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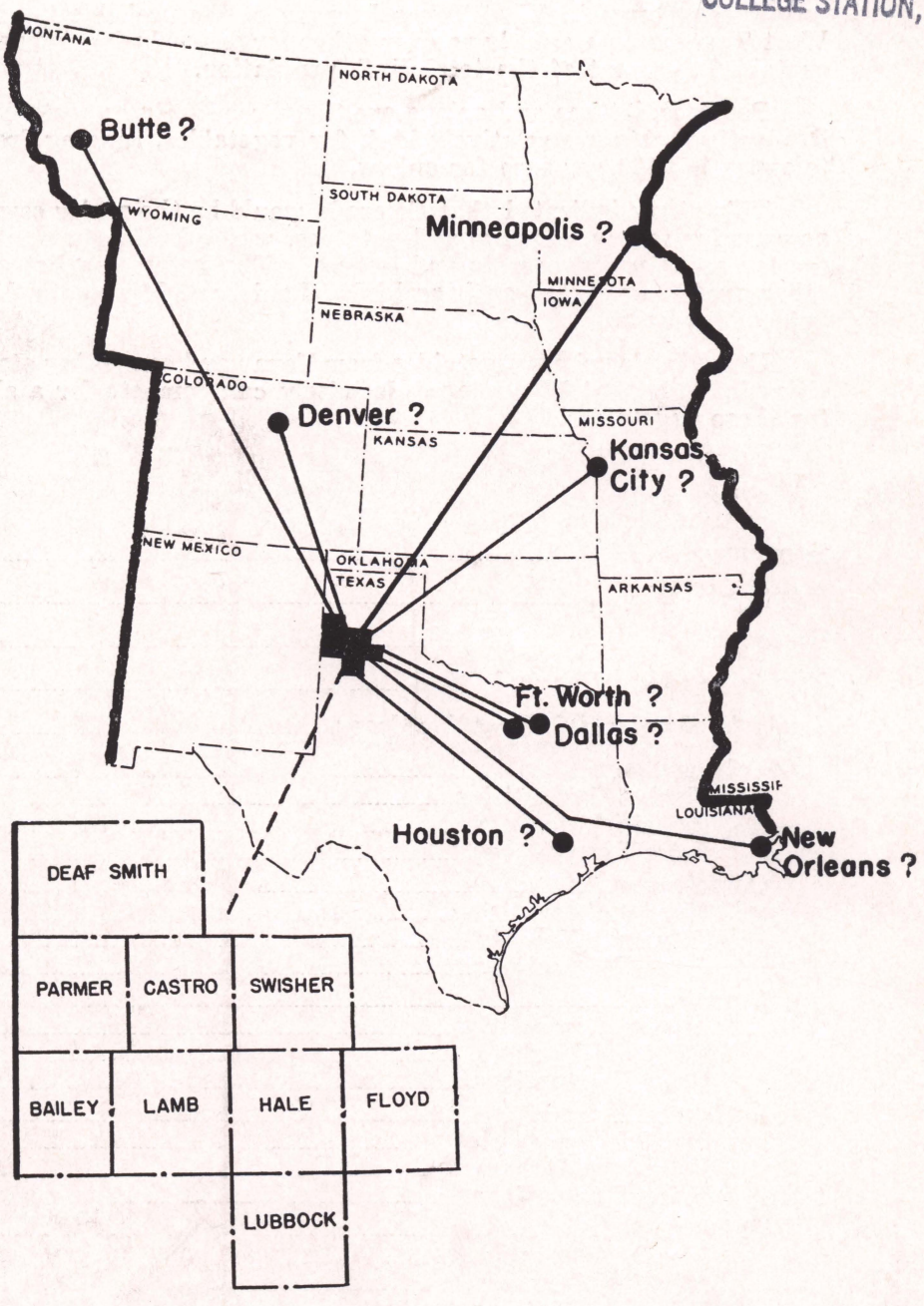
# Potential Markets for West Texas Vegetables



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## SUMMARY

Many farmers in West Texas have become interested in growing vegetables in order to utilize acres diverted from cotton and grain because of governmental controls and low grain prices. Between 1949-54, cotton acreage in nine West Texas counties decreased 10 percent and wheat acreage decreased 50 percent.

This study was designed to supply farmers with information relative to possible shipping areas and the markets production areas competing in those markets at the time West Texas production would be moving to market.

The Central States region was selected for analysis as a potential market area for vegetables grown in West Texas because of the probable transportation advantage the West Texas area would have over other large producing areas. These Central States contain 20 percent of the total U. S. population.

Potatoes, lettuce and onions are the three leading vegetables grown in West Texas. Production costs are relatively high for vegetables, ranging from $53 per acre for cantaloupes to $490 per acre for onions.

This study indicated that Colorado would be the major competitor to the West Texas area for onions, cabbage and potatoes, while California would be the major competitor for cantaloupes, carrots and lettuce. The potato market also is supplied by many other producing states, such as Idaho, Louisiana, Minnesota, North Dakota, South Dakota and others.

Unloads of various vegetables from Texas and competing states in the Central States cities indicate that West Texas definitely can compete for a share of the total market for these vegetables.

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# Potential Markets for West Texas Vegetables

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IN RECENT YEARS PRICES FOR GRAIN SORGHUMS grown in West Texas have declined almost to the point where it is difficult for farmers to break even on their sorghum crops. Governmental restrictions have reduced the wheat and cotton acreage that could be planted. These developments have made it necessary for farmers to look for profitable crops which could be grown on acreage diverted from grain and cotton. Therefore, a great deal of attention has been directed toward vegetables as prospective crops for use of these diverted acres.

This bulletin deals with the potential markets for several vegetables which can be grown in the West Texas farming area, or other Texas vegetable producing areas, the economic feasibility of going into vegetable production and the vegetables which might fit best into a particular farming system. Information was obtained from nine West Texas counties—Deaf Smith, Parmer, Castro, Swisher, Bailey, Lamb, Hale, Floyd and Lubbock. The following vegetables were analyzed: cantaloupes, carrots, lettuce, onions, cabbage and potatoes. A study of tomatoes was reported in Progress Report 1925, "West Texas Vegetable Market Potentials—Tomatoes."

## PROCEDURE

Some of the main objectives of this study are reported in this bulletin.

The first was to determine the extent of present vegetable production in West Texas. Information was obtained through a mailed questionnaire, personal interviews with farmers and the use of census data.

The second was to determine the pattern of tomato shipments into the various markets of the Central States by finding lows in the supply from competing areas at times when West Texas production would be available to move into these markets. These Central States contain approximately 20 percent of the total U. S. population and include the following states: Montana, Wyoming, Colorado, New Mexico, Texas, Oklahoma, Kansas, Nebraska, South Dakota, North Dakota, Minnesota, Iowa, Missouri, Arkansas and Louisiana. Data were obtained from records of the United States Department of Agriculture on shipments of tomatoes, carrots, lettuce, onions, cabbage, cantaloupes and potatoes into the markets at El Paso, San Antonio, Dallas, Fort Worth, Houston, Amarillo, Lubbock, Shreveport, Oklahoma City, Tulsa, New Orleans, Topeka, Wichita, Kansas City, Butte, Denver and Minneapolis. Cities in the Central States were selected for this analysis because transportation costs to them from West Texas would be lower than similar costs from California and Florida.

