

MARKET STRUCTURE AND ECONOMIC
ANALYSIS OF THE FLORIDA
SWEET CORN INDUSTRY

By
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CHAPTER I

INTRODUCTION

Commercial production of fresh market sweet corn in appreciable quantities is of relatively recent origin in Florida. Production was not of sufficient importance to be reported by the U. S. Department of Agriculture until the 1947-48 marketing season when less than one-half million crates were marketed. Production expanded rapidly during the next five years to a 1952-53 level of 4.4 million crates. Since that time the average rate of increase has been slightly less than one-half million crates per year. The 1962-63 production was 8.8 million crates and the value was slightly less than 18 million dollars.¹

The rapid expansion of the sweet corn industry in Florida has been made possible by a number of production and marketing innovations. The adoption of these innovations has necessitated many adjustments in the traditional marketing system. In the process of making these adjustments the industry has encountered numerous marketing problems. The availability of market research results, or even economic data, has often been too limited to serve as a guide in solving many of the problems.

¹USDA, AMS, Florida Crop and Livestock Reporting Service, Florida Agricultural Statistics, Vegetable Summary, 1963 Issue, Orlando, Florida.

A state marketing order was adopted in January, 1963 which covered a large segment of the industry. Concurrently, the Florida Sweet Corn Exchange, a cooperative bargaining organization of sweet corn growers, was organized. The purpose of this organization and the marketing order was to provide the industry with the organization and control to obtain more orderly marketing of sweet corn.

The Problem

The adoption of the Sweet Corn Marketing Order (as amended, 1962) and the formation of the Florida Sweet Corn Exchange offered an opportunity to work effectively on many industry marketing problems, but it also presented a challenge for effective and wise leadership in carrying out marketing programs. The leaders of the Exchange and the Marketing Order assumed a new responsibility to the industry since their decisions affected not only their own businesses, but those of all the industry. These organizations provided no more than the mechanism whereby industry-wide decisions could be made and implemented. Individual marketing problems must be studied, alternatives considered and courses of action decided upon. The extent to which either the Marketing Order or the Exchange can be effective in solving individual marketing problems depends upon the wisdom of the decisions made by the leadership.

A major problem for the leadership of the Marketing Order and the Exchange has been that of finding sufficient facts on which to base decisions. Insufficient information has been available on the market structure of the industry. Basic information, such as the

relative importance of various handlers in the marketing system, the importance of different methods of selling and the pattern of shipments to the principal terminal markets has been inadequate. Even less was known about levels of shipments and prices which would maximize industry benefits.

Under the Marketing Order and Exchange organizations a more complete knowledge of the market structure and the economic processes is necessary, since more decisions must be made at the shipping point level. Industry benefits from these organizations cannot be maximized unless those charged with their administration have adequate economic information and an understanding of the economic effects of their actions.

Purpose of Study

A primary purpose of this study was to develop basic economic information necessary to an understanding of the market structure of the Florida Sweet Corn Industry. This included the development of quantitative measures reflecting the importance of types of organizations handling corn, geographic sales and market areas, sales procedures and seasonal effects. Determining the important interrelationships between these and other factors was a part of the purpose also.

The secondary purpose of the study was to develop economic guidelines to decision making based on a theoretical economic model of the industry. Estimates of the demand elasticities for sweet corn were necessary to augment the use of these theoretical guidelines.

Review of Literature

Economic marketing research relating to the sweet corn industry has been limited, primarily because the industry became of major importance in Florida only in the last decade. Greig and Spurlock published some of the earliest marketing research on corn in 1956.² In this study of marketing margins a variation of the case study approach was used. A limited time period, May 10-14, 1955, was used to illustrate the marketing costs incurred at each level of the marketing system in moving a car of sweet corn from Belle Glade, Florida through the retail level in Baltimore, Maryland. A summary of the results indicated that grower returns were low during this peak season of shipments:

The Belle Glade grower received a gross return of \$0.67 per crate for this car of sweet corn shipped to Baltimore during the heavy shipping season. Out of the \$0.67, the grower had to cover all costs of production. After the costs of the container, picking, packing and shipping point marketing charges were added, the f.o.b. shipping point price was \$1.70 per crate. The wholesale selling price was \$2.75 and the retail price was \$3.87 per crate.³

Showalter et al., collected a sample of 2,200 shipment invoices in the 1953-54 marketing season from four sales firms.⁴

²W. Smith Greig and A. H. Spurlock, Margins and Costs in Marketing Florida Sweet Corn (Washington, D.C.: U.S. Department of Agriculture in cooperation with Florida Agricultural Experiment Station, Misc. Pub. No. 719, April, 1956.)

³Ibid., p. 10.

⁴R. K. Showalter et al., Long Distance Marketing of Fresh Sweet Corn (Gainesville, Florida: Florida Agricultural Experiment Station Bulletin 638, November, 1961.)

Sales were observed to 144 cities in 34 states, the District of Columbia and four Canadian provinces. It was shown that cities receiving larger volumes were found to account for a high percentage of the total shipments:

More than 85 percent of the corn went to cities receiving 5,000 or more crates each. Cities receiving less than 5,000 crates represented 73 percent of the number of cities, but took only 15 percent of the total volume.⁵

Showalter et al., also found that the monthly average f.o.b. prices of most grades of sweet corn declined steadily throughout the season and that prices of U.S. No. 1 averaged 25 cents less than U.S. Fancy. U.S. No. 2 averaged 88 cents less than U.S. No. 1, but Unclassified was higher than U.S. No. 2. Price differences between U.S. Fancy and U.S. No. 1 tended to become larger as the season progressed. The f.o.b. price for all corn averaged \$2.02 per crate over the entire 1953-54 marketing season.

The f.o.b. basis of sale was found to account for 88.0 percent of the total shipments. Delivered and consigned sales accounted for only 4.7 percent and 7.3 percent of the shipments, respectively. An inverse relationship was found to exist between f.o.b. prices and the monthly rate of shipments:

On the average, an increase in monthly shipments of each 100 cars in the 1953-54 caused a decrease in monthly f.o.b. price of U.S. Fancy corn of about 5 1/2 cents per crate. Increasing shipments depressed the price much more than this in the early part of the season, and less than this in the latter part.⁶

⁵Ibid., p. 10.

⁶Ibid., p. 19.

Brooke, in a 1962 study, found that sweet corn shippers have been shifting from the use of rail to truck transportation.⁷ Truck shipments rose from 44 percent of the total in 1954-55 to 56 percent in 1961-62. Based on shipment data Brooke made several other observations concerning the distribution of Florida sweet corn:

Data on the distribution of corn are available only for some 37 cities reported by the Florida State Marketing Bureau. Those cities received 72 percent of Florida's sweet corn shipments in 1960-61. The data indicate that: (1) Shipments by rail are greater than shipments by truck to the more distant markets of the Northeast and Midwest, (2) truck shipments predominate to southern and western markets, (3) the larger cities receive the largest supply of Florida corn, (4) Florida's market for corn, as for most other vegetables, is in the eastern half of the United States. Florida ships relatively little corn to destinations north of Texas that are west of the Mississippi River, (5) Florida's shipments to these 37 markets are about 30 percent of their total receipts of corn during the year.⁸

Procedure

As a part of the field work on this study, two types of information were obtained from Florida sales firms handling sweet corn. These were (1) information concerning the sales firms' organization, method of operation and marketing problems and (2) data on sweet corn shipments during the 1962-63 marketing season.

A census of the 25 sales firms located in Florida's principal production areas was made to obtain the basic information on organization, method of operation and marketing problems. The

⁷Donald L. Brooke, The Florida Sweet Corn Industry, 1953-62 (Gainesville, Florida: Florida Agricultural Experiment Station Agricultural Economics Mimeo Report 63-4, December, 1962.)

⁸Ibid., p. 11.

manager, or his representative, was interviewed, following a number of predetermined questions as shown in the questionnaire in Appendix A. The cooperation of all sales firms was obtained in supplying most of the information needed for this phase of the study.

Specific data on sweet corn shipments were obtained from 19 of the 25 sales firms. Six firms were not willing to cooperate. A 10 percent stratified random start systematic sample of the shipment invoices was selected to obtain data for this phase of the study. Data on date of shipment, type of buyer, basis of sale, type and grade of corn, market destination, size of shipment and adjusted f.o.b. price were collected on a field survey form as shown in Appendix B. These data were coded as they were collected so they could be entered on IBM cards. A multiple tabulation program of the IBM 1401-709 was used to carry out the tabular analyses.

A theoretical economic model of the industry, based on the tabular analyses of the data obtained from sales firms, was developed. Secondary data from the Sweet Corn Exchange, the Marketing Order's Administrative Committee and government agencies were used to augment the invoice data. Applicable economic theory which could serve as guidelines to marketable output and price decisions was drawn from the writings of noted economists and developed into a theoretical model suitable to explain how profits to the industry could be maximized.

Secondary information from the Exchange and government reports were used to obtain the data for the demand analysis of sweet corn at the f.o.b. level. Graphic analysis was used to establish preliminary relationships between variables. The

stepwise multiple regression program using the IBM 1401-709 was used to select variables statistically significant in explaining price variations. This regression technique was used to develop equations which served as a basis in obtaining price elasticities.

CHAPTER II

THE DEVELOPMENT AND IMPORTANCE OF THE SWEET CORN INDUSTRY

United States

Early Developments

The first reference to the existence of sweet corn as a distinct food is found in Thomas Jefferson's Garden Book of 1810.¹ By 1828 sugar, or sweet, corn was listed in seed catalogs although no variety names were given. During these early years sweet corn was produced largely as a garden crop and was not important commercially.

The perishability of fresh sweet corn has affected the development of this industry throughout its history. Sweet corn production in the United States developed in several truck farming areas adjacent to cities. Large concentrated production areas, such as the wheat and corn belts, did not develop in the sweet corn industry.

The traditional pattern, which prevailed until World War II, was one where fresh market production was dispersed among numerous truck farming areas. New York, New Jersey and Pennsylvania, which were densely populated areas, were also the three leading sweet

¹A. T. Erwin, "Sweet Corn--Mutation on Historic Species?" Economic Botany, Vol. V, No. 3 (July-September, 1951), pp. 302-6.

corn producing states in 1939.²

Post-World War II Developments

The traditional pattern of sweet corn production changed following World War II. Production in the truck crop areas near large cities began to level off and new specialized production areas developed. Andrews observed this development in his study of the Midwest sweet corn industry:

Important changes appear to be underway in all fresh market vegetable production, with production shifting from nearby truck farms to more distant specialized farms, and with an increase in out-of-season production. Around the largest cities, expanding suburbs have taken up farmland previously in vegetable crops. Expansion of chainstore operation into smaller communities and servicing of the chain retail outlet from centrally located depots have shrunk market outlets of the truck gardeners supplying these smaller urban centers.³

Substantial shifts to more specialized areas of production occurred within the traditional seasons. Ohio replaced the eastern states as the leading producer of summer fresh market sweet corn in 1963. Other leading states were New Jersey, New York and Pennsylvania, respectively.⁴

Seasonal Shifts in Production

A most important development, especially to the southern

²USDA, Bureau of Agricultural Economics, Commercial Truck Crops for Fresh Market and Processing, 1939-45 (Washington, D.C., June, 1947), p. 69.

³Richard A. Andrews, The Midwest Sweet Corn Industry (Minneapolis, Minnesota: Minnesota Agricultural Experiment Station Bulletin 450, June, 1959), p. 14.

⁴USDA, SRS, Crop Reporting Board, Vegetables--Fresh Market, 1963 Annual Summary (Washington, D.C., 1963) Vg2-2(63), pp. 36-37.

producing areas, has been the growth of the out-of-season production mentioned by Andrews. In another publication he elaborates further on the importance of this development and discusses other seasonal shifts in production:

A most important change in fresh market sweet corn marketing to be noted is the rise in importance of the out-of-season production. Winter, early spring and fall production rose in importance from 15 percent of the fresh market production in 1949 to 30 percent in 1956, declining to 28 percent in 1957. . . . Thus, the fresh market sweet corn marketing trend is toward increasing importance of winter, early spring and fall seasonal production. . . .⁵

The percentage of winter, early spring and fall production continued to fall after the 1957 decline referred to by Andrews. A low of 26.5 percent was reached in 1959, but since that time this percentage has risen sharply. By the 1963 season 34 percent of the fresh market corn was accounted for by out-of-season production.⁶

Important U.S. Production Areas

Twenty-seven states were reported by the U.S. Department of Agriculture as commercial producers of fresh market sweet corn in

⁵Richard A. Andrews, A Study of the Sweet Corn Industry in the Midwest Farm Economy (Minneapolis, Minnesota: Minnesota Agricultural Experiment Station, North Central Regional Publication No. 95, June, 1959), p. 20.

⁶USDA, SRS, Crop Reporting Board, Vegetables for Fresh Market, 1954-59 (Washington, D.C., Statistical Bulletin No. 300, December, 1961), p. 64, and USDA, SRS, Crop Reporting Board, Vegetables--Fresh Market, 1963 Annual Summary (Washington, D.C., 1963) Vg 2-2(63), pp. 36-37.

1963.⁷ Florida, as may be seen in Table 1, produced almost 30 percent of the total production. The three states, Florida, California and Texas, which supply sweet corn in the out-of-season months, produced 42 percent of the total corn. California also produced corn during the late spring and summer months, thus, making the total production of these states exceed that of the total out-of-season production cited earlier. Production of main season sweet corn was divided among the remaining 24 states and California. Distribution of this volume ranged from 7.6 percent in Ohio down to 0.3 percent in Arkansas.⁸

Table 1.--Acreage and production of states harvesting 10,000 or more acres of fresh market sweet corn, 1963

State	Harvested Acreage	Production	State Production
			as Percent of U.S. Total
	Acres	1,000 cwt.	Percent
Florida	50,300	3,974	29.4
California	19,100	1,319	9.6
Ohio	13,700	1,028	7.6
New Jersey	14,500	1,015	7.5
New York	16,100	966	7.1
Pennsylvania	18,500	851	6.2
Michigan	14,000	840	6.1
Texas	12,000	396	2.9
All others	51,950	3,148	23.3
Total	210,150	13,537	100.0

Source: USDA, SRS, Crop Reporting Board, Vegetables--Fresh Market, 1963 Annual Summary (Washington, D.C., 1963) Vg2-2(63), pp. 36-37.

⁷ USDA, SRS, Crop Reporting Board, Vegetables--Fresh Market, 1963 Annual Summary, op. cit., p. 37.

⁸ Ibid., p. 37.

Sweet Corn's Importance in the Vegetable Industry

Fresh market sweet corn in the United States was estimated to have a value of over \$52 million in 1963. Excluding melons and potatoes, its 1963 value was exceeded only by that of tomatoes, lettuce and onions (Table 2). The seven-year average of the value of vegetables in the United States indicated that sweet corn ranked fifth. Sweet corn was exceeded only by lettuce in the number of acres harvested both in the seven-year average and in 1963.

Table 2.--Value and harvested acreage of the five principal vegetables^a produced in the United States, 1957-63

Vegetable	Value		Harvested Acreage	
	Average 1957-63	1963	Average 1957-63	1963
	1,000 Dollars	1,000 Dollars	Acres	Acres
Tomatoes	144,604	150,089	181,984	159,840
Lettuce	142,183	161,426	219,711	215,680
Onions	71,358	85,378	102,099	95,000
Celery	54,643	49,657	33,909	31,430
Sweet corn	49,557	52,289	205,905	210,370

^aPotatoes and melons excluded.

Source: USDA, SRS, Crop Reporting Board, Vegetables--Fresh Market, 1963 Annual Summary (Washington, D.C., 1963) Vg2-2(63), pp. 4-5.

New Developments in Consumption Patterns

The potential for the sale of any food product depends upon its acceptance and ultimate consumption by consumers. Per capita consumption may be used as a measure of this acceptance and sweet corn in the United States has fared well by this measure. Per capita consumption averaged only 2.5 pounds during the 1920-24

period, but had risen to a high of 8.1 pounds by the 1955-59 period (Table 3). Per capita consumption dropped to 8.0 pounds during the 1960-62 period, but this decline was too small and the period too short to indicate any trend.

Table 3.--Civilian per capita consumption of fresh market sweet corn and total vegetables^a (farm weight basis), United States, 1920-62

Year	Sweet Corn	Total Vegetables
	<u>Pounds</u>	
1920-24	2.54	92.20
1925-29	3.22	104.94
1930-34	4.98	109.74
1935-39	5.38	113.16
1940-44	6.32	118.06
1945-49	7.92	125.16
1950-54	7.88	111.00
1955-59	8.14	105.04
1960-62	8.00	104.67

^aTotal vegetables excludes melons and potatoes.

Source: USDA, Agricultural Statistics, 1962 (Washington, D.C.: Government Printing Office, 1963), pp. 302-303 and USDA, ERS, Supplement for 1962 Consumption of Food in the United States, 1909-52 (Washington, D.C., October, 1962), p. 13.

The sweet corn consumption trend is encouraging when compared with that of other fresh market vegetables. Consumption of all fresh vegetables rose to a peak during the postwar years of 1945-49 of 125 pounds per person, but has since declined to a 1960-62 level of 105 pounds per person. A rise in the use of processed vegetables has offset much of this decline in fresh vegetable consumption; therefore, the total per capita consumption of vegetables has remained near its current level since World War II. Despite the declining

trend for fresh market vegetables, fresh market sweet corn consumption per capita has risen slightly since World War II.

An insight into the nature of this rise in sweet corn consumption may be gained by examining these data closely. If the annual per capita consumption is divided between the main season, May 15 through September 31, and the out-of-season, October 1 through May 14, it may be noted that main season consumption has declined since 1949 (Table 4). The increase in per capita consumption of sweet corn has been provided by the growth in out-of-season consumption. Per capita consumption during the out-of-season period increased from 1.2 pounds in 1949 to 2.7 pounds in 1963. Main season per capita consumption declined from 6.4 pounds to 5.3 pounds during this same period.

Table 4.--Civilian per capita consumption of fresh market sweet corn by seasons (farm weight basis), United States, 1949-63

Year	Out-of-season	Main Season	Annual Total
	Oct. 1-May 15	May 16-Sept. 30	
<u>Pounds</u>			
1949	1.2	6.4	7.6
1950	1.7	6.0	7.7
1951	1.4	6.2	7.6
1952	1.9	5.9	7.8
1953	2.0	5.8	7.8
1954	2.4	6.1	8.5
1955	2.5	5.7	8.2
1956	2.5	5.4	7.9
1957	2.3	5.4	7.7
1958	2.3	6.1	8.4
1959	2.3	6.2	8.5
1960	2.2	5.9	8.1
1961	2.2	5.8	8.0
1962	2.4	5.5	7.9
1963	2.7	5.3	8.0

Source: USDA, Agricultural Statistics, 1962 (Washington, D.C.: Government Printing Office, 1963), pp. 302-303; USDA, ERS, Supplement for 1962 Consumption of Food in the United States, 1909-52 (Washington, D.C., October, 1963,) p. 13.

In 1963 out-of-season per capita consumption reached a peak of 2.7 pounds and the main season consumption was at a low of 5.3 pounds. However, even during this year, the average monthly rate of consumption during the main season was more than three times that of the out-of-season period. The average monthly rate of consumption between May 16 and September 30 was 1.2 pounds per person and that during other months was only 0.4 pounds per person. Several factors, such as price, quality, availability and habit of consumption, account for this difference. Even so, in view of the trend of consumers toward a less seasonal diet, this difference in the consumption pattern appears to offer an opportunity and a challenge to out-of-season production areas.

Florida

Rapid Expansion of the Industry

Florida, which entered the fresh market sweet corn industry as a "Johnny-come-lately," has in a little more than a decade become the "Paul Bunyan" of the industry. Florida did not enter the commercial sweet corn market in any significant manner until after World War II and by 1963 produced more than three times the fresh market production of its largest competitor (Table 1).

The 1919 Census of Agriculture showed only 647 acres of sweet corn in Florida. (This was the earliest census which included sweet corn acreages.) By 1929 the acreage of sweet corn in Florida had increased to 5,549, and by 1939 to 6,367. The value of the crop was only \$192,000 in 1929 and \$148,000 in 1939. Beginning in 1939, sales of sweet corn were reported annually for

each of Florida's state farmers' markets where any was sold. It is interesting to note that in 1939 about one-third of the state's acreage was in the Starke area (Bradford County) and very little was produced in South Florida where most of it is now grown.

Expansion of the industry was extremely rapid after 1947-48 when production was 480,000 crates (Figure 1). During the first five years production increased over nine-fold or to a level near 4.4 million crates in 1952-53. Since 1952-53 Florida production has increased at an average annual rate of a little less than one-half million crates per year. Production for the 1962-63 season was estimated at 8.8 million crates.

Seasonality of Production

Florida produces sweet corn in three seasons, the fall which extends from October 1 through December 31, winter from January 1 through March 31, and spring from April 1 through June 30. Spring production is the largest. A three-year average, 1960-61 through 1962-63, indicated that 74 percent of the total production was harvested during the spring. Fifteen percent was harvested during the winter and 11 percent during the fall.

Fall production increased from 1952-53 through the 1958-59 season, but has leveled off at slightly below a million crates since that time (Figure 1). Winter production has followed no clear trend in recent years. The winter season has had the greatest year-to-year variations in production, due mostly to cold weather, although considerable variability was evident during all seasons. Expansion of spring production from 3.3 million crates in 1952-53

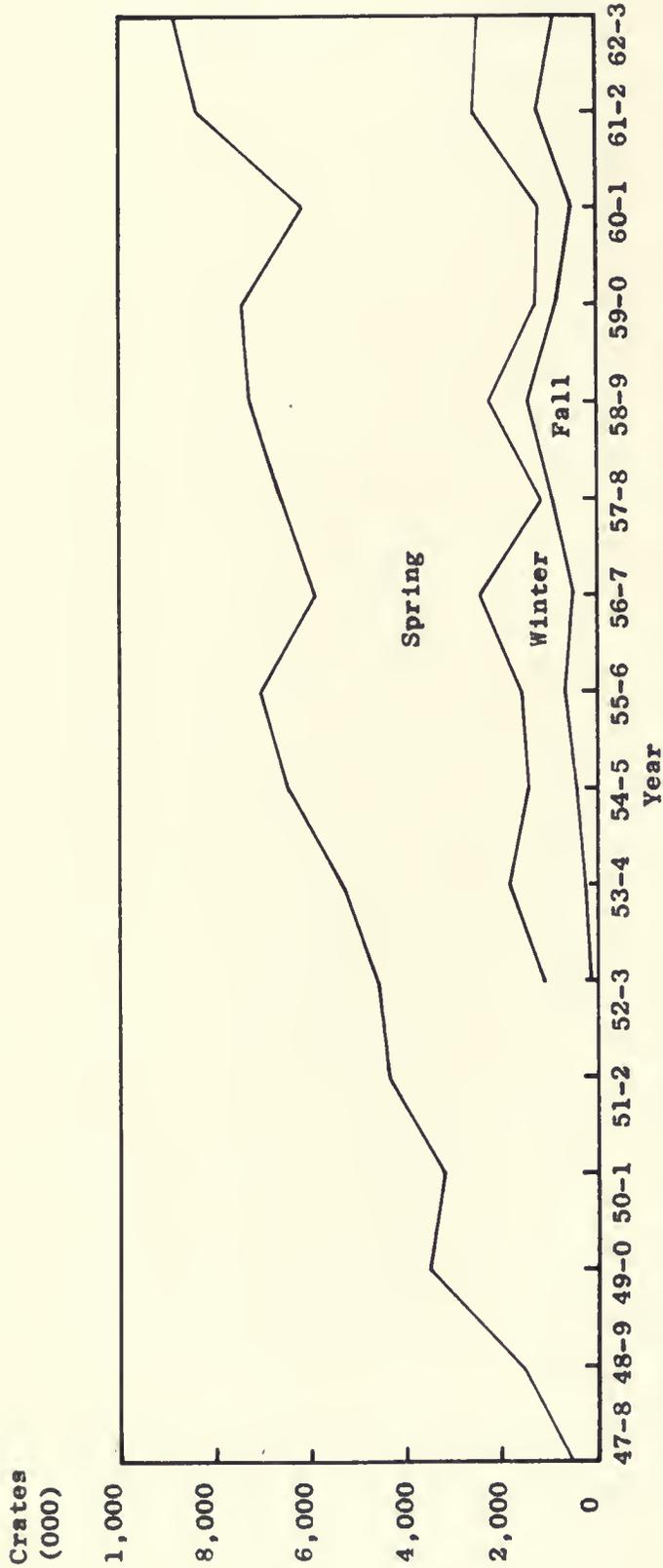


Figure 1.--Seasonal distribution of Florida sweet corn production, 1947-48 through 1962-63.

Source: Florida Department of Agriculture, Florida State Marketing Bureau, Annual Fruit and Vegetable Report, 1953-54 Season (Jacksonville, Florida, 1954), p. 53 and Florida Department of Agriculture, Division of Marketing, Vegetable Summary, 1962 Issue (Tallahassee, Florida, 1962), p. 34 and USDA, SRS, Crop Reporting Board, Vegetables--Fresh Market, 1963 Annual Summary (Washington, D.C., 1963) Vg2-2(63), pp. 36-37.

to 6.5 million crates in 1962-63 has accounted for most of the growth in production.

Production Risks

Year-to-year variations in the seasonal production of sweet corn have resulted from changes in yields and changes in planted acreages. Average yields of sweet corn have varied from over 200 crates per acre down to zero, or total loss. Production risks are the primary factors contributing to yield variations. Extreme temperatures, excessive rainfall, high winds, insect damage and plant diseases all represent production risks which growers must face. In favorable years losses due to these risks, of which low temperatures are most important, are low and yields high. In other years, yields may be low with substantial acreage being lost.

Variations in plantings are affected by expectations of future conditions, primarily those of yield and price. Past experiences are very important in arriving at these expectations. For example, increased plantings may often be observed in years following high prices. An examination of acreage planted, yields and unharvested acreage provides an insight into the extent to which production risks affect the Florida sweet corn industry.

Production risks appeared to be greatest during the winter season (Figure 2). Over the 10 years, 1953-54 through 1962-63, an average of 28 percent of the winter sweet corn acreage was unharvested. Acreage losses also demonstrated the greatest range of variability during this season. In 1958, 79 percent of the planted acreage was unharvested, while in 1957 only 7 percent

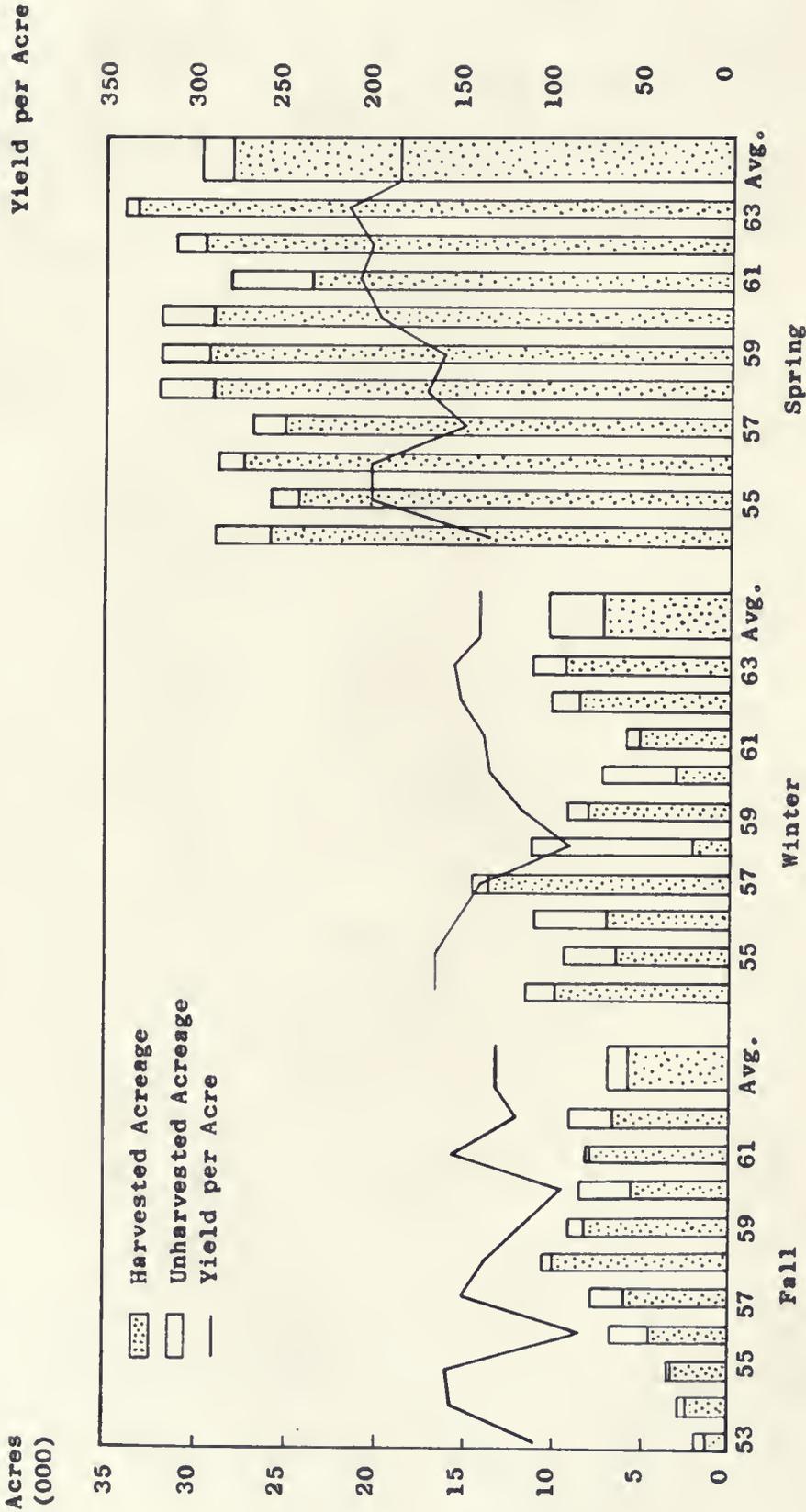


Figure 2.--Seasonal harvested acreage, unharvested acreage and yield per acre of Florida sweet corn, 1953-54 through 1962-63 seasons.

Source: Florida Department of Agriculture, Division of Marketing, Vegetable Summary, 1962 Issue (Tallahassee, Florida, 1962), p. 34 and USDA, SRS, Crop Reporting Board, Vegetables--Fresh Market, 1963 Annual Summary (Washington, D.C., 1963) Vg2-2(63), pp. 36-37.

was unharvested. The high losses in 1958 resulted from a combination of frosts and freezes, excessive rainfall and prolonged cold.⁹ Winter yields averaged 140 crates per acre, and ranged from 91 crates in 1958 to 164 crates in 1955.

Production risks in the fall were not as great as in the winter, but greater than during the spring. An average of 16 percent of the fall planted acreage was unharvested between the 1953-54 and 1962-63 seasons. Year-to-year variations ranged from a 32 percent loss in the fall of 1956 to a 2 percent loss in 1961. Yields during the fall averaged the lowest of all seasons at 128 crates per acre over the 10-year period. They ranged from 83 crates per acre in 1956 to 156 crates per acre in 1954.

Production variability was enhanced during the fall and winter seasons by the tendency for low yields and high acreage losses to be associated. This phenomenon may be observed in the fall season of 1956, 1960 and 1962 when acreage losses were at high levels (Figure 2). Yields during these same years were at low levels. This relationship would be expected since the damage, most often from cold temperatures, normally occurred late in the growing season. While a freeze may cause some acreage to be completely lost, other acreage would likely be damaged to the point that yields are lowered.

