SUPPLY AND UTILIZATION OF TEXAS CITRUS
1960-61 TO 1974-75

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January, 1970

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I. SUMMARY AND CONCLUSIONS

U. S. Citrus Supply

Oranges: The 1968-69 aggregate production level of all oranges in the United States was almost 7.9 million tons. By the 1974-75 season production is expected to increase to a level of 10.8 million tons.

Florida's increased production will contribute almost 86 percent to the total absolute increase of 2.9 million tons followed by California, Arizona and Texas with an expected contribution of about 8 percent each.

The production of Texas early oranges is expected to increase slightly faster than late oranges. About 60 percent of Texas aggregate orange production will be early oranges and 40 percent late oranges.

Grapefruit: The 1968-69 aggregate U. S. production level of grapefruit is about 2.2 million tons. By the 1974-75 season, production is expected to increase to a level of almost 2.9 million tons.

Texas increased production will contribute about 36 percent to the U. S. 0.7 million ton expected increase. Florida's increase will contribute 49 percent followed by California's and Arizona's increase of 14 percent.

Per Capita Production

Oranges: U. S. per capita orange production for the 6-year period, 1969-70 to 1974-75, is estimated to increase from about 79 to 101 pounds representing a little more than a 28 percent increase.

Grapefruit: U. S. per capita grapefruit production for the 6-year period, 1969-70 to 1974-75, is estimated to increase from 24 to almost 27 pounds, representing a little more than a 10 percent increase.

Consumption

Total consumption of citrus in the United States, among other things,

depends upon the population level and supply available to be consumed. In general the entire production less economic abandonment will be consumed in some form in most years, except for changes in carry-over of processed stock and changes in the net export level.

Citrus is consumed either as fresh or as processed. The citrus consumption pattern has changed during the past quarter of a century with fresh per capita consumption declining and processed increasing.

Given a 15-pound per capita fresh orange production level, a zero level of economic abandonment and the current (1969) export level, the residual production available for processing will increase from about 60 to 81 pounds for the 6-year period, 1969-70 to 1974-75. Grapefruit consumption will follow the same trend, but the increase in per capita production will be of less magnitude. Given a nine pound per capita fresh grapefruit consumption level, a zero level of economic abandonment and the current net export level, the residual production available for processing will increase from 13 to 15 pounds during this same period.

Utilization

Oranges: With increasing U. S. per capita orange production and the shifts in consumption from the fresh to the processed form, the greatest potential in the utilization of the increased production for the next 6-year period is in the processed form. With the ordinary appearance associated with Texas oranges, the shift toward increased consumption of oranges in the processed form is complementary with an increased utilization of Texas oranges in the processed form.

Texas utilization of the 1968-69 total production of early oranges

was 53 percent fresh and 47 percent processed. By the 1974-75 season, it is expected that from 80-85 percent of the total Texas production of early oranges and from 70-75 percent of the late orange production will be utilized as processed. This compares to Florida utilization which was about 93 percent processed for the 1968-69 season.

Grapefruit: The magnitude of the 1948-49 to 1974-75 (6-year) increase in U. S. per capita grapefruit production is less than that of oranges. In addition, the shift in consumption of grapefruit from the fresh to the processed form is more gradual.

Texas current (1968-69) utilization of grapefruit is 68 percent of the crop in the fresh form and 32 percent processed. By the 1974-75 season from 45-50 percent of the Texas total grapefruit production is expected to be utilized in the fresh form and the residual utilized in the processed form. This is a very reasonable expectation for the utilization of Texas grapefruit as Florida's 1968-69 utilization was about 58 percent in the processed form.

Texas Citrus Processing Capacity and Future Requirements

Texas current 1968-69 maximum citrus processing capacity is about 10 million cases of 24/2 equivalents annually, which will utilize about 293 thousand tons of citrus raw stock. At normal capacity, production is about 6 million cases of 24/2 case equivalents annually, which will utilize a total of about 175 thousand tons.

The Texas citrus processing capacity requirement by the 1974-75 season ranges between 650 and 700 thousand tons of citrus raw stock which ranges from 22.2 to 23.9, 24/2 case equivalents. To accomodate Texas's increased

supply of available raw stock for processing by the 1974-75 season, processing capacity will need to increase within a range from 13.1 to 14.8 million case 24/2 equivalents. The capital requirement for this increase capacity ranges from 14.6 to 21.6 million (1969) dollars.

II. INTRODUCTION

The purpose of this study is to provide decision-makers within the Texas Citrus Industry with information and analysis which may be used as guidelines for future planning. Important environmental changes are occurring which must be examined carefully by the Texas Industry in order to meet the challenges and opportunities created thereby. Two of the more apparent environmental changes are shifts in consumer tastes and preferences (such as increasing consumer demand for more convenient forms of traditional products), and rapidly increasing citrus supplies. The implications of these environmental changes may necessitate future structural changes with the Industry, of which several alternative structural changes may be possible and/or necessary. This study is designed to provide a basic analysis on which future policy decisions may be based.

Historical production of oranges and grapefruit by states and estimates of aggregate production of oranges and grapefruit for the 1974-75 season are presented in this study. In addition, national consumption patterns for fresh and various processed forms of citrus products are examined. These production and consumption statistics are analyzed and implications drawn concerning the need for additional citrus processing facilities in Texas. However, note that additional processing facilities represent only one possible structural change that could occur in the future. It is beyond the

scope of this study to examine other possible alternative sturctural changes or to determine an optimum change for the Texas Citrus Industry based upon the analyses contained herein.

In this study, "citrus" refers to only oranges and grapefruit, excluding crops such as tangerines, tangelos, mandarins, lemons and limes. Also, production and supply are used synonymously; that is, economic abandonment is assumed to be zero.

Estimates of citrus supply by states are presented for the 1974-75 season. Texas citrus supply estimates are presented on an annual basis to the 1974-75 season. A period of this general duration is often chosen as the relevant planning horizon for analyzing industry alternatives.

The estimates of future supply were based upon two general considerations. First, the appropriate historical consumption and production data were reviewed for relevant trends. These trends in combination with subjective judgement provided a basis for the estimates developed.

An important assumption throughout this study is that there will be no major freeze damage in any production area during the period under analysis. While it is expected that inflation will continue, it is assumed that costs and prices will be affected equally, and therefore all costs and prices relevant to citrus production will remain the same in relation to each other during the period of analysis.

III. CITRUS PRODUCTION-TEXAS AND OTHER STATES

Estimates are presented in two major components. First, annual citrus production, or supply, to 1974-75 for Texas is given. Historical citrus production for the four major states and aggregate (United States)

production is noted in the second part. In addition, estimated 1974-75 production by all major U. S. supply states and for the U. S. aggregate is presented.

The historical period consists of the nine citrus marketing seasons from 1960-61 to 1968-69. All estimates of future production are to the 1974-75 season.