Prices received by Texas farmers since 1940 for the vegetables listed were used in an attempt to explain the causes for price variations.

## VEGETABLE PRODUCTION AND COSTS

Information was obtained from 103 farmers, 27 percent of the 380 farmers contacted by both mail questionnaires and personal interviews, concerning 1956 vegetable acreage production costs and marketing practices. This information and census figures for 1949 and 1954 showed recent trends in acreage utilization for the nine West Texas counties studied. Cotton acreage in these counties declined 10.2 percent and wheat acreage declined 50.5 percent between 1949 and 1954, Table 1. The acreage planted in corn increased approximately 25 percent, sorghum acreage increased approximately 69 percent and alfalfa acreage increased 38 percent. Although the total acreage planted in vegetables in the counties is rather small, vegetable planting is increasing with potatoes, lettuce and onions being the most important in terms of acreage. The value of vegetables harvested in the nine counties increased from $514,872 to $907,954 (76.3 percent) during 1949-54.

**TABLE 1. SPECIFIED CROPS HARVESTED IN NINE[1] WEST TEXAS COUNTIES, 1949 AND 1954[2]**

| Crop | Acres, 1949 | Acres, 1954 | Percentage change from 1949 to 1954 |
|---|---|---|---|
| Corn | 7,783 | 9,701 | +24.6 |
| Sorghums | 934,521 | 1,577,632 | +68.8 |
| Wheat | 1,164,176 | 575,894 | −50.5 |
| Alfalfa | 34,211 | 47,219 | +38.0 |
| Cotton | 1,038,275 | 932,015 | −10.2 |
| Cabbage | 26 | 298 | +1,046.2[3] |
| Cantaloupes and mushmelons | 95 | 52 | −45.5 |
| Carrots | 10 | 113 | +1,030.0 |
| Lettuce and romaine | 1,043 | 2,894 | +177.5 |
| Onions (dry) | 835 | 668 | −20.0 |
| Potatoes | 3,973 | 4,984 | +25.4 |

[1]Bailey, Castro, Deaf Smith, Floyd, Hale, Lamb, Lubbock, Parmer and Swisher.
[2]Source: United States Census of Agriculture, 1954, Vol. 1, part 26, Texas.
[3]*These large percentage figures might be misleading unless the small acreage figures are considered.*

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TABLE 2. NUMBER OF FARMS REPORTING IRRIGATION AND ACRES UNDER IRRIGATION IN NINE WEST TEXAS COUNTIES, 1949 AND 1954

| County | Number of farms reporting | | Acres | |
|---|---|---|---|---|
| | 1949 | 1954 | 1949 | 1954 |
| Bailey | 338 | 463 | 50,125 | 74,292 |
| Castro | 491 | 730 | 128,207 | 251,635 |
| Deaf Smith | 375 | 450 | 93,111 | 152,993 |
| Floyd | 584 | 786 | 134,535 | 210,413 |
| Hale | 1,482 | 1,534 | 318,410 | 431,332 |
| Lamb | 1,036 | 1,278 | 179,051 | 263,764 |
| Lubbock | 1,584 | 1,658 | 240,119 | 323,723 |
| Parmer | 198 | 708 | 45,924 | 229,887 |
| Swisher | 683 | 833 | 150,554 | 251,453 |

Most vegetables produced in West Texas are produced on irrigated cropland. Table 2 shows the continuing increase in irrigated acreage between 1949 and 1954.

West Texas farmers grew 1 to 10 vegetables, but the majority grew either one, two or three types of vegetables. Usually a farmer with a large acreage grew one or two vegetables, Figure 1.

Because production costs and yields are important in figuring the probable profit of a crop, the farmers were asked to indicate the yield and per-acre costs of producing their vegetables. Table 3 shows the average per-acre cost components for seven vegetables and their average yield.

## ANALYSIS OF POTENTIAL VEGETABLE CROPS

Total shipments of seven vegetables which might be grown by West Texas farmers were analyzed by origin of shipments, carlot unloads in Central States markets from Texas, carlot unloads in Central States markets from major competing production areas and price variation.

### CABBAGE

Reports of the USDA list 32 states as growing cabbage. However, the major producing states are New York, California, Texas and Colorado. New York produces the greatest volume, but does not ship as much as other states.

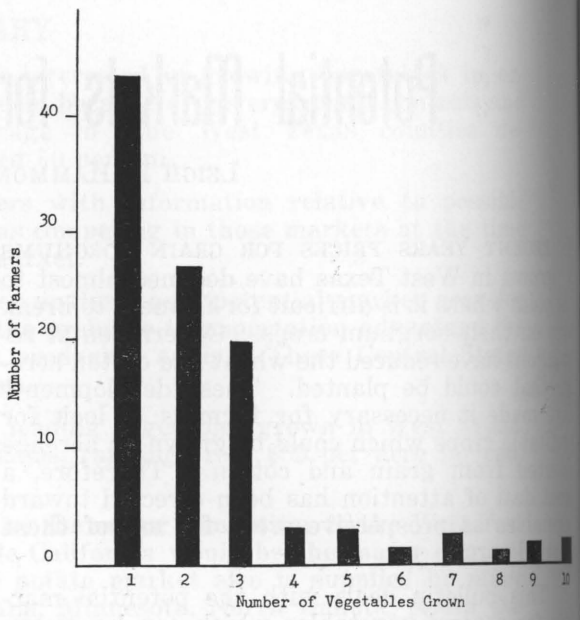



Figure 1. Distribution of the number of vegetables grown by 103 West Texas farmers in 1955.

#### Market Competition

Colorado is the major production area shipping to Central States markets during the season that West Texas production would be moving to market, Figure 2. Texas ships some cabbage throughout the year, with the peak shipments being from November to May.

#### Principal Markets

Carlot unloads of Texas cabbage in destination markets for the Central States area show the established trade channels, Figure 3. Most unloads of cabbage were in Dallas, Denver, Fort Worth and Kansas City.

The carlot unloads of Colorado cabbage in the Central States markets indicate that relatively few shipments move into the northern portion of this area, Figure 3. In Texas markets there were 199 carlot unloads of Colorado cabbage in Dallas and Fort Worth, Figure 3.