The spring season differed from the winter and fall in several respects. The percentage of unharvested acreage was much

⁹Florida Department of Agriculture, Florida State Marketing Bureau, Annual Agricultural Statistical Summary, 1957-58 Season (Jacksonville, Florida, November, 1958), p. 17.

smaller than that of other seasons, averaging only 6 percent over the 10-year period. Neither were year-to-year variations in acreage losses as great. Unharvested acreage ranged from 18 percent in 1961 to 3 percent in 1963.

Yields during the spring averaged substantially higher than during the fall or winter. Over the 10-year period yields averaged 184 crates per acre, ranging from 136 crates in 1954 to 214 crates in 1963. Yields and unharvested acreage did not appear to be as closely associated in the spring as in the fall and winter. This may have been expected since most weather damage would likely have occurred soon after planting and the crop would either have been abandoned or would have made a near complete recovery during the spring growing season.

Competition

Florida encounters little competition from other production areas during most of its season. The most active harvesting period for Florida begins around November 10. At this time only California is a factor in sweet corn production and their most active harvesting season ends around November 20. No production area offers major competition to Florida from November 20 through May 1, when the most active harvest season for Texas spring corn begins. California enters the market on May 15 followed by South Carolina and Georgia on June 1. Alabama begins its most active harvesting period on June 10. These states constitute the major competing areas during Florida's marketing

season.¹⁰ This pattern shifts somewhat from year to year depending on plantings and weather conditions.

The magnitude of the competition offered by competing areas is reflected by the distribution of average weekly sweet corn shipments from Florida and other areas over the three years, 1960-61 through 1962-63 (Figure 3). Shipments from other areas continued at a stable level up through mid-November, then declined for five weeks and ended the last week of December. Florida shipments, which remained substantially higher than other shipments after mid-October, reached a peak during the last week of November, then declined throughout the remainder of the fall.

For the three-season period covered by Figure 3, no shipments occurred from competing states during the winter months and Florida weekly shipments tended to increase throughout the season.

Spring shipments began from other states during the third week of April and became fairly heavy by the first week of May. They remained near this level throughout the remainder of the season. Florida shipments increased throughout the spring to a peak during the first week of June and then declined rapidly.

¹⁰USDA, SRS, Crop Reporting Board, Usual Planting and Harvesting Dates in Principal Producing Areas (Washington, D.C.: Agricultural Handbook No. 251, June, 1963).



Figure 3.--Three-year average weekly distributions of interstate sweet corn shipments from Florida and other states, 1960-61 through 1962-63.

Source: Donald L. Brooke, Florida Truck Crop Competition I, Interstate and Foreign (Gainesville, Florida: Florida Agricultural Experiment Station, Agricultural Economics Mimeo Reports 62-6, 63-2 and EC64-5).

CHAPTER III

SHIPPING POINT ORGANIZATION

Twenty-five sales firms were included in the field census to determine the organizational and marketing characteristics of the Florida sweet corn industry at the shipping point. These firms marketed 8,200,731 of the 8,804,000 crates of sweet corn sold from Florida in the 1962-63 season as reported by the Florida Crop and Livestock Reporting Service.¹ According to these data only 6.9 percent of the Florida shipments were made by firms not included in the survey and most of this volume as marketed from small scattered production areas.

A panoramic view of the development and competitive position of the Florida sweet corn industry was presented in the previous chapter. This approach, however, provided little information on the organization and operation of the industry. This chapter provides a more detailed picture of the firms growing and marketing sweet corn in Florida.

For the purposes of this study a sales firm was defined as any person or organization, either incorporated or unincorporated, which enters sweet corn into the primary channels of trade. A

¹USDA, AMS, Florida Crop and Livestock Reporting Service, Florida Agricultural Statistics, Vegetable Summary, 1963 Issue, op. cit.

firm is considered "entering sweet corn" only if the corn is produced by the firm or if the firm acts as the first handler of the corn. Sweet corn sold from a primary sales firm to a second firm, which second firm then enters it into primary channels of trade, does not make the second firm a sales firm as defined.

Growers include all persons or organizations, either incorporated or unincorporated, who produce sweet corn to be entered directly or indirectly into the commercial channels of trade.

Growers

Data on growers were obtained from information provided by sales firms and confirmed by records of the Florida Sweet Corn Advisory Committee. All growers were affiliated with sales firms in one manner or another. In some instances, the grower and sales firm were essentially the same. A grower-sales firm, where production and sales were carried out by a single organization, was considered as one grower affiliated with one sales firm for purposes of analysis. In firms handling corn for two or more growers, the numbers of growers reported were used.

Numbers and Sizes

Large growers, those producing 200,000 or more crates annually, predominated in the production of Florida sweet corn. Although they accounted for only 10.1 percent of the number of growers, they produced 40.9 percent of the output (Table 5). Medium growers, those producing between 100,000 and 199,999 crates, accounted for 24.7 percent of the growers and 38.0

percent of the production. Small growers, those producing under 100,000 crates annually, accounted for 65.2 percent of the growers, but only 21.1 percent of the production. A total of 89 growers produced the 8,200,731 crates of sweet corn.

Table 5.--Distribution of growers and production, by size of grower, affiliated with 25 Florida sweet corn sales firms, 1962-63 season

Size of Grower	Growers		Production	
	Number	Percent	Crates	Percent
Large	9	10.1	3,349,318	40.9
Medium	22	24.7	3,117,157	38.0
Small	58	65.2	1,734,256	21.1
Total	89	100.0	8,200,731	100.0

Attempts to gain benefits from economies of scale and to reduce risks appear to be the best explanations for the predominance of large scale producers in the Florida sweet corn industry. Brooke discussed some of the economies of scale in production in his 1963 study of the Florida sweet corn industry:

Specialized equipment for spraying and harvesting sweet corn has been developed and improved over the past 10 years. This equipment is costly both from the initial capital outlay and annual upkeep. A small grower with one crop of corn cannot justify its purchase for a few days per year of its use. Larger growers with multiple plantings of corn use such equipment more efficiently and can justify its cost.²

Risks, as discussed in the previous chapter, are important

²Brooke, op. cit., p. 4.

in affecting the profitability of sweet corn from year to year. All plantings in one area or in one period may be lost due to weather hazards. Larger growers can offset some of these risks by extending production over the season or by adding plantings in other production areas. Several of the large growers produce corn in two or more of the production areas as well as extend their plantings over more than one season.

Growers, in some instances, have been affected by the needs of sales firms to obtain economies of scale. This was especially true for the grower-sales firm organizations. In such instances, a larger volume of production was needed to achieve economies from the standpoints of servicing buyer accounts, as well as personnel, building and equipment use.

Production economies, risks and sales firm needs play a different role in the decisions of each grower depending upon his situation and problems. Some may expand production for one reason, some for another, while others may feel their volume is optimum. Nevertheless, from the standpoint of the industry as a whole, these forces have and will continue to encourage larger production units.

Sales Areas

Florida was divided into three sales areas, Belle Glade, South Florida and Central Florida, for analysis purposes (Figure 4). The Belle Glade and South Florida areas conform to the marketing areas established under the Sweet Corn Marketing Order. The Zellwood section produces most of the sweet corn in the Central Florida area. Scattered areas in northern Florida, which produced only 0.3 percent

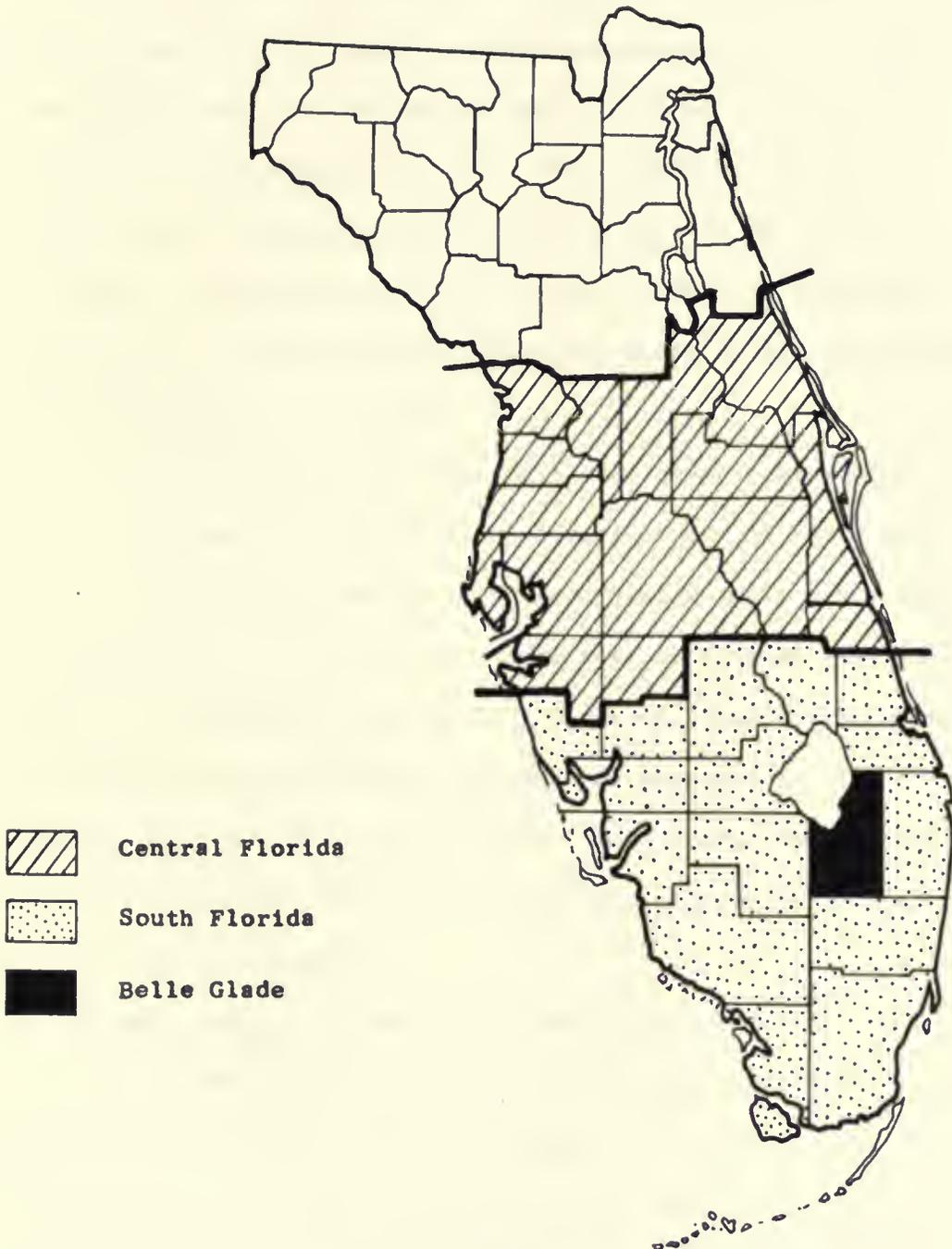


Figure 4.--Florida sweet corn sales areas, 1962-63 season

of the 1962-63 production, were not included in this analysis.³

The Belle Glade area had 71 growers who produced 6,037,348 crates of sweet corn in 1962-63. This accounted for 75.5 percent of the growers and 73.6 percent of the production. This area is located in western Palm Beach County and extends around the southeast shore of Lake Okeechobee, centering near the town of Belle Glade, Florida. Corn in this area is produced on peat and muck soils of the "custard apple" and "saw grass" types which range in depth from three to 10 feet.⁴

The South Florida area had only nine commercial sweet corn growers who produced 737,403 crates, 9 percent of the total production. Primary producing sections were eastern Palm Beach County, Pompano section of Broward County, Homestead section of Dade County, and small sections of Lee and Collier Counties. Sweet corn in the eastern Palm Beach and Pompano sections was produced on Leon-Portsmouth sands and fine sands. Dade County production in the Homestead section was concentrated on highly calcareous Perrine marl over oolite limerock.⁵

There were 14 growers in the Central Florida area who produced 1,425,980 crates of corn, 17.4 percent of the total production. The primary Central Florida area is the Zellwood

³ Florida Department of Agriculture, Division of Marketing, Vegetable Summary, 1962 Issue (Tallahassee, Florida: 1963), p. 35.

⁴ Brooke, op. cit., p. 2.

⁵ Ibid.

production section which is centered west of the town of Zellwood in Lake and Orange counties and just north of Lake Apopka. Corn is produced in this section on muck and mucky peat soils which vary in depth from four to 19 feet.⁶

Since some growers produced corn in more than one area, the sum of the growers operating in each area exceeded that for the total number of Florida growers. The proportion of growers falling into the three size classifications was not significantly different between the three areas (Table 6).

Table 6.--Distribution of growers and production, by size of grower and sales area, 25 Florida sweet corn sales firms, 1962-63 season

Size of Grower	Sales Area					
	Belle Glade		South Florida		Central Florida	
	Growers	Production	Growers	Production	Growers	Production
	<u>Percent</u>					
Large	11.3	42.8	11.1	36.4	14.3	35.0
Medium	22.5	36.1	22.2	36.2	35.7	46.8
Small	66.2	21.1	66.7	27.4	50.0	18.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
Percent- age of Total	75.5	73.6	9.6	9.0	14.9	17.4

Sales Firms

The traditional shipping point market where local shippers

⁶Ibid.

buy from various growers at a competitive price does not exist for the sweet corn industry in Florida. Only two sales firms reported any direct purchases from growers and this volume was very small. The function of the sales firm in Florida is to act as an agent for one or more of its affiliated growers. In practically all cases, the entire production of a grower was delivered to one sales firm.

Numbers of Growers

Ten of the 25 sweet corn sales firms in Florida have only one grower as a source of supply--usually the same firm was doing both the growing and selling. These 10 single-grower sales firms ranged in size from over 800,000 crates annually to fewer than 50,000 crates. The other fifteen sales firms had two or more growers as a source of supply (Table 7).

Table 7.--Distribution of sales firms, by number of affiliated growers and sales area, 25 Florida sweet corn sales firms, 1962-63 season

Number of Growers	Sales Area							
	Belle Glade		South Florida		Central Florida		All Areas	
	Number	Percent	Number	Percent	Number	Percent	Number ¹	Percent
1	4	25.0	4	66.7	5	66.7	10	40.0
2 - 5	6	37.5	2	33.3	2	33.3	9	36.0
6 or more	6	37.5	-	-	-	-	6	24.0
Total	16	100.0	6	100.0	7	100.0	25	100.0

¹Sales firm numbers are not additive since some sales firms operated in two or more areas.

Only one-fourth of the sales firms in the Belle Glade area

were single-grower sales firms, but in the other area two-thirds of the firms fell in this class. The large firms in the Belle Glade area attained their volume to a substantial extent by affiliating with several growers. Thirty-seven percent of the firms in this area had six or more affiliated growers compared with none in other areas. The number of sales firms operating in each area was exaggerated somewhat by the fact that a few sales firms operated in more than one area. This was especially true of the Central Florida area.

Methods of Organization

About one-half of the sales firms were organized as corporations, one-fourth as cooperatives and one-fourth as partnerships or proprietorships. The method of organization did not vary appreciably between sales areas. The corporate organization was observed somewhat more frequently in the Belle Glade and South Florida areas than in the Central Florida area. A slightly higher proportion of cooperatives were observed in the Central Florida area.

There appeared to be little relationship between the method of organization of the sales firm and the number of affiliated growers (Table 8). Both corporations and cooperatives were observed for all grower-number classifications. Half of the firms with six or more growers were corporations and the other half were cooperatives. Indications are that the method of organization of the sales firms was more a matter of personal preference or other considerations than it was of the number of growers to be affiliated with the sales firm.

Table 8.--Distribution of sales firms, by number of affiliated growers and method of organization, 25 Florida sweet corn sales firms, 1962-63 season

Number of Growers	Method of Organization				
	Corporation	Cooperative	Partnership	Proprietorship	All Methods
	<u>Percent</u>				
1	50.0	20.0	10.0	20.0	100.0
2 - 5	66.7	11.1	11.1	11.1	100.0
6 or more	50.0	50.0	-	-	100.0
Average	52.0	28.0	8.0	12.0	100.0

Sizes

Large sales firms, those handling 500,000 or more crates annually, marketed almost two-thirds of the sweet corn production (Table 9). Although these firms accounted for only 32 percent of the number of firms, they were predominant in the volume marketed. Small sales firms, those handling less than 100,000 crates annually, marketed only 8.1 percent of the corn, but accounted for 36 percent of the firms. Medium sales firms, those handling between 100,000 and 499,999 crates, accounted for the remaining 27.1 percent of the volume and 32 percent of the number of firms.

The proportion of sweet corn handled by large sales firms in the Belle Glade area was substantially greater than that sold by firms of this size in other areas (Table 9). In fact, all eight of the large sales firms in Florida operated in the Belle Glade area. Some of these firms handled substantial quantities of corn in other areas also.

Table 9.--Distribution of sales firms and crates sold, by size of sales firm and sales area, 25 Florida sweet corn sales firms, 1962-63 season

Size of Sales Firm	Sales Area							
	Belle Glade		South Florida		Central Florida		All Areas	
	Sales Firms	Crates Sold	Sales Firms	Crates Sold	Sales Firms	Crates Sold	Sales Firms	Crates Sold
	Percent							
Large	50.0	78.0	16.7	13.9	28.6	35.0	32.0	64.8
Medium	25.0	18.5	33.3	58.7	42.8	47.3	32.0	27.1
Small	25.0	3.5	50.0	27.4	28.6	17.7	36.0	8.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Vegetables Handled

The importance of sweet corn relative to other vegetables marketed by the sales firm is important because the policies of a firm in which several vegetables are marketed are determined by the combined needs of all vegetables handled. In multi-vegetable sales firms, it must be realized that the marketing policies and practices followed in sweet corn marketing are not independent, but are a part of the total sales firm operation. With this in mind, an attempt was made to determine the number of vegetables other than sweet corn marketed by the sales firms and the relative importance of sweet corn in this array.

Twenty-four vegetables, other than sweet corn, were handled by the sales firms, but eleven of these were considered as minor vegetables since they were handled by three or fewer of the firms. Examples of such vegetables are snise, water cress and turnips.

The remaining 13 vegetables, plus sweet corn, are shown in Table 10. The percentage of the sales firms which handled vegetables other than sweet corn ranged from 67.9 percent handling cabbage down to 17.9 percent handling okra. Practically all major vegetables were handled by the firms in all areas, but the relative importance of each varied for one area to another.

Table 10.--Distribution of sales firms handling 14 vegetables, by sales area, 25 Florida sweet corn sales firms, 1962-63 season

Vegetable Handled	Sales Area			
	Belle Glade	South Florida	Central Florida	All Areas
	Percent			
Green Beans	66.7	66.7	42.9	60.7
Cabbage	80.0	16.7	85.7	67.9
Celery	66.7	16.7	85.7	60.7
Sweet Corn	100.0	100.0	100.0	100.0
Cucumbers	26.7	66.7	14.3	32.0
Eggplant	26.7	16.7	14.3	21.4
Endive	46.7	16.7	85.7	50.0
Lettuce	46.7	16.7	85.7	50.0
Okra	13.3	33.3	14.3	17.9
Field Peas	33.3	50.0	28.6	35.7
Potatoes	33.3	50.0	42.9	39.3
Peppers	66.7	33.3	28.6	50.0
Radishes	26.7	--	57.1	28.6
Squash	33.3	50.0	--	28.6

Although the number of vegetables handled by the sales firms was important, the relative importance of particular vegetables to the firm was of even more significance. Sweet corn was the most important vegetable in terms of annual value to 42 percent of the sales firms, but none of these handled sweet corn exclusive of other vegetables. Thirty-eight percent of the firms indicated

that celery was their most important crop. Sweet corn ranked second in importance in many of the firms where celery was the principal vegetable handled and vice versa. Celery ranked second where sweet corn was most important. Either snap beans, cucumbers, radishes or lettuce was the most important vegetable handled by the remaining 20 percent of the firms.

Although sweet corn was an important crop to most firms and the leading one for 42 percent of the firms, it still may not be assumed that the policies and marketing practices of the firms were not affected by the marketing requirements of other vegetables. Celery was particularly important to most firms. Even though the other vegetables were not considered individually important for some firms the relative importance of sweet corn to the firms was diminished when the entire array of vegetables was considered.

Brokers

Due to the large number of brokers handling sweet corn no attempt was made to obtain a complete census as was done for the sales firms. Judgment samples of brokers handling sweet corn were selected and interviews were made to obtain information on their methods of organization and operation. A quantitative measure of numbers, size and other factors was not obtained, but a fairly complete picture of their role was presented by those interviewed.

A broker, by definition, is one whose business it is to bring together a seller and buyer who are ready, willing and able to trade. His authority is limited in the particular duty he undertakes by the instructions of the seller or buyer he is acting for.

Although all sweet corn brokers interviewed fell under this definition, their methods of operation and functions varied widely because (1) they were agents for different principals, and (2) they operated under different instructions. Brokers may be classified according to the identity of their principals either as buying brokers or as selling brokers.

Buying Brokers

The buying broker is the buyers' representative at the shipping point and the fees for his services are paid by the buyer. His job is to negotiate the purchase of sweet corn according to the instructions of the buyer. The interest of the broker is in seeing that sweet corn purchases meet the quality, size, price and other requirements desired by the buyer. Such purchases may be made in the name of the broker or the buying firm itself.

Buying brokers, as such, were relatively unimportant in the Florida sweet corn industry. Some sales were made on this basis, but as a rule, terminal buyers have not paid brokerage to shipping point brokers in Florida.

Selling Brokers

The selling broker is the representative of the local seller and his services are paid for by the seller. The job of the selling broker is to negotiate the sale according to the instructions of the seller. The interest of the broker in this case is to sell sweet corn at the most favorable terms for the seller. The arrangements between the broker and seller vary widely according to the needs and interests of each. The more common arrangements and practices followed by brokers are discussed briefly.

Sweet corn sold through selling brokers may be invoiced either to the broker or the buyer, just as with the buying broker. Through trade practices in Florida, most corn is invoiced to the broker who, in turn, invoices it to the buyer. The broker collects from the buyer and then remits the payment to the seller, less brokerage fees. In actual practice most brokers pay the seller before receiving the remittance from the buyer. The seller may or may not know who the buyer of the corn was under this arrangement.

Some shipping point brokers handle corn for several sales firms while others handle corn for only one, or a few. The distinction must be kept in mind between a broker who handles corn for sales firms and one who handles corn for growers. Under the definition used for a sales firm in this study, a broker handling corn directly for growers is classified as a sales firm since he is the first handler. This is applicable even though the grower may pay a "brokerage fee," rather than pay a share of "selling cost" as may be the case for other sales firms.

The number of buyers to whom brokers sell varies considerably. Most brokers have a limited number of buyers with whom they tend to work on a recurring basis. Some brokers make practically all their sales to a single buyer. These brokers become very well acquainted with the needs of the buyer as well as with sources of sweet corn. Although these brokers obtain corn from several sellers and generally use only one buyer outlet, they are still acting as selling brokers by definition since their services are paid for by the seller. Selling brokers operating under these arrangements are sometimes confused with buying brokers.

CHAPTER IV

MARKET STRUCTURE AND PRACTICES AT THE SHIPPING POINT

The basic organizational framework of the Florida sweet corn industry as it existed in the 1962-63 marketing season was discussed in the previous chapter. This discussion does not relate how the industry functions within this framework. The purpose of Chapters IV and V is to describe the details of Florida sweet corn marketing based on data from the sample of shipment invoices, or stated another way, it is to reveal the "whos, hows, whens and wheres" of the industry's marketing. Chapter IV is concerned with the functions at the shipping points and Chapter V with those at the terminal markets.

Sales Firms and Volume Observed

A stratified random start systematic sample of the shipment invoices was collected from 19 of the 25 commercial sweet corn sales firms in Florida. Data could not be obtained from the remaining six firms. Ten percent of the shipment invoices, exclusive of interpackinghouse sales, were selected from each firm according to the sample design. Interpackinghouse sales were handled separately since they did not move directly into the primary channels of trade, but were more correctly a type of transfer between sales firms.

The sample included 8.7 percent of the 8,200,731 crates of

sweet corn handled by the 25 sales firms operating in Florida during the 1962-63 season. The rate of sampling varied between the three sales areas. The highest sampling rate was 9.3 percent in the Belle Glade area. The lowest sampling rate was in South Florida where only 4.1 percent of the area's sales were included. This was lower than desired, but the total sample rate was not greatly affected since this area accounted for only 9 percent of the Florida sales. The sample from the Central Florida area included 8.6 percent of the area's sales.

A total of 2,533 shipment invoices, exclusive of interpackinghouse sales, was selected for this sample. An additional 239 interpackinghouse invoices were observed. A total of 711,758 crates of sweet corn was accounted for in the invoices sampled and the average size of sale was 281 crates. The value of the sweet corn included in the sample was \$1,507,839 and the weighted average price per crate was \$2.12.

Grades

The proportions of sweet corn which were classified in the various grades were substantially different in this study from those observed by Showalter et al., for the 1953-54 season.¹ From a sample of 2,224 invoices for the 1953-54 season it was found that 73 percent was U. S. Fancy, 12 percent U. S. No. 1 and 13 percent U. S. No. 2. Unclassified corn made up the

¹ Showalter et al., op. cit., p. 16.

remaining 2 percent of the shipments.

There were no U. S. No. 1 or U. S. No. 2 grade shipments observed in this current study for the 1962-63 season. These grades make provisions for the tip of the ear to be clipped. U. S. Fancy corn must not be clipped and the ear must be at least six inches long. Since ear damage is rigidly controlled with the production practices used in Florida, it is not necessary to clip the corn. Thus, practically all corn may be classified as U. S. Fancy except that which does not meet ear length or has minor defects. Shippers included in this study did not like to sell corn which did not meet the U. S. Fancy grade as U. S. No. 1 or U. S. No. 2 because their unclipped corn was generally considered to be superior in quality to clipped corn from other production areas which used these latter two grades.

Therefore, a system of stating the percentage of U. S. Fancy was developed. Sweet corn of the U. S. Fancy grade has a tolerance of 10 percent, by count, which may fail to meet the grade requirements. For corn in Florida which exceeded these tolerances the percentage of corn meeting the U. S. Fancy grade requirements was stated rather than down grading the corn. For example, a lot may be graded and invoiced as "85 percent or better U. S. Fancy." This differentiates Florida corn from that originating in other states which failed to meet the Fancy grade because the ears had to be clipped.

For purposes of this study the percentage quotations were divided in two grade classifications--85 to 89 percent U. S. Fancy and 75 to 84 percent U. S. Fancy. Corn below 75 percent U. S. Fancy or ungraded corn was sold as Unclassified.

The proportion of U. S. Fancy corn marketed rose from 73.0 percent in the 1953-54 season to 92.5 percent in the 1962-63 season (Table 11). White corn, which was normally not graded, accounted for 3.5 percent of the 1962-63 shipments. The "percentage grades" were relatively unimportant to the total volume of sweet corn shipped. Sweet corn falling in the 85-89 percent U. S. Fancy grade accounted for 2.4 percent of the total shipments and that in the 75-84 percent U. S. Fancy category accounted for only 1.3 percent. Only 0.3 percent of the observed corn was Unclassified.

Table 11.--Number of sales and crates shipped, percentage of crates shipped, average size of sale, value of shipments and average price per crate, by grade and type, 19 Florida sweet corn sales firms, 1962-63 season

Grade and Type	Sales		Crates		Average Size of Sale	Value of Shipments	Average Price Per Crate
	Number	Number	Percent	Crates	Dollars	Dollars	
U.S. Fancy yellow	2,327	658,495	92.5	283	1,388,606	2.11	
85-89 percent U.S. Fancy yellow	83	17,221	2.4	207	39,768	2.31	
75-84 percent U.S. Fancy yellow	52	9,036	1.3	174	16,004	1.77	
Unclassified yellow	13	2,036	.3	157	3,430	1.68	
Unclassified white	256	24,970	3.5	98	60,031	2.40	
Total or Average	2,731 ^a	711,758	100.0	281	1,507,839	2.12	

^aThis number observed on 2,533 invoices since some invoices accounted for more than one shipment.

Weeks of Shipment

Data were summarized by weekly time periods to determine the

"whens" of sweet corn marketing. Sweet corn shipments were observed during 40 weeks, beginning with the second week of October and ending with the second week of July.

Based on graphic analysis of prices and shipments of sweet corn, the marketing season was divided into two parts. The first, fall and winter, extended from the week of October 8 through February 18 and the second, spring, extended from the week of February 25 through July 8. A pronounced shift occurred in the relationship between prices and shipments between these periods.² For that reason the periods are analyzed separately.

Grades

It was hypothesized by several sales managers interviewed that the proportion of "percentage grade" corn marketed was affected both by the season and the price level. During the fall and winter months, when the growing season is often unfavorable, a higher proportion of "percentage grade" corn is available for marketing. The existence of this corn encourages sales firms to market it, but the amount actually marketed is also affected by the price level. According to the sales managers, a positive relationship exists between the level of prices and the amount of the "percentage grade" corn marketed. During periods of low prices much or all of the corn that does not make the U. S. Fancy grade may be left in the fields because it is not profitable to pick, handle and market

²This phenomenon is discussed under "Graphic Analysis" in Chapter VIII.

this corn. During periods of high prices the returns from "percentage grade" corn may be high enough to make its' marketing profitable.

Evidence that this phenomenon occurred may be observed in Table 12. The proportion of "percentage grade" corn shipped was highest from January through April. The average prices of all corn ranged from \$2.00 to \$4.00 per crate during this period. Average prices were generally under \$2.00 per crate during May, June and July and shipments of "percentage grade" corn dropped to a very low level.

The pooled and paired t test as discussed by Steel and Torrie were used to compare two means during several instances in this chapter.³ The pooled t test was used to determine if a significant difference existed between the average proportion of "percentage grade" corn sold during the fall and winter season and the spring season.⁴ An average of 8.3 percent during the fall and winter and 3.6 percent during the spring was "percentage grade" corn. Each season had 20 weekly observations; thus, there were 38 pooled degrees of freedom. The calculated t was 1.52.⁵ It was concluded that even though the proportion of "percentage grade" corn marketed during the fall and winter was higher than during the spring, the difference was not statistically significant due to the wide week-to-week variations.

³ Robert G. D. Steel and James H. Torrie, Principles and Procedures of Statistics (New York: McGraw-Hill Book Company, Inc., 1960), pp. 73-81.

⁴ The use of the pooled t test and other statistical tests to determine the reliability of results are discussed in Appendix C.

⁵ See Appendix C.