Estimated Texas Citrus Production, 1974-75

The basic assumption in estimating Texas citrus production for the 1974-75 season is that no major freeze damage will occur in Texas between the 1968-69 period and 1975. In addition, it is assumed the new citrus tree plantings (both oranges and grapefruit) will continue to 1974-75 at the 1967 rate. The Texas Citrus Mutual citrus tree census as of October 1, 1967, was utilized as a basis for estimating the acreage now planted. Texas citrus tree plantings in the Rio Grande Valley, Texas for the 17 year period 1952-68 were utilized to estimate the 1968-69 rate of plantings. Also, 1968-69 U. S. Department of Agriculture production statistics were utilized as a base period. (See Appendix)

The estimated total production of grapefruit, early oranges and late oranges for Texas to the 1974-75 season is presented in Table 1. The key 1974-75 estimates and basis thereof are given in detail in Appendix I of this study. Estimates for each crop season between 1969-70 to 1973-74, Table 1, assume a linear increase between the 1968-69 level and the 1974-75 forecast[1].

The estimated 1974-75 total Texas citrus production represents a 116

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[1] Linearly means "increase by a constant amount each year". The value of the constant is determined by dividing the change in production from the base year 1968-69 to 1974-75 by six crop seasons.

percent increase over the 1968-69 level. This is an absolute gain of 548,030 tons, Figure 1.

The estimated 1974-75 Texas grapefruit production represents an increase of 89.1 percent, or 238,860 tons above the 1968-69 level. However, the largest percentage increases are likely to occur for oranges. The 1974-75 estimate for Texas early oranges represents a gain of 153 percent, or 192,940 tons. Late Texas orange production is expected to be up by 152 percent, or 116,230 tons.

An interesting aspect of the 1974-75 production estimate is the change in composition of total Texas citrus crop. In 1968-69 57 percent was grapefruit, 27 percent early oranges, and 16 percent late oranges. This compares to a 1974-75 estimated composition of 50 percent grapefruit, 31 percent early oranges, and 19 percent late oranges. Thus, there probably will be some shift from grapefruit toward orange production.

Citrus Production in Other States

Florida, California, and Arizona comprise the other major production areas for grapefruit and oranges. Historical production of all four states (Texas included) is presented along with estimated 1974-75 production for grapefruit and oranges in Table 2.

Historical Production by States

Oranges: Florida is the most important state for this fruit, Tables 2 and 3. Total United States production for the 1968-69 crop year was 7.8 million tons, with Florida accounting for 74 percent. California had 21 percent of the total and Texas and Arizona between 2 and 3 percent each[2]. During the

[2]All percentages computed from Table 3.

TABLE 1. Estimated Grapefruit and Orange Production, Texas, 1969-70 to 1974-75[1]

GRAPEFRUIT

SEASON	TONS	BOXES-80 lbs.	CARTONS-40 lbs.
1968-69*	268,000	6,700,000	13,400,000
1969-70	307,000	7,695,250	15,390,500
1970-71	347,620	8,690,500	17,381,000
1971-72	387,430	9,685,750	19,371,500
1972-73	427,240	10,681,000	21,362,000
1973-74	467,050	11,676,250	23,352,500
1974-75	506,860	12,671,500	25,343,000

EARLY ORANGES

SEASON	TONS	BOXES-90 lbs.	CARTONS-45 lbs.
1968-69*	126,000	2,800,000	5,600,000
1969-70	158,160	3,514,666	7,029,332
1970-71	190,310	4,229,111	8,458,222
1971-72	222,470	4,943,777	9,887,554
1972-73	254,630	5,658,444	11,316,888
1973-74	286,780	6,372,888	12,745,776
1974-75	320,160	7,114,667	14,229,333

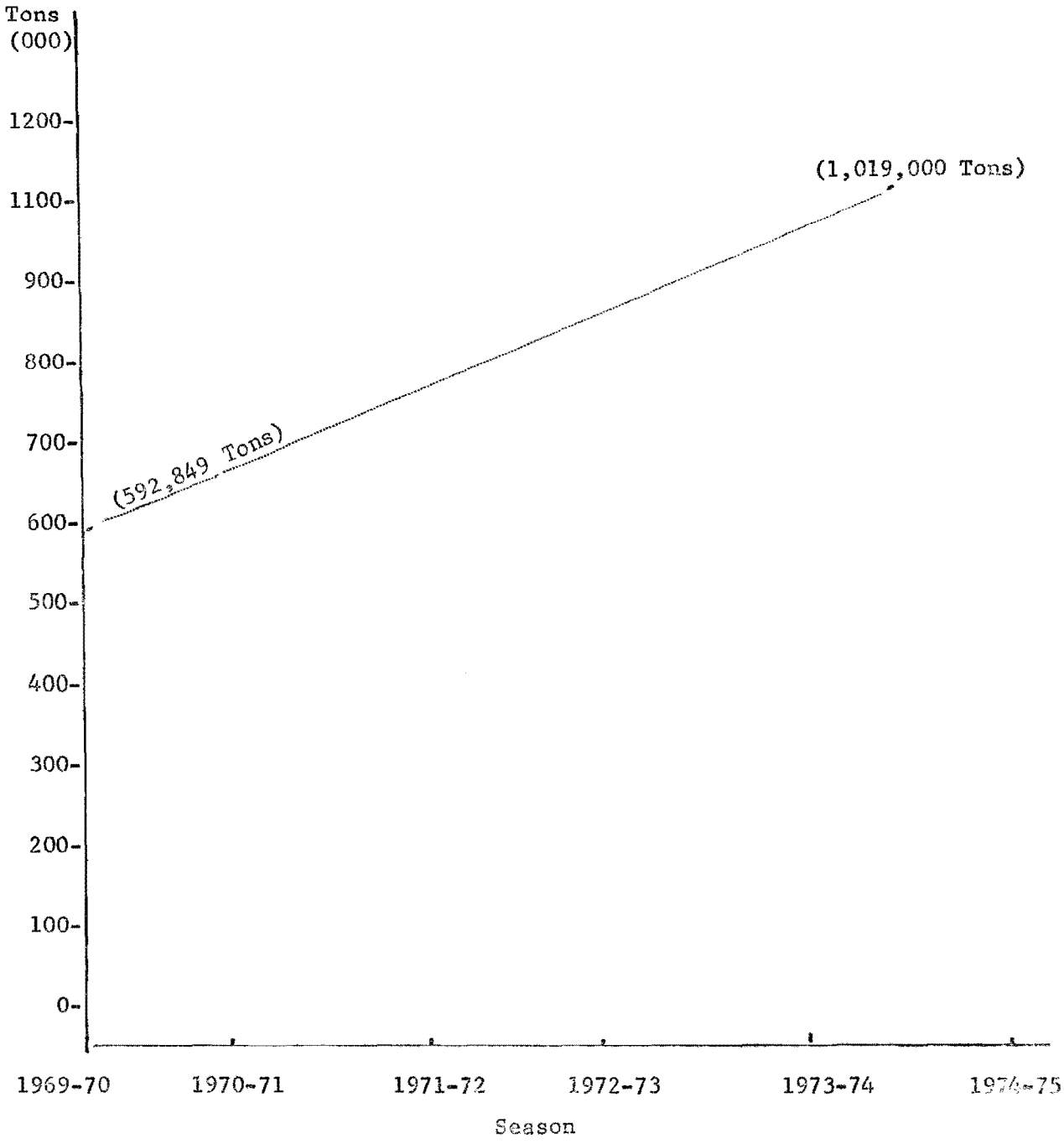
LATE ORANGES (VALENCIA)

SEASON	TONS	BOXES-90 lbs.	CARTONS-45 lbs.
1968-69*	76,500	1,700,000	3,400,000
1969-70	95,870	2,130,444	4,260,888
1970-71	115,240	2,560,889	5,121,777
1971-72	134,610	2,991,333	5,982,666
1972-73	153,980	3,421,777	6,843,555
1973-74	174,360	3,852,444	7,704,888
1974-75	192,730	4,282,888	8,565,777

*Actual Production

[1]Based on current production and a detailed forecast for 1974-75 with an assumed linear increase between these years.