#### Price Fluctuations

A discussion of the technique used to study price variations will facilitate understanding the

TABLE 3. ESTIMATED YIELD AND COST OF PRODUCING AND MARKETING SEVEN VEGETABLES PRODUCED IN NINE WEST TEXAS COUNTIES, 1955

| Vegetable | Average yield per acre | Average cost per acre, dollars | | | | | | Average total cost per acre, dollars |
|---|---|---|---|---|---|---|---|---|
| | | Labor | Machinery | Fertilizer | Irrigation | Insect control | Marketing | |
| Cabbage | 11.6 tons | 22 | 6 | 14 | 6 | 26 | 88 | 162 |
| Cantaloupes | 287.0 bushels | 6 | 6 | 3 | 5 | 14 | 19 | 53 |
| Carrots | 6.0 tons | 20 | 13 | 17 | 16 | 17 | 192 | 275 |
| Lettuce | 232.0 cartons[1] | 37 | 11 | 21 | 12 | 18 | 206 | 305 |
| Onions | 678.0 bags[2] | 87 | 8 | 24 | 15 | 19 | 339 | 492 |
| Peppers | 360.0 bushels | 28 | 8 | 11 | 7 | 7 | 58 | 119 |
| Potatoes | 217.0 bags | 17 | 10 | 21 | 14 | 16 | 123 | 201 |

[1]70-pound carton.
[2]50-pound bag.

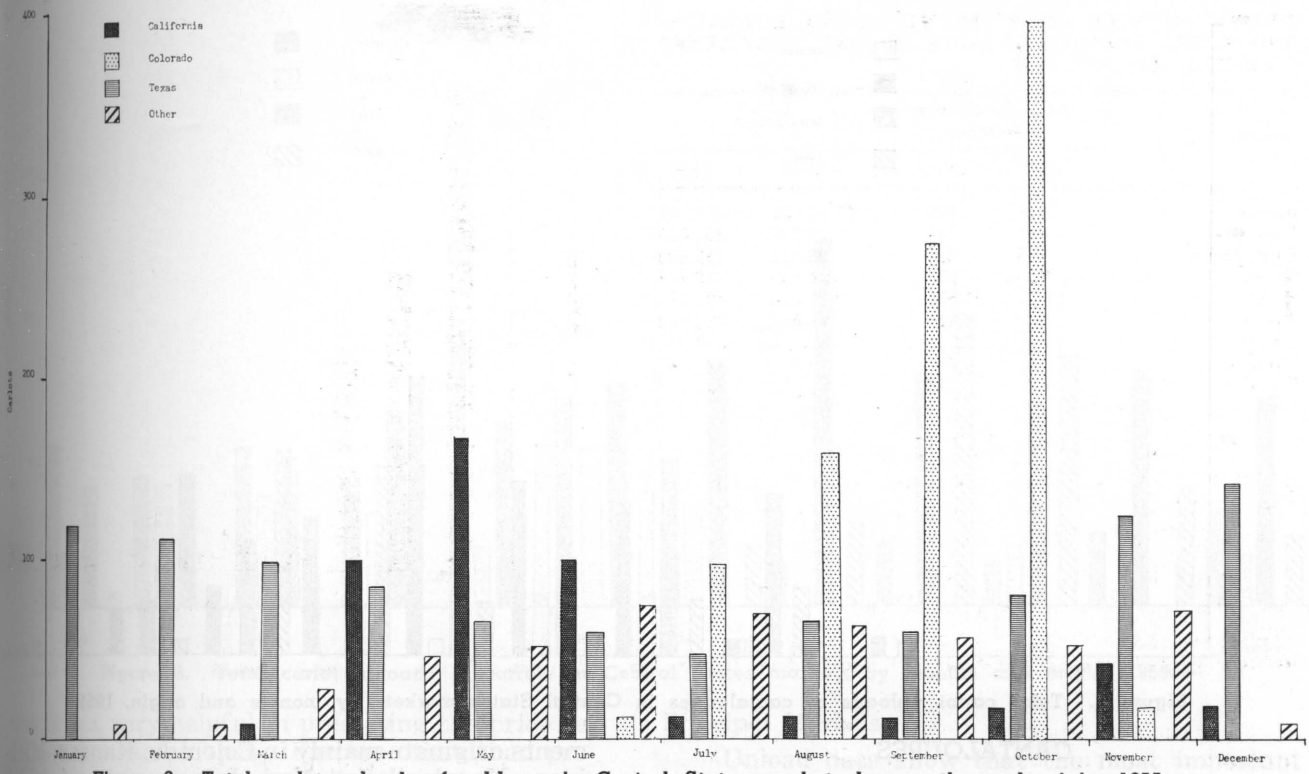


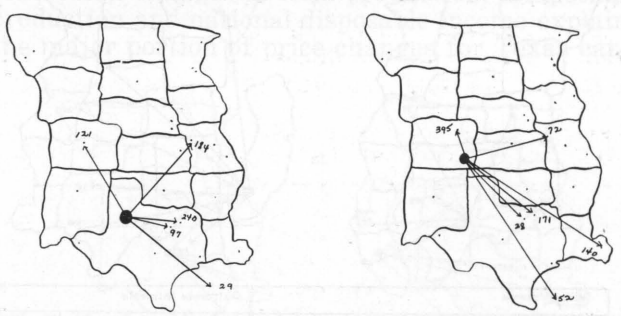

**Figure 2. Total carlot unloads of cabbage in Central States markets by months and origin, 1955.**

presentation of the results. In this study it seemed reasonable that production in Texas, production in competing areas and disposable national income would affect the prices received by farmers for vegetables. For the analysis of the effect these three items had on prices, a statistical technique of correlation analysis was used which relates price changes in past years (1940-55 in this study) to changes in Texas production, competing production and national disposable income and gives a correlation coefficent that tells how closely these changes are related. A perfect relation gives a correlation coefficient of 1.0; however, if the result is .6 or more the relationship is generally considered reliable. From this correlation coefficient a coefficient of determination is computed which gives the percent of price variation explained by changes in Texas production, competing areas production and national disposable income. The computation of the partial correlation coefficient indicates which of these three things has the greatest influence on prices. Thus, by knowing something about the reaction of price to changes in these factors a farmer can be in a better position to anticipate the probable price situation for a crop.

The correlation of Texas cabbage prices during 1940-55 to Texas production, competing production and disposable personal income yielded a correlation coefficient of 0.89, which shows a close relation between price changes and changes in these factors. Seventy-nine percent of the variation in cabbage prices is explained by changes in local production, competing production and disposable personal income.

Local production had the largest influence on price, disposable personal income was next and competing production was least influential.