Table 12.--Distribution of crates shipped and average price per crate, by grade and week of shipment, 19 Florida sweet corn sales firms, 1962-63 season

Monday of Week	Grade and Type																	
	U.S. Fancy Yellow			85-89 Percent U.S. Fancy Yellow			75-84 Percent U.S. Fancy Yellow			Unclassified Yellow			Unclassified White			All Grades and Types		
	Crts. Ship.	Avg. Price	Dol.	Crts. Ship.	Avg. Price	Dol.	Crts. Ship.	Avg. Price	Dol.	Crts. Ship.	Avg. Price	Dol.	Crts. Ship.	Avg. Price	Dol.	Crts. Ship.	Avg. Price	Dol.
Oct. 8	87.0	\$2.15	\$--	--	--	\$--	--	--	--	--	\$--	--	13.0	\$2.39	100.0	\$2.18		
15	76.4	2.33	1.53	--	--	--	--	--	--	--	--	--	23.5	2.42	100.0	2.31		
22	88.5	2.03	--	--	--	--	3.6	1.80	--	--	--	7.9	2.47	100.0	2.05			
29	85.0	2.08	1.78	4.3	1.4	1.90	--	--	--	--	--	9.3	2.66	100.0	2.12			
Nov. 5	80.8	2.44	2.15	2.2	1.7	2.15	2.2	2.50	2.2	2.2	2.50	13.1	2.20	100.0	2.40			
12	92.8	2.85	--	--	--	--	--	--	--	--	--	7.2	2.66	100.0	2.84			
19	87.2	2.34	--	--	1.8	1.75	7.0	1.75	7.0	1.75	1.75	4.0	2.37	100.0	2.29			
26	94.4	1.87	1.40	1.2	--	--	--	--	--	--	--	4.4	1.16	100.0	1.83			
Dec. 3	95.2	2.23	--	--	--	--	1.8	1.95	1.8	1.95	1.95	3.0	2.42	100.0	2.23			
10	72.0	3.19	3.17	22.1	--	--	--	--	--	--	--	5.9	3.04	100.0	3.17			
17	84.6	3.35	--	--	--	--	--	--	--	--	--	15.4	2.99	100.0	3.30			
24	82.3	3.98	2.46	8.3	--	--	--	--	--	--	--	9.4	2.04	100.0	3.67			
31	52.3	3.40	3.47	31.8	--	--	--	--	--	--	--	15.9	2.54	100.0	3.29			
Jan. 7	51.2	3.92	2.57	18.3	--	--	--	--	--	--	--	30.5	3.06	100.0	3.41			
14	82.8	4.43	1.95	7.0	--	--	--	--	--	--	--	10.2	2.97	100.0	4.11			
21	72.7	3.27	3.21	27.3	--	--	--	--	--	--	--	--	--	100.0	3.25			
28	88.1	3.38	2.98	8.4	3.5	2.90	--	--	--	--	--	--	--	100.0	3.33			
Feb. 4	99.9	3.42	--	--	.1	2.50	--	--	--	--	--	--	--	100.0	3.42			
11	89.4	3.20	2.83	10.6	--	--	--	--	--	--	--	--	--	100.0	3.16			
18	92.7	3.34	--	--	1.3	2.04	--	--	--	--	--	6.0	3.27	100.0	3.32			
25	98.6	3.26	--	--	.6	1.75	--	--	--	--	--	2.8	3.26	100.0	3.26			

March 4	88.5	3.32	5.4	2.41	.6	1.75	--	--	5.5	3.00	100.0	3.24
11	88.0	2.99	5.4	2.75	2.3	1.59	--	--	4.3	3.30	100.0	2.95
18	91.5	2.47	1.4	2.11	4.1	1.50	1.7	1.49	1.3	3.07	100.0	2.41
25	94.3	2.26	.1	1.50	3.0	1.50	1.6	1.43	1.0	2.93	100.0	2.23
April 1	93.2	2.63	2.6	2.25	.8	1.75	--	--	3.4	3.08	100.0	2.62
8	90.7	2.64	5.3	2.41	2.3	2.18	--	--	1.7	2.93	100.0	2.62
15	88.9	2.58	3.6	2.34	4.6	2.02	--	--	2.9	2.95	100.0	2.56
22	87.9	2.56	5.1	2.32	4.0	1.96	.1	2.00	2.9	3.00	100.0	2.53
29	84.5	2.15	7.3	1.89	4.4	1.62	--	--	3.8	2.52	100.0	2.12
May 6	98.2	1.64	--	--	.2	1.50	--	--	1.6	2.01	100.0	1.65
13	91.6	1.54	1.3	1.75	--	--	--	--	7.1	2.06	100.0	1.58
20	95.7	1.49	--	--	--	--	--	--	4.3	1.63	100.0	1.50
27	94.9	1.41	1.5	1.75	--	--	--	--	3.6	2.10	100.0	1.44
June 3	97.3	2.04	a	2.35	--	--	--	--	2.7	2.02	100.0	2.04
10	99.2	1.77	a	1.60	--	--	--	--	.8	2.17	100.0	1.77
17	98.4	1.79	1.1	1.50	--	--	--	--	.5	2.25	100.0	1.79
24	100.0	2.47	--	--	--	--	--	--	--	--	100.0	2.47
July 1	98.3	2.21	1.7	2.30	--	--	--	--	--	--	100.0	2.21
8	100.0	1.80	--	--	--	--	--	--	--	--	100.0	1.80
Average	92.5	2.11	2.4	2.31	1.3	1.77	.3	1.68	3.5	2.40	100.0	2.12

^aLess than one-tenth of 1 percent.

As may be observed in Table 12, the seasonal average price was \$2.11 for U. S. Fancy, \$2.31 for 85-89 percent U. S. Fancy and \$1.77 for 75-84 percent U. S. Fancy. The higher average price for 85-89 percent U. S. Fancy resulted from the weekly shipping pattern where a larger volume of shipments of this grade occurred between January and April when prices were above average. Shipments of this grade were practically discontinued during May, June and July when prices averaged below \$2.00. Since average price was related to week of shipment in this manner, it was necessary to use some other method to estimate price differentials between grades.

A more accurate method of measuring price differentials was to measure the weekly deviations between U. S. Fancy and the "percentage grades" for weeks when shipments of both grades were observed. This method partially eliminated the effect of week of shipment on average prices.

A comparison between U. S. Fancy and 85-89 percent U. S. Fancy prices in which this method was used indicated that prices for 85-89 percent U. S. Fancy averaged 41 cents per crate below U. S. Fancy. The paired t test was used to determine if this difference was statistically significant. Since weeks in which no shipments were observed were eliminated, weekly paired price observations were reduced to 27. With the 41 cents per crate price differential the calculated t value was 3.96.⁶ This difference was significant as the 1 percent confidence level,

⁶See Appendix C.

so it may be concluded that for the weeks observed the average price of U. S. Fancy corn was significantly higher than that for 85-89 percent U. S. Fancy.

The average price of 75-84 percent U. S. Fancy was 77 cents less than that of U. S. Fancy during the weeks in which both were observed. Paired price observations were available for 17 weeks. The calculated t value was 7.00 which indicated significance at the 1 percent confidence level.⁷

When the \$2.12 per crate average was used as a base price for U. S. Fancy sweet corn, prices for other grades fell below this average. On the basis of these analyses the price of 85-89 percent U. S. Fancy would be expected to be \$1.71 per crate, or 19.4 percent less than the base price. Corn grading 75-84 percent U. S. Fancy would be expected to be \$1.35 per crate, or 36.5 percent less than the base price. These ratios may be expected to vary somewhat from season to season, but they can serve as a guideline for expected price differences between grades.

Sales Areas

The weekly pattern of sweet corn shipments from all Florida sales areas showed marked seasonal differences (Table 13). Weekly shipments began during the second week of October at the moderate rate of about 1 percent of total sales. With some week-to-week variations this rate continued until the first part of December.

⁷ See Appendix C.

Table 13.--Distribution of crates shipped of white and of all corn,
by sales area and week of shipment, 19 Florida sweet corn
sales firms, 1962-63 season

Monday of Week	Sales Area							
	Belle Glade		South Florida		Central Florida		All Areas	
	White only	All	White only	All	White only	All	White only	All
	<u>Percent</u>							
Oct. 8	4.7	1.5	--	--	--	--	4.4	1.2
15	3.6	0.8	--	--	--	--	3.4	0.7
22	3.0	1.6	--	--	--	--	2.8	1.2
29	2.7	1.2	--	--	--	--	2.6	1.0
Nov. 5	2.5	0.8	--	--	--	--	2.3	0.6
12	1.7	1.0	--	--	--	--	1.6	0.8
19	0.9	1.0	--	--	--	--	0.9	0.8
26	1.8	1.7	--	--	--	--	1.7	1.4
Dec. 3	1.6	2.2	--	--	--	--	1.5	1.8
10	1.2	0.9	--	--	--	--	1.1	0.7
17	1.0	0.3	--	--	--	--	1.0	0.2
24	0.5	0.2	--	--	--	--	0.5	0.2
31	1.3	0.3	--	--	--	--	1.2	0.3
Jan. 7	2.7	0.4	--	--	--	--	2.5	0.3
14	0.6	0.3	--	--	--	--	0.6	0.2
21	--	0.5	--	2.1	--	--	--	0.4
28	--	0.5	--	0.3	--	--	--	0.4
Feb. 4	--	0.5	--	0.5	--	--	--	0.5
11	--	0.8	--	1.5	--	--	--	0.7
18	1.2	0.7	--	2.2	--	--	1.1	0.6
25	1.0	1.5	--	0.9	--	--	1.0	1.2
March 4	1.9	1.4	--	2.0	--	--	1.8	1.2
11	1.8	1.9	100.0	6.1	--	--	2.1	1.7
18	1.3	3.6	--	14.6	--	--	1.2	3.4
25	1.3	4.4	--	24.3	--	--	1.3	4.5
April 1	4.8	5.1	--	15.8	--	--	4.6	4.7
8	1.9	4.3	--	12.1	--	--	1.8	3.9
15	3.2	4.3	--	4.8	--	--	3.0	3.6
22	4.5	6.1	--	6.7	--	--	4.2	5.1
29	9.6	10.1	--	5.8	--	--	9.1	8.2

Table 13.--Continued

Monday of Week		Sales Areas							
		Belle Glade		South Florida		Central Florida		All Areas	
		White only	All	White only	All	White only	All	White only	All
<u>Percent</u>									
May	6	4.7	12.5	--	0.3	--	0.1	4.5	9.8
	13	14.9	9.0	--	--	--	^a	14.2	7.0
	20	9.9	9.5	--	--	--	0.7	9.4	7.6
	27	4.9	6.3	--	--	47.1	10.3	6.9	6.7
June	3	3.3	2.3	--	--	21.6	21.7	4.2	5.5
	10	--	0.5	--	--	18.3	21.1	0.9	4.0
	17	--	0.1	--	--	13.0	23.3	0.6	4.0
	24	--	--	--	--	--	17.3	--	3.0
July	1	--	--	--	--	--	4.9	--	0.8
	8	--	--	--	--	--	0.6	--	0.1
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Percentage of Total			94.8	0.4	9.0	4.8	17.4	100.0	100.0

^aLess than one-tenth of 1 percent.

The rate then dropped to about one-half the fall rate and remained near this level through the third week of February. The rate rose sharply thereafter and reached the spring peak, a weekly rate of almost 10 percent, during the second week of May. Shipments declined during the remainder of the Florida season which ended during the second week of July.

Sweet corn sales were observed from the Belle Glade area during 37 of the 40 weeks (Table 13). The weekly pattern of shipments was similar to that discussed for Florida except that the Belle Glade season ended around the first week of June. Shipments from the South Florida area began during the third week of January, reached a peak during the last week of March and ended by the first week of May. Volume sales began from the Central Florida area during the third week of May, reached a peak during the third week of June and ended the second week of July.

White Corn

The Belle Glade area marketed 94.8 percent of the white corn (Table 13). The Central Florida area accounted for 4.8 percent of the white corn shipments and the remaining 0.4 percent was sold from the South Florida area.

The seasonal pattern of shipments of white corn varied from that for all corn. Although white corn shipments averaged only 3.5 percent of the weekly volume over the year, during the fall and winter the average weekly rate of shipment of white corn was 0.93 percent greater than that for all corn. The paired t test was used to test this difference and the calculated t value was 2.58, indicating

significance at the 5 percent confidence level.⁸ It was concluded that the average rate of shipment of white corn was higher in the fall and winter season and consequently lower in the spring than the average shipment rate of all corn.

Prices

The seasonal pattern of prices for sweet corn was inverse to that of shipments (Table 14). Prices averaged slightly above \$2.00 per crate from the second week of October through the first week of December. Prices then rose to a range of \$3.00 to \$4.00 and remained at this level throughout the winter. Prices declined after the first of March to a spring season low of \$1.44 during the last week of May. Prices then rose somewhat during the remainder of the season.

The season average prices within the three sales areas ranged from \$2.42 per crate in the South Florida area to \$1.97 in the Central Florida area. The average price in the Belle Glade area was \$2.13. The season average price received by an area was affected by the weeks in which shipments were made from that area. Even so, there was some evidence that price differences existed between sales areas, exclusive of the effect of week of shipment. Since shipments during any one week, with one exception, were observed from no more than two areas the paired t test was used to test these differences.

A comparison between Belle Glade and South Florida weekly prices during weeks when both areas shipped sweet corn indicated

⁸See Appendix C.

that the Belle Glade prices averaged 17 cents per crate, or 8 percent, higher during this 16-week period. Using the paired t test, the calculated value was 2.93, indicating significance at the 5 percent confidence level.⁹

Central Florida prices averaged 6 cents higher per crate than Belle Glade prices during the seven weeks when sales were made from both areas. Using the paired t test, the calculated value was 1.58.¹⁰ This indicated that no significant difference existed between the averages of these area prices.

Sizes of Sales

The average number of crates of sweet corn per sale varied substantially during different periods of the year (Table 15). During the early fall weeks, the average number of crates per sale ranged between 200 and 300. This gradually declined to a low of 53 crates during the second week of January. Thereafter, the average size sale gradually increased throughout the remainder of the season.

During the late fall and winter months buyers bought more mixed loads of vegetables. Many shipments of 25 or fewer crates were observed during this period. In the spring the mixed loads tended to decline and orders for solid loads of corn predominated. It was not uncommon during this period for a buyer to purchase several solid loads of corn at one time. It was during this period that the ability to supply large quantities of corn became more important to the sales firm.

⁹See Appendix C.

¹⁰See Appendix C.

Table 15.--Average size of sale, by sales area and week of shipment, 19 Florida sweet corn sales firms, 1962-63 season

Monday of Week	Sales Area				Monday of Week	Sales Area				
	Belle Glade		South Central Florida			Belle Glade		South Central Florida		
	All Areas		All Areas			All Areas		All Areas		
Oct. 8	358	--	--	358	March 4	106	--	75	--	103
15	246	--	--	246	11	147	--	186	--	152
22	288	--	--	288	18	238	--	202	--	230
29	204	--	--	204	25	272	--	294	--	277
Nov. 5	136	--	--	136	April 1	225	--	371	--	239
12	148	--	--	148	8	230	--	462	--	246
19	126	--	--	126	15	236	--	489	--	244
26	188	--	--	188	22	300	--	683	--	310
					29	361	--	586	--	365
Dec. 3	187	--	--	187	May 6	423	150	100	150	419
10	140	--	--	140	13	407	--	--	13	401
17	75	--	--	75	20	454	--	--	152	439
24	67	--	--	67	27	525	--	--	422	493
31	78	--	--	78						
Jan. 7	71	--	--	71	June 3	474	--	--	541	517
14	53	--	--	53	10	436	--	--	478	474
21	88	213	--	100	17	350	--	--	460	458
28	103	30	--	96	24	--	--	--	530	530
Feb. 4	114	35	--	103	July 1	--	--	--	605	605
11	100	64	--	96	8	--	--	--	700	700
18	93	131	--	97	Average	259	250	480	261	261
25	127	71	--	124						

The average size sale for the season was 259 crates from Belle Glade, 250 crates from South Florida and 480 crates from Central Florida. In order to eliminate the effect of week of shipment the differences between Belle Glade and other areas were tested using the paired t test. Sales from South Florida averaged 30 crates per shipment larger than Belle Glade shipments for the 16 weeks observed. The calculated t value was 1.20, indicating that no significant difference existed.¹¹

Shipments from Central Florida averaged 122 crates larger than those from Belle Glade for the seven weeks when both areas shipped corn. Due to the week-to-week variations and the small number of weeks observed, the 2.35 calculated t value indicated that this difference was not significant.¹²

Sizes of Sales Firms

Sales firms of different sizes were found to have substantially different seasonal shipment patterns (Table 16). Large and medium sales firms made practically all the fall and winter shipments from Florida. The rate of shipment from firms of all sizes increased in the spring, but the increase for small firms was greater than that for firms of other sizes. During the fall and winter large firms made 15.1 percent and medium firms made 15.4 percent of their total seasonal shipments. Small firms made only 1.0 percent of their shipments during this period.

This relationship was expected since a higher proportion

¹¹See Appendix C.

¹²See Appendix C.

Table 16.--Distribution of crates shipped, by size of sales firm and week of shipment, 19 Florida sweet corn sales firms, 1962-63 season

Monday of Week	Size of Sales Firm			
	Large	Medium	Small	All Sizes
				<u>Percent</u>
Oct. 8	.7	3.5	-	1.2
15	.5	1.5	-	.7
22	1.2	1.9	-	1.2
29	1.0	1.2	-	1.0
Nov. 5	.7	.7	-	.6
12	.8	1.1	-	.8
19	1.1	.2	-	.8
26	1.6	1.3	-	1.4
Dec. 3	2.0	1.7	-	1.8
10	.8	.3	-	.7
17	.2	.3	-	.2
24	.2	.2	-	.2
31	.3	.1	.4	.3
Jan. 7	.4	.1	-	.3
14	.3	.1	a	.2
21	.6	.1	-	.4
28	.5	.1	.3	.4
Feb. 4	.6	.1	-	.5
11	.8	.7	-	.7
18	.8	.2	.3	.6
25	1.5	.8	-	1.2
March 4	1.5	.5	-	1.2
11	2.3	.5	-	1.7
18	3.8	1.9	3.6	3.4
25	4.7	1.4	9.8	4.5
April 1	4.8	3.4	6.2	4.7
8	4.1	2.1	5.8	3.9
15	4.1	2.1	2.7	3.6
22	5.2	4.8	4.8	5.1
29	8.8	7.3	5.6	8.2
May 6	9.9	10.4	8.4	9.8
13	7.3	7.2	4.5	7.0
20	8.0	7.5	4.6	7.6
27	6.4	9.1	4.2	6.7
June 3	5.0	7.7	4.5	5.5
10	2.9	6.5	7.2	4.0
17	2.7	6.7	8.7	4.0
24	1.7	4.4	9.7	3.0

Table 16.--Continued

Monday of Week	Size of Sales Firm			
	Large	Medium	Small	All Sizes
	<u>Percent</u>			
July 1	.2	.3	7.6	.8
8	-	-	1.1	.1
Total	100.0	100.0	100.0	100.0
Percentage of Total	64.8	27.1	8.1	100.0

^sLess than one-tenth of 1 percent.

of small sales firms operated in the South and Central Florida areas than in the Belle Glade area. Only 3.5 percent of the shipments from the Belle Glade area were made by small sales firms, compared with 27.4 percent from South Florida and 17.7 percent from Central Florida.

Types of Buyers

The purpose of studying types of buyers was to determine the "whos" of marketing sweet corn. Who are the buyers of sweet corn during different seasons, from different sales areas and from different sizes of sales firms? Six types of terminal market buyers--chains, terminal brokers, wholesalers, jobbers, retailers and government--were considered in this analysis. Terminal brokers included both buying brokers and selling brokers who operate in the terminal markets.

Shipments from sales firms to local brokers, either buying or selling, were not included since most of these shipments were resold to one of the above types of buyers as discussed in Chapter III. Inclusion of local brokers in this analysis would have given a distorted picture of the terminal market buyers of Florida sweet corn. Nevertheless, the local broker plays an important role as a second handler. Sales firms included in the sample sold 12.5 percent of their volume to local brokers. This accounted for 480 of the 2,533 invoices observed and for 89,383 crates of corn.

The type of buyer could not be determined from the information available on 89 of the invoices observed. Shipments with unknown types of buyers accounted for only 0.1 percent of the volume handled. Shipments to unknown buyers were not included in the analysis since this would have introduced a bias in the distribution figures.

Two types of terminal market buyers--chain and wholesalers--accounted for over 90 percent of all shipments (Table 17). Sales to chains made up 45.5 percent of the shipments and sales to wholesalers 44.7 percent. Terminal broker sales accounted for 7.5 percent of the total. Sales to jobbers, retailers and government were relatively unimportant, accounting for only 2.3 percent of the shipments.

Practically no difference existed between the average price per crate for sales to chains and wholesalers. Average prices to other types of buyers varied from the over-all average of \$2.11, but care should be observed in interpreting these differences due to the limited number of observations for some types of buyers.

The average size sale to chain buyers was substantially

larger than that to other types of buyers. Chain sales averaged 373 crates per shipment while sales to wholesalers averaged 288 crates. The average size of sale to terminal brokers, 308 crates, was slightly higher than that to wholesalers. Sales to the other types of buyers averaged from 148 to 172 crates.

Table 17.--Number of sales and crates shipped, percentage of crates shipped, value of shipments and average price per crate, by type of buyer, 19 Florida sweet corn sales firms, 1962-63 season

Type of Buyer	Sales		Crates	Value of Shipments	Average Price Per Crate
	Number	Number	Percent	Dollars	Dollars
Chain	757	282,509	45.5	594,773	2.11
Terminal Broker	152	46,525	7.5	102,323	2.20
Wholesaler	966	277,847	44.7	583,515	2.10
Jobber	46	7,917	1.3	19,263	2.43
Retailer	10	1,485	.2	3,253	2.19
Government	33	5,241	.8	10,811	2.06
Total or Average	1,964	621,524	100.0	1,313,938	2.11

Sales Areas

Sales firms in the South Florida area sold a larger percentage of their corn direct to chains than did firms of other areas (Table 18). These sales firms sold 71.7 percent of their shipments to chains, compared with 44 percent sold to chains by firms in other areas. The higher shipments to chains in the South Florida area were offset by lower sales to wholesalers. Only 25.1 percent of the South Florida shipments were to wholesalers while 47.0 percent of the Belle Glade and 40.2 percent of the Central Florida shipments were to wholesalers.

Table 18.--Distribution of crates shipped, by sales area and type of buyer, 19 Florida sweet corn sales firms, 1962-63 season

Type of Buyer	Sales Area			
	Belle Glade	South Florida	Central Florida	All Areas
	<u>Percent</u>			
Chain	44.2	71.7	44.1	45.5
Terminal Broker	6.8	3.0	11.3	7.5
Wholesaler	47.0	25.1	40.2	44.7
Jobber	1.4	a	1.1	1.3
Retailer	.2	.1	.4	.2
Government	.4	.1	2.9	.8
Total	100.0	100.0	100.0	100.0
Percentage of Total	73.6	9.0	17.4	100.0

^aLess than one-tenth of 1 percent.

Terminal broker sales were most prevalent in the Central Florida area, accounting for 11.3 percent of the shipments, but only 3 percent of the South Florida shipments were made to terminal brokers. Sales to other types of buyers from all areas were relatively unimportant, but sales to government agencies were considerably more important in Central Florida than in other areas.

Weeks of Shipment

The weekly distribution of shipments was analyzed by types of buyers to determine if seasonal differences existed (Table 19). Since chains and wholesalers were so important, accounting for over 90 percent of the total, primary interest was to ascertain whether or not a seasonal shift occurred between these two types of buyers. Weekly

Table 19.--Distribution of crates shipped, by type of buyer and week of shipment, 19 Florida sweet corn sales firms, 1962-63 season

Monday of Week	Type of Buyer						All Types
	Chain	Terminal Broker	Whole- saler	Jobber	Retailer	Govern- ment	
Percent							
Oct. 8	30.8	7.2	53.7	8.3	--	--	100.0
15	32.1	--	59.9	7.8	--	--	100.0
22	46.9	.1	52.8	.2	--	--	100.0
29	54.8	--	43.3	1.9	--	--	100.0
Nov. 5	65.3	--	34.7	--	--	--	100.0
12	23.6	--	76.4	--	--	--	100.0
19	24.1	7.9	67.7	--	--	.3	100.0
26	48.3	5.5	45.9	--	--	.3	100.0
Dec. 3	74.4	2.7	22.5	.4	--	--	100.0
10	39.5	4.5	55.5	.5	--	--	100.0
17	32.7	--	64.6	2.7	--	--	100.0
24	74.5	--	25.5	--	--	--	100.0
31	55.9	2.6	33.6	6.7	--	1.2	100.0
Jan. 7	54.8	9.7	34.1	--	1.4	--	100.0
14	10.8	--	89.2	--	--	--	100.0
21	56.4	5.6	38.0	--	--	--	100.0
28	18.8	17.6	59.7	3.9	--	--	100.0
Feb. 4	49.2	4.2	46.1	.5	--	--	100.0
11	41.9	10.3	45.3	2.3	--	.2	100.0
18	40.0	1.7	58.3	--	--	--	100.0
25	45.1	9.2	39.6	6.1	--	--	100.0
March 4	40.5	--	59.5	--	--	--	100.0
11	38.1	12.2	38.4	10.6	--	.7	100.0
18	45.0	12.1	42.3	.4	.1	.1	100.0
25	62.9	11.9	24.9	.3	--	--	100.0
April 1	47.4	13.1	37.4	2.0	--	.1	100.0
8	40.2	6.9	51.4	1.3	--	.2	100.0
15	43.8	1.3	50.5	1.2	3.1	.1	100.0
22	33.0	9.9	54.6	.9	.1	1.5	100.0
29	45.9	8.5	43.8	1.4	.3	.1	100.0

Table 19.--Continued

Monday of Week	Type of Buyer						
	Chain	Terminal Broker	Whole- saler	Jobber	Retailer	Govern- ment	All Types
	<u>Percent</u>						
May 6	49.6	3.9	45.4	.1	.1	.9	100.0
13	49.2	2.2	46.0	1.7	--	.9	100.0
20	48.2	8.2	42.9	--	.1	.6	100.0
27	51.6	2.7	45.0	.2	.5	--	100.0
June 3	44.1	6.8	47.0	2.1	--	--	100.0
10	39.6	20.5	35.6	--	.7	3.6	100.0
17	36.0	16.8	42.2	1.7	.4	2.9	100.0
24	36.8	5.9	49.3	--	--	8.0	100.0
July 1	34.7	11.6	42.2	11.5	--	--	100.0
8	--	--	100.0	--	--	--	100.0
Average	45.5	7.5	44.7	1.3	.2	.8	100.0

sales to other types of buyers tended to be more sporadic and no definite pattern was apparent.

Pooled t tests were used to determine whether a significant difference existed between the fall and winter season and the spring season in the percentage of shipments handled by chains and wholesalers. Twenty weeks were observed in the fall and winter and 19 in the spring when sales were made to chains. The average percentage sold to chains was only 0.1 percent greater in the spring than in the fall and winter. The calculated t value was 0.02, indicating that no significant difference existed in the percentage sold to chains between these two seasons.¹³

The average percentage of shipments sold to wholesalers in the fall and winter was 6.2 percent larger than in the spring. Most of the decrease in the spring was accounted for by increased shipments to the three minor types of buyers--jobbers, retailers and government. The distribution of shipments was observed for 20 weeks in the fall and winter and 19 weeks in the spring. The calculated t value was 1.48, indicating nonsignificance.¹⁴ It may be concluded that even though some differences in the seasonal pattern of shipments were observed, they were not large enough to conclude that a shift in the seasonal pattern of shipments to wholesalers occurred.

Sizes of Sales Firms

Little difference was observed in the types of buyers to

¹³See Appendix C.

¹⁴See Appendix C.

which large and medium sales firms sold sweet corn. Small firms tended to sell more to chains and less to wholesalers and terminal brokers (Table 20). Small sales firms sold 61.1 percent of their volume to chains, while large and medium firms sold 44.6 and 41.2 percent, respectively. Small firms sold 32.6 percent of their volume to wholesalers--about 14 percent less than large and medium firms.

Table 20.--Distribution of crates shipped, by size of sales firm and type of buyer, 19 Florida sweet corn sales firms, 1962-63 season

Type of Buyer	Size of Sales Firm			
	Large	Medium	Small	All Sizes
	<u>Percent</u>			
Chain	44.6	41.2	61.1	45.5
Terminal Broker	7.7	8.1	4.5	7.5
Wholesaler	45.8	46.3	32.6	44.7
Jobber	.9	2.7	1.2	1.3
Retailer	.2	.4	.1	.2
Government	.8	1.3	.5	.8
Total	100.0	100.0	100.0	100.0
Percentage of Total	64.8	27.1	8.1	100.0

Bases of Sale

Bases of sales were analyzed to determine the "hows" of marketing Florida sweet corn. How were the various bases of sales used in the sales areas, during different seasons, by different sizes of firms and by different types of buyers? Six bases of sales, f.o.b., delivered, price arrival, cash, joint account and consigned, were considered in these analyses.

Two bases of sales, f.o.b. and delivered, accounted for

95.9 percent of the shipments observed (Table 21). F.o.b. sales, by far the most prevalent, accounted for 86.5 percent of the shipments. Consigned sales was the third most important basis of sale used, but accounted for only 2.8 percent of the crates sold. Other bases of sale were observed only sporadically and accounted for only 1.3 percent of the volume marketed.

The season average price for f.o.b. shipments was \$2.12, the same as the average for all shipments. The average price of delivered sales was slightly lower at \$2.04. Average prices for other bases of sale varied substantially from that for f.o.b. sales, but since the observations were limited, this difference probably resulted more from week of shipment or some possible third factor than it did from the basis of sale used.

Table 21.--Number of sales and crates shipped, percentage of crates, value of shipment and average price per crate, by basis of sale, 19 Florida sweet corn sales firms, 1962-63 season

Basis of Sale	Sales		Crates	Value of Shipments	Average Price Per Crate
	Number	Number			
F.o.b.	2,140	616,071	86.5	1,307,497	2.12
Delivered	245	66,704	9.4	136,168	2.04
Price Arrival	4	2,800	.4	4,879	1.74
Cash	90	902	.1	2,009	2.23
Joint Account	12	5,479	.8	11,042	2.02
Consigned	42	19,802	2.8	46,244	2.34
Total or Average	2,533	711,758	100.0	1,507,839	2.12

The average number of crates per sale varied from 700 for price arrival sales to 10 for cash sales. F.o.b. sales averaged 305 crates,

somewhat larger than the average for all types of sales, which was 281 crates. The average size of delivered sales was below the average at 272 crates. Consigned sales average 471 crates, considerably larger than f.o.b. and delivered sales.

Sales Areas

No appreciable difference existed between the use of f.o.b. and delivered sales in the Belle Glade and South Florida areas (Table 22). The volume of corn consigned from Belle Glade was substantially larger than from South Florida probably because of the differences in seasonal movement between the areas and perhaps from a difference in sales policies of firms. Other bases of sale were of minor importance in the Belle Glade area and were not observed in the South Florida area.

Table 22.--Distribution of crates shipped, by sales area and basis of sale, 19 Florida sweet corn sales firms, 1962-63 season

Basis of Sale	Sales Area			
	Belle Glade	South Florida	Central Florida	All Areas
	<u>Percent</u>			
F.o.b.	88.7	90.1	76.0	86.5
Delivered	7.3	9.6	18.7	9.4
Price Arrival	.5	-	-	.4
Cash	.1	-	.2	.1
Joint Account	1.0	-	-	.8
Consigned	2.4	.3	5.1	2.8
Total	100.0	100.0	100.0	100.0
Percentage of Total	73.6	9.0	17.4	100.0

The percentage of f.o.b. shipments was substantially lower and delivered and consigned shipments were higher in the Central Florida area. F.o.b. shipments in the Central Florida area were 13 percent less than in other areas. Delivered shipments accounted for 18.7 percent and consigned shipments 5.1 percent of the total. This rate of consignment in the Central Florida area was more than twice that in the Belle Glade and South Florida areas where the Marketing Order and the Exchange were in operation. This again reflects a difference in sales policies among firms.

Weeks of Shipment

The f.o.b. sale, which ranged from 59.6 to 100.0 percent of weekly shipments, was the predominant basis of sale used throughout the season (Table 23). Delivered sales were observed during most weeks, but other bases of sale were observed only sporadically.

Since the f.o.b. basis of sale was of such major importance, the pooled t test was used to determine if a seasonal difference existed in the use of this basis of sale. Based on 20 weekly observations for each season, it was determined that f.o.b. sales in the fall and winter averaged 3.3 percent higher than in the spring. A calculated t value of 1.20 indicated that this difference was not significant.¹⁵ It was concluded that no shift between f.o.b. and other bases of sale occurred between the seasons.