FIGURE 1. Projected Aggregate Long Run Citrus Supply, Rio Grande Valley, Texas 1969-70 to 1974-75.



Source: Table 1. Actual production 1969-70 and a detailed estimate for 1974-75. Linear growth is assumed between these two seasons.

5-year period, 1964-65 to 1968-69, Florida reported an average of about 77 percent of the total U. S. production, followed by California with 20 percent, Arizona with 2 percent, and Texas with nearly 2 percent.

Grapefruit: Florida again is the largest production state, Tables 4 and 5. The 1968-69 crop year was 2.2 million tons, with Florida producing nearly 77 percent of the total. Texas had 12 percent of the total, California 7 percent, and Arizona almost 4 percent[3]. During the 5-year period, 1964-65 to 1968-69 the pattern was substantially the same. Florida averaged 79 percent of the output, California and Texas about 8 percent each, while Arizona averaged around 5 percent of the total production.

Estimated Production by States and United States Total, 1974-75

Estimates of orange and grapefruit production for Florida, California, Arizona, and Texas for the 1974-75 season are necessarily based upon somewhat imperfect knowledge. Considered judgement has been used in the forecast plus the assumption of no severe freeze in any producing state. All production estimates are presented in the context of a low to a high production range.

Oranges: Of the four major citrus producing states, Florida, of course, will remain the dominant production area. The range of total 1974-75 production for all four states is estimated to be from a low of 10.0 million to a high of 11.6 million tons, Tables 6 and 7. The midpoint, or average, is 10.8 million tons. Of the latter amount, it is estimated that Florida's share will be about 77 percent, California and Arizona combined about 18 percent and 5 percent[4] for Texas. U. S. orange production is estimated to gain from 34 to 55 percent over the 1968-69 level.

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[3]All percentages computed from Table 5.

[4]All percentages computed from Table 7

TABLE 2. Total Production of Oranges by States, 1960-61 to 1968-69, in Boxes

CROP YEAR	TOTAL PRODUCTION[1]			
	FLORIDA	TEXAS	CALIFORNIA	ARIZONA
	1,000 Boxes[2]			
1960-61	82,700	3,500	25,000	1,160
1961-62	108,800	2,300	20,500	1,440
1962-63	72,500	40	28,600	1,560
1963-64	54,900	240	31,700	2,200
1964-65	82,400	880	31,200	2,420
1965-66	95,900	1,300	36,500	2,420
1966-67	139,500	2,800	37,400	3,910
1967-68	100,500	1,800	19,600	3,120
1968-69	129,700	4,500	43,600	5,380

[1]Includes economic abandonment

[2]Due to the variation in the number of pounds per box among states, boxes are not additive (See Appendix Table VI).

Source: U. S. Department of Agriculture, Citrus Fruits By States 1909 to 1969, Crop Reporting Board, Statistical Reporting Service, Washington, D.C.

TABLE 3. Total Production of Oranges by States, 1960-61 to 1968-69, In Tons

CROP YEAR	TOTAL PRODUCTION[1]				UNITED STATES (FLORIDA, TEXAS, CALIFORNIA, AND ARIZONA)
	FLORIDA	TEXAS	CALIFORNIA	ARIZONA	
	1,000 Tons				1,000 Tons
1960-61	3,721.5	157.5	937.5	43.5	4,860.0
1961-62	4,896.0	103.5	768.8	54.0	5,822.3
1962-63	3,262.5	1.8	1,072.5	58.5	4,395.3
1963-64	2,470.5	10.8	1,188.8	82.5	3,752.6
1964-65	3,708.0	39.6	1,170.0	90.8	5,008.4
1965-66	4,315.5	58.5	1,368.8	90.8	5,833.6
1966-67	6,277.5	126.0	1,402.5	146.6	7,952.6
1967-68	4,522.5	81.0	735.0	117.0	5,455.5
1968-69	5,836.5	202.5	1,635.0	201.8	7,875.8

[1]Includes economic abandonment

Source: Table 2

Grapefruit: The range of production by states and the total for the 1974-75 season is presented in Tables 8 and 9. It is estimated that the 1974-75 grapefruit crop will reach a level within the range from a low of 2.6 million to a high of 3.0 million tons, with a midpoint average of 2.8 million tons. Florida's share will be about 70 percent of the total grapefruit production, California and Arizona combined about 12 percent, and Texas about 18 percent[5]. Total grapefruit production is anticipated to increase within a range of 13 to 27 percent above the 1968-69 season level.

IV. NATIONAL CITRUS CONSUMPTION

Analysis of consumption trends and patterns is an important step in defining marketing opportunities available to an industry. This section reviews the historical changes in citrus product consumption. It considers the factors affecting per capita usage and examines the changing relationship among the various product forms consumed.

The market available to the Texas Citrus Industry goes beyond local or regional boundaries. The appropriate market to consider is the total United States[6], whereas the production data examined in the preceding section was both by states and a national basis, consumption data is presented only on a national level.

Evaluation of per capita consumption data is useful. However, it may be misleading if its limitations are not recognized[7]. Total per capita consumption depends directly on population and very closely on the available

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[5] All percentages computed from Table 9

[6] It may even be argued that the relevant market should be extended to include other countries. It is, however, beyond the scope of this study to examine markets outside the U.S. In addition, Texas is currently a minor exporter of citrus.

[7] Nichols, J. P. and Sporleder, T. L. "Recent Changes in Characteristics of Orange Consumption", Journal of Lower Rio Grande Horticultural Society. Vol. 23. 1969. pp. 24-28.

TABLE 4. Total Production of Grapefruit by States 1960-61 to 1968-69, in Boxes

CROP YEAR	TOTAL PRODUCTION[1]			
	FLORIDA	TEXAS	CALIFORNIA	ARIZONA
	1,000 Boxes[2]			
1960-61	31,600	6,800	2,640	2,260
1961-62	35,000	2,700	2,940	2,270
1962-63	30,000	70	2,500	2,170
1963-64	26,300	500	4,200	3,210
1964-65	31,900	2,000	4,230	2,900
1965-66	34,900	3,800	4,950	3,050
1966-67	43,600	5,600	5,000	1,680
1967-68	32,900	2,800	4,618	3,740
1968-69	39,900	6,700	4,960	2,510

[1]Includes economic abandonment

[2]Due to the variation in the number of pounds per box among states, boxes are not additive (See Appendix Table VI).