From these computations we can estimate the effect on price of a certain increase in production. If Texas production of cabbage increased by 10,000 tons, the price received would tend to decrease approximately $2.85 per ton or, to take the State average of 4.6 tons yield per acre, this 10,000 tons would represent about 2,170 acres. If production of cabbage in competing areas increased a comparable 10,000 tons the price would tend to drop only 56 cents per ton. The disposable personal income has a positive effect on price in that a one billion dollar increase in national disposable personal income tends to raise prices for cabbage approximately $1.90 per ton.




| Texas Shipments | | | | | | | | | | | | | Colorado Shipments | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Jan | Feb | Mar | Apr | May | June | July | Sept | Oct | Nov | Dec | Total | June | July | Aug | Sept | Oct | Nov | Total |
| Dallas | 29 | 44 | 40 | 7 | 12 | 35 | 2 | -- | 3 | 37 | 31 | 240 | 1 | 36 | 41 | 53 | 38 | 2 | 171 |
| Denver | 29 | 27 | 30 | 21 | 4 | -- | -- | -- | -- | -- | 9 | 121 | 2 | 61 | 100 | 136 | 85 | 9 | 395 |
| Fort Worth | 16 | 19 | 14 | 5 | 4 | 10 | 1 | -- | -- | 13 | 15 | 97 | -- | 2 | 5 | 14 | 6 | 1 | 28 |
| Kansas City | 53 | 46 | 41 | 53 | 4 | -- | -- | -- | -- | 9 | 18 | 184 | -- | 1 | 14 | 29 | 21 | 7 | 72 |
| New Orleans | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | --- | -- | 2 | 19 | 32 | 86 | 1 | 140 |
| Other | 11 | 13 | 2 | 1 | -- | -- | -- | 1 | -- | 1 | -- | 29 | -- | 1 | 6 | 30 | 15 | -- | 52 |

**Figure 3. Monthly carlot unloads of Texas and Colorado cabbage in destination markets, 1955.**

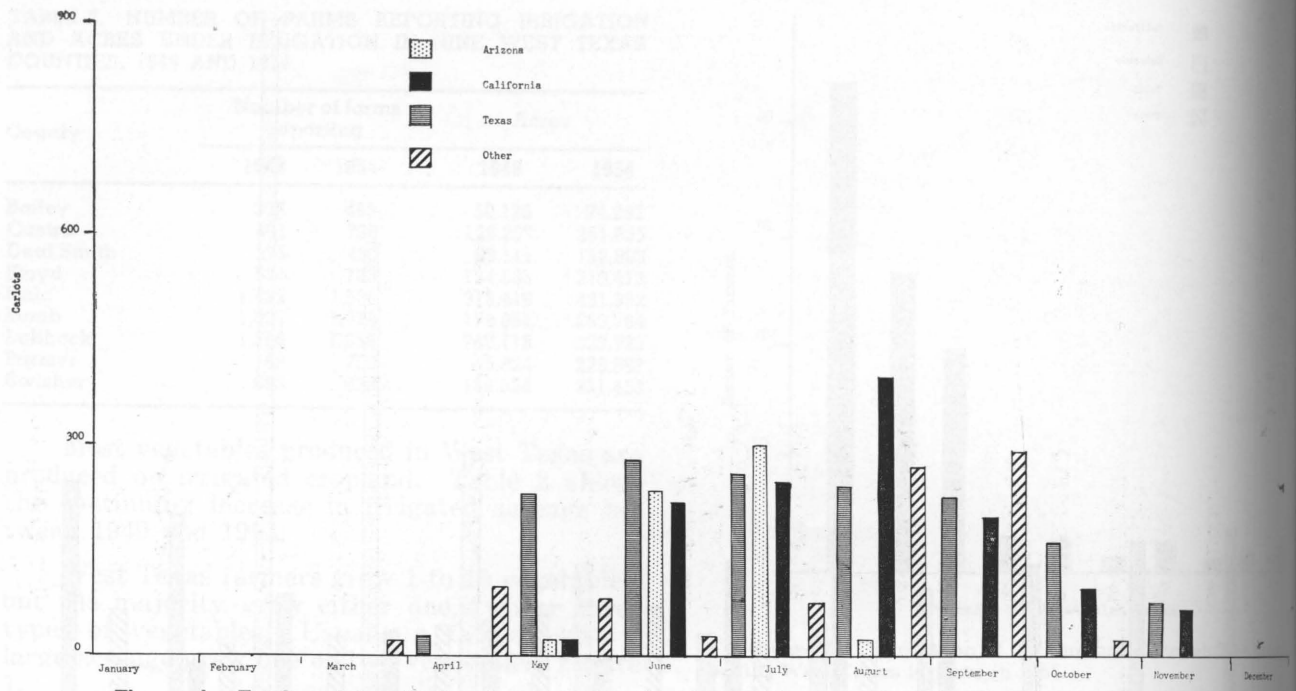


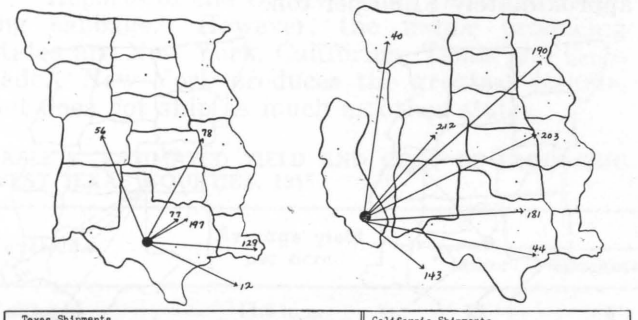

**Figure 4. Total carlot unloads of cantaloupes in Central States markets by months and origin, 1955.**

## CANTALOUPES

Cantaloupe unloads in Central States markets are limited primarily to the period of April to October. Although cantaloupes are not produced in all months, a melon-type fruit is available in the markets through the use of the Chilean, Peruvian and Spanish honey-dews. The lower valley area of Texas is the first major area to make shipments, which begin in late April. Texas is followed by Arizona and California, which start volume shipments in late May.

### Market Competition

California is the major area making shipments during the months that West Texas would be shipping, Figure 4. A considerable volume moves during August, September and October from "other" destinations. These "other" shipments originate mainly in Colorado, Kansas, Michigan, Maryland and New Jersey, none of which ships very large volumes.




| Texas Shipments | | | | | | | | | California Shipments | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | May | June | July | Aug. | Sept. | Oct. | Nov. | Total | May | June | July | Aug. | Sept. | Oct. | Nov. | Total |
| Butte | -- | -- | -- | -- | -- | -- | -- | --- | 9 | 8 | 17 | 5 | 1 | -- | -- | 40 |
| Dallas | 26 | 71 | 50 | 37 | 13 | -- | -- | 197 | 1 | 20 | 9 | 25 | 48 | 76 | 2 | 181 |
| Denver | 11 | 36 | 8 | 1 | -- | -- | -- | 56 | -- | 41 | 47 | 113 | 5 | 6 | -- | 212 |
| Fort Worth | 3 | -- | 36 | 22 | 11 | 4 | 1 | 77 | -- | -- | -- | -- | -- | -- | -- | --- |
| Houston | -- | -- | -- | -- | -- | -- | -- | --- | -- | -- | -- | 39 | 4 | 1 | -- | 44 |
| Kansas City | 20 | 51 | 7 | -- | -- | -- | -- | 78 | -- | 37 | 29 | 81 | 42 | 11 | 3 | 203 |
| Minn-St. Paul | -- | -- | -- | -- | -- | -- | -- | --- | -- | 10 | 19 | 101 | 47 | 13 | -- | 190 |
| New Orleans | 25 | 69 | 27 | 8 | -- | -- | -- | 129 | -- | -- | -- | -- | -- | -- | -- | --- |
| Other | 4 | 2 | 2 | 3 | 1 | -- | -- | 12 | -- | 21 | 39 | 54 | 28 | 1 | -- | 143 |

**Figure 5. Monthly carlot unloads of Texas and California cantaloupes in destination markets, 1955.**

### Principal Markets

The data on carlot unloads in Central States markets from Texas during 1955 show that most of the shipments were to Dallas, Denver, New Orleans, Kansas City and Fort Worth. This indicates the established trade channels from the lower valley for cantaloupes. Texas unloads are made primarily during May, June, July and August, Figure 5.