Some sales managers suggested that consigned sales were used more during periods of declining prices than during periods of rising

¹⁵See Appendix C.

Table 23.--Distribution of crates shipped, by basis of sale and week of shipment, 19 Florida sweet corn sales firms, 1962-63 season

Week of Shipment	Basis of Sale							All Bases
	F.o.b.	Delivered	Price Arrival	Cash	Joint Account	Consigned		
								Percent
Oct. 8	59.6	5.8	--	--	28.2	6.4	100.0	
15	88.2	4.3	--	--	7.5	--	100.0	
22	85.4	14.6	--	--	--	--	100.0	
29	99.9	--	--	.1	--	--	100.0	
Nov. 5	90.0	9.9	--	.1	--	--	100.0	
12	90.2	9.8	--	a	--	--	100.0	
19	73.8	1.1	--	.9	6.6	17.6	100.0	
26	91.4	4.3	--	.2	--	4.1	100.0	
Dec. 3	87.1	11.2	--	.1	--	1.6	100.0	
10	98.6	1.4	--	a	--	--	100.0	
17	92.7	6.3	--	1.0	--	--	100.0	
24	93.7	--	--	.4	--	5.9	100.0	
31	90.2	9.2	--	.6	--	--	100.0	
Jan. 7	97.6	--	--	2.4	--	--	100.0	
14	99.7	--	--	.3	--	--	100.0	
21	95.8	1.1	--	--	--	3.1	100.0	
28	86.3	3.3	--	--	3.5	6.9	100.0	
Feb. 4	97.5	.6	--	a	--	1.9	100.0	
11	89.1	2.8	--	.1	2.0	6.0	100.0	
18	97.0	2.9	--	.1	--	--	100.0	
25	85.6	1.2	8.2	a	--	5.0	100.0	
March 4	98.3	1.7	--	a	--	--	100.0	
11	85.4	8.8	--	.1	--	5.7	100.0	
18	89.6	4.6	--	.1	--	5.7	100.0	
25	89.9	5.6	--	.1	--	4.4	100.0	
April 1	87.5	8.8	--	.1	--	3.6	100.0	
8	96.6	3.0	--	.1	--	.3	100.0	
15	88.9	11.0	--	.1	--	--	100.0	
22	86.2	11.9	1.9	a	--	--	100.0	
29	91.1	6.1	--	a	1.2	1.6	100.0	

Table 23.--Continued

Week of Shipment	Basis of Sale							All Bases
	F.o.b.	Delivered	Price Arrival	Cash	Joint Account	Consigned	Percent	
May 6	88.6	9.3	1.0	.1	--	1.0	100.0	
13	89.0	9.6	1.4	^a	--	--	100.0	
20	81.2	10.5	--	.5	2.6	5.2	100.0	
27	89.1	10.1	--	.1	--	.7	100.0	
June 3	86.1	10.3	--	.1	--	3.5	100.0	
10	75.3	17.8	--	.3	--	6.6	100.0	
17	71.5	19.2	--	.1	--	9.2	100.0	
24	70.4	24.3	--	.1	--	5.2	100.0	
July 1	86.8	13.2	--	--	--	--	100.0	
8	100.0	--	--	--	--	--	100.0	
Average	86.5	9.4	.4	.1	.8	2.8	100.0	

^aLess than one-tenth of 1 percent.

prices. They reasoned that sales were more difficult to make when prices were falling, and, therefore, salesmen were forced to turn to consignments. In order to test this hypothesis all weeks were classified as those of rising or declining prices based on the direction of price movement from the previous week. Using the prices from Table 14, price rises were observed in 20 weeks and declines in 19 weeks. The week of October 8 could not be classified since the previous week's price was unknown.

The average percentage of consigned shipments was found to be 1.4 percent larger in weeks of declining prices than in weeks of rising prices. The pooled t calculated value was 1.34, and with 37 degrees of freedom it was nonsignificant.¹⁶ Although the difference may indicate that more corn was consigned during periods of declining prices, the difference was not large enough to make this a positive conclusion. Some firms have an established policy of consigned selling regardless of the trend of the market price.

Types of Buyers

F.o.b. was the predominant basis of sale used by all types of buyers except retailers and government. Delivered basis was most frequently used by these two types of buyers (Table 24).

Chains used only two bases of sale, f.o.b. which accounted for 86.8 percent of their purchases and delivered which accounted for 13.4 percent. Wholesalers used all bases of sale except cash although the volumes handled on bases other than f.o.b. were low.

¹⁶See Appendix C.

Table 24.--Distribution of crates shipped, by basis of sale and type of buyer, 19 Florida sweet corn sales firms, 1962-63 season

Type of Buyer	Basis of Sale						All Bases
	F.o.b.	Del.	Price Arr.	Cash	Joint Acct.	Cons.	
Percent							
Chain	86.6	13.4	-	-	-	-	100.0
Terminal Broker	53.1	5.6	4.5	-	1.6	35.2	100.0
Wholesaler	89.9	7.0	.3	-	1.7	1.1	100.0
Jobber	92.9	7.1	-	-	-	-	100.0
Retailer	14.1	85.9	-	-	-	-	100.0
Government	6.0	94.0	-	-	-	-	100.0
Local Broker	100.0	-	-	-	-	-	100.0
Unknown	-	-	-	100.0	-	-	-
Average	86.5	9.4	.4	.1	.8	2.8	100.0

Consigned sales, as would be expected, were largest to terminal brokers, accounting for 35.2 percent of the shipments to them. Slightly more than 1 percent of the volume sold to wholesalers was on consignment. All cash sales were to unknown types of buyers, but these accounted for only 0.1 percent of the total sales.

Sizes of Sales Firms

Small sales firms sold 95.3 percent of their shipments on an f.o.b. basis--almost 10 percent more than sales firms of other sizes (Table 25). Since small sales firms sold a higher proportion of their volume to chains, who buy predominantly on an f.o.b. basis, this relationship may have been expected. Large sales firms sold 10.6 percent of their volume delivered and medium and small firms sold progressively less.

Medium sales firms sold the highest percentage, 4.8 percent,

on a consigned basis. Large sales firms sold 2.5 percent of their volume on consignment and small firms only 0.1 percent.

Table 25.--Distribution of crates shipped, by size of sales firms and basis of sale, 19 Florida sweet corn sales firms, 1962-63 season

Basis of Sale	Size of Sales Firm			All Sizes
	Large	Medium	Small	
	<u>Percent</u>			
F.o.b.	85.5	86.4	95.3	86.5
Delivered	10.6	7.0	4.6	9.4
Price Arrival	.6	-	-	.4
Cash	.1	.4	-	.1
Joint Account	.7	1.4	-	.8
Consigned	2.5	4.8	.1	2.8
Total	100.0	100.0	100.0	100.0
Percentage of Total	64.8	27.1	8.1	100.0

Interpackinghouse Sales

Interpackinghouse sales are not sales in the sense that they enter directly into the primary channels of trade. They may more accurately be called exchanges between packinghouses. By mutual agreement between the sales firms, a discount is usually allowed by the selling firm to cover the selling cost of the purchasing firm. This discount makes it possible for the purchasing firm to cover the marketing cost involved in placing the corn into the primary channels of trade and still sell at the competitive market price. The selling firm foregoes the normal selling revenue, but does not have the marketing expense of placing the corn in the primary channels of trade.

The volume of interpackinghouse movement was 71,873 crates or about 10 percent of the observed sales. This volume was observed on 239 shipment invoices and the average size of interpackinghouse sale was 301 crates. This is slightly larger than the average of 281 crates per sale for corn which was entered into the primary channels of trade. The value of the interpackinghouse sales was \$161,491 and the season average price was \$2.25.

Grades

The distribution of the grades of corn handled through interpackinghouse sales was not substantially different from that observed for other sales. U. S. Fancy accounted for 93.5 percent of the interpackinghouse volume, compared with 92.5 percent for other types of sales. White corn accounted for 3.8 percent of the interpackinghouse shipments and 3.5 percent of the other shipments. The "percentage grades" accounted for the remaining 2.7 percent of interpackinghouse shipments, compared with 4.0 percent for other shipments.

Sales Areas

Over 98 percent of the interpackinghouse movement was observed in the Belle Glade sales area. Although interpackinghouse sales were observed occasionally in other areas, they were a common marketing practice only in the Belle Glade area.

Sizes of Sales Firms

An interpackinghouse transaction may be considered as either a sale or a purchase to a sales firm depending on whether the corn is bought or sold. Both sides of the picture must be considered in order to understand the use of interpackinghouse sales at the shipping point.

Large sales firms predominated in the making of interpackinghouse sales, but medium firms were predominant in purchases (Table 26). Large firms accounted for 75.2 percent of the interpackinghouse sales, but only 44.8 percent of the purchases. Medium firms, which accounted for only 18.1 percent of the sales, accounted for 48.9 percent of the purchases. Little difference was evident between sales and purchases for the small firms.

Substantial differences were observed between the percentages of sales and purchases accounted for by individual firms (Table 26). Interpackinghouse sales of individual firms ranged from 0 to 32.4 percent of the observed volume and purchases ranged from 0 to 34.2 percent. No particular pattern between sales and purchases of the firms was apparent. Some firms with large interpackinghouse sales had very low purchases and vice versa.

Weeks of Shipment

A comparison between Tables 13 and 27 revealed that the pattern of weekly shipments of interpackinghouse sales followed that of other shipments closely. The trend of sales which were entered into the primary channels of trade tended to be followed by interpackinghouse sales from October through May, but interpackinghouse sales were practically discontinued during June and July. This may be accounted for by Central Florida's domination of the market during this period and the fact that interpackinghouse sales were not used in this area to an appreciable extent.

A comparison between Tables 14 and 27 revealed that weekly average prices of interpackinghouse shipments and all other shipments

Table 26.--Distribution of crates shipped and purchased as interpacking-house sales, by sales firm and size of sales firm, 19 Florida sweet corn sales firms, 1962-63 season

Sales Firm Size and Sales Firm	Type of Transaction	
	Sale	Purchase
	<u>Percent</u>	
Large:		
A	2.0	1.8
B	7.4	9.0
C	13.7	1.8
D	4.9	17.1
E	32.4	6.6
F	a	2.4
G	12.6	.6
H	2.2	5.5
Subtotal	75.2	44.8
Medium:		
I	a	.1
J	12.2	2.3
K	3.5	11.4
L	a	.9
M	2.4	34.2
Subtotal	18.1	48.9
Small:		
N	-	2.6
O	a	1.1
P	5.2	-
Q	.4	-
R	1.1	-
S	-	2.6
Subtotal	6.7	6.3
Total	100.0	100.0

^aLess than one-tenth of 1 percent.

were closely related although some week-to-week variations occurred. The seasonal average price of interpackinghouse shipments were \$2.25 and that of all other shipments was \$2.12. The average price for all other shipments was lower because interpackinghouse sales were discontinued during June and July. A comparison of prices during the weeks when interpackinghouse sales were active, October through May, showed the average price of interpackinghouse sales to be \$2.60 and all other sales to be \$2.69. This was more typical of the expected difference during periods when interpackinghouse sales were used.

Table 27.--Distribution of crates shipped and average price per crate of interpackinghouse sales, by week of shipment, 19 Florida sweet corn sales firms, 1962-63 season

Monday of Week	Crates Shipped	Price per Crate
	Percent	Dollars
Oct. 8	3.1	1.83
15	.3	2.29
22	.2	2.40
29	2.1	2.02
Nov. 5	1.4	2.58
12	2.2	2.93
19	.3	2.40
26	1.5	1.93
Dec. 3	7.3	2.07
10	1.9	3.27
17	^a	2.40
24	.4	3.45
31	.8	3.61
Jan. 7	.6	3.75
14	.5	4.36
21	.5	2.72
28	.1	3.23
Feb. 4	^a	2.95
11	.6	3.21
18	1.0	3.02
25	1.7	3.21
March 4	.8	3.18
11	1.8	2.94
18	5.0	2.36
25	3.1	2.09
April 1	8.6	2.54
8	5.3	2.65
15	9.8	2.55
22	6.0	2.50
29	8.2	2.09
May 6	11.0	1.59
13	4.9	1.57
20	6.3	1.46
27	1.2	1.39
June 3	.4	1.75
10	^a	1.73
17	-	-
24	1.1	1.80
July 1	-	-
8	-	-
Total or Average	100.0	2.25

^aLess than one-tenth of 1 percent.

CHAPTER V

TERMINAL MARKET STRUCTURE AND PRACTICES

A total of 1,853 invoices on shipments to known market destinations was observed. The destinations were unknown for the remaining 680 invoices, most of which were to Florida brokers. Only shipment invoices with known destinations were included in the analysis of the terminal market distribution, since inclusion of unknown destinations would have introduced a bias in the distribution figures. Terminal markets for Florida sweet corn were grouped into six market areas of the United States, plus one for Canada. States included in each of these market areas may be observed in Figure 5.

The terminal market sample of 581,337 crates of sweet corn had a total value of \$1,228,891 (Table 28). The weighted season average f.o.b. Florida price was \$2.11 per crate with a range from \$2.30 in the Southwest market area down to \$1.93 in the Canadian area. The distribution of the sweet corn shipped into the various market areas ranged from 36.1 percent for the Northeast to 2.8 percent for the West. The Northeast, North Central and Southern market areas, the three most important areas, accounted for 82.1 percent of the corn marketed.

Season average prices for the market areas appeared to be affected substantially by the period during which the shipments were

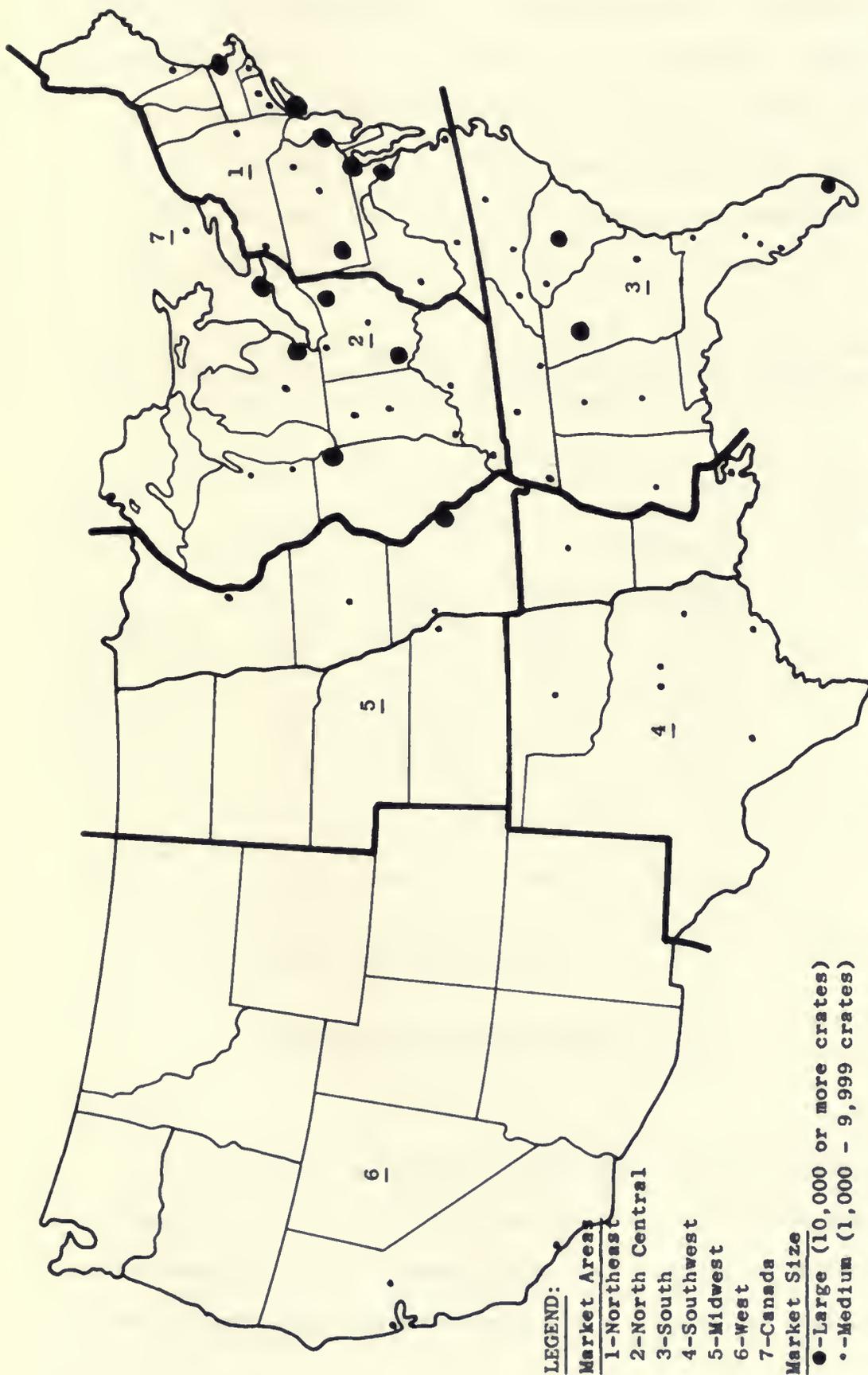


Figure 5.--Market areas and distribution of large and medium terminal markets 19 Florida sweet corn sales firms, 1962-63 season.

heaviest to the various areas. A comparison between the Southwest and the Canadian market areas illustrated this. The largest percentage of shipments to the Southwest, where the average price was 37 cents higher than in Canada, were received during January and February when prices were high. The highest percentage of shipments were made to Canada during May, June and July, a low price period.

Table 28.--Number of sales and crates shipped, percentage of crates, value of shipments and average price per crate, by market area, 19 Florida sweet corn sales firms, 1962-63 season

Market Area	Sales		Crates		Value of Shipments	Average Price Per Crate ^a
	Number	Number	Percent	Dollars	Dollars	
Northeast	540	210,082	36.1	429,784	2.05	
North Central	354	135,822	23.4	289,121	2.13	
South	536	131,017	22.6	283,702	2.17	
Southwest	175	32,106	5.5	73,987	2.30	
Midwest	147	28,071	4.8	61,027	2.17	
West	31	16,357	2.8	37,411	2.29	
Canada	70	27,882	4.8	53,859	1.93	
Total or Average	1,853	581,337	100.0	1,228,891	2.11	

^aF.o.b. Florida shipping points.

Characteristics of the Market Areas

Seasonality

Three-week moving averages of the percentages of weekly shipments received by each marketing area were computed to determine the relative importance of the market areas during different periods of the year. These moving averages were used to smooth out some of the

week-to-week variations that occurred in the weekly distribution data (Figure 6).

Shipments to northern market areas were larger during the spring and early summer months, while shipments to southern market areas were heavier during the late fall and winter. A more detailed discussion of the seasonal patterns of shipments is presented in the subsequent discussion of shipments to individual market areas.

Terminal Market Sizes

Terminal markets were classified by size according to the number of crates of sweet corn shipped to that market during the 1962-63 season. Large markets, those receiving 10,000 or more crates, accounted for only 9.7 percent of the markets to which shipments were reported, but the 15 markets in this category accounted for 61.0 percent of the sweet corn shipped (Table 29). Medium markets, those receiving between 1,000 and 9,999 crates, represented 33.5 percent of the markets and 33.8 percent of the volume shipped. Small markets, those receiving less than 1,000 crates, accounted for 56.8 percent of the markets, but only 5.2 percent of the volume.

Ten of the 15 large terminal markets observed were located in the Northeast and North Central market areas. The three other large markets were located in the South, Midwest and Canada. Medium and small markets were observed in all market areas. A more detailed discussion of the size of the markets in each area is presented in the subsequent discussion of the individual market areas.

Sizes of Sales

The average number of crates of sweet corn per sale tended to

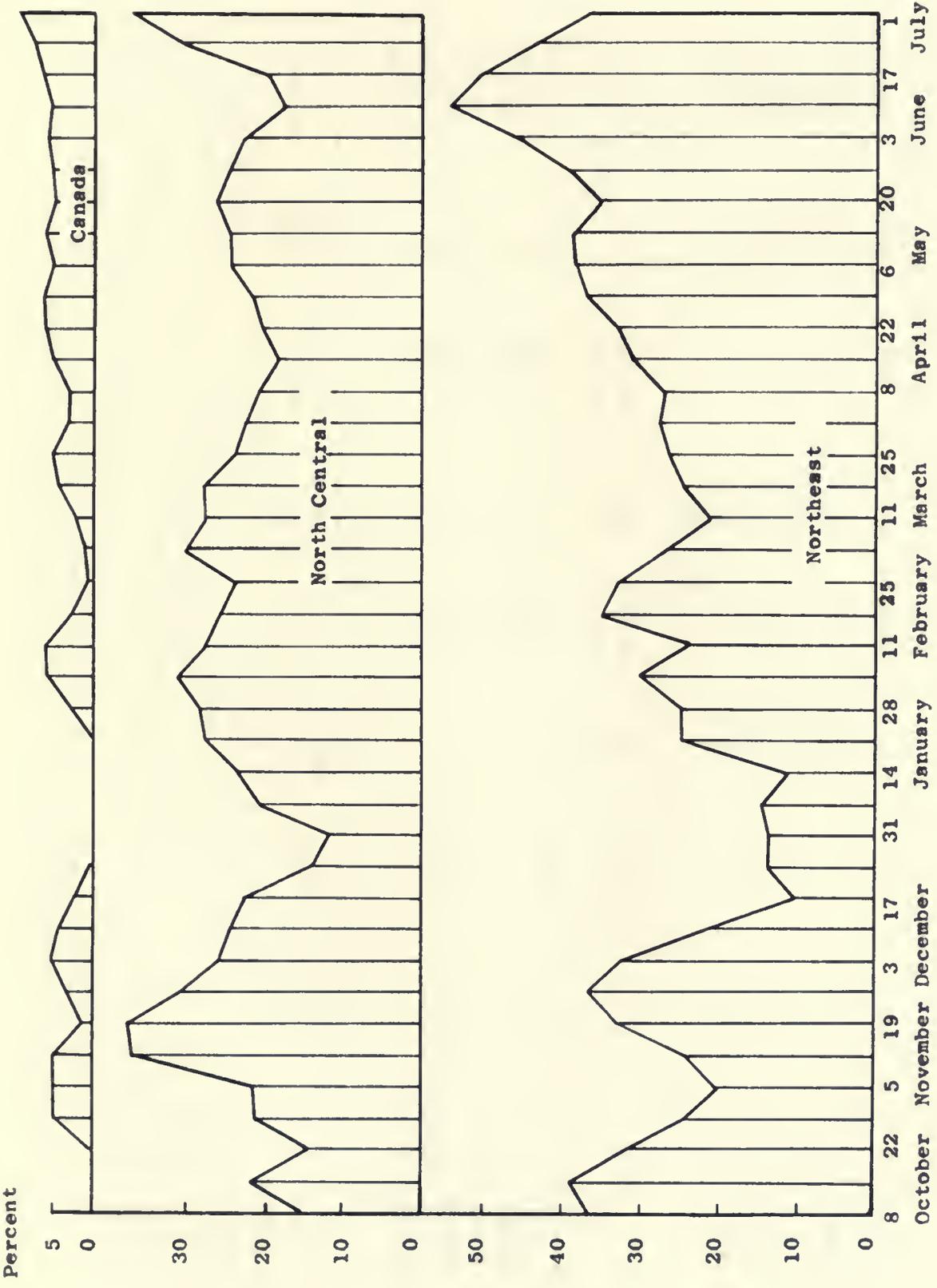


Figure 6.--Three-week moving average of percentages of weekly sweet corn shipments to seven market areas, 19 Florida sweet corn sales firms, 1962-63 season.

vary inversely with the distance between the Florida sales area and the market area. The average sale to the Western area, which was the greatest distance from Florida, was 520 crates, compared with an average of 241 crates for the Southern area. Sales to the Northeast averaged second largest at 392 crates per shipment. Although Canadian markets were more distant, these shipments averaged only 380 crates per shipment. Shipments to the North Central area also averaged 380 crates per shipment. The Southwest and Midwest areas were exceptions to this tendency. Southwest shipments averaged 172 crates and Midwest shipments averaged 190 crates per shipment.

Major Markets of the Market Areas

A more intensive study of the individual market areas and the distribution of shipments among the terminal markets provided an insight into the structure and practices of these areas. A pronounced seasonal pattern of shipments was evident for most areas.

In order to provide a more realistic picture of the volume handled through metropolitan area markets, small outlying markets were included as a part of the major market. This assimilation of smaller markets provided a more accurate description of a major market's importance since these shipments were undoubtedly consumed in the metropolitan area. For example, all shipments to Forest Park and East Point, Georgia were included as shipments to the Atlanta, Georgia terminal market. A list of terminal markets and outlying markets included under each may be found in Appendix D.

No criteria such as mileage between the center of the major market and that of outlying markets were established as a basis of delineating terminal from outlying markets. Such definitions were unworkable for the heterogeneous markets. The distinction between a terminal market and an outlying market was made on a judgment basis, using the general consensus of the produce industry as a criterion.

Northeast

The Northeast received the largest volume of sweet corn in the seven market areas considered. This area received 210,082 crates, or 36.1 percent of the total observed shipments. This volume was received by 34 markets in the 13-state area.

The percentage of Florida sweet corn shipped to the Northeast markets during October and November was variable, but averaged near 30 percent of the observed shipments (Figure 6). The rate of shipment declined sharply during the first three weeks of December to a level near 10 percent. This level prevailed until mid-January when the proportion of Northeast shipments rose. A peak of 35 percent was reached in mid-February, followed by a slight decline until mid-March. The percentage of sweet corn sold in the Northeast market area rose throughout the spring, with the exception of the last three weeks of the season.

Seventeen large and medium terminal markets in the Northeast received 97.3 percent of the corn shipped to this area (Table 30). The six large markets, New York, New York, Philadelphia, Pennsylvania, Boston, Massachusetts, Washington, D.C., Pittsburgh,

Pennsylvania and Baltimore, Maryland, accounted for 81.5 percent of the area's receipts from Florida and 29.6 percent of all observed shipments. New York and Philadelphia alone accounted for 48.1 percent of the area's receipts. The 17 small markets accounted for only 2.7 percent of the corn received by this area.

Table 30.--Number and percentage of crates shipped to terminal markets in the Northeast market area, 19 Florida sweet corn sales firms, 1962-63 season

Terminal Market	Number of Crates	Percent of Northeast	Percent of Total
New York, New York	58,235	27.7	10.0
Philadelphia, Pennsylvania	42,931	20.4	7.4
Boston, Massachusetts	26,285	12.5	4.5
Washington, D. C.	16,373	7.8	2.8
Pittsburgh, Pennsylvania	14,867	7.1	2.6
Baltimore, Maryland	12,698	6.0	2.3
Hartford, Connecticut	5,885	2.8	1.0
Buffalo, New York	4,800	2.3	.8
Norfolk, Virginia	4,741	2.3	.8
Albany, New York	3,020	1.4	.5
Providence, Rhode Island	2,750	1.3	.5
Roanoke, Virginia	2,518	1.2	.4
New Haven, Connecticut	2,395	1.1	.4
Portland, Maine	1,985	.9	.4
Scranton, Pennsylvania	1,944	.9	.3
Sunbury, Pennsylvania	1,850	.9	.3
Charleston, West Virginia	1,388	.7	.2
Other markets ^a	5,417	2.7	.9
Total	210,082	100.0	36.1

^aMarkets receiving less than 1,000 crates. See Appendix D for list of all Northeast markets.

North Central

The North Central was the second most important market area in terms of volume received. Shipments to this area amounted to

135,822 crates and accounted for 23.4 percent of all observed shipments. Shipments were made to 40 markets, the largest number of markets observed for any market area.

The North Central area received between 15 and 20 percent of the total shipments during the first five weeks of the fall season (Figure 6). The rate of shipment then rose to a peak of 38 percent during the third week of November. Following a pattern similar to that of the Northeast, the percentage declined to a low of 11 percent the last week of December and then rose rapidly in early January to a level between 20 and 30 percent. The rate of shipments to this area generally stayed within this range for the remainder of the year. The proportion of shipments marketed in this area during the spring did not rise as it did in the Northeast and Canadian market areas.

The 14 large and medium markets in the North Central area accounted for 95.1 percent of the corn received (Table 31). The four large markets, Chicago, Illinois, Cincinnati, Ohio, Detroit, Michigan and Cleveland, Ohio, accounted for 73.8 percent of Florida corn shipments to the North Central area and 17.2 percent of all observed shipments. Chicago, by far the largest market in this area, accounted for over one-fourth of the area's receipts. This market was the third largest sweet corn market in the United States, exceeded only by New York and Philadelphia. A larger number of small markets were observed in the North Central area than in other areas. Twenty-six, or 65 percent of the number of markets observed, were small, but they accounted for only 4.9 percent of the North Central sweet corn receipts.

Table 31.--Number and percentage of crates shipped to terminal markets in the North Central market area, 19 Florida sweet corn sales firms, 1962-63 season

Terminal Market	Number of Crates	Percent of North Central	Percent of Total
Chicago, Illinois	36,311	26.7	6.2
Cincinnati, Ohio	25,749	19.0	4.4
Detroit, Michigan	23,200	17.1	4.0
Cleveland, Ohio	14,966	11.0	2.6
Louisville, Kentucky	9,096	6.7	1.6
Indianapolis, Indiana	4,924	3.6	.9
Grand Rapids, Michigan	3,026	2.2	.5
Milwaukee, Wisconsin	2,440	1.8	.4
Toledo, Ohio	2,130	1.6	.4
Green Bay, Wisconsin	1,856	1.4	.3
Paducah, Kentucky	1,520	1.1	.3
Evansville, Indiana	1,511	1.1	.3
Columbus, Ohio	1,235	.9	.2
Fort Wayne, Indiana	1,198	.9	.2
Other markets ^a	6,660	4.9	1.1
Total	135,822	100.0	23.4

^aMarkets receiving less than 1,000 crates. See Appendix D for list of all North Central markets.

South

A total of 131,017 crates of sweet corn was received in the Southern market area, accounting for 22.6 percent of the total shipments. Shipments to the South were only slightly less than those to the North Central area. Thirty-seven terminal markets were recorded in the seven-state area.

The Southern marketing area received around 40 percent of the observed volume during the first five weeks of the fall period (Figure 6). The rate of shipment dipped sharply during the second and third weeks of November, then rose sharply for five weeks to a

peak of 55 percent during the last week of December. The percentage of Southern shipments declined sharply during January to a level near 30 percent. Although there were some week-to-week variations, the percentage of shipments received by this area exhibited a declining trend throughout the remainder of the season. During June and July less than 20 percent of the observed volume was shipped to the South, compared with 40 to 50 percent during the fall.

Eighteen large and medium terminal markets in the South received 93.9 percent of the corn shipped to this area (Table 32). The three large markets, Columbia, South Carolina, Atlanta, Georgia and Miami, Florida, accounted for almost 40.0 percent of Florida corn shipments to the South and 8.9 percent of all observed shipments. Sweet corn shipments in the South were less concentrated in major terminal markets than in the Northeast and North Central areas. The largest market in the Northeast and North Central areas accounted for 28 and 27 percent of the area's shipments, respectively, but for only 16 percent in the South. The 15 medium markets in the South accounted for 54.0 percent of the shipments and the 19 small markets accounted for only 6.1 percent.

Southwest

The Southwest area ranked fourth in terms of volume of sweet corn received. During the 1962-63 season 32,106 crates were received in this four-state market area. Shipments to the thirteen terminal markets in the Southwest accounted for 5.5 percent of the total observed volume.

