_



### III. AVERAGE SEASONAL WHOLESALE PRICES

What is the "average" price at which you sell topgrade carnations to your customers (retailers) during the seasons listed below? Base your answers on "normal" years or long-time averages.

<u>Season</u>	<u>Price per carnation flower</u>
Christmas	_____¢
Valentine Day	_____¢
Easter	_____¢
Mother's Day	_____¢
Memorial Day	_____¢
June	_____¢
July-September	_____¢

### IV. PROBLEMS OF WHOLESALERS

List any problems you feel are vital in relation to carnation cut flower supply, quality, transportation problems, costs, etc. in general or related to specific producing areas.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.