The carlot unloads from California in Central States markets are spread more evenly among the markets over the area than unloads from Texas, Figure 5. California touched the northern parts of the area with unloads in Butte, Montana and the Minneapolis-St. Paul, Minnesota area. These unloads from California have a rather heavy concentration in August, September and October, Figure 5. California ships a rather heavy volume of cantaloupes into the Dallas and Houston markets. The transportation advantage alone would be an important factor. The quality of cantaloupe offered in these markets by West Texas producers would largely determine their ability to compete with the California cantaloupes.

### Price Fluctuations

The computation of the correlation coefficient for cantaloupes yielded a coefficient of .52 and a coefficient of determination of .27. The changes in local production, competing production and national disposable income explained only 27 percent of the variation in prices received for Texas cantaloupes. Such a low percentage explana-

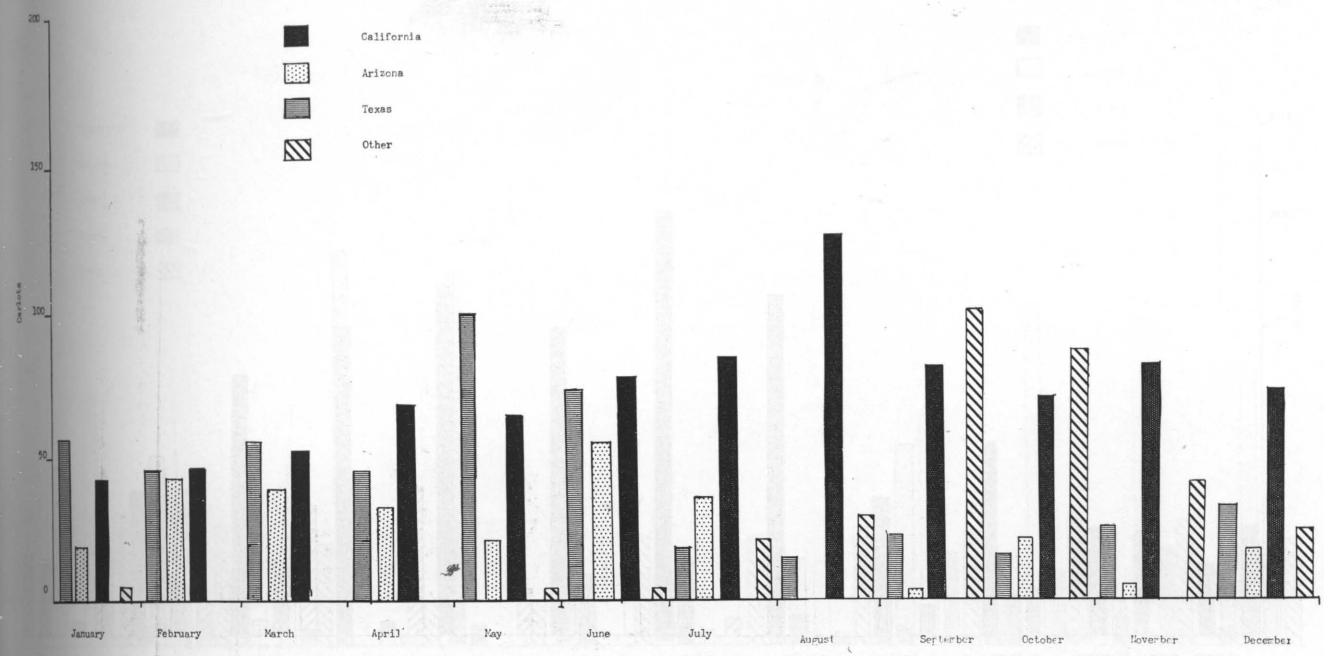



**Figure 6. Total carlot unloads of carrots in Central States markets by months and origin, 1955.**

tion is not very helpful in predicting the price reactions for cantaloupes. Factors other than production and income are important in causing price variations.

For the three factors used, local production had the most influence on prices received for Texas cantaloupes with competing production next and national disposable income least. For example, if Texas production increased 100,000 crates (an average yield of 43 crates would be approximately 1,900 acres) the price would tend to drop 33 cents per crate while a comparable increase in competing production would cause only about a 1 cent drop in price.

## CARROTS

California and Texas produce more than half of the carrots produced in the United States. Many other states produce small volumes of carrots. Figure 6 shows that California ships a rather consistent volume throughout the year with peak shipments to the Central States region during August. Texas has sporadic shipments during the spring, which reach a peak in May, then decline sharply to June.

### Market Competition

California has a significant volume of unloads in Central States markets during August to November. The unloads from "other" areas during the August to November period will offer competition to West Texas. Shipments from Michigan, Idaho, New Mexico, New York and Oregon furnish most of these "other" unloads. California was analyzed as the major competitor to West Texas for carrot markets on the basis of its being as important in volume as all the numerous "other" states.

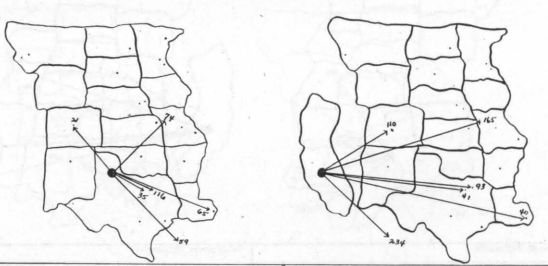
### Principal Markets

Unload data show that the most important receiving points for Texas grown carrots shipped to Central States markets are Dallas, Kansas City, New Orleans and Fort Worth.

California ships to the same major population centers; unloads from California are spread rather evenly over the entire 12 months, Figure 7.