Table 32.--Number and percentage of crates shipped to terminal markets in the Southern market area, 19 Florida sweet corn sales firms, 1962-63 season

Terminal Market	Number of Crates	Percent of South	Percent of Total
Columbia, South Carolina	20,551	15.7	3.5
Atlanta, Georgia	19,926	15.2	3.4
Miami, Florida	11,727	9.0	2.0
Jacksonville, Florida	9,876	7.5	1.7
Lakeland, Florida	9,539	7.3	1.7
Tampa, Florida	8,852	6.7	1.5
Greenville, South Carolina	7,250	5.5	1.3
Charlotte, North Carolina	7,109	5.4	1.2
Birmingham, Alabama	5,901	4.5	1.0
Nashville, Tennessee	4,377	3.3	.8
Memphis, Tennessee	3,681	2.8	.6
Raleigh, North Carolina	3,381	2.6	.6
Asheville, North Carolina	2,660	2.0	.5
Orlando, Florida	2,235	1.7	.4
Montgomery, Alabama	1,834	1.4	.3
Chattanooga, Tennessee	1,675	1.3	.3
Jesup, Georgia	1,370	1.1	.2
Jackson, Mississippi	1,121	.9	.2
Other markets ^a	7,952	6.1	1.4
Total	131,017	100.0	22.6

^aMarkets receiving less than 1,000 crates. See Appendix D for list of all Southern markets.

The seasonal pattern of shipments to the Southwest was similar to that of the South, with the exception of the early fall weeks (Figure 6). The Southwest received between 5 and 10 percent of the observed shipments during October, November and the first half of December. The percentage of shipments then increased to a level of 23 percent during the second week of January. A declining trend in the percentage of corn received in the Southwest prevailed for the remainder of the year although there were some week-to-week

variations. During May, June and July this area accounted for only 2 to 3 percent of the volume observed, compared with over 15 percent during several winter weeks.

None of the terminal markets in the Southwest to which shipments were made were large, but the eight medium markets accounted for 94.2 percent of the sweet corn received by the area (Table 33). The two largest of these markets, Houston, Texas and New Orleans, Louisiana, accounted for 47.4 percent of the area's receipts. The five small terminal markets in the Southwest accounted for only 5.8 percent of the area's receipts.

Table 33.--Number and percentage of crates shipped to terminal markets in the Southwest market area, 19 Florida sweet corn sales firms, 1962-63 season

Terminal Market	Number of Crates	Percent of Southwest	Percent of Total
Houston, Texas	7,622	23.7	1.3
New Orleans, Louisiana	7,613	23.7	1.3
Dallas, Texas	4,806	15.0	.8
San Antonio, Texas	3,099	9.7	.5
Little Rock, Arkansas	2,353	7.3	.4
Oklahoma City, Oklahoma	1,848	5.8	.3
Fort Worth, Texas	1,516	4.7	.3
Tyler, Texas	1,377	4.3	.2
Other markets ^a	1,872	5.8	.4
Total	32,106	100.0	5.5

^aMarkets receiving less than 1,000 crates. See Appendix D for list of all Southwest markets.

Midwest

The Midwest market area ranked fifth in the volume of Florida corn receipts. A total of 28,071 crates was received by the 18

terminal markets located in the Midwest. This volume accounted for 4.8 percent of all observed shipments.

The percentage of sweet corn shipments received by the Midwest markets during October and November was very small (Figure 6). The rate of shipment rose rapidly in December, but declined to a level near 5 percent by the first of January. Although the percentage of corn received declined in February and rose in March, no pronounced trend was observed for the late winter and spring periods. Receipts for this entire period averaged around 5 percent of observed Florida shipments.

Large and medium size terminal markets in the Midwest accounted for 86.2 percent of the corn shipped to that area (Table 34). The one large market, St. Louis, Missouri, accounted for 39.1 percent of the area's volume, but only 1.9 percent of the total observed shipments. The 13 small terminal markets received 13.8 percent of the Midwest corn receipts.

Table 34.--Number and percentage of crates shipped to terminal markets in the Midwestern market area, 19 Florida sweet corn sales firms, 1962-63 season

Terminal Market	Number of Crates	Percent of Midwest	Percent of Total
St. Louis, Missouri	10,968	39.1	1.9
Minneapolis, Minnesota	6,050	21.5	1.0
Kansas City, Missouri	3,903	13.9	.7
Des Moines, Iowa	1,775	6.3	.3
Kansas City, Kansas	1,518	5.4	.3
Other markets ^a	3,857	13.8	.6
Total	28,071	100.0	4.8

^aMarkets receiving less than 1,000 crates. See Appendix D for list of all Midwestern markets.

West

The volume of sweet corn shipped to the West was smaller than for any of the other six areas. Only 16,357 crates, accounting for 2.8 percent of the observed shipments, moved into the eight terminal markets in this area.

Practically all shipments to the Western market area occurred during March and April. The West received around 6 percent of the total shipments during this period. During the fall and late spring, competition from California producers made Florida shipments to this area uneconomical.

None of the terminal markets in the West received enough corn to be classified as large, primarily due to the short marketing season. The three medium size markets, Los Angeles, San Francisco and Sacramento, California, accounted for 79.2 percent of the corn shipped to the area, but only 2.0 percent of the total volume (Table 35). Los Angeles

Table 35.--Number and percentage of crates shipped to terminal markets in the Western market area, 19 Florida sweet corn sales firms, 1962-63 season

Terminal Market	Number of Crates	Percent of West	Percent of Total
Los Angeles, California	5,966	36.5	1.0
San Francisco, California	5,586	34.1	1.0
Sacramento, California	1,400	8.6	.2
Other markets ^a	3,405	20.8	.6
Total	16,357	100.0	2.8

^aMarkets receiving less than 1,000 crates. See Appendix D for list of all Western markets.

and San Francisco were the two major terminal markets, each receiving around 35 percent of the area's total. The five small markets received 20.8 percent of the shipments to this area.

Canada

Shipments to Canada were about one-third larger than those to the West and about equal to Midwest receipts. A total of 27,882 crates of sweet corn was observed for the Canadian market area. For the shipments to Canada, the province was considered as the terminal market, rather than the individual city. Shipments were observed to five Canadian provinces.

During the fall and winter, shipments were irregular and no pattern was apparent. Spring weekly shipments began at 2 to 3 percent of the total volume and increased slowly throughout the season to a level of 9 percent in July.

The two largest provinces in Canada accounted for 97.2 percent of the area's volume and 4.7 percent of the observed shipments (Table 36). Ontario alone received 71.6 percent of the Canadian shipments.

Large and Medium Markets

It is apparent from Figure 5 that the major terminal markets were spread over the eastern United States and Canada with a concentration in major population centers. The terminal markets shown on this map received 94.8 percent of the sweet corn shipments from Florida. The 15 large markets shown accounted for 61.0 percent and the 52 medium markets accounted for the remaining 33.8 percent.

Table 36.--Number and percentage of crates shipped to provinces in the Canadian market area, 19 Florida sweet corn sales firms, 1962-63 season

Provinces	Number of Crates	Percent of Canada	Percent of Total
Ontario, Canada	19,976	71.6	3.5
Quebec, Canada	7,134	25.6	1.2
Other provinces ^a	772	2.8	.1
Total	27,882	100.0	4.8

^aProvinces receiving less than 1,000 crates. See Appendix D for list of all Canadian markets.

Distribution of White Corn

Although white corn accounted for only 3.5 percent of the sweet corn observed it was of more relative importance to some sales firms, especially during certain periods. The pattern of market distribution of white corn was found to vary substantially from that of yellow corn. The percentage of white corn sold in the South was three-times greater than the proportion of yellow (Table 37). The Southern marketing area received 63.4 percent of the observed white corn, but only 21.1 percent of the yellow. The Southwest received a slightly higher percentage of the white corn than of the yellow--7.4 percent compared to 5.5 percent, respectively. All other market areas received a higher proportion of yellow corn than they did of white.

Table 37.--Distribution of crates shipped by type of corn and market area, 19 Florida sweet corn sales firms, 1962-63 season

Market Area	Type of Corn					
	Yellow		White		All Types	
	Crates	Percent	Crates	Percent	Crates	Percent
Northeast	206,145	36.7	3,937	20.4	210,082	36.1
North Central	134,473	23.9	1,349	7.0	135,822	23.4
South	118,762	21.1	12,255	63.4	131,017	22.6
Southwest	30,675	5.5	1,431	7.4	32,106	5.5
Midwest	27,711	4.9	360	1.8	28,071	4.8
West	16,357	2.9	-	-	16,357	2.8
Canada	27,882	5.0	-	-	27,882	4.8
Total	562,005	100.0	19,332	100.0	581,337	100.0

Sales Areas

The percentage of corn shipped to the Northeast market area was considerably larger from Central Florida than from the other sales areas (Table 38). The fact that receipts in the Northeast and shipments from Central Florida both peaked in late spring explained why almost 50 percent of the shipments from Central Florida went to the Northeast, while less than 40 percent from other sales areas went to this market area.

The percentage of corn shipped to the Southern market area from Belle Glade and South Florida was higher than average. Receipts of corn in the South were highest in the fall and winter, a period which coincides with the shipping season of the Belle Glade and South Florida areas. Shipments to the Southwest followed a pattern similar to that of the South.

Table 38.--Distribution of crates shipped, by sales area and market area, 19 Florida sweet corn sales firms, 1962-63 season

Market Area	Sales Area			
	Belle Glade	South Florida	Central Florida	All Areas
	<u>Percent</u>			
Northeast	32.4	39.1	49.8	36.1
North Central	24.3	13.6	22.2	23.4
South	23.7	28.4	16.4	22.6
Southwest	6.1	11.3	2.0	5.5
Midwest	5.2	2.4	4.0	4.8
West	3.6	2.7	-	2.8
Canada	4.7	2.5	5.6	4.8
Total	100.0	100.0	100.0	100.0
Percentage of Total	73.6	9.0	17.4	100.0

All shipments to the West were from the Belle Glade and South Florida sales areas. Sales to the West were discontinued in the spring before the Central Florida area commenced shipments.

Sizes of Sales Firms

Large size sales firms shipped a smaller percentage of their volume to the Northeast and Canadian market areas than did medium and small firms (Table 39). Shipments by large firms averaged about 10 percent less to the Northeast and 5 percent less to Canada. Shipments to other market areas were dominated by large sales firms with the exception of the Western market area. Medium firms dominated shipments to this area.

Table 39.--Distribution of crates shipped, by size of sales firm, and market area, 19 Florida sweet corn sales firms, 1962-63 season

Market Area	Size of Sales Firm			
	Large	Medium	Small	All Sizes
	<u>Percent</u>			
Northeast	32.9	45.9	42.2	36.1
North Central	25.1	17.2	22.5	23.4
South	23.4	20.8	19.1	22.6
Southwest	6.5	2.3	3.9	5.5
Midwest	5.9	2.3	1.7	4.8
West	2.6	4.2	1.2	2.8
Canada	3.6	7.3	9.4	4.8
Total	100.0	100.0	100.0	100.0
Percentage of Total	64.8	27.1	8.1	100.0

Types of Buyers

Chain buyers played a more important role in the Northeastern and Southern markets than in other areas. Chains purchased slightly less than one-half of the sweet corn handled in these areas, compared to only one-fifth to one-third of that handled in other areas (Table 40).

Wholesalers handled more than one-half the corn in the Canadian, North Central and Western market areas. Wholesalers handled the lowest percentage in the Northeast and Midwest areas where they received slightly more than 40 percent of the observed shipments. Since chain and wholesale buyers accounted for over 90 percent of the sweet corn handled, one of these types of buyers tended to be dominant in each market area. Only in the Southwest, Midwest and West did other types of buyers handle a sizeable portion of the

Table 40.--Distribution of crates shipped, by type of buyer and market area, 19 Florida sweet corn sales firms, 1962-63 season

Market Area	Type of Buyer						
	Chain	Term. Broker	Whole-saler	Jobber	Retailer	Government	All Types
	Percent						
Northeast	49.5	5.7	40.4	2.9	.3	1.2	100.0
North Central	32.5	9.6	57.2	^a	.6	.1	100.0
South	47.3	3.7	47.1	.4	^a	1.5	100.0
Southwest	30.3	20.6	47.2	1.0	-	.9	100.0
Midwest	35.1	22.7	40.2	.2	-	1.8	100.0
West	21.1	22.5	51.7	4.7	-	-	100.0
Canada	30.4	-	69.0	.6	-	-	100.0
Average	45.5	7.5	44.7	1.3	.2	.8	100.0

^aLess than one-tenth of 1 percent.

volume. Terminal brokers receiver over 20 percent of the volume handled in each of these areas. The sales to chains and wholesalers by terminal brokers could not be determined from the invoices sampled. Therefore, the total volume handled eventually by these factors could not be established. Most of the shipments to miscellaneous types of buyers--jobbers, retailers and government--were observed in the Northeast. However, jobbers played an important role in the West and government in the South and Midwest.

Bases of Sale

F.o.b. was the principal basis of sale used in all market areas, ranging from 78.4 percent of the volume in the North Central to 100.0 percent in Canada. Nevertheless, three areas--Northeast, North Central and Midwest--received substantially fewer f.o.b.

shipments than did other areas. F.o.b. shipments accounted for 76 to 79 percent of the receipts in these areas, while accounting for over 90 percent to other areas. The decline in importance of f.o.b. shipments to these areas was offset by an increase in delivered sales. Delivered sales accounted for more than 12 percent of the area's receipts in the Northeast, North Central and Midwest (Table 41).

Table 41.--Distribution of crates shipped, by basis of sale and market area, 19 Florida sweet corn sales firms, 1962-63 season

Market Area	Basis of Sale ^a					All Bases
	F.o.b.	Delivered	Price Arrival	Joint Account	Consigned	
<u>Percent</u>						
Northeast	78.6	14.9	1.0	1.6	3.9	100.0
North Central	78.4	12.4	.5	.9	7.8	100.0
South	91.4	7.9	-	.6	.1	100.0
Southwest	96.9	3.1	-	-	-	100.0
Midwest	76.9	19.9	-	.7	2.5	100.0
West	95.1	4.9	-	-	-	100.0
Canada	100.0	-	-	-	-	100.0
Average	86.5	9.4	.5	.8	2.8	100.0

^aCash sales omitted since no area received as much as one-tenth of 1 percent.

Consigned shipments were above average to the Northeast and North Central market areas. Even in these areas, consigned sales accounted for only a small percentage of the total volume received. Some consigned sales were also observed in the Southern and Midwestern market areas.

CHAPTER VI

INDUSTRY ORGANIZATION AND MARKETING CHANNELS

[The Florida sweet corn industry, which developed from one of little importance to a multi-million dollar industry in the past 15 years, has experienced a number of acute marketing problems during the past few years. Some of these problems were associated with rapid growth, but others appeared to be chronic.] By the early 1960's, leaders in the industry began questioning whether the marketing problems could be met satisfactorily with the market organization and structure then existing.

Action was subsequently initiated to adopt a state marketing order covering sweet corn. Industry hearings were held to evaluate the feasibility of an order and in January, 1963 the Sweet Corn Marketing Order (as amended 1962) was adopted in the Belle Glade and South Florida sales areas. Concurrently, a cooperative bargaining association was organized whose membership was made up of Florida sweet corn growers from the area covered by the Marketing Order. This cooperative was known as the Florida Sweet Corn Exchange, referred to hereafter as the Exchange.

The Marketing Order

The authority for the Marketing Order adopted by the sweet corn industry was granted in the Florida Sweet Corn Marketing Act

of 1959, as amended.¹ This act provided the framework under which the sweet corn industry could adopt a marketing order if approved by the growers and handlers. Adoption of the order required the approval by 65 percent of the affected growers who produced 75 percent of the sweet corn volume in the area affected. It also required the approval of the handlers of 65 percent or more of the volume. Regulations and restrictions issued under the authority of the Marketing Order are binding on all growers and handlers in the affected area once the Order has been adopted. The Marketing Order may be terminated at the end of a marketing season by the Commissioner of Agriculture when he receives a written request for such action by 50 percent or more of the growers who produced more than 50 percent of the volume marketed. Some of the more important provisions of the Marketing Order are discussed in the following sections.²

Purpose

The purpose of the marketing order is to improve returns to growers through a more orderly system of marketing. Specific provisions of the Order which are intended to promote more orderly marketing are quantity regulation, quality control, inspection and container regulation, prohibition of unfair trade practices, research and advertising.

¹All references to the sweet corn industry in respect to the Marketing Order or Exchange refer only to the Belle Glade and South Florida areas and not the Central Florida area.

²Florida Department of Agriculture, Sweet Corn Marketing Order (as amended 1962) (Tallahassee, Florida: January, 1963), pp. 1-12.

Administration

The final responsibility for the administration of the Marketing Order rests with the Commissioner of Agriculture. He is authorized to appoint an 11-member Sweet Corn Advisory Committee to recommend rules and regulations and to carry out certain provisions of the program. Elections are held in the production areas to select the nominations for the nine Advisory Committee members from the Belle Glade area and the two from the South Florida area.

Although the final authority of the Marketing Order is vested in the Commissioner of Agriculture, the Advisory Committee's role is vital since it has the responsibility of formulating plans and policies for the industry and for recommending actions to carry these out. Recommendations of the Advisory Committee are normally accepted by the Commissioner provided they are within the authority of the Order and do not violate the public interest.

Quantity Regulations

Provisions are made in the Marketing Order to control the quantity of sweet corn sold during a marketing year by the use of a "marketable allotment." The "marketable allotment" represents the total number of crates which the industry intends to market during a marketing year. Based on an "economic and marketing survey" it is the responsibility of the Advisory Committee to recommend a "marketable allotment" to the Commissioner prior to the start of each season. With the approval of the Commissioner, the "marketable allotment" may:

- (1) Limit the total quantity of sweet corn, or that of any grade, size or quality, which may be distributed by handlers.

- (2) Limit the grade, size or quality which may be distributed during a particular period of the marketing year.
- (3) Allot equitably among handlers the total quantity, or the quantity by grade, size or quality that may be placed in the primary channels of trade. This allotment is based on a prior period of sales which the Commissioner finds representative. Such an allotment constitutes a "base quantity" for handlers.

"Base quantity" is the predominant element used in computing the market share of the "marketable allotment" which sales firms will receive in subsequent years. Normally, the total "marketable allotment" will be divided according to the ratios in which the "base quantities" are shared in the previous year; however, a "base quantity reserve" is set aside each year for new sales firms. "Temporary base quantities" may be assigned from this by the Advisory Committee if they deem it appropriate. "Temporary base quantities" become permanent after three consecutive years of use. Of the total "marketable allotment," 5 percent will be set aside annually for this purpose through the 1964-65 season and 2.5 percent each season thereafter.

Quality and Container Regulations

The Advisory Committee may recommend to the Commissioner of Agriculture that standards of grade, condition, size, maturity or pack be established. Uniform inspection, grading and proper labeling may also be required under this provision. Regulations may be issued establishing the size, weight, capacity and dimensions of containers which may be used for sweet corn placed in the primary channels of trade.

The Commissioner has issued requirements that (1) all sweet corn be precooled prior to leaving the marketing area, (2) all sweet

corn be packed in specified crates and (3) no corn below 85 percent U. S. Fancy Grade be placed in the primary channels of trade.³ These regulations may be changed at any time upon recommendation of the Advisory Committee and the concurrence of the Commissioner.

Unfair Trade Practices

The Commissioner, upon the recommendation of the Advisory Committee, may issue and enforce regulations designed to correct any trade practice adversely affecting the distribution of corn within the area covered by the order. The Commissioner may also enforce existing regulations concerning trade practices.

Research

The Advisory Committee is authorized to carry out such studies on the production or distribution of sweet corn as are deemed desirable. It is also authorized to allocate and expend the funds that may be required.

Advertising and Promotion

The Advisory Committee with the approval of the Commissioner may establish advertising and sales promotion programs to create new, or maintain present, markets for Florida sweet corn. Any type of program in this category may be promulgated as long as it does not promote any particular handler's brand or trade name.

³ Florida Department of Agriculture, Florida Administrative Code, 7I - 6.04, 7I - 6.05 and 7I - 6.09.

The Florida Sweet Corn Exchange

The articles of incorporation and bylaws of the Florida Sweet Corn Exchange are similar to those of other cooperative marketing organizations, but its method of operation is somewhat unique. From its membership of growers a 13-member board of directors is elected whose responsibility it is to formulate policies and conduct the business of the Exchange. Three officers, a president, vice-president and secretary-treasurer, are selected by the Board from its members. The Exchange has two standing committees, the Executive Committee and the Marketing Subcommittee, to whom the responsibility for carrying out many of the activities is delegated.

Through the use of marketing contracts with growers, the Exchange acquires title to and exclusive marketing rights of sweet corn produced by its members. The Exchange also signs contracts with "authorized sales agencies" under which such agencies agree to be governed in the sale and distribution of all corn handled for Exchange members. Sweet corn is delivered by growers directly to the "authorized sales agencies" of the growers' choice, but must be handled according to the Exchange agreement. Specifically, the sales firms agree not to sell for a price less than that specified by the Board of Directors and to adopt any sales procedures recommended by the Directors as being in the best interest of the growers.

Membership in the Exchange, unlike the provisions of the Marketing Order, is on a voluntary basis. All rules of the Exchange are applicable only to Exchange members while Marketing Order regulations are applicable to all industry members. Growers who join the Exchange must place their entire production under contract. Sales firms who contract with the Exchange may handle corn for

both members and nonmembers. Exchange policies are applicable only to corn handled for members.

Pricing

Setting the selling price is a continuous job, requiring constant revision throughout the season. This function is delegated to the Marketing Subcommittee by the Directors. The Marketing Subcommittee weighs all marketing information and sets prices by grade and type of corn. These prices must be followed by all sales firms handling Exchange corn. Prices are normally set as early as possible each week, usually on Monday, and are applicable for periods ranging up to a week, depending upon marketing conditions, but they may be revised anytime the Subcommittee feels it is necessary.

Coordination

The Marketing Order and the Exchange are separate organizations, however, in an operational sense they are companion organizations and are intended to work closely together to meet the marketing objectives of the industry. Each has specific functions which it can perform, but the two working together make it possible to have some control over marketable output, price, advertising and other factors which may affect industry revenue.

Although the functions of the Marketing Order and Exchange are separate, a well defined marketing program must take into account the contributions from both. Coordination is obtained largely by having an overlapping of Exchange Directors and members of the Advisory Committee. Nine of the 13 Directors of the Exchange

during the 1963-64 season were either members or alternate members of the Advisory Committee.

Evaluation by Sales Firms

The managers of the 20 sales firms in the Belle Glade and South Florida areas were asked to evaluate the effects of several of the Marketing Order and Exchange programs. Sales firms in the Central Florida area were not included in this phase of the study since the Marketing Order did not cover that area and most of the growers there were not members of the Exchange.

Selling Functions

Managers were asked to evaluate how their selling functions in 1962-63, the first active year for the Marketing Order and Exchange, had been changed from previous years. In four primary areas of interest, one-half or more of the firms observed no change in their selling functions (Table 42).

Table 42.--Effects which the Marketing Order and Exchange programs had on certain selling functions of the firm, 20 Florida sweet corn sales firms, 1962-63 season

Selling Function	Comparison with Previous Years			
	Different		Same	
	Number	Percent	Number	Percent
Sales cost	6	30.0	14	70.0
Market area	2	10.0	18	90.0
Basis of sale	8	40.0	12	60.0
Grade shipped	10	50.0	10	50.0

Changes in sales cost of the firms were considered, exclusive

of any direct contributions to the Exchange. The six managers who observed changes in their sales cost indicated it was higher. Telephone charges and carryover expenses were the two areas that accounted for most of the increases in sales cost. The managers indicated that it took more calls to locate buyers when operating with fixed prices and that more return calls were required to confirm prices set by the Exchange. Two managers indicated that delays in finding buyers when the prices were set increased the cost of storage and handling. Fourteen managers observed no effect on their sales cost due to the operation of the Exchange and Marketing Order.

Only two of the sales firms felt that the Marketing Order and Exchange programs had any effect on the terminal market areas to which they marketed sweet corn. They felt that some sales of "price corn" were lost to competing sales firms who were not members of the Exchange.⁴

Although 60 percent of the managers indicated that they had not altered their basis of sale, four firms consigned more and three firms less than in previous years. The increase in consigned sales was attributed to the difficulty in finding buyers and the tendency to use up the 5 percent consignment limitation permitted by the Exchange. The firms that decreased consigned sales had to do so to remain within the Exchange limitation. The remaining firm indicated it had increased delivered sales in order to be more competitive.

⁴"Price corn" refers to corn which barely meets the specifications of a particular grade and is sometimes sold below the accepted price for the grade.

One-half of the managers interviewed indicated that the grades of corn their firms shipped were affected by the activities of the Marketing Order and Exchange. All 10 of these managers indicated that the volume of the lower grades had been reduced. Some firms had done this by discontinuing shipments of bulk corn; others had reduced their shipments of "percentage grade" corn, while still others discontinued shipments of U. S. No. 2 grade corn.

Marketable Allotment

None of the firm managers thought the 1962-63 "marketable allotment" of the Marketing Order was too low, but seven, or 35 percent, felt it was too high (Table 43).⁵ Most of these felt that the allotment was so large that it encouraged excess production.

Table 43.--Opinions of firm managers concerning the size of the "marketable allotment" established under the Marketing Order, 20 Florida sweet corn sales firms, 1962-63 season

Opinion	Sales Firms	
	Number	Percent
Too high	7	35.0
Too low	0	0
About right	5	25.0
Qualified right	7	35.0
No opinion	1	5.0

Sixty percent of the sales firms thought the size of the

⁵"Marketable allotment" was referred to in the questionnaire as "marketing quotas."

"marketable allotment" was about right, or about right if certain conditions occurred. Of the seven firms that qualified their opinions on the allotment size, five thought it was all right provided the production was well distributed throughout the season. The suggestion was made that the allotment should be made on a seasonal basis in order to assure a more satisfactory seasonal distribution. Two firms felt the allotments were all right provided yields were not too high.

Advertising

Three-fourths of the sales firms felt that the advertising program conducted under the Marketing Order was beneficial to their sales (Table 44). The extent to which they felt it benefited them ranged from "very much" to "it does no harm." Only five sales firms felt that the program was of no benefit to them. Three of these were from the South Florida area and indicated that they received no benefits due to the timing of the promotional efforts.

Only one manager indicated that the advertising program should be eliminated and only three thought it should be decreased. These three qualified their answers by stating they would be more in favor of the program if it were redirected toward more direct merchandising efforts with their buyers. They felt that consumer advertising was of little benefit to them. On the other hand, several of the managers who felt the program should be expanded felt that consumer advertising should be expanded.

Table 44.--Questions on attitudes of firm managers concerning the industry advertising program conducted under the Marketing Order, 20 Florida sweet corn sales firms, 1962-63 season

Question	Sales Firms	
	Number	Percent
Did the program benefit sales?		
Yes	15	75.0
No	5	25.0
Should it be:		
Expanded	8	40.0
Same	8	40.0
Decreased	3	15.0
Eliminated	1	5.0

Buyer Relations

All 18 sales firm managers, who had received reactions from their buyers on the activities of the Marketing Order and Exchange, indicated that these reactions were unfavorable. Two had received no buyer reactions to the program. Buyers generally did not recognize any benefits they may have received from the price stability or uniform price aspects of the program. Reasons given for the buyer's dislike of the program were (1) prices could not reflect the actual value of some corn and (2) advanced prices could not be arranged for special large volume purchases which were tied in with buyer's promotional programs.

Pricing

Sixty percent of the sales firm managers felt that the pricing activities of the Exchange both raised and lowered

prices at various times (Table 45). There was little agreement, however, on the periods when prices were raised or lowered. Some thought that prices were held down in the winter and early spring, but were enhanced during the late spring. Others disagreed with this and thought that prices were helped more by these programs in the winter and early spring. Several of the managers felt that the Exchange lowered or raised prices on a day-to-day basis, depending on market conditions each day. Those who thought the Exchange either raised or lowered prices were about equally divided, two and three, respectively. Only two firms felt the Exchange had no effect on the prices.

Table 45.--Opinions of firm managers concerning the effect the Exchange had on price levels, 20 Florida sweet corn sales firms, 1962-63 season

Effect	Sales Firm	
	Number	Percent
Raised	2	10.0
Lowered	3	15.0
Both	12	60.0
No effect	2	10.0
No opinion	1	5.0

Marketing Channels

The organizations handling sweet corn have been discussed in some detail in this study. However, due to the numerous organizations involved and the varied roles of each, it is sometimes difficult to understand how they fit together in the marketing system. The schematic drawing in Figure 7 illustrates the relative position in the marketing channels of organizations handling Florida sweet corn.

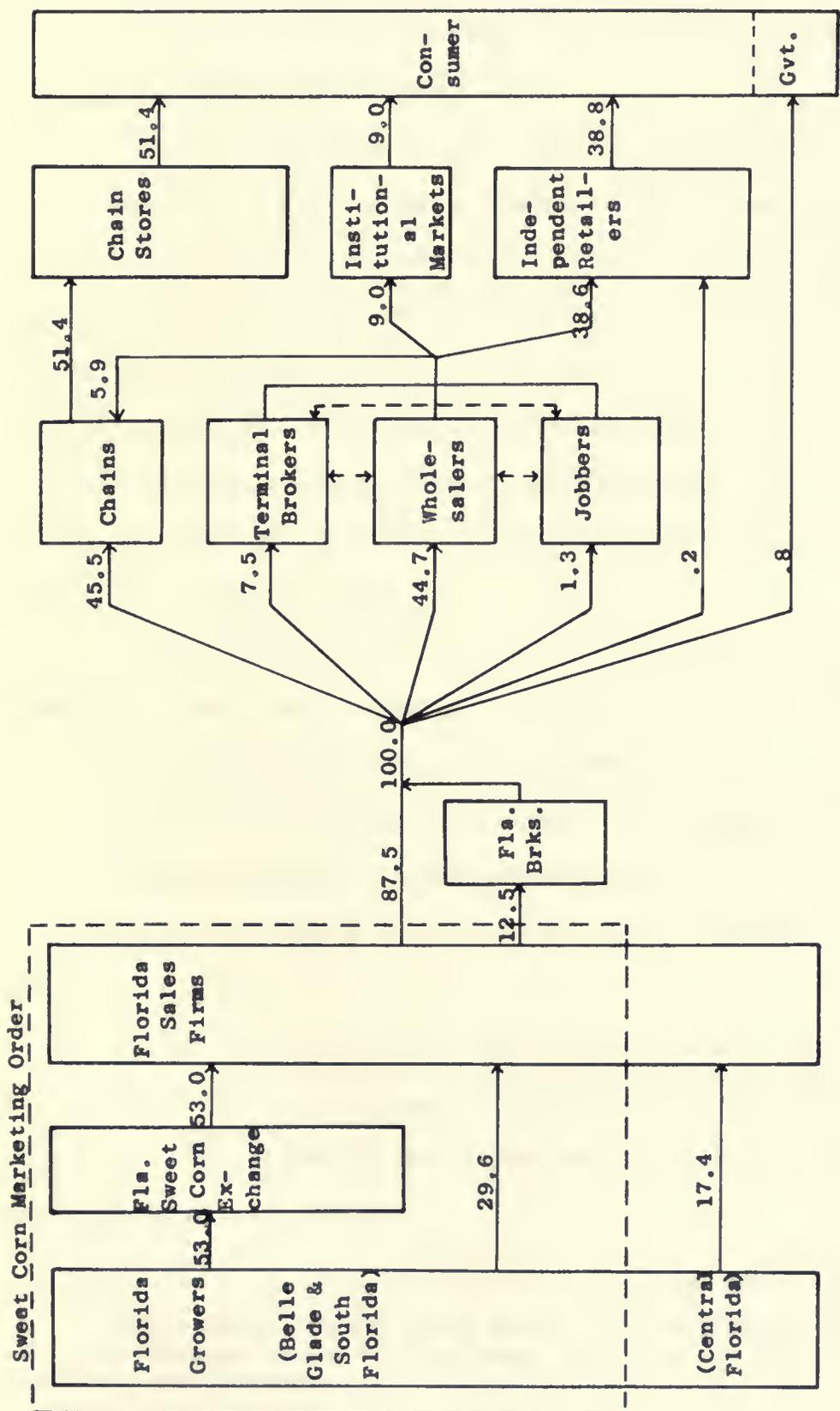


Figure 7.--Distribution of crates shipped by organizations handling Florida sweet corn, 19 Florida sweet corn sales firms, 1962-63 season.