Source: Same as Table 2.

TABLE 5. Total Production of Grapefruit by States 1960-61 to 1968-69, in Tons

CROP YEAR	TOTAL PRODUCTION[1]				UNITED STATES (FLORIDA, TEXAS, CALIFORNIA, AND ARIZONA)
	FLORIDA	TEXAS	CALIFORNIA	ARIZONA	
	1,000 Tons				1,000 Tons
1960-61	1,343.0	272.0	86.6	72.3	1,773.9
1961-62	1,487.5	108.0	96.2	72.6	1,764.3
1962-63	1,275.0	2.8	82.0	69.4	1,429.2
1963-64	1,117.8	20.0	137.7	102.7	1,380.2
1964-65	1,355.8	80.0	138.7	92.8	1,667.3
1965-66	1,483.3	152.0	162.3	97.6	1,895.2
1966-67	1,853.0	224.0	163.9	53.8	2,294.7
1967-68	1,398.3	112.0	151.4	119.7	1,781.4
1968-69	1,695.8	268.0	162.6	80.3	2,206.7

[1]Includes economic abandonment

Source: Table 4

TABLE 6. Estimated Total Production of Oranges by States for the 1974-75 Crop Year, With Estimated Range in Boxes

STATE	TOTAL PRODUCTION		
	LOW	HIGH	MIDPOINT
	1,000 Boxes		
Florida	170,000	200,000	185,000
Texas[1]	10,760	12,030	11,370
California and Arizona	50,000	55,000	52,500

[1]From Appendix

Source: Estimated

TABLE 7. Estimated Total Production of Oranges by States for the 1974-75 Crop Year, with Estimated Range in Tons

STATE	TOTAL PRODUCTION		
	LOW	HIGH	MIDPOINT
	1,000 Tons		
Florida	7,650	9,000	8,325
Texas	484	541	512
California and Arizona	1,875	2,063	1,969
TOTAL	10,009	11,604	10,806

Source: Table 6

TABLE 8. Estimated Total Production of Grapefruit by States for the 1974-75 Crop Year, with Estimated Range in Boxes

STATE	TOTAL PRODUCTION		
	LOW	HIGH	MIDPOINT
	1,000 Boxes		
Florida	45,000	50,000	47,500
Texas[1]	11,570	13,773	12,671
California	5,500	6,000	5,750
Arizona	3,500	4,000	3,750

[1]From Appendix

Source: Estimated

TABLE 9. Estimated Total Production of Grapefruit by States for the 1974-75 Crop Year, with Estimated Range in Tons

STATE	TOTAL PRODUCTION		
	LOW	HIGH	MIDPOINT
	1,000 Tons		
Florida	1,913	2,125	2,019
Texas	463	551	507
California	180	197	189
Arizona	112	128	120
TOTAL	2,694	3,029	2,862

Source: Table 8

supply of the product. In most years the entire production will be consumed in some form except for changes in processed product stocks which may not be consumed because of storage. When per capita consumption falls because of changes in supply, such as when freezes occur, the lower per capita consumption figures do not usually reflect any basic change in consumer preferences.

Likewise, total per capita consumption data may mask shifts among the several forms in which a product is consumed. Examination on a product-by-product basis can reveal the presence of such shifts.

Review of Orange Consumption

Per capita consumption of fresh oranges has followed a pattern similar to most other fresh fruits since the World War II period, generally declining since that time. The long decline hit its low point in 1963 (mainly as a result of the freeze in January 1962, which affected a large part of the U. S. citrus industry). Since 1962, per capita consumption has recovered the amount lost as a result of the freeze and has indicated a possible slow down in the rate of decline.

While fresh consumption was involved in a long decline (post World War II) utilization of oranges in the frozen concentrate form (FCOJ) increased significantly. As indicated in Table 10 per capita consumption of FCOJ had by 1967 recovered the amount lost due to the 1962 freeze.

Chilled orange juice represents the latest important marketing opportunity for oranges. After it was introduced, per capita consumption increased at a moderate rate. Since recovery from the freeze in January 1962 and introduction of new technology, the rate of increase has been dramatic. In 1967 per capita consumption was double that of 1965 for chilled orange

juice. This is a highly convenient item which has attracted the consumer's interest. Examination of the market share percentages reveals that the decline for fresh oranges was replaced by FCOJ and chilled orange juice which about equally divided the difference.

Canned single strength orange juice exhibited a downward trend similar to that for fresh oranges since the 1940's. The decline in per capita consumption of this product was closely associated with the concurrent increase in per capita consumption of FCOJ and chilled orange juice noted above. Canned single strength juice consumption was also depressed by the 1962 freeze. Increase has occurred since that time, but unlike fresh oranges, the pre-freeze level of per capita consumption has not been regained.

It is helpful to look at the long time trend of product consumption as indicated in Table 11. Over the 17-year period 1951-67, fresh oranges per capita consumption declined by an average of 0.9 pounds and canned single strength juice by about 0.3 pounds per year. FCOJ and chilled orange juice increased by 0.6 and 0.3 pounds respectively. These estimates are based on linear trend lines and are limited by the usual assumptions of regression analysis. They provide, however, a measure of the general shift away from fresh oranges toward FCOJ and chilled orange juice.

An additional product form for oranges is citrus fruit drinks. Orange juice is part of the composition of such a product. The proportion which is actual orange juice may vary depending on price and availability. It is important to recognize, however, that a given amount of oranges makes a much greater volume of orange drink than of single strength orange juice.

The fruit drink segment of the fruit beverage market has shown an increase since the mid-1950's. In the 1956 marketing season fruit drinks

TABLE 10. Per Capita Consumption of Fresh Oranges and Selected Orange Products, United States, 1961-68, Fresh Weight Basis

YEAR	PRODUCT FORM									
	FRESH ORANGES		FROZEN CONCENTRATED ORANGE JUICE[1]		CHILLED JUICE[2]		CANNED SINGLE STRENGTH[2]		TOTAL	
	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%
1961	16.1	31	29.1	57	3.0	6	3.1	6	51.3	100
1962	15.6	27	34.2	60	4.0	7	3.5	6	57.3	100
1963	11.9	30	22.5	57	2.1	5	3.1	8	39.6	100
1964	14,3	37	20.1	52	2.3	6	2.1	5	38.8	100
1965	16.4	34	26.8	55	3.4	7	2.2	4	48.8	100
1966	16.4	33	25.6	51	5.5	11	2.8	5	50.3	100
1967	18.0	28	37.0	57	7.5	11	2.8	4	65.3	100
1968	14.1	25	32.4	58	7.2	13	2.2	4	55.9	100

[1]Conversion factor: 6.7 lbs fresh oranges = 1 lb FCOJ at 45° brix

[2]Conversion factor: 1.81 lbs fresh oranges = 1 lb single strength orange juice

Source: U.S.D.A., Fruit Situation, Economic Research Service, Washington, D. C., August 1969, pp. 14-20.

were 6.3 percent of the market[8]. In ten years, or by 1964, this drink segment grew to 38 percent of the total fruit beverages market and has remained at about the same level[9].