### Price Fluctuations

By computing the relationship of changes in prices received for Texas carrots to changes in local (Texas) production, competing production and national disposable income, a correlation coefficient value of .61 was obtained. The coefficient of determination was only .37, or the changes in the three factors explain only 37 percent of the changes in the prices Texas carrot growers received for their produce. Some factors other than changes in local production, competing production and national disposable income explain the major portion of price changes for Texas car-




| Texas Shipments | | | | | | | | | | | | | | California Shipments | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Total | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Total |
| Dallas | 10 | 10 | 13 | 15 | 22 | 7 | 2 | 6 | 8 | 1 | 7 | 15 | 116 | 2 | 3 | 3 | 4 | 8 | 8 | 19 | 10 | 8 | 11 | 17 | 93 |
| Denver | 4 | 3 | 2 | 1 | 5 | 6 | -- | -- | -- | -- | -- | -- | 21 | 4 | 6 | 6 | 14 | 9 | 6 | 14 | 16 | 10 | 2 | 12 | 11 | 110 |
| Fort Worth | 11 | 6 | 8 | 5 | 4 | 1 | -- | -- | -- | -- | -- | -- | 35 | -- | 2 | 2 | -- | 1 | 1 | 4 | 5 | 8 | 5 | 6 | 7 | 41 |
| Kansas City | 18 | 13 | 10 | 13 | 4 | -- | -- | -- | -- | 1 | 4 | -- | 74 | 6 | 5 | 7 | 9 | 13 | 14 | 16 | 22 | 12 | 17 | 22 | 19 | 165 |
| New Orleans | 10 | 11 | 11 | 9 | 6 | 10 | 2 | -- | -- | -- | 1 | 5 | 65 | 1 | -- | 1 | 1 | 2 | 3 | 5 | 8 | 8 | 5 | 3 | 3 | 40 |
| Other | 8 | 5 | 9 | 4 | 21 | 16 | 5 | -- | -- | -- | -- | 2 | 69 | 12 | 14 | 15 | 18 | 16 | 26 | 30 | 37 | 16 | 16 | 21 | 13 | 234 |

**Figure 7. Monthly carlot unloads of Texas and California carrots in Central States destination markets, 1955.**

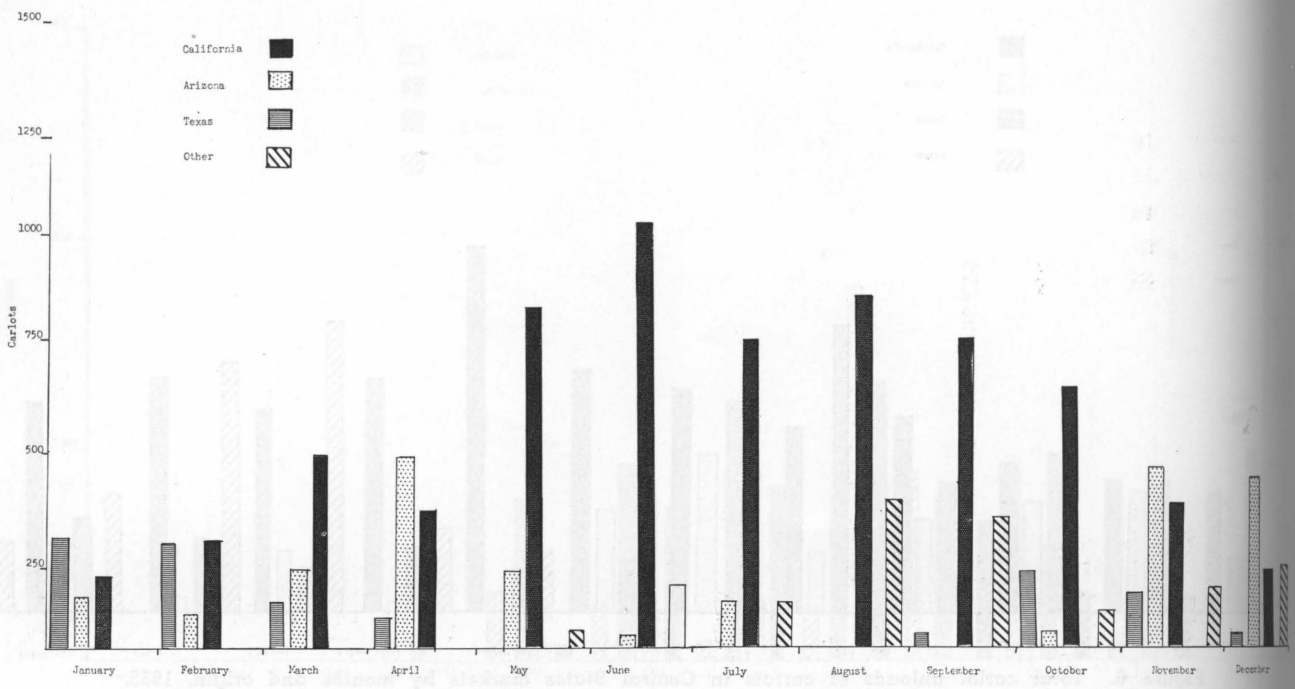


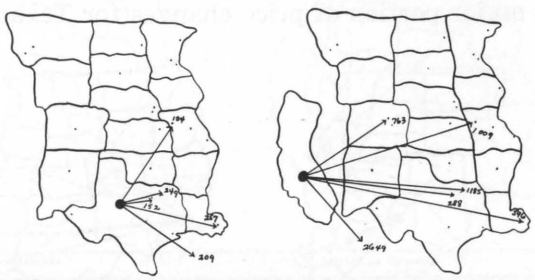

**Figure 8. Total carlot unloads of lettuce in Central States markets by months and origin, 1955.**

rots. It is somewhat difficult to isolate just what these other factors are that explain much of the carrot price variation.

National disposable income and local production had relatively the same influence on price changes for carrots. Competing production was slightly less influential. For example, an increase of 1,000,000 bags (50 pounds) or approximately 5,000 acres in Texas production would have a depressing effect on prices of 4.7 cents per bag. A corresponding volume increase in competing production would tend to lower prices 1.4 cents per bag. For national disposable income, an increase of 10 billion dollars would tend to raise prices approximately 7 cents per bag.

## LETTUCE

Lettuce is grown in many geographical localities within the United States. Three states—California, Arizona and Texas—are the most important producing states out of approximately 30 states which produce varying volumes of lettuce. Colorado, Florida, New Mexico and Oregon are the more important of the smaller volume states.




| Texas Shipments | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Jan | Feb | Mar | Apr | May | Sept | Oct | Nov | Dec | Total |
| Dallas | 73 | 43 | 25 | 8 | 8 | 10 | 36 | 14 | 32 | 249 |
| Denver | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Fort Worth | 28 | 24 | 26 | 5 | 4 | 5 | 33 | 10 | 17 | 152 |
| Kansas City | 35 | 22 | 4 | -- | 1 | 2 | 27 | 8 | 5 | 104 |
| Houston | 55 | 63 | 39 | 26 | 7 | -- | 14 | 5 | 58 | 267 |
| New Orleans | 74 | 57 | 30 | 37 | 11 | 1 | 1 | 11 | 36 | 257 |
| Other | 61 | 59 | 16 | 2 | 1 | 7 | 50 | 13 | 9 | 209 |

| California Shipments | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Total |
| 24 | 57 | 94 | 47 | 152 | 135 | 163 | 152 | 136 | 149 | 46 | 30 | 1185 |
| 46 | 54 | 73 | 45 | 121 | 82 | 101 | 36 | 25 | 21 | 37 | 63 | 763 |
| 6 | 15 | 23 | 4 | 45 | 19 | 56 | 44 | 46 | 18 | 12 | -- | 228 |
| 54 | 73 | 83 | 30 | 114 | 141 | 109 | 103 | 123 | 111 | 46 | 22 | 1009 |
| -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1 | 7 | 40 | 4 | 61 | 90 | 80 | 85 | 84 | 86 | 42 | 15 | 596 |
| 91 | 144 | 166 | 75 | 286 | 279 | 419 | 359 | 363 | 314 | 120 | 33 | 2649 |

**Figure 9. Monthly carlot unloads of Texas and California lettuce at various destinations, 1955.**

### Market Competition

Arizona makes its major shipments in March, April, May, November and December, Figure 8. Their shipments would not be moving into the markets at the same time that West Texas lettuce would be marketed. Most of the Texas production originates in the valley area. The Texas shipments in September, October and November probably reflect the recent developments in the West Texas area. California is the big shipper during the season that West Texas production of lettuce would move to market.