The percentage distribution figures from the producer to the wholesale level were based on data discussed in this study, but the retail level data were based on secondary sources.

Sweet corn was produced by 89 growers in the three primary production areas of Florida and was marketed by 25 sales firms. The Central Florida area, which was not covered by the Marketing Order, sold 17.4 percent of the total volume. The remaining 82.6 percent was shipped from the Belle Glade and South Florida areas and was under the Marketing Order. The Florida Sweet Corn Exchange contracted for the handling of 64.2 percent of the volume marketed from the area covered by the Marketing Order, although it accounted for only 53.0 percent of the Florida volume.

Florida brokers had 12.5 percent of the volume invoiced directly to them. This does not include all corn handled by brokers since part was invoiced directly to the terminal buyer by the sales firm. When this was done the designation of the terminal buyer was used. Although the type of buyer was not known for sales invoiced to brokers, it was assumed the distribution was the same as that of other sales.⁶

Shipments made to the wholesale level accounted for 99 percent of the volume sold, with chains and wholesalers accounting for over 90 percent. One percent of the volume was sold directly to retailers and government.

⁶This assumption was based on (a) the distribution of shipments from brokers where the type buyer was known and (b) personal interviews with brokers.

The distribution of shipments throughout the remainder of the marketing system was based on the assumption that sweet corn was handled in the same proportion by the chain stores, retail stores and institutional markets as all food.⁷ Data could not be obtained on the distribution of sweet corn at this level.

Based on data reported by the Progressive Grocer on the distribution of food handled by chain and independent stores, it was estimated that slightly over one-half of the Florida corn reached consumers through chain stores. Independent stores were estimated to handle around 39 percent.⁸ The estimate of the institutional market size was derived from a study of institutional wholesale grocers by Wischkaemper and Bouma.⁹ It was estimated that 9 percent reached consumers through these outlets. The remaining 0.8 percent was accounted for by direct government purchases.

⁷ It was realized that certain biases may be introduced by making this assumption, although there was no apparent reason why corn would be expected to be handled in a ratio different from other foods. Nevertheless, the data should be accepted for their purpose--to indicate the relative importance of the marketing channels.

⁸"Grocery Business Annual Report--1964." Progressive Grocer (New York: The Butterick Company, Inc., April, 1964), p. F7.

⁹Paul Wischkaemper and John C. Bouma, Services of Institutional Wholesale Grocers (Washington, D. C.: USDA, AMS, December, 1962), p. 1.

CHAPTER VII

THEORETICAL GUIDELINES FOR PRICE AND MARKETABLE OUTPUT

The primary decisions which must be made by the Marketing Order's Advisory Committee relate to marketable output and those by the Exchange's Directors relate to price. Although the organization and market structure of the Florida sweet corn industry have been discussed in considerable detail in the previous chapters, they do not relate directly to either of these questions. It is not the purpose of this chapter to provide answers to price and output questions, but only to provide theoretical guidelines for maximizing profits to the industry.

The Economic Model

Agriculture is often thought of as a segment of the economy in the United States that closely approximates the economic model of pure competition. This is undoubtedly true for some industries, such as cattle and hogs at the farm level, but the Florida sweet corn industry does not meet many of the conditions assumed in this model. Conditions contributing to the sweet corn industry's variance from this model may be classified as (1) natural phenomena and (2) organizational characteristics.

Natural phenomena refer to the climatic and cultural conditions that permit production of sweet corn in Florida over an

extended period when production is not available from competing areas. Not only is there no competition, but there is no threat of domestic competition, barring a major change in technology, during most of this period.

Organizational characteristics refer to the number of sales firms, their interrelationships and their organization under the Marketing Order and Exchange. The limited number of firms sets this industry aside from many others, but of even more significance to its economic character is its organization under the Marketing Order and Exchange.

These two characteristics, peculiar to the Florida sweet corn industry, introduce an element of monopoly and of seller concentration with some degree of collusion. These characteristics are evidently not compatible with the conditions of pure competition. It is virtually impossible to develop a theoretical model that conforms perfectly to the conditions of an industry in the real world. The job of the economist is to develop a theoretical model that explains an industry's functions as perfectly as possible. Based on the results of this study it was determined that the Florida sweet corn industry was most closely approximated by the conditions of the "organized collusive oligopoly" as discussed by Leftwich,¹ or the "collusive oligopoly selling identical products" as discussed by Blodgett.² These models with certain modifications

¹Richard H. Leftwich, The Price System and Resource Allocation (rev. ed.; New York: Holt, Rinehart and Winston, March, 1960), pp. 236-237.

²Ralph H. Blodgett, Our Expanding Economy (New York: Rinehart & Company, Inc., July, 1955), pp. 355-367.

appeared to offer the most appropriate framework around which to develop a theoretical analysis of the industry.

The validity of using the collusive oligopoly model to explain price and marketable output determinations depends on how well the industry in the real world conforms to the assumptions of the theoretical model. Although it would not be expected that the market conditions of the industry and the model would conform perfectly, they should be approximated.

Number of Sellers

Blodgett defines oligopoly as "a market situation in which there are only a few sellers of some economic good."³ The term "a few" is difficult to define in absolute numbers. Bain elaborates further by dividing oligopolies into five classes based on the numbers of sellers and the concentration of output.⁴ Bain's classification, "moderate concentration among a few sellers with a competitive fringe," seems to be most representative of the market conditions found in the Florida sweet corn industry. Bain describes this classification as follows:

Industries where a very few or a moderately few sellers control the bulk of the industry output and where a substantial number of small sellers share the remainder. For example, seven large sellers supply 85 percent of the industry output and 35 small sellers divide the remainder⁵

In the area included under the Marketing Order there were 20

³Ibid., p. 355.

⁴Joe S. Bain, Price Theory (New York: Henry Holt and Company, 1952), pp. 268-270.

⁵Ibid., p. 269.

sweet corn sales firms in 1962-63. The Central Florida area was not included in this analysis since it was not covered by the Marketing Order and it shipped corn only in late May and June. Eight large sales firms in the Belle Glade and South Florida areas sold 71 percent of the corn observed. The 12 medium and small firms accounted for the remaining 29 percent. The concentration of volume among the large sellers was slightly less and the competitive fringe smaller than that described by Bain, but the industry would undoubtedly still be considered as an oligopoly on the basis of the number of sellers and concentration of sales.

Leftwich in discussing the number and size of firms in an oligopoly makes the additional point that "there are few enough sellers of a particular product for the activities of one to be of importance to the others" ⁶ Since one of the objectives of the Exchange as described by a Director was "to prevent drops in prices due to price cutting of one or two shippers," there appears to be little doubt that the activities of one sales firm are of importance to all.

Collusion

Leftwich defines the "organized collusive oligopoly" as follows:

⁶Leftwich, op. cit., p. 233.

Oligopoly of the Class 1 (this) variety consists primarily of cartel arrangements. A cartel is a formal organization of the producers within a given industry. Its purpose is to transfer certain management decisions and functions of the individual firms to a central association with the expectation that profit positions of the individual firms will be improved by the transfer.⁷

The Marketing Order and Exchange are types of legal cartels operating in the sweet corn industry in Florida. The management decision on output level was transferred from the growers and indirectly from the sales firms to the Advisory Committee of the Marketing Order. The management decision of the sale price was transferred from the sales firms to the Exchange. The purpose of these transfers was to improve the profits of the industry and its members. Certain other management decisions and functions of the sales firms were transferred to the Marketing Order and Exchange also, but those of output and price are most relevant to this analysis.

Identical Products

It may be possible for a sweet corn sales firm to market a differentiated product in at least two ways: (1) market a substantially different quality of corn and (2) provide distinctive services to the buyers.

It seems unlikely that any substantial degree of differentiation was secured by the firms through marketing a superior quality

⁷Ibid., p. 236.

corn. It was found that 92.5 percent of the observed corn was yellow U. S. Fancy grade and 3 percent was white, all of which was precooled and packed in standard crates. This means that only 4.5 percent could be differentiated by grade. Since most of the "percentage grade" corn was marketed in the fall and winter, corn quality can practically be considered homogeneous during most of the season.

Services which the sales firms may offer buyers could take several forms. Some of the more common are protection against risks, confidence in business ethics, prompt adjustments of losses and credit terms on the shipments. Since most business is transacted verbally and the buyer usually does not see the product before purchase, confidence plays an important role in the produce business. For this reason some degree of differentiation could exist between sales firms in this manner. However, it seems unlikely that it is large enough to substantially alter this assumption.

Assumptions of the Analysis

It was necessary to assume prescribed time periods for analysis purposes. Three time periods, the short run, intermediate and long run, as outlined by Blodgett were used.⁸ The short run for this analysis refers to a period within the season after the corn has been planted. Once planted the quantity to be marketed cannot be changed substantially and the only relevant decision on output is whether to sell or abandon it. The intermediate period roughly

⁸Blodgett, op. cit., pp. 288-289.

coincides with a marketing season. It is a period long enough to change the rate of plantings and, consequently, the rate of marketable output, but not long enough to change the productive capacity. This assumes that land is not a limiting factor in this period. The long run is normally a period longer than a marketing season. During this period the productive capacity of the firm can be changed by acquiring or selling such equipment as planters, harvesting machines, precoolers and, in some cases, land.

This analysis is developed to show the combination of price and marketable output for each time period that will maximize profits. In this analysis it is assumed that demand does not change. It is also assumed that each time period is independent and that the effects of action taken in one period do not have to be considered in another. This analysis theoretically develops how profits could be maximized in each time period. This does not necessarily mean that it would always be desirable or wise for the industry to attempt to maximize profits as shown. For example, limitation of marketable output in one period may limit long run growth or prompt the Commissioner of Agriculture to intercede in the "public interest." This analysis is intended to serve only as a guideline as to how profits could be maximized.

Short Run

The Advisory Committee of the Marketing Order has the authority to affect the short run supply of corn through the use of flow-to-market regulations, harvesting holidays and grade restrictions. The level to which supply should be restricted is a continuing problem for the Committee.

Maximization of Revenue

In the short run costs become irrelevant since all costs, with the exception of harvesting and marketing costs, have already been incurred. The only relevant decision is whether or not to harvest and sell the crop. The short run problem thus becomes one of how to maximize revenue with a given potential marketable output.

In order to maximize short run revenue the industry must operate at the level on the demand curve where elasticity is at, or as close as possible to, unity. An assumed weekly demand schedule based on a typical price-quantity relationship during a heavy shipment period for the Florida sweet corn industry is shown in the first three columns of Table 46. In this demand schedule the most profitable short run marketable output would be at the level where elasticity is at unity. This level is obtained when the marketable output is 15,200 crates and the price is \$2.00 per crate. The total industry revenue at this level is \$30,400, and if the marketable output were raised or lowered from this level, total revenue would decline. For example, if all 28,000 crates were sold the total revenue would drop \$6,000, to a total of \$22,400.

If a schedule of marketing costs is considered as shown in columns 4 and 5 of Table 46, then the optimum marketable output--the level where net industry revenue (column 6) would be maximized--would be at a lower level of shipments. Industry revenue would now be maximized when the quantity sold was 12,000 crates per week and the price per crate was \$2.40. Marketing cost per crate would be \$1.10 and the net industry revenue would be \$15,680.

Table 46.--Assumed weekly demand schedule and marketing cost schedule for Florida sweet corn

Demand Schedule			Marketing Cost Schedule		
Quantity Which Could be Sold	Price Per Crate	Total Industry Revenue	Marketing Cost Per Crate	Total Marketing Cost	Net Industry Revenue
<u>Crates</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>
8,000	3.20	25,600	1.30	10,400	15,200
9,600	2.80	26,880	1.20	11,520	15,360
12,000	2.40	28,880	1.10	13,200	15,680
15,200	2.00	30,400	1.00	15,200	15,200
18,400	1.60	29,440	.90	16,560	12,880
22,400	1.20	26,880	.80	17,920	8,960
28,000	.80	22,400	.70	19,600	2,800

Evaluation

Attempts to maximize revenue by reducing shipments in the short run have been undertaken only in a limited way. Flow-to-market regulations, probably the most effective means of controlling short run supply, have not been invoked. Minimum grade requirements for shipment have been invoked, but have not been very effective in reducing total shipments. Grade requirements generally have been set at a level such that the volume shipped by most firms was not affected substantially. Their chief benefit has been to remove the miscellaneous shipments of low grade corn that may damage the reputation of all Florida corn. Harvesting holidays have been invoked in order to remove the pressure of "market gluts." These may have had some effect in spreading out shipments, but it is doubtful if such holidays actually reduced the short run volume. Many compensate for a holiday by accelerating their rate of harvesting before and after the harvesting holiday, thus negating much of its effect.

Intermediate Period

The Advisory Committee has the authority to set the quantity of sweet corn that may be marketed in the intermediate period. This is made possible by the provision for establishing an annual "marketable allotment" prior to the time plantings begin. The procedure whereby this allotment is established and divided among the growers was discussed in the previous chapter.

Maximization of Profits

The determination of the most profitable level of price and marketable output in the intermediate period is more involved than in the short run since costs cannot be ignored. Costs are important because that part of the marginal costs schedule which exceeds the level where marginal and average variable cost are equal makes up the supply schedule for a firm. This is a schedule of quantities the firm is willing to sell at corresponding prices.

The industry supply schedule is formed by a summation of the individual firm supply or marginal cost schedules. This process is illustrated graphically in Figure 8. If it is assumed that the industry is composed of three firms and that mc_1 , mc_2 and mc_3 represent their respective marginal cost curves, the industry marginal cost or supply curve will be the horizontal summation of these curves as illustrated by MC.

The principle of equating marginal cost and marginal revenue is followed to determine the most profitable level of marketable output for the industry. If DD represents the demand for sweet corn and MR the marginal revenue, then the most profitable level for the industry

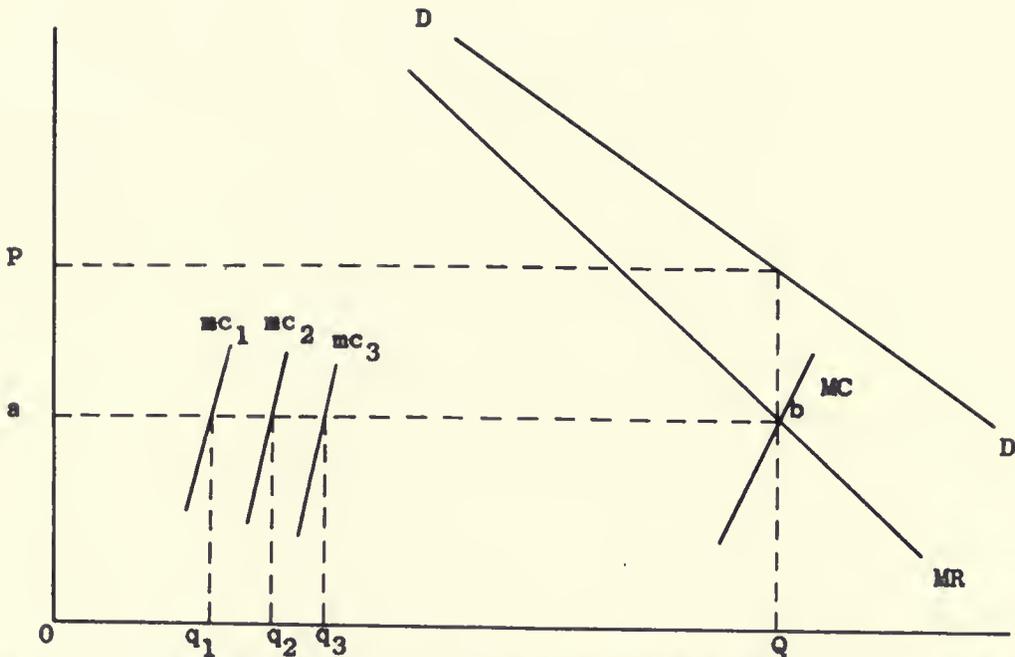


Figure 8.--Optimum solution for price and marketable output in the intermediate period.

is at point b , where MC equals MR . At this level the industry marketable output will be oQ and the price will be oP .

This solution indicates the total intermediate period output, but does not solve the problem of what firms should produce how much in order to maximize industry profits. In order to maximize profits at this price and output, cost must be at a minimum. This may be accomplished only by equating the marginal cost of all firms to that of the industry. This is illustrated in Figure 8 by line ab which equates the marginal cost of all firms to that of the industry at the optimum price and output level. The marketable output of each firm is oq_1 , oq_2 and oq_3 , which necessarily equals the industry output oQ . This is the optimum combination of price, industry output and firm output to maximize intermediate period profits. A change in any of these factors would cause profits to decline.

Evaluation

The evaluation of the intermediate period adjustments will be considered in two parts. First, the adjustment of the industry price and output to the optimum level and second, adjustment of the firms to the optimum output.

The extent to which marketable output is adjusted to a level that equates industry marginal cost and marginal revenue is difficult to evaluate. The obvious problem in making this adjustment and also in making the evaluation is that of inadequate information. Marginal cost and marginal revenue, for example, are not known and can only be approximated. The 1962-63 production estimates do not indicate that seasonal production was affected substantially, assuming a reduction was necessary to approach the optimum output. Production was about one-half million crates larger than in 1961-62, about equal to the average annual increase for the past 10 years. Even so, one year is too short a period to permit a valid evaluation to be made.

A look at some of the factors that may tend to inhibit intermediate period output adjustments to the optimum level may provide an insight into the extent that adjustments may be expected. The Marketing Order provides that the Commissioner of Agriculture shall see that the "public interest" is protected. Substantial exploitation of the demand curve through marketable output limitations may cause public reaction resulting in action against the industry under this provision. Although this may affect marketable output decisions under some conditions, other factors seem more important.

The incentive for the individual firm to expand marketable output, even though it may not be in the interest of greatest industry

profits, appears to be more important. This phenomenon is illustrated graphically in Figure 9. If DD is the industry demand curve, the firm demand curve will be illustrated by dd . Actually, the total demand, DD , is composed of an aggregation of parallel firm demand curves, dd , each representing the firms' market share. All firm demand curves have identical slopes to that of the industry demand curve because the Advisory Committee determines the output at various levels on this curve. It should be stressed, that this condition prevails only so long as the Advisory Committee controls the output decisions and the individual firm may not change output independently to exploit this sloped demand curve.

If the Advisory Committee should decide that industry profits could be increased by reducing marketable output from oQ to oQ' , then the firm must necessarily reduce its output by an equal percentage, or from oq to oq' . When this occurs price rises from oP to oP' .

An industry price which is stabilized by a cartel agreement of this nature creates the incentive for a firm to expand marketable output. The firm does not think of itself as having a sloping demand curve like dd , but one which is much more elastic, or perfectly elastic, as shown by the price line $p'a$. Such a demand curve would exist only if all other firms followed the controls of the Advisory Committee, while it was free to make adjustments. Each firm, looking at its self interest, has the incentive to behave in this manner, whether or not it is rational from the industry standpoint. Therefore, when price rises to oP' , the firms' incentive is to equate its marginal cost with the industry price and thus expand output to oq'' , a quantity even larger than its original output of oq .

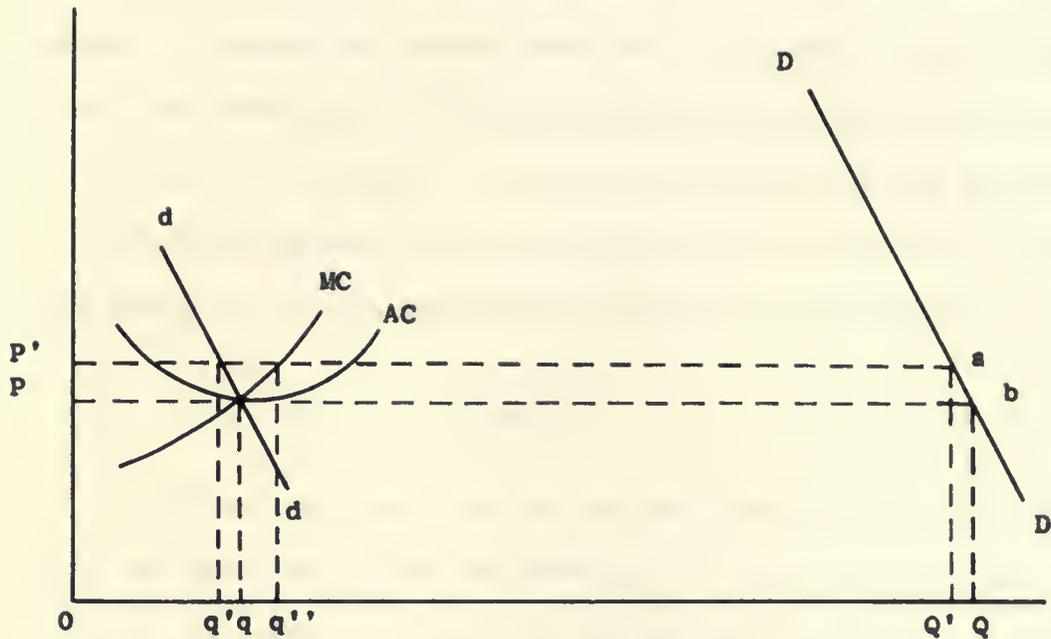


Figure 9.--Response of the firm to an industry change in price and marketable output.

When this phenomenon is considered industry-wide, it means that whenever the Advisory Committee reduces industry output, and price rises, there is immediately, for the firms, an incentive for expansion of the allotments. This occurs when the price is lower and output greater than that which would maximize industry intermediate period profits. Due to this conflict in firm and industry interest, it is unlikely that the optimum price and output levels would ever be reached.

A second criterion for the optimum intermediate period solution was that quotas be assigned on the basis of each firm's marginal cost. Present quotas are not assigned on this basis, but on the basis of previous years' shipments. Authority to assign quotas on the basis of marginal cost is not authorized under the Marketing Order.

Under the present system any profits accruing to the industry are distributed to the firms on the basis of their quota. Therefore, assignment of quotas on a basis other than that presently used would involve a new system for distributing industry profits, as well as a redistribution of production. It is unlikely that a scheme acceptable to the industry could be found for redistribution of profits and production quotas, even if permissive legislation were obtained.

Long Run

The primary authority of the Advisory Committee which is applicable to the long run is that of limiting the entry of new firms. This authority is not granted explicitly, but is implicit in its authority to limit quantities that may be marketed by new growers. A new marketing quota can be marketed through an existing firm, or through a new firm. However, due to the limited size of new quotas, it is unlikely that an efficient sales firm could be established to handle this volume.

Other barriers, exclusive of the Marketing Order, exist which limit entry of new firms. When the managers of sales firms were asked how difficult it would be for a new firm to enter the industry, 16 indicated it would be difficult, two thought it would be very difficult and two had no opinion (Table 47). Difficulty in obtaining supplies of corn, either by attracting present growers from other sales firms or by obtaining suitable land to go into production, was mentioned by most sales firms as a reason for the difficulty of entry. The high investment necessary to enter the business on an economical scale was mentioned as a barrier also.

Table 47.--Opinions of managers on the degree of difficulty which new sales firms would encounter in entering the Florida sweet corn industry, 20 Florida sweet corn sales firms, 1962-63 season

Degree of Difficulty	Firm	
	Number	Percent
Very easy	0	0
Easy	0	0
Difficult	16	80.0
Very difficult	2	10.0
No opinion	2	10.0
Total	20	100.0

Maximization of Profits

Two types of adjustments are possible in the long run: (1) new firms may enter and existing firms may exit from the industry and (2) firms may expand or contract their productive capacity by changing the scale of their plants. As long as the industry remains under the Marketing Order and Exchange organizations it does not appear the first type of adjustment will be of substantial importance. The inherent barriers, plus those of the Marketing Order, should discourage a significant entry of new firms. On the other hand, if the Marketing Order and Exchange operate effectively, few, if any, firms should be forced to exit from the industry for economic reasons. Some realignment of quotas between firms may occur, but this would not substantially affect the economic nature of the industry.

Adjustments in the productive capacity of the firms are of primary long run interest to the industry. The long run problem for the firm is to select the optimum scale of plant to handle its

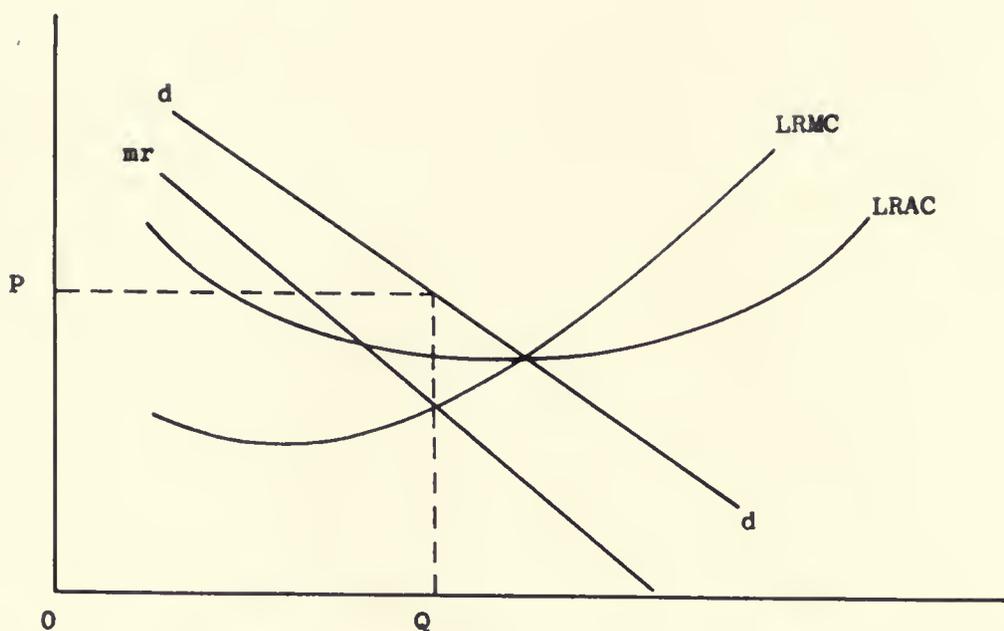


Figure 10.--Optimum solution for plant size in the long run.

volume.⁹ This may be analyzed theoretically by considering an array of scale of plants, each operating at the optimum level for a given output. If such an array of plant sizes were considered, long run average and long run marginal cost curves could be developed as shown in Figure 10. In order to choose the scale plant from this array which would maximize profits, the firm must equate its long run marginal cost, LRMC, with its marginal revenue, mr. The most profitable long run solution would be for the firm to sell quantity oQ at price oP .

⁹The word "plant" in this discussion refers to a production unit and/or a marketing unit.

Evaluation

Firms in the Florida sweet corn industry will probably not approach this optimum solution very closely in the long run because the firms are not free under the present Order to change their marketable output. For example, if the firm discussed in Figure 10 had a quota for less than oQ , it would not be free to expand output to reach this optimum long run output. It may obtain the most efficient scale plant at some lesser output authorized by a quota and still make a profit, but this would be less profitable than the long run optimum solution. At some later date the Marketing Order may be amended to allow the sale of marketable quotas, just as milk base quotas are sold under present State Milk Commission legislation and regulations. This would allow the optimum long run solution to be more closely approximated.

CHAPTER VIII

DEMAND ANALYSIS

The demand for sweet corn at the shipping point level was analyzed to determine elasticities within the range of prices and marketable outputs at which the industry normally operates. Prior to developing these elasticity values, it was necessary to develop functions explaining the demand relationships for sweet corn. These functions were developed through the use of graphic and regression analyses.

Graphic Analysis

Weekly data on carlot shipments and prices of Florida sweet corn at the f.o.b. level are compiled for the period from the second week of November through the last week of May for the 1960-61, 1961-62 and 1962-63 marketing seasons (Table 48). Carlot shipments included the sum of rail and truck shipments as reported by Brooke.¹ All truck shipments were adjusted from the 600 crate load to a standard 675 crate rail load before compilation. Data on f.o.b. prices were compiled from the "Daily Belle Glade Market Report."²

¹Donald L. Brooke, Florida Truck Crop Competition I. Interstate and Foreign (Gainesville, Florida: Florida Agricultural Experiment Station Agricultural Economics Mimeo Reports 62-6, 63-2 and EC64-5, 1961-64).

²USDA AMS, Federal-State Market News Service, Daily Belle Glade Market Report (Belle Glade, Florida, 1960-61, 1961-62 and 1962-63).

Table 48.--Weekly distribution of carlot shipments and f.o.b. prices of Florida sweet corn, 1960-61 - 1962-63 seasons

Monday of week 1962-63	Week No.	Shipments			Price Per Crate			
		1960-61	1961-62	1962-63	1960-61	1961-62	1962-63	
		<u>Carlots</u>			<u>Dollars</u>			
					<u>Fall and Winter</u>			
Nov.	5	5	28.0	164.2	63.6	3.50	1.75	2.50
	12	6	69.1	144.6	80.0	2.75	1.95	3.06
	19	7	112.2	120.2	95.6	2.00	1.78	2.50
	26	8	54.6	114.9	121.7	3.15	1.65	2.00
Dec.	3	9	29.0	132.1	101.6	3.50	1.87	2.25
	10	10	82.9	121.1	82.9	2.80	1.97	3.50
	17	11	56.7	110.8	24.0	2.25	2.10	3.55
	24	12	22.6	70.1	21.1	3.25	2.38	4.25
	31	13	30.2	24.1	27.7	3.03	4.00	3.81
Jan.	7	14	32.9	44.0	24.0	3.70	4.20	4.05
	14	15	43.1	63.9	14.2	3.65	3.45	4.55
	21	16	53.3	56.2	42.8	3.10	3.50	4.10
	28	17	42.6	53.0	53.4	2.97	3.75	3.50
Feb.	4	18	32.0	56.1	48.0	3.37	3.94	3.55
	11	19	42.7	70.9	55.6	3.12	3.40	3.50
	18	20	22.7	117.7	60.0	4.00	2.93	3.50
					<u>Spring</u>			
Feb.	25	21	40.2	125.9	77.4	3.69	2.97	3.50
March	4	22	79.2	93.3	116.3	3.10	3.77	3.50
	11	23	93.9	95.1	157.9	3.37	4.05	3.00
	18	24	109.1	146.8	386.0	3.35	3.40	2.45
	25	25	126.2	292.3	506.7	3.25	2.85	2.30
April	1	26	114.6	351.3	440.8	3.95	2.75	2.65
	8	27	126.9	463.7	422.6	4.05	2.50	2.70
	15	28	316.8	397.2	363.6	3.30	2.70	2.60
	22	29	283.2	267.3	510.7	3.10	3.00	2.60
	29	30	288.2	386.7	839.8	3.60	2.50	2.16
May	6	31	600.4	449.1	1028.7	2.40	2.80	1.65
	13	32	644.1	634.9	911.8	2.25	2.50	1.71
	20	33	772.0	867.4	847.2	1.97	2.15	1.50
	27	34	1008.8	959.8	774.1	1.78	1.50	1.45

Prices as quoted for "yellow, U. S. Fancy" were collected for Monday through Friday of each week. A simple average of these daily prices was used to obtain the weekly f.o.b. price.