Review of Grapefruit Consumption

Fresh grapefruit consumption per capita has also declined since the 1940's but more gradually both in absolute and percentage terms, than that of fresh oranges, Table 12. Grapefruit supply was affected in the same manner as oranges by the January 1962 freeze. Fresh grapefruit consumption approached the pre 1962 level by 1965.

Frozen concentrated grapefruit juice never developed the same consumer acceptance as FCOJ. As a result, this product represents less than 10 percent of the total grapefruit market. Chilled grapefruit juice has less than 1 percent of market share of total grapefruit usage. However, in 1969 it began to show an upward trend and may become more important in the future.

Canned single strength juice is the most important form of grapefruit juice consumption. Affected to a degree by the 1962 freeze, its per capita consumption rate recovered quickly and has generally increased since then.

Changing Characteristics of Per Capita Consumption of Oranges and Grapefruit

Evaluation of the per capita citrus consumption data reviewed above

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[8]Black, W. E., Economic Outlook for Florida Citrus for the Next Five Years 1966-71, Economic Research Department, Florida Citrus Commission, Lakeland, Florida. May 1966, p. 14.

[9]Consumer Purchases of Fruit Juices and Drinks, Market Research Department, Florida Citrus Commission, Lakeland, Florida, November 1968.

TABLE 11. Average Annual Change in Per Capita Consumption of Fresh Oranges and Selected Processed Orange Products, Fresh Weight Basis[1]

PRODUCT	AVERAGE ANNUAL CHANGE[2]
	(pounds)
Fresh Oranges	-0.90
Canned Single Strength Orange Juice	-0.27
Frozen Concentrated Orange Juice	0.58
Chilled Orange Juice	0.27

[1]Fresh weight basis derived from product weight basis using the following conversion: 1 lb. single strength orange juice = 1.81 lbs fresh fruit.

[2]Based on data from 1951 through 1967.

Source: Nichols, J. P. and T. L. Sporleder, "Recent Changes in Characteristics of Orange Consumption", Journal of Lower Rio Grande Valley Horticultural Society. Vol. 23, 1969, pp. 24-28.

indicates several shifts. Most important among these is the move toward increased consumption of processed products at the expense of the fresh form. This, of course, is not unique to citrus. It has been occurring, post 1940, to most agricultural products. While this move is more apparent for oranges, it is of some significance for grapefruit.

New significant changes are in the offing. Currently, a shift toward synthetic products is occurring. Another recent change is the introduction of FCOJ in high density form. This new high density brix concentrate will alter the amount of juice the consumer will be able to make from a unit of concentrate, thereby allowing for price adjustments to some degree in the retail market. Thus, the industry may not be tied as closely to the historical price of the six-ounce can of FCOJ.

The future for synthetics appears to be optimistic, although their market share will be closely associated with the price levels for natural citrus products. If citrus production expands rapidly prices will decline and there may be less inducement for expansion of the synthetics into the market. If, on the other hand, a freeze should occur and prices for natural juices increase significantly, synthetic products may appreciably increase their share of the market.

The citrus drink market as a whole may offer some expansion possibilities for citrus utilization. In periods of heavy supplies with declining juice prices, the proportion of actual juice in the drink may be increased, thus providing an additional outlet for citrus juice.

V. UTILIZATION OF TEXAS CITRUS

Although Texas citrus is marketed in both fresh and processed form,

TABLE 12. Per Capita Consumption of Fresh Grapefruit and Selected Grapefruit Products, United States, 1961-68, Fresh Weight Basis

YEAR	PRODUCT FORM			
	FRESH GRAPEFRUIT	FROZEN CONCENTRATED GRAPEFRUIT JUICE[1]	CHILLED JUICE[2]	CANNED SINGLE STRENGTH[2]
1961	9.8	1.2	0.1	3.0
1962	9.0	1.4	0.2	3.2
1963	6.4	1.0	0.1	2.8
1964	7.5	1.1	0.2	2.4
1965	8.2	1.3	0.1	3.0
1966	8.4	1.4	0.3	3.8
1967	9.0	1.9	0.5	5.1
1968	8.0	1.3	0.5	4.8

[1]Conversion factor: 8.67 lbs fresh grapefruit = 1 lb frozen concentrated grapefruit juice at 40° brix.

[2]Conversion factor: 2.18 lbs fresh grapefruit = 1 lb single strength grapefruit juice.

Source: U. S. Department of Agriculture., Fruit Situation, Economic Research Service, Washington, D. C., August 1969, pp. 14-20.

historically the Texas Citrus Industry has been primarily fresh market oriented (Table 13). The 1964 to 1968 seasons average was 23.8 percent of the total grapefruit supply and 34.1 percent of the total orange supply entering processing plants. During the 1968 season for the first time, more than half of the total Texas orange supply was utilized in the processed form.

The historical emphasis on marketing Texas citrus as fresh fruit partly reflected a limited local citrus processing capacity. After the 1951 and 1962 Texas freezes, a portion of the capacity was moved to Florida. Some of the other local facilities meanwhile became obsolete. Consequently it is now uneconomic to operate some of the present capacity.

Current Capacity

Early in 1969, Texas Citrus Mutual (TCM) conducted a survey in the Rio Grande Valley, Texas for the purpose of estimating the current citrus processing capacity, Table 14. The one facility not in operation was in dis-repair. Based on a 24-hour a day operation, a six-day week and a 120-day season, the combined total maximum citrus processing capacity in Texas was estimated at 293,000 tons per season, Table 14. Measured in 24/2 case equivalents, this is almost 10 million cases per year. At 65 percent of maximum capacity, which is considered a normal performance level, the processing capacity is about 175,000 tons of citrus raw stock or about 6 million 24/2 case equivalents.

Utilization of Texas Citrus, 1968-69

About one-third of the commercial supply of Texas grapefruit, about one-half of the early oranges and nearly two-thirds of late oranges were

TABLE 13. Utilization of Texas Citrus, 1960-61 to 1968-69, in Tons

CROP SEASON	GRAPEFRUIT		ORANGES	
	FRESH	PROCESSED	FRESH	PROCESSED
	Tons			
1960-61	217,760	51,240	114,750	39,600
1961-62	91,760	14,240	55,485	46,440
1962-63	1,800	0	1,125	0
1963-64	17,200	1,000	9,000	1,260
1964-65	72,640	5,560	35,685	3,375
1965-66	120,400	28,800	50,085	6,840
1966-67	158,400	54,400	80,550	39,150
1967-68	88,200	20,600	64,800	14,400
1968-69	180,400	84,400	95,400	104,850

Source: U. S. Department of Agriculture, Citrus Fruits, By States 1909 to 1969. Crop Reporting Board, Statistical Reporting Service, Washington, D. C.

processed during the 1968-69 season, Table 15. In total, almost 190,000 tons of citrus raw stock was processed with an output of about 6.3 million 24/2 case equivalents, Table 16. Slightly more than 0.15 million 24/2 case equivalents of Texas oranges were processed in Florida and about 6.15 million 24/2 case equivalents were processed in Texas, Table 16. Consequently, the 1968-69 processed volume was in excess of the normal performance level of about 6.0 million 24/2 case equivalents.