### Principal Markets

Texas shipments of lettuce tend toward the eastern part of the Central States markets, with Houston, New Orleans, Dallas, Fort Worth and Kansas City receiving the largest portion of the unloads. Figure 9, with the table inset, shows the distribution of unloads in Central States cities.

Although California ships to practically the same markets as Texas, it ships throughout the year. The local demand that exists for lettuce is shown by the fact that almost 1,500 carlot unloads were shipped into two Texas cities—Dallas and Fort Worth.

### Price Fluctuations

The lettuce production season in Texas is divided into the early fall and winter. The price data for early fall were available for 1948-55 and for the winter in 1946-55. This period is not long

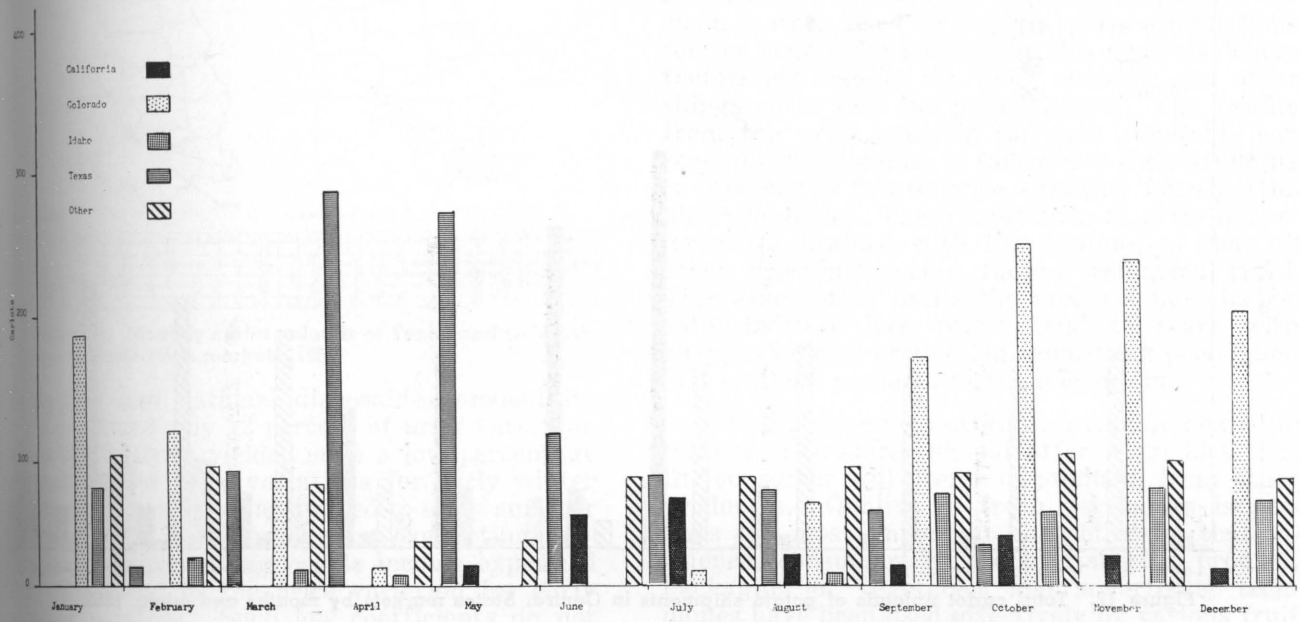



**Figure 10. Total carlot unloads of onion shipments in Central States markets by months and origin, 1955.**

enough for an extremely reliable comparison of changes in prices received with changes in local production, competing production and national disposable income. However, some useful indications were revealed through the analysis.

For early fall lettuce the analysis yielded a correlation coefficient of .75 when Texas prices for lettuce were related to local production, competing production and national disposable income. This gave a coefficient of determination of .57, or explains 57 percent of the price variations of early fall lettuce.

The disposable national income had the greatest effect on early fall lettuce prices, with competing production next and local production the least.

The analysis of prices for winter lettuce yielded a correlation coefficient of .66 and coefficient of determination of .44. Local production, competing production and national disposable income explain 44 percent of the price variation for Texas lettuce prices.

The analysis indicated that competing production had the greatest effect on winter lettuce prices with local production next and national disposable income the least. Data on late fall lettuce showed the reverse effect; no plausible explanation can be offered as to why income influences early fall lettuce prices more than winter lettuce prices.

## ONIONS

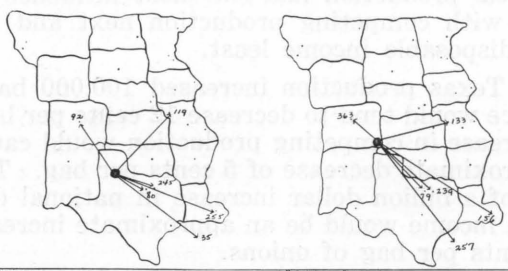
The Central States markets are supplied from several onion growing localities. Figure 10 indicates that Texas and Colorado are the more important growing states volumewise. Most Texas onions are grown in the southern part of the State. The West Texas area has moved successfully into the onion market in recent years.

### Market Competition

Colorado is shipping onions in volume during the months that West Texas production is ready for market. Idaho and California are shipping in small volume to Central States markets at that time, but their volume is somewhat insignificant in comparison with Colorado volume.