Preliminary graphic analysis indicated that a curvilinear relationship existed between prices and carlot shipments. During the fall and winter all prices were associated with relatively low shipments. During the spring shipments increased several fold, but prices declined only modestly. This resulted in a trend line where prices declined sharply as volume was increased in the low volume range. In the high volume range the curve leveled out and prices declined modestly as shipments increased.

The feasibility of using a curvilinear analysis was explored graphically, but a seasonal division of the marketing year was found to be a superior approach. Each of the marketing years was divided into a fall and winter season which extended from the second week of November through the third week of February and a spring season which extended from the last week of February through the remainder of the year.

Graphic analysis revealed that a distinct negative linear relationship existed between prices and shipments when each of the seasons was considered separately. This relationship for the fall and winter season of 1962-63 may be observed in Figure 11. Each point represents a weekly price and shipment observation. Dates corresponding to the week numbers may be found in Table 48. A similar linear trend may be observed for the spring in Figure 12, but it should be noted that the scale for carlot shipments in Figure 12 is ten times that used in Figure 11.

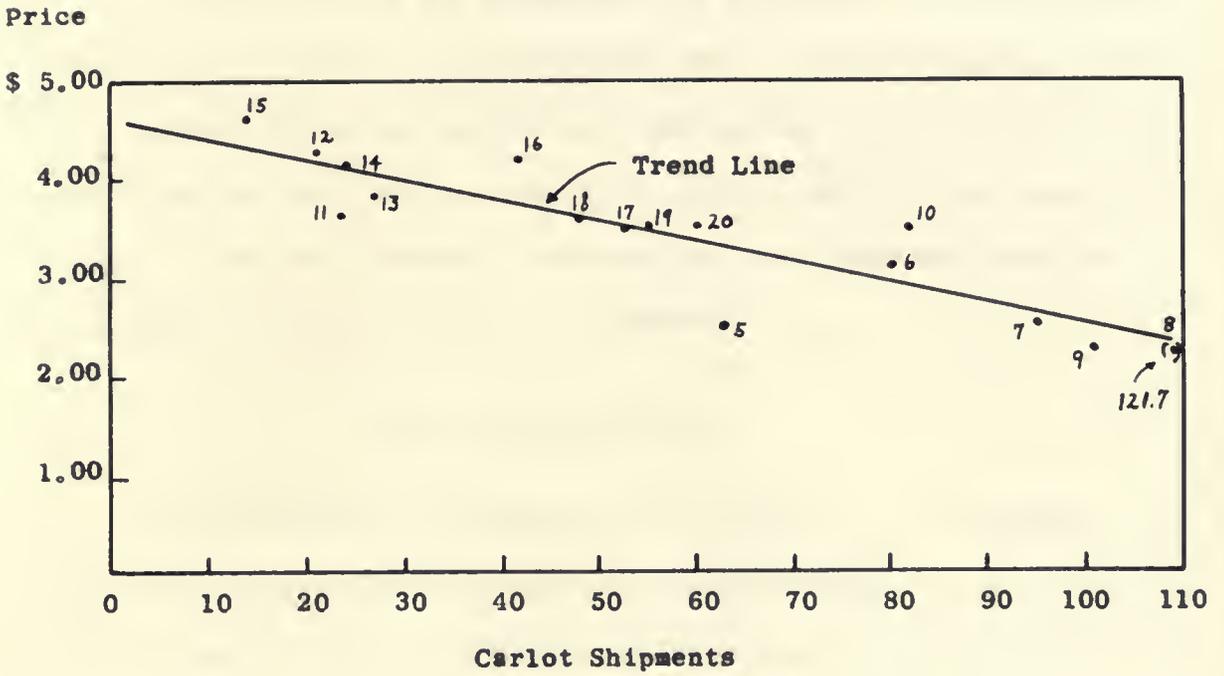


Figure 11.--Scatter diagram of weekly prices and carlot shipments of Florida sweet corn, fall and winter season, 1962-63.

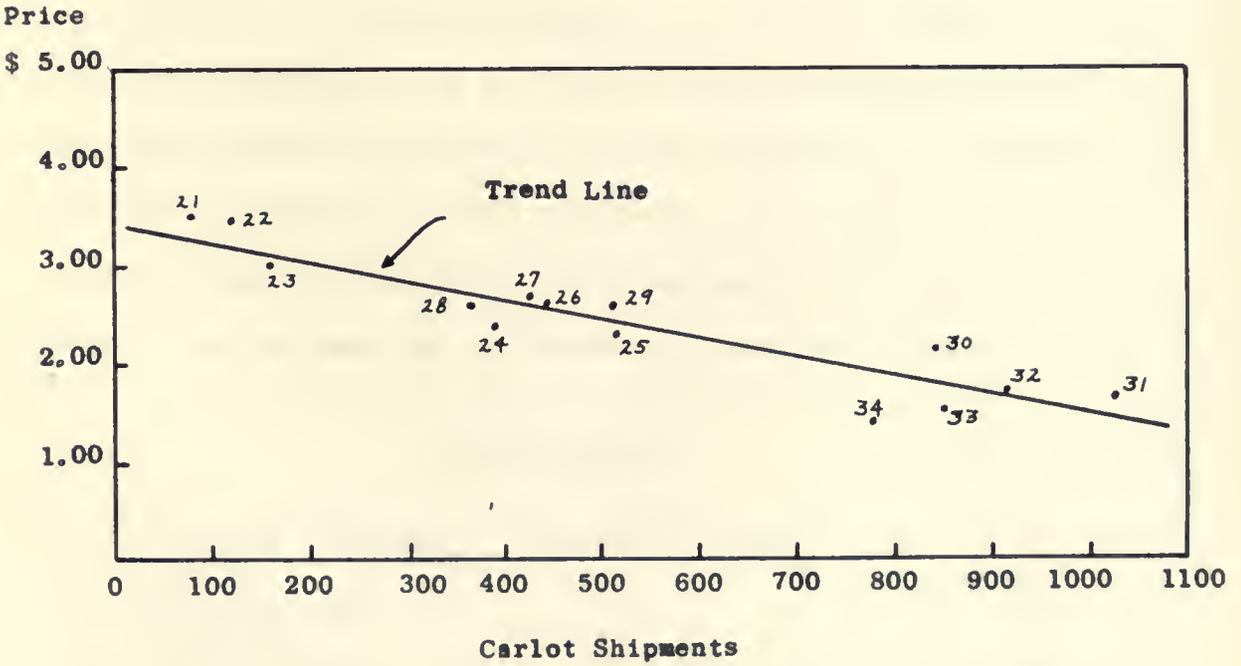


Figure 12.--Scatter diagram of weekly prices and carlot shipments of Florida sweet corn, spring season, 1962-63.

The division of the marketing year was based on the supposition that a shift occurred in the demand for sweet corn between the fall and winter season and the spring season. The seasonal shift in tastes and preferences may have been related to weather, traditional patterns of consumption or other factors. Nevertheless, the important thing is to recognize that such a shift did apparently occur.

Selection of Variables

Ten independent variables were considered for a regression analysis to determine the factors that explain variations in f.o.b. prices of sweet corn. The stepwise multiple regression method was used to select the significant independent variables for each season. A discussion of the stepwise regression model, independent variables considered, method of variable selection and method of computing the price explanation equations is shown in Appendix E.

This examination of the ten variables revealed that three independent variables as shown below were significant in explaining price variations based on the three years of data. The multiple regression equations, coefficients of determination and standard errors of the estimate for each season are also shown below:

Fall and Winter

$$\hat{Y} = 1.77 - .01160x_1 + .41214x_2 + .0994x_3$$

$$R^2 = .86$$

$$\sigma_{\hat{Y}} = .30$$

Spring

$$\hat{Y} = 1.38 - .00127x_1 + .39579x_2 + .00817x_3$$

$$R^2 = .92$$

$$\sigma_{\hat{Y}} = .22$$

where:³

\hat{Y} = Expected f.o.b. price for week w.

x_1 = Florida carlot shipments for week w.

x_2 = Terminal market price on Monday of week w.

x_3 = Market tone on Monday of week w.

The fall and winter equation accounted for 86 percent of the price variations with a standard error of the estimate of 30 cents. The spring equation explained 92 percent of the price variations with a standard error of the estimate of only 22 cents.

Although the multiple regression equations were effective in explaining price variations, they were not satisfactory for estimating price elasticities. Estimating elasticities from these equations required that variables x_2 and x_3 be held at a constant level while x_1 , carlot shipments, was varied. However, due to interaction between the variables, a bias was introduced when this was done. For example, terminal market price (x_2) was related to carlot shipments (x_1) in a similar relationship to f.o.b. price (y). Therefore, it was unrealistic to assume that x_2 remained

³See Appendix E for full explanation of variables.

constant while only x_1 and y interacted. Due to this weakness in using the multiple regression equations, only f.o.b. prices and Florida carlot shipments were used in developing the equations to estimate price elasticities.

Regression Analysis

The simple linear regression was used to analyze the relationship between prices and carlot shipments for each season. This analysis was based on the three years of weekly data as shown in Table 48.

Model

The general statistical model for the simple linear regression as used in this analysis is shown below:

$$\hat{Y}_w = a + bx_w + e_w$$

where:

\hat{Y}_w = Expected f.o.b. price for week w .

a = Intercept of the Y axis.

b = Coefficient of the effect of carlot shipments.

x_w = Number of carlot shipments for week w .

e_w = Random effect.

Regression Equations

When the data for all three marketing years were combined in the seasonal analyses there were 47 degrees of freedom for the fall and winter season and 41 degrees of freedom for the spring season. Based on the above model, seasonal regression equations were computed

using the method of analysis for linear regression as outlined by Steel and Torrie.⁴ The regression equations for each season are shown below:

Fall and Winter

$$\hat{Y} = 4.24 - .01741x$$

$$R^2 = .72$$

$$\sigma_{\hat{Y}} = .42$$

$$F = 114.9^{**}$$

Spring

$$\hat{Y} = 3.68 - .00219x$$

$$R^2 = .84$$

$$\sigma_{\hat{Y}} = .29$$

$$F = 206.3^{**}$$

where:

\hat{Y} = Expected f.o.b. price for week w.

x = Carlot shipments for week w.

The regression coefficients for both seasons were highly significant, indicating that the independent variables caused a significant reduction in the residual sums of squares. The percentages of explained variation in the dependent variables declined and the standard errors of the estimate rose from those

⁴Steel and Torrie, op. cit., pp. 161-181.

**Indicates significance at the 1 percent confidence level.

observed for the multiple regression equations. Nevertheless, the single independent variable explained 72 percent of the variations in prices with a standard error of the estimate of 42 cents in the fall and winter. In the spring, variations in shipments explained 84 percent of the price variations with a standard error of the estimate of 29 cents.

Price Elasticity

Elasticity refers to the responsiveness of the quantity of a product that will be taken on a market to changes in price. Mathematically, it may be defined as the percentage change in quantity taken divided by percentage change in price, when the price change is small.⁵

The elasticity of demand would vary at different points on the demand curve if a linear relationship were assumed. Therefore, elasticity was measured at more than one level to obtain an estimate of how it changed. Four levels of shipments were chosen for elasticity measurements--the mean, the mean plus one standard deviation, the mean minus one standard deviation and the level where elasticity was unity.

The mean weekly shipment during the fall and winter was 65.31 carlots and the standard deviation was 37.75 carlots. Shipment levels for plus and minus one standard deviation were 103.06 and

⁵Leftwich, op. cit., pp. 34-36.

27.56 carlots, respectively. The mean weekly shipment during the spring was 417.10 carlots and the standard deviation was 299.75 carlots. Shipments levels for plus and minus one standard deviation were 716.85 and 117.35 carlots, respectively.

Elasticity, by definition, is at unity when marginal revenue equals zero. Therefore, the shipment levels where elasticity is unity can be determined by finding the levels where marginal revenue is zero. The total revenue equation may be found by multiplying the price regression equation by the x variable. The shipment levels where elasticity is unity may then be found as shown below:

Total Revenue

$$TR = ax + bx^2$$

Marginal Revenue equals the derivative of TR

$$MR = \frac{\partial TR}{\partial x} = a - 2bx$$

Shipment level when marginal revenue equals zero

$$0 = a - 2bx$$

$$x = \frac{a}{2b}$$

Substitute in values from regression equations

Fall and Winter

$$x = \frac{4.24}{2(.01741)} = 121.77$$

Spring

$$x = \frac{3.68}{2(.00219)} = 840.18$$

The regression equations were solved at each of the four levels of shipments to determine the corresponding prices as shown below:

<u>Shipment Level⁶</u>	<u>Equation</u>	<u>Price in Dollars</u>
	<u>Fall and Winter</u>	
\bar{x}	$\hat{Y} = 4.24 - .01741(65.31)$	3.10
$\bar{x} + \sigma$	$\hat{Y} = 4.24 - .01741(103.06)$	2.45
$\bar{x} - \sigma$	$\hat{Y} = 4.24 - .01741(27.56)$	3.76
MR = 0	$\hat{Y} = 4.24 - .01741(121.77)$	2.12
	<u>Spring</u>	
\bar{x}	$\hat{Y} = 3.68 - .00219(417.10)$	2.77
$\bar{x} + \sigma$	$\hat{Y} = 3.68 - .00219(716.85)$	2.11
$\bar{x} - \sigma$	$\hat{Y} = 3.68 - .00219(117.35)$	3.42
MR = 0	$\hat{Y} = 3.68 - .00219(840.18)$	1.84

Point elasticity was computed at each price level by the use of derivatives following the method outlined by Tintner.⁷ Point elasticity may be defined as the limit of the relative change in quantity taken resulting from a relative increment in price, if the increment in price approaches zero. Accordingly, point elasticity may be expressed as shown below:

$$\eta = \frac{Y}{x} \left[\frac{1}{\frac{\partial Y}{\partial x}} \right]$$

⁶Symbols used:

- \bar{x} Mean weekly shipment.
 $\bar{x} + \sigma$ Mean weekly shipment plus one standard deviation.
 $\bar{x} - \sigma$ Mean weekly shipment minus one standard deviation.
 MR = 0 Weekly shipment where elasticity is unity.

⁷Gerhard Tintner, Mathematics and Statistics for Economists (New York and Toronto: Rinehart & Company, Inc., 1953), pp. 118-120.

<u>Shipment Level</u>	<u>Equation</u>	<u>Price Elasticity</u>
<u>Fall and Winter</u>		
\bar{x}	$\frac{3.10}{65.31} \left[\frac{1}{-.01741} \right]$	- 2.72
$\bar{x} + \sigma$	$\frac{2.45}{103.06} \left[\frac{1}{-.01741} \right]$	- 1.37
$\bar{x} - \sigma$	$\frac{3.76}{27.56} \left[\frac{1}{-.01741} \right]$	- 7.83
MR = 0	$\frac{2.12}{121.77} \left[\frac{1}{-.01741} \right]$	- 1.00
<u>Spring</u>		
\bar{x}	$\frac{2.77}{417.10} \left[\frac{1}{-.00219} \right]$	- 3.04
$\bar{x} + \sigma$	$\frac{2.11}{716.85} \left[\frac{1}{-.00219} \right]$	- 1.34
$\bar{x} - \sigma$	$\frac{3.42}{117.35} \left[\frac{1}{-.00219} \right]$	-13.15
MR = 0	$\frac{1.84}{840.18} \left[\frac{1}{-.00219} \right]$	- 1.00

Economic Implications

The Florida sweet corn industry operated predominantly in the elastic segment of the demand curve over the past three years. Both the mean and the mean plus one standard deviation fell well below the shipment level where elasticity reached unity. This may be observed for the fall and winter in Figure 13 where unit elasticity was reached at a price of \$2.12 and a shipment level of 121.8 carlots. Unit elasticity for the spring was reached when the price was \$1.84 and

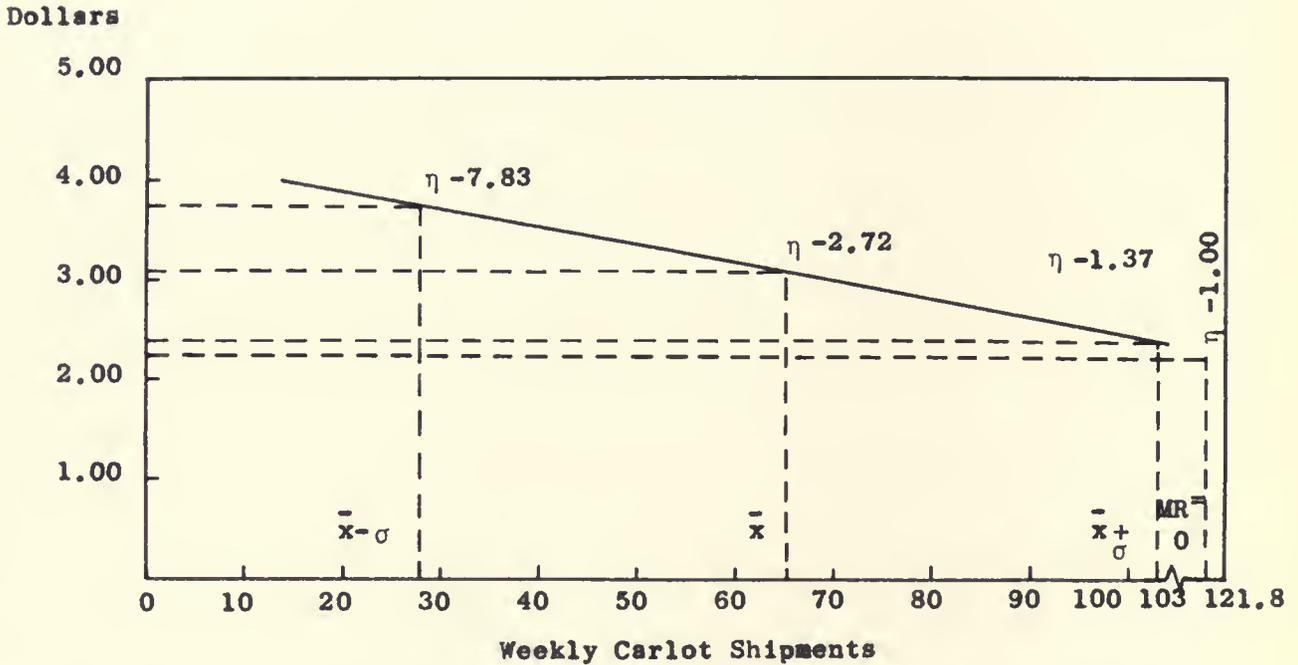


Figure 13.--Price elasticities at the shipping point for Florida sweet corn, fall and winter season, of three years 1960-61 through 1962-63.

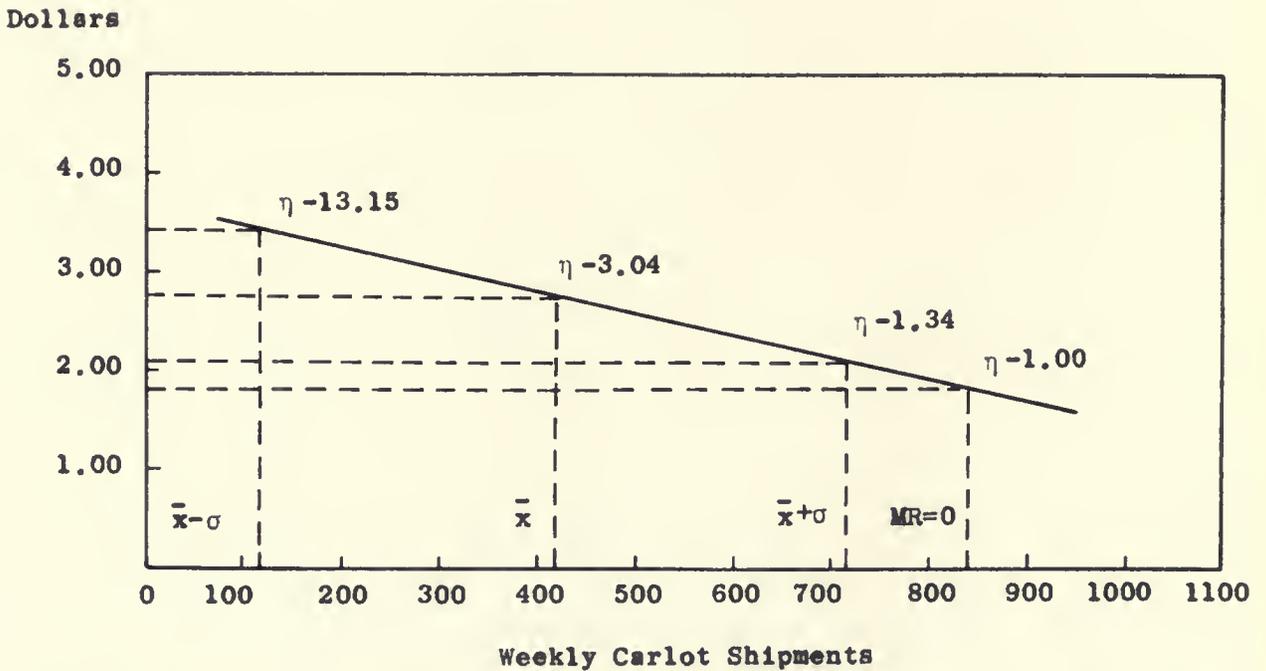


Figure 14.--Price elasticities at the shipping point for Florida sweet corn, spring season, of three years 1960-61 through 1962-63.

the shipment level 840.2 carlots (Figure 14). Unit elasticity was not reached in either season until shipments exceeded a level approximately twice that of the mean.

Based on these elasticities the industry could not have increased total revenue by limiting shipments at anytime during the fall and winter of 1962-63. The highest weekly shipment was 121.7 carlots as may be observed in Table 48, slightly less than that of unit elasticity of 121.8 carlots. Although shipments also remained below this level in 1960-61, the level was exceeded during three weeks in the 1961-62 season. These weeks occurred during November and December. Of the 48 fall and winter weeks observed over the three-year period, total revenue could have been increased during only three by limiting marketable output.

During the spring of 1962-63 total revenue could have been increased during three weeks by limiting shipments. During these three weeks, May 6, 13 and 20, shipments exceeded 840.2 carlots as may be observed in Table 48. Shipments exceeded the level of unity for two weeks in 1961-62 and for one week in 1960-61. Of the 42 spring weeks observed over the three years, total revenue could have been increased during six by limiting shipments. All six of these weeks occurred during May, so it may be concluded that total revenue could have been increased by limiting shipments during one-half of the 12 May weeks observed.

This analysis has been concerned only with maximizing total revenue as would be done in the short run. This does not suggest that the industry should operate at this level in the intermediate

period. The intermediate period point of maximum profits is where marginal revenue equals marginal cost. This point is above where marginal revenue equals zero, as was assumed in this analysis. An estimate of marginal cost, which was beyond the scope of this study is necessary before the most profitable intermediate period output can be determined.

CHAPTER IX

SUMMARY AND CONCLUSIONS

Florida sweet corn production did not become important from a national marketing viewpoint until after World War II, with a 1947-48 production of 480,000 crates. By the 1962-63 season production increased to 8.8 million crates--a level two and one-half times that of its largest competitor. During this period of rapid expansion a number of marketing problems were encountered. Industry actions were promulgated to alleviate some of these problems; however, information on the market structure and the economic nature of the industry have been inadequate in several respects. The purpose of this study was to develop the data and carry out certain analyses to provide guidelines that would be helpful in solving marketing problems.

The traditional pattern of fresh market sweet corn production in the United States changed after World War II when specialized production areas located at greater distances from major markets became more important relative to the established market-garden farming areas. Out-of-season production expanded--increasing from 15 percent of the total in 1949 to 34 percent in 1963. Florida, now the leading sweet corn producing state, accounted for 29.4 percent of the 1963 production. Although annual per capita consumption of sweet corn has increased only slightly since 1949, out-of-season consumption has increased from 1.2 to 2.7 pounds per person between 1949 and 1963.

Production risks, especially cold weather, which play an important role in the profitability of sweet corn in Florida, appeared to be greatest in the winter and smallest in the spring. Acreage losses were highest during the winter and yields were low, although fall yields averaged slightly lower. Spring acreage losses were lowest and yields highest of the three seasons. Florida encountered little competition during most of its marketing season; however, it did receive limited competition from California in the early fall. In the late spring Texas and California entered the market and after June 1 several southeastern areas also commenced shipments.

Twenty-five sales firms were included in a 1962-63 season census of the Florida sweet corn industry. These firms were affiliated with 89 growers for a source of supply of corn. Forty percent of the firms were affiliated with only one grower while 36 percent were affiliated with two to five growers. The remaining 24 percent were affiliated with six or more growers.

About one-half of the firms were organized as corporations, one-fourth as cooperatives and one-fourth as partnerships or proprietorships. There appeared to be little relationship between the method of organization and the number of growers affiliated with the firms. Method of organization appeared to be more a matter of personal preference or other considerations than it was the number of growers.

Sweet corn was marketed from three primary sales areas--Belle Glade, South Florida and Central Florida. Belle Glade, which had 71 growers and 16 sales firms, shipped 6,037,348 crates of corn,

or 73.6 percent of the total. South Florida, which had nine growers and six sales firms, sold 737,403 crates, accounting for 9 percent of the total. Central Florida, which had 14 growers and seven sales firms, marketed 1,425,980 crates--17.4 percent of the total. Some growers and sales firms operated in more than one area.

Large volume sales firms, those handling 500,000 or more crates annually, accounted for 32 percent of the firms, but shipped 64.8 percent of the corn. Medium firms, those handling between 100,000 and 499,999 crates, accounted for 32 percent of the firms and 27.1 percent of the corn. Small firms, those handling under 100,000 crates, accounted for 36 percent of the firms, but only 8.1 percent of the corn marketed. The proportion of sweet corn handled by large firms in the Belle Glade area was substantially greater than that sold by firms of this size in other areas.

A 10 percent stratified random start systematic sample of 2,533 shipment invoices was drawn from 19 of the sales firms in the three sales areas. Based on these data, 92.5 percent of the corn shipped was yellow, U. S. Fancy grade. Yellow corn in the range of 85-89 percent U. S. Fancy grade accounted for 2.4 percent and 75-84 percent U. S. Fancy for 1.3 percent. Unclassified corn accounted for only 0.3 percent while white corn accounted for the remaining 3.5 percent of the shipments.

Although there were some indications that the proportion of "percentage grade" corn shipped during the fall and winter was higher than during the spring--the difference was not statistically significant. The price of 85-89 percent U. S. Fancy corn averaged 19.4 percent less and 75-84 percent U. S. Fancy averaged 36.5 percent less than the price of U. S. Fancy during weeks when both prices were observed. These differences were significant at the 1 percent

confidence level. Prices in South Florida were significantly higher than in Belle Glade during the 16 weeks when both areas shipped corn, but price differences between Belle Glade and Central Florida were nonsignificant.

The average size of shipment from Florida during the early fall was between 200 and 300 crates, but this gradually declined to a low of 53 crates by the second week of January. The average then rose throughout the remainder of the season to a high of 700 crates during July. Excluding the effect of the seasonal shipping patterns, no significant differences were observed in average size shipments from the three sales areas.

When the Florida marketing season was divided into two periods; (1) the fall and winter, (October through the third week of February) and (2) the spring (the remainder of the year), large and medium sales firms were found to dominate shipments during the fall and winter. Large and medium firms shipped 15.1 and 15.4 percent of their annual shipments, respectively, during this period but small firms shipped only 1 percent of their volume then. Small firms were relatively more important in the spring when the South Florida and Central Florida areas commenced shipments.

Chain and wholesale buyers received over 90 percent of the terminal market shipments, with chains accounting for 45.5 percent and wholesalers 44.7 percent. Terminal brokers received 7.5 percent and jobbers, retailers and government agencies received the remaining 2.3 percent. South Florida firms sold 71.7 percent of their shipments to chains, compared to only 44 percent by firms in other areas. South Florida firms sold less to wholesalers than other areas. Little

difference was observed in the types of buyers to which large and medium sales firms sold sweet corn, but small firms tended to sell more than average to chains and less to wholesalers and terminal brokers.

The f.o.b. basis of sale, by far the most prevalent, was used for 86.5 percent of the shipments. Delivered and consigned sales accounted for 9.4 and 2.8 percent, respectively. Price arrival, joint account and cash sales were observed only sporadically and accounted for only 1.3 percent of the volume marketed. F.o.b. shipments from Central Florida were 13 percent lower than from other areas, but delivered and consigned shipments were higher. No significant difference existed in the percentages of f.o.b. shipments marketed in the fall and winter season and the spring season. Although the average percentage of consigned shipments was 1.4 percent higher during weeks of declining prices than during weeks of rising prices, the difference was nonsignificant. Small sales firms sold 95.3 percent of their shipments on an f.o.b. basis, almost 10 percent more than firms of other sizes. Consignments by medium firms were highest, 4.8 percent, compared to 2.5 percent by large and 0.1 percent by small firms.

Interpackinghouse sales amounted to about 10 percent of the shipments handled by the sales firms. Practically all of these were observed in Belle Glade. The distribution of grades of the interpackinghouse sales was not substantially different from those observed for other sales. Transactions between firms were analyzed from the standpoint of both selling and buying. Large sales firms accounted for 75.2 percent of the interpackinghouse sales, but only 44.8 percent

of the purchases. Medium firms, which accounted for only 18.1 percent of the sales, accounted for 48.9 percent of the purchases. Sales and purchases of the small firms were near equal.

Terminal markets in the eastern areas of the United States received the largest proportion of the Florida sweet corn shipments, although substantial shipments were observed to Canada and western areas during some periods. The proportion of shipments received by northern market areas was highest in the early fall and spring. The highest percentage of shipments was received by southern areas during the winter and shipments to western areas were highest during the early spring.

The 34 terminal markets in the Northeast area received 36.1 percent of the shipments. The six large Northeast markets, those receiving 10,000 or more crates, accounted for 81.5 percent of the area's volume and 29.6 percent of all Florida shipments. In the North Central area 40 terminal markets received 23.4 percent of the shipments and the 37 terminal markets in the South received 22.6 percent of the shipments. Thirteen terminal markets in the Southwest and 18 terminal markets in the Midwest received 5.5 percent and 4.8 percent of the shipments, respectively. The eight terminal markets in the West received only 2.8 percent of the shipments and Canada received the remaining 4.8 percent of the shipments.

The 15 large markets, which accounted for only 9.7 percent of those observed, received 61 percent of the shipments. The three largest markets, New York, Philadelphia, and Chicago, accounted for 24.6 percent of all shipments. The 52 medium markets, which accounted for 33.5 percent of those observed, accounted for 33.8 percent of the shipments

and the 88 small markets, or 56.8 percent, accounted for the remaining 5.2 percent of the shipments.

The percentage of shipments from the Central Florida sales areas to the Northeast was considerably higher than from other areas. Shipments to the South and Southwest were higher from the Belle Glade and South Florida areas, while all shipments to the West were from those sales areas. Seasonal differences in shipments and market receipt patterns explained most of these differences.

Shipments by large sales firms to the Northeast averaged 10 percent less and those to Canada 5 percent less than did medium and small firm shipments. Large firms dominated shipments to other market areas with the exception of the West where medium firms sold more. Chain buyers purchased slightly less than one-half of the corn handled in the Northeast and South compared to only one-fifth to one-third in other areas. Wholesalers handled more than one-half of the corn in the Canadian, Northeast and Western areas. The f.o.b. basis of sale was predominant in all market areas, but the Northeast, North Central and Midwest received substantially less on an f.o.b. basis than did other areas. Consigned sales were above average in the Northeast and North Central, but they still accounted for only a small percentage of the areas' receipts.