The entire existing citrus processing capacity in Texas is currently (1969) privately owned. Management is natuarally interested in maximizing profits for the stockholders. The quantity of the Texas citrus crop processed is normally determined by the firm's projected sales potential. When a quantity equal to projected sales is processed, the management ceases plant operations for the season regardless of the additional fruit supply that could be processed. The balance of the fruit of processing quality is either placed on the fresh market as U. S. No. 2's or is not harvested and is classified as economic abandonment.

Estimated Utilization of Texas Citrus Supply, 1974-75

The projected supply of Texas citrus for the 1974-75 marketing season is cited in Table 1. The required citrus processing capacity for the 1974-75 season at a zero level of economic abandonment requires estimate of the proportion of the supply to be utilized as fresh and as processed. The derivation of these estimates for grapefruit, early oranges, and late oranges is considered below.

Grapefruit: The most recent Texas experience (1968-69) reveals

TABLE 14. Capacity of Texas Citrus Processing Facilities, 1968-69

PERFORMANCE LEVEL[1]	INPUT		OUTPUT
	VOLUME/DAY	VOLUME/SEASON	VOLUME/SEASON[2]
	----------tons----------		Cases 24/2 Equivalents
Maximum	2,440	293,000	9,950,280
Normal	1,453[3]	174,600[3]	5,929,416[3]

[1]Maximum performance level is based on a 24-hour day, season of 120 days (20 weeks, 6 days/week).
Normal performance level is defined as approximately 65 percent of maximum capacity of those facilities operating during the 1968-69 season. (Two 8-hour shifts per day, season of 120 days).

[2]Based on supply composition of 50 percent oranges and 50 percent grapefruit. Given this assumption, 1 ton of raw stock equals 33.96 cases of 24/2 equivalents.

[3]This is not 65 percent of the maximum volume per season because one facility did not operate during the 1968-69 season.

Source: Texas Citrus Mutual 1969 Survey of the Current Six Citrus Processing Facilities in the Rio Grande Valley, Texas.

TABLE 15. Utilization of Texas Grapefruit, Early Oranges, and Late Oranges, 1968-69

FORM	GRAPEFRUIT		EARLY ORANGES		LATE ORANGES	
	TONS	PERCENT	TONS	PERCENT	TONS	PERCENT
Fresh	180,400	68.1	67,395	53.1	28,005	38.1
Processed[1]	84,400	31.9	59,430	46.9	45,420	61.9
TOTAL	264,800	100.00	126,825	100.00	73,425	100.00

[1] 4,120 tons of Texas oranges processed in Florida during the 1968-69 season.

Source: Adjusted estimates from Texas Valley Citrus Committee, Final Texas Citrus Review. Pharr, Texas. June 19, 1969.

TABLE 16. Utilization of All Texas Citrus Processed in Texas, Cases of 24/2 Product Equivalents, 1968-69.

TYPE OF CITRUS	TONS PROCESSED	24/2 CASE EQUIVALENTS[1]
	----------tons----------	--------cases---------
Grapefruit	84,400	2,637,500
Oranges	100,724[2]	3,693,549
All Citrus	189,250	6,331,049

[1]One ton of grapefruit raw stock equals 31.25 cases of 24/2 single-strength equivalent. One ton of orange raw stock equals 36.67 cases of 24/2 single-strength equivalent.

[2]A total of 104,850 tons of Texas oranges were processed during the 1968-69 season, 4,126 of which were processed in Florida.

Source: Table 15.

that about 59 percent of the supply was utilized in the fresh form and 41 percent was processed. Long-run grapefruit consumption trends indicate that U. S. per capita consumption of the fresh fruit is declining while per capita consumption of the processed form is increasing slightly. Since there is no emerging reason for this consumption trend to change within the next six years, it is estimated that from 45 to 50 percent of the 1974-75 season Texas grapefruit supply will be utilized as fresh fruit and the residual of 50 to 55 percent as processed. Florida processed 58 percent of its total grapefruit production during the 1968-69 season, therefore, the Texas forecast is a reasonable expectation. On this basis the estimated 1974-75 processing supply of grapefruit for Texas ranges from 253 to 278 thousand tons, Table 17.

Early Oranges: During the 1968-69 season, slightly more than 53 percent of the Texas supply of early oranges was utilized in the fresh form and almost 47 percent was processed. Due to the lack of good external appearance of many Texas oranges plus the long-run trend of increasing per capita orange consumption in processed form, it is estimated that only about 15 to 20 percent of the 1974-75 supply will be utilized as fresh. The residual 80 to 85 percent of the total early orange supply will be available for processing. This is equivalent to a range of 255 to 271 thousand tons of early oranges, Table 18.

Late Oranges: About 38 percent of the Texas late orange supply was utilized as fresh and 62 percent processed during the 1968-69 season. The January, 1969 light freeze in Florida resulted in an increased demand by Florida for Texas FCOJ to blend with Florida's FCOJ. Consequently, the percentage of the 1968-69 Texas supply utilized for processing was not

typical of previous years. Considering the external appearance problem of many Texas late oranges and the long-run trend toward increased per capita consumption of processed orange products, it appears logical to expect that no more than 25 to 30 percent of the 1974-75 supply will be utilized as fresh, with the residual 70 to 75 percent available for processing. By comparison, during the 1968-69 season, Florida processed almost 93 percent of its total orange production. The probability, therefore, is that 134,000 to 144,000 tons of late oranges will be available for processing during the 1974-75 marketing season, Table 19.

Aggregate Texas Citrus Processing Capacity

A comparison of 1968-69 and 1974-75 citrus processing capacity needs for Texas is provided in Table 20. Using the normal operating capacity as a base, an additional 16.3 to 18.0 million cases of 24/2 equivalents capacity will be needed over and above that of 1968-69. Using the maximum capacity as a base, from 13.1 to 14.8 million case 24/2 equivalent capacity will need to be added. This increase in processing capacity may be converted into capital investment costs by applying a factor of $1.20 per 24/2 case equivalent of processing capacity (1969 dollars)[10]. For example, an increase in processing capacity of 13.1 million cases (24/2 case equivalent) would require an investment of about 15.7 million dollars, while an increase of 18 million cases would require approximately 21.6 million dollars in investment.

VI. PROCESSING POTENTIAL FOR TEXAS CITRUS

As stated previously the 1968-69 citrus processing capacity in Texas

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[10]Walker, Charles of Gulf Machinery Company, Clearwater, Florida.

TABLE 17. Forecasted Tons of Texas Grapefruit Utilized in Fresh and Processed Forms, 1974-75

PRODUCT FORM	45% FRESH[1]	50% FRESH[2]
	----------1,000 tons----------	
Fresh	228	253
Processed	278	253
TOTAL[3]	506	506

[1] Assuming 45 percent of the 1974-75 total estimated production for Texas grapefruit will be utilized in the fresh form.

[2] Assuming 50 percent of the 1974-75 total estimated production for Texas grapefruit will be utilized in the fresh form.

[3] Table 1.

TABLE 18. Forecasted Tons of Texas Early Oranges Utilized in Fresh and Processed Forms, 1974-75.

PRODUCT FORM	15% FRESH[1]	20% FRESH[2]
	----------1,000 tons----------	
Fresh	48	64
Processed	271	255
TOTAL[3]	319	319

[1]Assuming 15 percent of the 1974-75 total estimated production of Texas Early Oranges will be utilized in the fresh form.

[2]Assuming 20 percent of the 1974-75 total estimated production of Texas Early Oranges will be utilized in the fresh form.

[3]Table 1.

TABLE 19. Forecasted Tons of Texas Late Oranges Utilized in Fresh and Processed Forms, 1974-75

PRODUCT FORM	25% FRESH[1]	30% FRESH[2]
	----------1,000 tons----------	
Fresh	48	58
Processed	144	134
TOTAL[3]	192	192

[1]Assuming 25 percent of the 1974-75 total estimated production of Texas Late Oranges will be utilized in the fresh form.

[2]Assuming 30 percent of the 1974-75 total estimated production of Texas Late Oranges will be utilized in the fresh form.

[3]Table 1.

can be measured by two criteria. One is based upon maximum capacity and the other on normal, or 65 percent capacity. In terms of 24/2 case equivalents, maximum capacity was estimated at 10 million cases, or approximately 293,000 tons of citrus fruit. Normal capacity was about 6 million cases, or 175,000 tons of citrus.

The forecast supply of Texas citrus available for processing in the 1974-75 season ranges from about 650,000 to 700,000 tons. In order to accomodate this increased supply processing capacity would need to be increased from 2 1/4 to 4 times that of 1968-69.

The expected increase in processing utilization of Texas citrus fortunately coincides with anticipated further increases in consumer preferences for processed citrus. This trend appears strong enough to continue during the planning horizon of this study due to the factors noted in Section VI.

Although additional Texas citrus processing capacity would be required to utilize forecast increases in the fruit supply, both marketing advantages and disadvantages can accrue from the larger capacity. These are now considered.

Advantages

Advantages can accrue from both the fresh and processed fruit market by having the increased marketing flexibility added processing capacity affords in marketing. Two basic changes could occur. One may be termed a "direct" flexibility, resulting from the year around market for processed products as opposed to a seasonal market for fresh fruit. The other is a more "indirect" flexibility provided by the capability of allocating citrus fruit to either

TABLE 20. Texas 1968-69 Citrus Processing Capacity and Capacity Required by 1974-75

PROCESSING CAPACITY	AVERAGE[1] PERFORMANCE LEVEL		MAXIMUM[2] PERFORMANCE LEVEL	
	Maximum Estimated Supply	Minimum Estimated Supply	Maximum Estimated Supply	Minimum Estimated Supply
	Million Case 24/2 Equivalent[3]		Million Case 24/2 Equivalent[3]	
Processing Capacity Required by 1974-75	23.9	22.2	23.9	22.2
1968-69 Processing Capacity	5.9	5.9	9.1	9.1
Additional Processing Capacity Required to Process Supply Available in 1974-75	18.0	16.3	14.8	13.1

[1]Normal capacity based on 65 percent of maximum capacity.

[2]Maximum capacity based on 24-hour day operation, 6-day work week, and 20-week season for those processing plants in operation during the 1968-69 season.

[3]1 ton grapefruit raw stock = 31.24 case 24/2 equivalents.
1 ton orange raw stock = 36.67 case 24/2 equivalents.

the fresh or processed market to achieve the greatest profit combination available.

Processing of citrus also permits other advantages. Among these are increased product uniformity (quality control), use of storage, and product differentiation by type of brand name. The quality of a processed product can be more closely monitored than fresh fruit. Blending of FCOJ is widely practiced for this reason. Storage capabilities of processed fruit permit lengthening of the marketing period from about 8 months (for fresh) to from 12 to 24 months. This enhances supply control capabilities. Establishment of consumer brands and consequent brand promotion is more easily attained for processed foods. Citrus is no exception.

Increasing the proportion of total citrus that is processed also indirectly affects the fresh market. Lower grade citrus removed from the fresh pack and processed will strengthen fresh fruit prices. This results from a higher grade fresh pack and a smaller quantity marketed in fresh form. Thus, additional processing capacity can provide the industry with increased marketing flexibility over quality and quantity in the fresh and processed sector with the goal of increasing total crop profits.

Disadvantages

There is risk and uncertainty associated with added capital investment in Texas citrus processing capacity. The extra expense of excess processing capacity for any one year is always a possibility. A short supply of fruit could be caused by several factors such as freeze, hurricanes, or insects. However, this risk is not new, nor is it unique to citrus.

Some risk avoidance could be introduced by integrating new citrus

processing facilities with vegetable processing capabilities. For example, a processing facility in Texas may be designed to process both citrus and tomatoes. Further processing of other products could also utilize "off-season" time. A diversified processing facility has the advantage of keeping key resources, especially top and middle management as well as labor, more fully employed throughout the year.

In order to promote and expand the market for Texas processed citrus products, aggressive capable management, and highly motivated sales personnel must be further expanded. Also, skilled food technologists are needed to work closely with management on product improvement and new product development. Sufficient capital must be available for market development activities. These are some of the challenges and opportunities that would be created by added citrus processing capacity in Texas.

A P P E N D I X

TABLE I. Forecasted Citrus Production - Rio Grande Valley, Texas, 1974-75 Crop Year

COMMODITY	RANGE	AVERAGE
	----------Tons----------	
Grapefruit	462,808 to 550,913	506,859
Early Oranges	295,722 to 344,602	320,162
Late Oranges	188,634 to 196,827	192,730

Assumptions

The basic assumption in making the forecasts for 1974-75 citrus production is that no major freeze damage will occur between the period 1968-69 and 1974-75, and that new plantings will continue at the 1967 rate.

Methodology Used in Deriving Forecasted Estimates

The citrus tree census as of October 1, 1967, was used as a basis for estimating the acreage now planted. Texas citrus tree plantings in the Rio Grande Valley were used to estimate the current rate of plantings. The 1968-69 U.S.D.A. production estimates were used to determine present production levels. Early orange and late orange production levels are estimated by upward adjustment from the base level. No adjustment was made for grapefruit. These forecasts were developed with the assistance of Dr. Richard Hensz, Texas A&I Citrus Center; Dr. Calvin Lyons, Texas A&M Extension Horticulturist; and Mr. Norman Maxwell, Texas A&M Research Horticulturist.