The pattern of shipments and market distribution of white corn was substantially different from that of yellow. The Belle Glade sales areas shipped 94.8 percent of the white corn, as compared with 73.6 percent of all corn. The South Florida and Central Florida sales areas shipped the remaining 5.2 percent of the white corn. There was 63.4 percent of the white corn marketed in the Southern marketing area

compared to only 22.6 percent of all corn. The Southwest also received a higher than average proportion of white, but the percentage of yellow exceeded that of white to all other market areas.

The purpose of the Marketing Order, which was adopted in January, 1963, was to improve returns to growers through a more orderly marketing system. Specific provisions of the Order included quantity regulation, quality control, inspection, container regulation, prohibition of unfair trade practices, research and advertising. The Order was established to be administered by an 11-member Advisory Committee, subject to the concurrence of the Commissioner of Agriculture.

The Florida Sweet Corn Exchange was a cooperative bargaining association of growers. The Exchange acquired exclusive marketing rights through contracts with its members and with handlers. Prices and regulations as established by the Board of Directors were enforced under contracts with "authorized sales firms." Coordination of the activities of the Exchange and the Marketing Order was obtained by having an overlapping of Exchange Directors and Advisory Committee members.

In an evaluation of the Marketing Order and Exchange programs, 30 percent of the sales firm managers indicated that their sales costs had increased since these programs were activated. The basis of sale used was altered by 40 percent, but only 10 percent had changed their terminal markets. One-half of the firms had changed the grades shipped due to the Marketing Order. Thirty-five percent of the managers thought the 1962-63 "marketable allotment" was too high, but 60 percent thought it was about right. Seventy-five percent of the managers felt they

benefited from the current advertising program and 80 percent felt it should be expanded or kept at its present level. Sixty percent of the managers felt that the Exchange both raised and lowered prices at various times while 10 percent thought prices were only raised and 15 percent thought prices were only lowered. Fifteen percent had no opinion or thought the Exchange had no effect on prices.

The theoretical economic model of the "organized collusive oligopoly" or the "collusive oligopoly selling identical products" as explained by certain economic theorists was found to most closely approximate the conditions of the Florida sweet corn industry. Number of sellers, degree of collusion and type of product did not vary appreciably from those of the model. The analysis theoretically developed how profits could be maximized in three time periods-- short run, intermediate period and long run.

In the short run costs were irrelevant since all costs, with the exception of harvesting and marketing costs, had already been incurred. Maximizing revenue with a given potential marketable output thus became the short run problem. It was determined that revenue was maximized at a price and marketable output level on the demand schedule where elasticity was at, or as close as possible to, unity. Attempts to maximize short run returns have been undertaken only in a limited way. Flow-to-market regulations, probably the most effective short run supply control, have not been invoked and minimum grade requirements have generally been set at a level too low to substantially affect supply. Harvesting holidays have had some effect in spreading out shipments, but not much in reducing supply.

In the intermediate period the supply schedule for a firm

is that part of the marginal cost schedule which exceeds the level where marginal and average variable cost are equal. The industry supply schedule is formed from a summation of the firm supply schedules. The optimum industry price and output combination is obtained at a level where marginal cost and marginal revenue are equated. Maximum industry profits are obtained when the marketable output of each firm is such that the marginal costs of all firms are equated with each other at the optimum level--where industry marginal cost and marginal revenue are equal.

Limited data do not indicate that the intermediate period output was substantially affected during the 1962-63 season. Economic analysis indicated that it is unlikely that optimum industry price and marketable output levels will be reached due to a conflict of firm and industry interest. This phenomenon occurs because each time industry output is reduced and price rises, the incentive for the firm is to demand a larger quota. Assignment of quotas to firms on the basis of marginal cost seems unlikely since this would involve a redistribution of industry profits as well as production.

Entry of new firms in the industry does not appear to be a major factor in the long run adjustments of the industry due to inherent barriers to entry, plus those of the Marketing Order. Primary long run adjustments are expected to be those of plant size. The optimum scale plant (productive and/or marketing unit) is one in which long run marginal cost is equated with marginal revenue. Since firms are not free to vary output under the Marketing Order, it is questionable if the optimum long run conditions will be closely approximated.

The marketing season was divided into (1) a fall and winter season and (2) a spring season on the basis of graphic analysis. The distinct linear relationships which existed when the seasons were considered separately were attributed to a seasonal shift in demand between the two seasons.

Ten independent variables were considered in a stepwise linear multiple regression analysis to determine the factors that explained variations in the f.o.b. prices of sweet corn. Three variables--Florida carlot shipments of the current week, the average terminal market price on Monday and the average market tone on Monday--were found to be significant. Although these equations were effective in explaining price variations, they were not satisfactory for estimating elasticities due to inter-correlation between the independent variables. Simple linear regression equations were used as a basis for computing elasticities.

Point elasticities in the price and marketable output range in which the industry normally operates were found to be elastic. The elasticity at the mean shipment rate during the fall and winter was -2.73 and during the spring it was -3.04. Unit elasticity in the fall and winter was reached when marketable output exceeded 121.8 carlots and in the spring when it exceeded 840.2 carlots.

Based on these elasticities, restriction of marketable output would have increased total revenue during only three weeks of the fall and winter season between 1960-61 and 1962-63. During the 45 fall and winter weeks when output was below 121.8 carlots per week, total revenue would have been increased by expanding output. During the spring total revenue could not have been increased by limiting

output at any time, except during the month of May. However, total revenue could have been increased during one-half of the 12 May weeks considered if marketable output had been limited. It was concluded that efforts to increase short run benefits should be directed primarily at the high volume weeks of May. It is questionable if short run returns during other periods can be increased by limiting marketable output unless shipment levels are exceptionally high.

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APPENDIX A

**QUESTIONNAIRE FOR
FIRST HANDLERS OF FLORIDA SWEET CORN**

**Questionnaire for
FIRST HANDLERS OF FLORIDA SWEET CORN**

**used in study of
Market Structure and Economic Analysis
of the Florida Sweet Corn Industry**

**Department of Agricultural Economics
University of Florida
Gainesville, Florida**

Firm _____

Address _____

Enumerator _____

Date _____

FIRST HANDLERS OF FLORIDA SWEET CORN

1. Name and position of person interviewed. _____

2. Type of organization of sales firm:

_____ Cooperative
 _____ Corporation
 _____ Proprietorship
 _____ Partnership

3. What volume of sweet corn did this firm handle in 1962-63 season?

(a) Crates _____

(b) What percent increase or decrease is this over:

	Increase	Decrease
5 years ago?	_____ %	_____ %
10 years ago?	_____ %	_____ %

4. How many growers supplied sweet corn to this firm in 1962-63?

(a) Number _____

(b) What percent was supplied by the:

(1) largest? _____ %

(2) smallest? _____ %

5. What were the terms of business between this firm and the growers for sweet corn?

(a) Direct purchases _____ %

(b) Agent for grower, _____ %

or if co-op:

Agent for members _____ %

Agent for nonmembers _____ %

(c) _____ %

6. What services were performed for and what charges made to the grower of sweet corn?

<u>Services</u>	<u>Charges</u>
(a) Financing	\$ _____
(b) Planting	\$ _____
(c) Cultivation	\$ _____
(d) Spraying	\$ _____
(e) Harvesting	\$ _____
(f) Precooling	\$ _____
(g) Sales	\$ _____
(h) _____	\$ _____
(i) _____	\$ _____

7. What vegetable crops other than sweet corn does this firm handle?

Green beans	_____	Peas, Southern	_____
Cabbage	_____	Potatoes, Irish	_____
Celery	_____	Peppers	_____
Cucumbers	_____	Radishes	_____
Cauliflower	_____	Strawberries	_____
Endive, escarole	_____	Tomatoes	_____
Chicory	_____	Watermelons	_____
Carrots	_____	_____	_____
Lettuce	_____	_____	_____
Okra	_____	_____	_____

8. Would sweet corn be ranked among the upper, middle or lower one-third in dollar value of the vegetables handled by this firm?

(a) Upper-third _____
 Middle-third _____
 Lower-third _____

- (b) What vegetable crop handled had the highest dollar value in 1962-63?

9. How many personnel does this firm have in:

(a) Sales? _____

(b) Sales and management? _____

10. What are the first and second most important sources of market information for sweet corn?

Local U.S.D.A. market reports _____

Newspapers _____

TT wire service
(NA if not available) _____

Terminal market U.S.D.A. market reports _____

Telephone from terminal market buyers _____

Other local salesmen _____

Local buyers _____

11. Is your market information on sweet corn adequate?

(a) Yes _____ No _____

Comments _____

(b) Has the type or amount of market information needed been affected by operation of the sweet corn marketing order or the Exchange?

Yes _____ No _____

Comments _____

12. Did this firm have its own advertising and promotional program for sweet corn in 1962-63?

(a) Yes _____ No _____

If so, briefly describe the program _____

13. Did you feel the advertising activities of the sweet corn committee benefited your sales program in 1962-63?

(a) Yes _____ No _____

Why _____

(b) In the future should the program be:

Expanded _____ Eliminated _____
Decreased _____ About the same _____

Why _____

14. How many of the growers who delivered sweet corn to this firm were members of the Florida Sweet Corn Exchange in 1962-63? _____

15. How many firms which act as first handlers of sweet corn have entered the industry in the: (Belle Glade-Pahokee area) over the past 10 years. (South Florida area) (Central Florida area)

(a) Number _____

(b) How many have discontinued to act as first handlers?

Number _____

- (c) Would you consider it difficult to establish a successful sales firm handling sweet corn in this area?

Very easy _____ easy _____ difficult _____
 Very difficult _____

Why _____

- (d) Has the sweet corn marketing order or the Exchange affected ease of entry?

Yes _____ No _____

Why _____

16. In the years immediately prior to the operation of the sweet corn marketing order and the Exchange, what was the level of the shipping-point price of sweet corn based upon primarily? (Indicate 1 and 2 in importance)

(a) Local price leader _____
 Chain store price _____
 Quoted terminal price _____
 Local supply _____
 Rate of movement _____

- (b) If local price leader mentioned, who was it? _____

17. In what ways were your selling functions in 1962-63 altered from previous years with respect to:

Sales cost: Higher _____ Same _____ Lower _____

Area of sale: Different _____ Same _____

Type of sale: Different _____ Same _____

Grades shipped: Different _____ Same _____

Non-price competition (advertising, etc.): Different _____ Same _____

Other changes:

18. What opinion, if any, did your customers express concerning the pricing activities of the Sweet Corn Exchange _____

19. Since most firms in this area are in close proximity and have a good idea of the activities of others, do you feel the Exchange raised, lowered or did not affect the sweet corn price relative to what it would otherwise have been during certain periods?

(a) Raised _____ Period _____

Lowered _____ Period _____

No change _____ Period _____

Why _____

(b) Were the Exchange prices too high or too low during certain periods?

Too high _____ Period _____

Too low _____ Period _____

Why _____

20. Were the marketing quotas set by the marketing order in 1962-63

(a) Too high _____ Too low _____ About right _____

Comments _____

(b) Are the 1963-64 quotas

Too high _____ Too low _____ About right _____

Comments _____

(c) What changes are needed in the policy of establishing marketing quotas?

21. The marketing order has a provision for the entry of new growers into the industry. Does this encourage:

Fewer new growers _____ More new growers _____ Makes no difference _____

Why _____

APPENDIX B

FORM FOR SWEET CORN INVOICE DATA

CONFIDENTIAL
SWEET CORN INVOICE DATA

Sales Agency		Week of Shipment		Type Buyer	Basis of Sale	Term. Market (State)	Term. Market (City)	Record Number	Count	U. S. Fancy--Yellow									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	No. Crates	F.O.B. Price	19	20	21
														15					
															16	17	18		

Invoice Number _____ Account _____ Consignment Price \$ _____

Buyer's Name _____
Address _____



85-89% Fancy--Yellow		75-84% Fancy--Yellow		Unclassified--Yellow																
Count	No. Crates	F.O.B. Price	Count	No. Crates	F.O.B. Price															
22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42

Consignment Price \$ _____ \$ _____

Term. Charges:

Freight \$ _____	Inspection \$ _____
Cartage \$ _____	Prot. Srvs. \$ _____
Sorting \$ _____	Commission \$ _____
Handling \$ _____	Ice \$ _____
Total Charges \$ _____	Total Crates _____
Per Unit Charges \$ _____	

SWEET CORN INVOICE DATA

U. S. Fancy--White			Percentage--White			Unclassified--White		
Count	No. Crates	F.O.B. Price	Count	No. Crates	F.O.B. Price	Count	No. Crates	F.O.B. Price
43	44 45 46	47 48 49	50	51 52 53	54 55 56	57	58 59 60	61 62 63

64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Record Number _____

APPENDIX C

PAIRED AND POOLED t TESTS

The paired and pooled t tests were used to test for significant differences between average prices or average shipments where a comparison of two parameters was possible. The pooled t test was used primarily to test between seasonal differences, for example, to determine if a significant difference existed between the percentage of "percentage grade" corn shipped during the fall and winter season and the spring season. In all such tests the observations fell into two measurable samples.

The paired t test was used where paired observations were made on some parameter, for example, to determine if a significant difference existed between the mean prices in Belle Glade and South Florida. In such tests the observations normally fell in only two classifications. In a few instances some observations fell in a third classification, but this was not frequent enough to substantially affect the validity of the tests.

An assumption of the test is that the sample is composed of random observations. Data used in these tests are based on weekly averages from a stratified random start systematic sample. Although these data were not actually random, they will approximate a random sample. It was realized that all the assumptions of these tests were not fully met; nevertheless, these statistical analyses provided a better measure of parameter differences than would otherwise have been possible.

Statistical tests using the pooled t are shown in Table 49 and tests using the paired t are shown in Table 50.

Table 49.--Pooled t test of weekly percentages, by seasonal and price direction differences, 19 Florida sweet corn sales firms, 1962-63 season

Type of Test	N_1	N_2	$\bar{x}_1 - \bar{x}_2$	$\sum x_1^2$	$\sum x_2^2$	S_p^2	S_d	t
Percentage of "percentage grade" in Fall and Winter vs. Spring	20	20	4.7	3,121	419	93.1	3.10	1.52
Percentage Chain in Fall and Winter vs. Spring	20	19	-.1	5,923	911	184.7	4.35	.02
Percentage Wholesaler in Fall and Winter vs. Spring	20	19	6.2	5,426	1,034	174.6	4.20	1.48
Percentage f.o.b. in Fall and Winter vs. Spring	20	20	3.3	1,719	1,127	74.9	2.74	1.20
Percentage Consigned During Rising and Falling Prices	20	19	1.4	153	260	11.2	1.07	1.34

Table 50.--Paired t test of weekly prices, shipment sizes and percentages, by grade, sales area and type corn differences, 19 Florida sweet corn sales firms, 1962-63 season

Type of Test	N	$\bar{x}_1 - \bar{x}_2$	$\sum(x_{1j} - x_{2j})^2$	$[\sum(x_{1j} - x_{2j})]^2$	S_d	t
Price of Fancy vs. 85-89 Percent Fancy	27	-41.2	139,740	64,163	10.4	3.96**
Price of Fancy vs. 75-84 Percent Fancy	17	-77.0	133,446	100,331	11.4	7.00**
Percentage of White Shipments vs. all Shipments	39	.93	66	17	.36	2.58*
Price in Belle Glade vs. South Florida	16	16.7	15,599	8,053	5.7	2.93*
Price in Belle Glade vs. Central Florida	7	6.0	1,710	1,106	3.8	1.58
Shipment Size in Belle Glade vs. South Florida	16	29.8	331,601	184,256	24.8	1.20
Shipment Size in Belle Glade vs. Central Florida	7	121.7	348,962	236,992	51.6	2.35

**Significant at the 1 percent level.

*Significant at the 5 percent level.

APPENDIX D

TERMINAL MARKETS RECEIVING

FLORIDA SWEET CORN

<u>Area or State</u>	<u>Terminal Market and Markets Included</u>	<u>Area or State</u>	<u>Terminal Market and Markets Included</u>
NORTHEAST			
Connecticut	Bridgeport Hartford New Haven North Haven New London Torrington	Rhode Island	Providence
Maine	Portland	Virginia	Norfolk Portsmouth Richmond Roanoke Salem Lynchburg Charlottesville
Maryland	Baltimore	West Virginia	Charleston Owens Huntington Fairmont
Massachusetts	Boston Watertown Sommerville Newtonville Springfield	D. C.	Washington Landover, Md. Beltsville, Md. Arlington, Va.
New Jersey	Camden	NORTH CENTRAL	
New York	New York City Maspeth, N. Y. Mt. Kisco, N. Y. Newark, N. J. Keamy, N. J. Elizabeth, N. J. Linden, N. J. Jersey City, N. J. Patterson, N. J. N. Hawthorn, N. J. Yonkers, N. Y. Buffalo Rochester Fairpoint Albany Waterford Menands Syracuse Norwick Elmira	Illinois	Chicago Northlake Peoria Champaign Urbana Springfield Bloomington Decatur Rock Island Free Port
Pennsylvania	Philadelphia Yeadon Norristown Pittsburgh Uniontown Scranton Sunbury Wilkes-Barre Sharon	Indiana	Indianapolis Evansville Fort Wayne Gary South Bend Elkhart Lafayette Bloomington
		Kentucky	Louisville Paducah
		Michigan	Detroit Livonia Grand Rapids Hudsonville Saginaw

<u>Area or State</u>	<u>Terminal Market and Markets Included</u>	<u>Area or State</u>	<u>Terminal Market and Markets Included</u>
	Kalamazoo Muskegon Ishpeming	Mississippi	Jackson Tupelo
Ohio	Cincinnati Woodlawn Solon Cleveland Akron Columbus Toledo Canton Dayton Xenia Youngstown Defiance Bellefontaine Springfield	North Carolina	Charlotte Greensboro Ellender Winston-Salem Hickory High Point Raleigh Durham Goldsboro Ashville Fayetteville
		South Carolina	Columbia Greenville Charleston
Wisconsin	Milwaukee Butler Madison Greenbay Superior Wausau Stevens Point	Tennessee	Memphis Chattanooga Knoxville Nashville Morristown
SOUTH Alabama	Birmingham Mobile Montgomery	SOUTHWEST Arkansas	Little Rock Alma
Florida	Miami Jacksonville Tampa Lakeland Key West Ocala Orlando W. Palm Beach	Louisiana	New Orleans Westwego Baton Rouge Shreveport Monroe
		Oklahoma	Oklahoma City Tulsa
Georgia	Atlanta Forest Park East Point Columbus Macon Savannah Thomasville Jesup Albany	Texas	Dallas Irving Arlington Houston San Antonio Fort Worth Austin Tyler
		MIDWEST Iowa	Des Moines Burlington Cedar Rapids Davenport

<u>Area or State</u>	<u>Terminal Market and Markets Included</u>	<u>Area or State</u>	<u>Terminal Market and Markets Included</u>
Kansas	Kansas City Topeka	Nebraska	Omaha Grand Island
Minnesota	Minneapolis St. Paul Hopkins Duluth	North Dakota	Bismark
Missouri	Kansas City St. Louis Granite City Hazelwood Sedalia Joplin St. Joseph Springfield Jefferson City	WEST California	Los Angeles San Francisco Sacramento
		Colorado	Denver
		Montana	Butte
		Oregon	Portland Clackamas
		CANADA Canada	Ontario Quebec Alberta Nova Scotia New Brunswick
		Unknown	

APPENDIX E

**SELECTION OF INDEPENDENT VARIABLES FOR
REGRESSION ANALYSIS**

Stepwise Multiple Regression Model

Ten independent variables were considered for the development of a multiple regression equation to explain variations in sweet corn prices at the f.o.b. level. Data on the one dependent and ten independent variables were collected from secondary sources. The stepwise multiple regression was used to select the variables which were significant in explaining price variations from the ten considered. The general statistical model of the stepwise multiple linear regression is shown below.

$$\hat{Y}_w = a + b_1 x_{1w} \dots b_y x_{yw} + e_i$$

Where:

\hat{Y}_w = Estimate of f.o.b. price for week w.

a = Intercept of Y axis.

b₁ = Coefficient of the effect of the 1th independent variable.

x_{1w} = Value of the 1th independent variable for week w.

e_i = Random error or residual.

The IBM 1401-709 computer was used to carry out the stepwise regression program. This program first selected the independent variable that best explained variations in the dependent variable. In the following steps the independent variables that rendered the greatest reduction in the residual sums of squares were selected.

A more complete explanation of this method is given by Schultz and Coggan.¹

New regression coefficients were computed for all independent variables at each step. Each additional regression coefficient was tested by the null hypothesis to determine whether the effect of the coefficient was zero. This was done by testing whether the reduction in the residual sums of squares was significant by using the *f* test shown below.

$$f = \frac{\text{additional reduction mean square}}{\text{residual mean square}}$$

A significant *f* value from this test indicated that the null hypothesis must be rejected, thus the regression coefficient had an effect which was greater than zero.²

The multiple correlation coefficient, which was computed at each step when a variable was added, measured the closeness of fit of the regression plane to the observed data. The square of the correlation coefficient, the coefficient of determination, was used to indicate the proportion of the total sums of squares that was attributable to the independent variable or variables.³

Classification and Sources of Variables

In order to simplify the process of variable selection,

¹ Fred E. Schultz and James F. Coggan, A Systematic Procedure for Determining Patent Independent Variables in Multiple Regression and Discriminant Analysis (Auburn, Alabama: Alabama Agricultural Experiment Station Bulletin 336, November 1961).

² Steel and Torrie, op. cit., pp. 287-288.

³ Ibid., pp. 187, 286.

the independent variables were classified according to the general parameter which they measured. The variables were classified into four groups--measures of current supply, measures of lagged supply, measures of price and measures of market expectation. The variables, their classification and their sources are shown below.

Measures of Current Supply

- x_1 -- Carlot shipments of sweet corn from Florida during week w .
Source -- sum of Florida rail and truck shipments adjusted to a standard 675 crate rail load.⁴
- x_2 -- Carlot shipments of sweet corn in the United States during week w .
Source -- sum of United States rail and truck shipments adjusted to a standard 675 crate rail load.⁵
- x_8 -- Carlot shipments from the Belle Glade area during week w .
Source -- sum of the daily shipments from Monday through Sunday of week w as quoted in the Belle Glade Market Report.⁶

Measures of Lagged Supply

- x_3 -- Carlot shipments of sweet corn from Florida during week $w-1$.
Source -- same as x_1 with values lagged one week.
- x_4 -- Carlot shipments of sweet corn in the United States during week $w-1$.
Source -- same as x_2 with values lagged one week.
- x_6 -- Carlot quantities available in 16 cities on Monday of week w .
Source -- sum of "on track" and "arrivals" by rail and truck in 16 cities on Monday as quoted in the Belle Glade Market Report.⁷

⁴Donald L. Brooke, Florida Truck Crop Competition, op. cit., p. 7.

⁵Ibid.

⁶USDA, AMS, Federal-State Market News Service, op. cit.

⁷Ibid.

- x₇ -- Carlot shipments from the Belle Glade area during Thursday through Sunday of week w-1. Source -- sum of the dsily shipments from Thursday through Sunday of week w-1 as quoted in the Belle Glade Market Report.⁸

Measures of Price

- x₅ -- Terminal market price on Monday of week w. Source -- simple average of available quoted market prices for yellow 5 dozen Fancy sweet corn in 11 terminal markets as quoted in the Belle Glade Market Report.⁹
- x₉ -- Florida f.o.b. price per crate of sweet corn for week w-1. Source -- simple average of the Monday through Friday f.o.b. prices of yellow Fancy grade sweet corn for week w-1 as quoted in the Belle Glade Market Report.¹⁰

Measure of Market Expectation

- x₁₀ -- Average market tone on Monday of week w. Source -- simple average of assigned values for 10 market tones used in 11 terminal markets as quoted in the Belle Glade Market Report on Monday of week w.¹¹

⁸Ibid.

⁹Ibid.

¹⁰Ibid.

¹¹ Assigned values used to calculate the average market tone were as shown.

<u>Quoted Market tone</u>	<u>Assigned value</u>
Much stronger	10
Stronger	9
Slightly stronger	8
Barely stronger	7
Firm	6
Steady	5
About steady	4
Barely steady	3
Slightly weaker	2
Weaker	1
Dull	0

Dependent Variable

y -- Florida f.o.b. price per crate of sweet corn for week w.

Source -- same as x_9 except computed for week w.

Selection of Variables

For the purpose of variable selection, single-year multiple regression analysis was used for each season. Each of the three single-year regression problems for the fall and winter had 16 weekly observations, and each of the three problems for the spring had 14 weekly observations.

When the first four independent variables selected in the stepwise program were considered, it was found that only one variable was selected from each classification with the exception of both seasons of 1962-63. An examination of the selected variables, their regression coefficients and levels of statistical significance indicated one variable within each classification best explained price variations over the seasons (Table 51). Each of these selected variables is discussed separately.

Measures of Current Supply

The x_1 variable, Florida shipments during week w, was found to be the most significant measure of current supply. This variable best explained price variations in three of the six seasonal analyses and all regression coefficients were significant at the 1 percent confidence level (Table 1). The x_2 variable, United States shipments, week w, was significant at the 1 percent level for both seasons in 1962-63.

Table 51.--Independent variables and regression coefficients selected through step four of the stepwise regression analysis, 1960-61 through 1962-63

Classification of Selected Variable	Fall and Winter			Spring		
	Variable Selected	Step of Entry	Coefficient and F Level	Variable Selected	Step of Entry	Coefficient and F Level
1960-61						
Current Supply	x_1	1	-.02131**	x_1	1	-.00214**
Lagged Supply	x_4	4	.00836*	x_3	4	.00119
Price Level	x_5	3	.49421	x_5	3	.41527
Market Expectation	x_{10}	2	.01404*	x_{10}	2	.01043**
1961-62						
Current Supply	x_8	2	-.00482**	x_1	1	-.00248**
Lagged Supply	x_4	1	-.00764**	x_7	4	.00238
Price Level	x_9	4	.25625	x_5	2	.44131*
Market Expectation	x_{10}	3	.01275	x_{10}	3	.00746
1962-63						
Current Supply	x_2	1	-.01400**	x_2	1	-.00171**
Lagged Supply	x_3	2	-.01369	x_3	3	.00348*
Price Level	$(x_7)^a$	3	(.01145**)	x_5	2	.69481**
Market Expectation	x_{10}	4	.01040**	$(x_4)^b$	4	(-.00192)

*Significant at 5 percent level.

**Significant at 1 percent level.

^aNo measure of price level entered in first four steps.

^bNo measure of market expectation entered in first four steps.

The correlation coefficients between x_1 and x_2 were .97 in the fall and winter and .99 in the spring indicating that it would make little difference which of these variables was used.

Measures of Lagged Supply

The x_3 variable, Florida shipments during week w-1, was found to be the most suitable of the lagged supply variables. This

variable best explained price variations in three of the six seasonal analyses. United States shipments were found to be significant in two seasons, but as was discussed earlier, United States and Florida shipments were highly correlated so little difference would be expected with either of these variables.

Measures of Price

The x_5 variable, terminal market price on Monday, best explained price variations at the f.o.b. level. This variable was selected by the stepwise analysis in four of the six seasons as shown in Table 1. One coefficient was significant at the 1 percent and one at the 5 percent confidence level.

Measure of Market Expectations

The x_{10} variable, terminal market tone on Monday, entered in one of the first four steps of the regression analysis in five of the six seasons considered. Two of the regression coefficients were significant at the 1 percent and one at the 5 percent confidence level.

Intercorrelation of Independent Variables

Based on the foregoing analyses, four independent variables were selected for further use in developing regression equations. The selected variables were x_1 -- Florida carlot shipments during week w , x_3 -- Florida carlot shipments during week $w-1$, x_5 -- terminal market price on Monday and x_{10} -- market tone on Monday. It should be noted that the correlation between the selected

variable and other independent variables within each classification was high as shown in Table 52. In the fall and winter most of the intercorrelation coefficients fell between .85 and .95 while in the spring all the coefficients fell between .93 and .99. These results further substantiated the logic of considering only the most significant variable in each class.

Table 52.--Correlation coefficients between the selected independent variables, the dependent variable and other independent variables within major classifications, 1960-61 through 1962-63

Year	Fall and Winter				Spring					
	Selected Variable	Classification of Variables			Selected Variable	Classification of Variables				
Current Supply										
		y	x ₂	x ₈		y	x ₂	x ₈		
1960-61	x ₁	-.80	.89	.86	x ₁	-.91	.98	.94		
1961-62	x ₁	-.89	.99	.92	x ₁	-.90	.98	.98		
1962-63	x ₁	-.89	.97	.88	x ₁	-.93	.99	.97		
Lagged Supply										
		y	x ₄	x ₆	x ₇		y	x ₄	x ₆	x ₇
1960-61	x ₃	-.35	.81	.85	.72	x ₃	-.85	.99	.99	.95
1961-62	x ₃	-.90	.98	.85	.79	x ₃	-.85	.98	.99	.96
1962-63	x ₃	-.82	.97	.92	.85	x ₃	-.91	.99	.93	.96
Price Level										
		y	x ₉			y	x ₉			
1960-61	x ₅	.19	.69		x ₅	.82	.97			
1961-62	x ₅	.85	.97		x ₅	.83	.94			
1962-63	x ₅	.80	.95		x ₅	.92	.99			
Market Expectations										
		y				y				
1960-61	x ₁₀	.49			x ₁₀	.57				
1961-62	x ₁₀	.32			x ₁₀	.59				
1962-63	x ₁₀	.42			x ₁₀	.31				

Additional preliminary analysis of the independent variables indicated that a high level of positive correlation existed between the current supply variable and the lagged supply variable. The simple correlation coefficients between the x_1 and x_3 variables were .24, .76 and .78 for the fall and winter season and .96, .94 and .91 for the spring season. The use of two independent variables with this high level of correlation would be redundant and introduce an interaction effect. Since the correlation between the dependent variable and the x_1 variable was higher than that with the x_3 variable (Table 52), it was decided to use the measure of current supply and eliminate the measure of lagged supply.

Regression Equations

Two approaches were used in developing the regression equations based on the three independent variables. First, single-year equations were computed for each season each year. In the second approach, data from the three years were combined in the seasonal analyses.

In the single-year analyses each fall and winter problem had 15 degrees of freedom and each winter problem had 13 degrees of freedom. Two primary weaknesses were evident in these analyses -- (1) the x_2 and x_3 regression coefficients were nonsignificant in several equations and (2) the equations would not satisfactorily explain price variations for years other than the one from which they were developed.

Data from all years were combined in the three-year analysis to yield 47 degrees of freedom in the fall and winter and 41 degrees

freedom in the spring. This analysis overcame both of the weaknesses observed for the single-year analysis. All regression coefficients were significant at the 1 percent confidence level and the equations explained price variations satisfactorily during all years. The three-year regression equations are presented and discussed in Chapter VIII.

BIOGRAPHICAL SKETCH

James Bailey Bell was born on May 21, 1932, at Marionville, Northampton County, Virginia. He graduated from Northampton High School in 1949 and entered Virginia Polytechnic Institute in September of the same year. He received the B.S. degree in Agricultural Economics from that institution in June 1954.

Mr. Bell entered the United States Army in February 1954 and served two years in Korea. He returned to Virginia Polytechnic Institute in 1956 and received the M.S. degree in Agricultural Economics in June 1958. He was employed as an Assistant Extension Economist by the Virginia Agricultural Extension Service from May, 1957, through September, 1961. Following his recall into the United States Army for one year, he entered the University of Florida Graduate School in September, 1962, for work towards the Ph.D. degree, with a major in Agricultural Economics.

The writer is a member of Alpha Zeta and Epsilon Sigma Phi. He holds the rank of Captain in the Virginia Army National Guard.

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