Grapefruit:

35,241 = acres now planted

9.5 = yield in tons per acre for bearing acreage for the 1968-69 season

3,430 = acres to be planted during the 1969-71 period

12.5-15.0 = 1975 expected average yield in tons per acre for acreage now planted

6.5 = 1975 expected average yield in tons per acre for acreage to be planted during the 1969-71 period

35,241 x 12.5 = 440,513 tons

35,241 x 15.0 = 528,615 tons

3,430 x 6.5 = 22,295 tons

Range of forecast in tons: 462,808 to 550,910

Average: 506,859 tons

Early Oranges:

24,440 = total acres now planted

10.0 = average yield in tons per acre for the 1968-69 season

814 = estimated acreage to be planted during the 1969-71 period that will be bearing in 1975

12.0-14.0 = 1975 average expected yield per acre for acreage now planted

3.0 = 1975 average expected yield per acre for acreage to be planted during the 1969-71 period

24,440 x 12.0 = 293,280 tons

24,440 x 14.0 = 342,160 tons

814 x 3.0 = 2,442 tons

Range of forecasts in tons: 295,722 to 344,602

Average: 320,162

Late Oranges:

16,386 = acres now planted

8.8 = average expected yield in tons per acre for the 1968-69 crop

150 = expected acreage to be planted during the 1969-71 period

11.5-12.0 = average expected yield in tons in 1975 for acreage now planted

1.3 = average expected yield in tons in 1975 for acreage to be planted during the 1969-71 period

16,386 x 11.5 = 188,439 tons

16,386 x 12.0 = 196,632 tons

150 x 1.3 = 195 tons

Range of forecasts in tons: 188,634 to 196,827

Average: 192,730

TABLE II. Citrus Tree Census - October 1, 1967

VARIETY	NON-BEARING Acres	NON-BEARING Trees	BEARING Acres	BEARING Trees	TOTAL Acres	TOTAL Trees
HIDALGO COUNTY						
Early Oranges	9,308	916,012	11,732	962,179	21,040	1,878,191
Valencias	3,080	330,824	11,585	877,196	14,665	1,208,020
Total Oranges	12,388	1,246,836	23,317	1,839,375	35,705	3,086,211
Mandarins	255	22,695	220	20,539	445	43,234
Grapefruit	6,045	702,401	22,088	1,706,853	28,133	2,409,254
All Citrus	18,658	1,971,932	45,625	3,566,767	64,283	5,538,699
CAMERON COUNTY						
Early Oranges	513	58,576	1,200	110,947	1,713	169,523
Valencias	290	32,565	645	59,483	935	92,048
Total Oranges	803	91,141	1,845	170,430	2,648	261,571
Mandarins	40	5,122	40	3,662	80	8,784
Grapefruit	1,438	166,613	4,880	442,621	6,318	609,234
All Citrus	2,281	262,876	6,765	616,713	9,046	879,589
WILLACY COUNTY						
Early Oranges	378	36,768	589	42,627	967	79,395
Valencias	218	22,313	568	40,428	786	62,741
Total Oranges	596	59,081	1,157	83,055	1,753	142,136
Mandarins	31	4,036	60	4,036	91	8,072
Grapefruit	240	20,256	550	41,691	790	61,947
All Citrus	867	83,373	1,767	128,782	2,634	212,155
TOTAL VALLEY						
Early Oranges	10,199	952,780	13,521	1,115,753	23,720	2,127,109
Valencias	3,588	385,702	12,798	977,107	16,386	1,362,809
Total Oranges	13,787	1,397,058	26,319	2,092,860	40,106	3,489,918
Mandarins	296	31,853	320	28,237	616	60,090
Grapefruit	7,723	889,270	27,518	2,191,165	35,241	2,080,435
Total Citrus	21,806	2,318,181	54,157	4,312,262	75,963	6,630,443

Source: Texas Citrus Mutual (TCM), Edinburg, Texas.

TABLE III. Texas Citrus Tree Planting in the Lower Rio Grande Valley, 1952-68

Year beginning July 1	GRAPEFRUIT			ORANGES			Other Citrus	All Citrus
	White Flesh	Pink and Red Flesh	Total	Early and Mid-season	Valencia	Total		
	--Thousand trees--							
1952	2	298	300	40	52	92	23	415
1953	8	509	517	74	88	162	10	689
1954	3	239	242	63	38	101	11	354
1955	5	237	242	53	42	95	17	354
1956	26	185	211	72	46	118	24	353
1957	28	209	237	92	83	175	11	423
1958	8	160	168	87	59	146	18	332
1959	16	191	207	112	79	191	5	403
1960	34	150	184	182	83	265	17	466
1961 Before freeze Jan. 9-12, '62	16	58	74	118	49	167	5	246
After freeze Jan. 9-12, '62	1	2	3	5	4	9	--	12
1962	12	86	98	224	119	343	8	449
1963	14	192	206	268	98	366	26	598
1964	13	254	267	318	87	405	38	710
1965	10	350	360	301	98	391	35	786
1966	8	287	295	96	33	129	11	435
1967	2	158	160	38	7	45	5	210

Source: U. S. Department of Agriculture and Texas Department of Agriculture, Texas Citrus Tree Plantings in the Lower Rio Grande Valley 1952-68, Release September 23, 1968.

TABLE IV. Fresh Weight Equivalents of One Pound of Selected Citrus Juice Products[1]

PRODUCT FORM	FRESH WEIGHT EQUIVALENT
	(pounds)
FCOJ - at 45° Brix	6.70
Orange Juice - Single Strength	1.81
Frozen Concentrated Grapefruit Juice - 40° Brix	8.67
Grapefruit Juice - Single Strength	2.18

[1]The amount of fruit (by weight) which it takes, under average conditions, to produce one pound of the citrus juice product.

Source: U. S. Department of Agriculture and various publications.

TABLE V. Factors for Conversion From One Ton of Fresh Citrus to Cases of Selected Citrus Juice Products

PRODUCT FORM	JUICE EQUIVALENT FROM ONE TON FRESH CITRUS
Orange - single strength juice	36.67 cases (24/2's)
Orange - FCOJ	13.33 cases (48 6-oz. cans)
Grapefruit - single strength juice	31.25 cases (24/2's)

Source: U. S. Department of Agriculture and various publications.

TABLE VI. Net Weight of Oranges and Grapefruit Per Box

STATE	POUNDS PER BOX	
	ORANGES	GRAPEFRUIT
Arizona	75	64
California	75	67
Florida	90	85
Texas	90	80

Note: California desert valleys and Arizona grapefruit box has a net weight of 64 pounds. All other areas of California have a net average of 67 pounds.

Source: U. S. Department of Agriculture, Citrus Fruits by States, Crop Reporting Service, Statistical Reporting Service, Washington, D. C. Fr Nt 3-1 (10-69) October 1969.

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