### Principal Markets

Texas onions have moved primarily to the southern population centers in the Central States region. Figure 11 shows that Dallas, New Orleans, Kansas City, Denver and Fort Worth receive the major volume of onions shipped to the Central States markets. Most of the shipments from Texas were received from March to September.



| Texas Shipments | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Total |
| Dallas | -- | 21 | 54 | 41 | 30 | 33 | 44 | 17 | 5 | 245 |
| Denver | -- | 9 | 34 | 30 | 12 | 4 | 1 | 2 | -- | 92 |
| Fort Worth | -- | 9 | 30 | 10 | 15 | 5 | 8 | -- | 3 | 80 |
| Kansas City | 1 | 1 | 20 | 42 | 23 | 7 | 8 | 15 | 2 | 119 |
| New Orleans | -- | 24 | 76 | 67 | 44 | 25 | 16 | 3 | -- | 255 |
| Other | -- | -- | 13 | 19 | 3 | -- | -- | -- | -- | 35 |

| Colorado Shipments | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Jan. | Feb. | Mar. | Apr. | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
| 32 | 14 | 9 | -- | -- | 4 | 26 | 50 | 53 | 51 | 239 |
| 22 | 17 | 13 | 3 | 9 | 33 | 88 | 94 | 49 | 35 | 363 |
| 21 | 6 | 8 | -- | -- | -- | 6 | 10 | 12 | 17 | 79 |
| 22 | 19 | 7 | -- | 3 | 11 | 17 | 13 | 17 | 24 | 133 |
| 19 | 13 | 6 | -- | -- | 2 | 19 | 41 | 32 | 24 | 156 |
| 71 | 52 | 36 | 1 | 1 | -- | 5 | 5 | 39 | 47 | 257 |

**Figure 11. Monthly carlot unloads of Texas and Colorado onions in destination markets, 1955.**

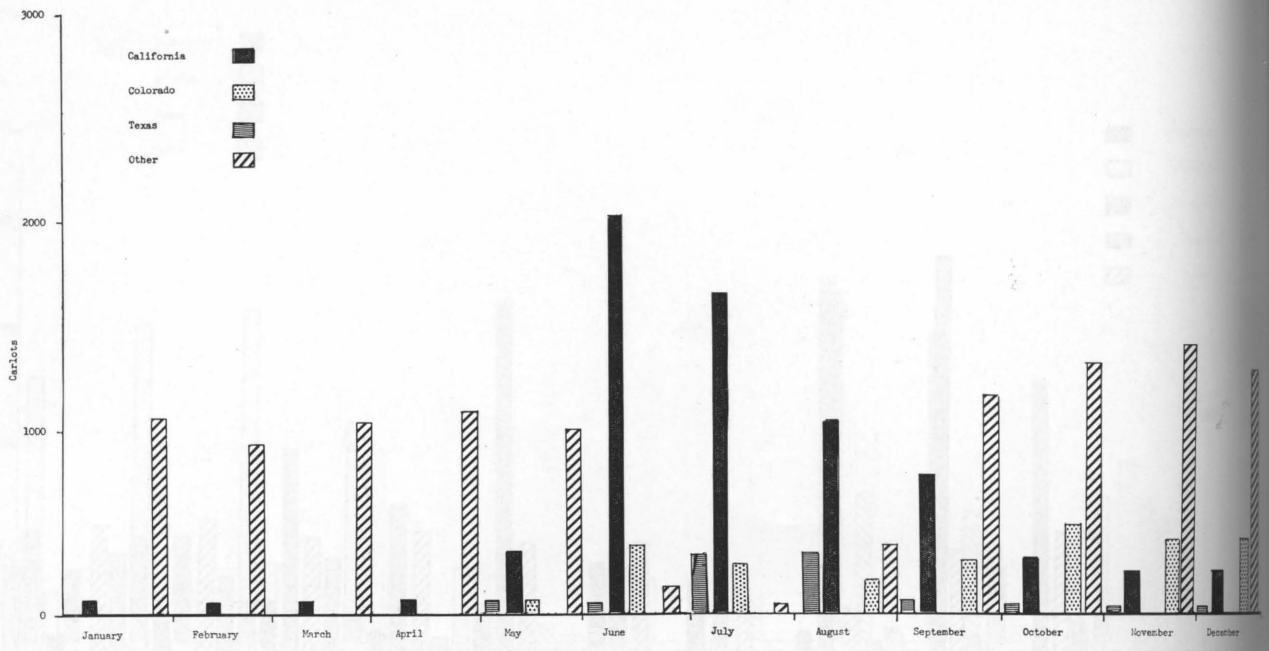



**Figure 12. Total carlot unloads of potato shipments in Central States markets by months and origin, 1955.**

Colorado and Texas unloads are made in the same cities, Figure 11. Again two Texas population centers—Fort Worth and Dallas—are on the receiving end of a large volume of a crop that is grown in the State. The table inset shows Colorado shipments during the early and late months of the year; few shipments were made between April and August. Fort Worth and Dallas had approximately 225 carlot unloads from Colorado from August to December 1955.

### Price Fluctuations

The analysis of variations in prices received for Texas onions was for late spring onions which were grown mainly in South Texas.

In relating change in prices received to changes in local production, competing production and national disposable income, a correlation coefficient of .89 and a coefficient of determination of .80 were obtained. These three items explained 80 percent of the price variation for late spring onions in Texas, a good percent explanation.

Local production had the most influence on prices, with competing production next and national disposable income least.

If Texas production increased 100,000 bags, the price would tend to decrease 12 cents per bag. An increase in competing production would cause an approximate decrease of 5 cents per bag. The effect of a billion dollar increase in national disposable income would be an approximate increase of 3 cents per bag of onions.

## POTATOES

Potatoes are grown throughout the United States. Many states grow potatoes in volumes large enough to permit extensive shipments to distant markets. The three largest producing states in terms of shipments are Idaho, California and Maine, in order of volume. Following these three large producers are Washington, North Dakota, Minnesota, Florida, Oregon and Colorado. All ship approximately the same volume.

### Market Competition

The carlot unloads in the Central States markets originate in many states. California is the major area during June, July and August. Colorado is the largest state competing with Texas during the fall. However, many states enter into the market during the fall with small numbers of unloads. The large volume of unloads under the "other" category in Figure 12 is made up of shipments from Alabama, Arkansas, Idaho, Indiana, Kansas, Louisiana, Minnesota, Missouri, Nebraska, North Dakota, South Dakota and Wisconsin. Therefore, West Texas potato growers are one among many in the potato market.

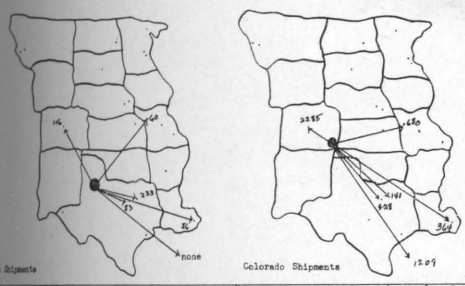
### Principal Markets

The Texas potato shipments to the Central States area were made primarily to Dallas, Fort Worth, Denver, New Orleans and Kansas City. Most of these shipments were made in July and August, Figure 13.

Colorado and Texas shipped to the same Central States markets. Colorado shipments were spread fairly evenly throughout the entire year and thus compete with West Texas during the harvest season.

### Price Fluctuations

Relating prices received for early winter potatoes (early winter prices were used since these are closer to the time that West Texas is in the market) to changes in local production, competing




Texas Shipments Colorado Shipments

| Location | Feb | Mar | June | July | Aug | Sept | Oct | Nov | Dec | Total | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dallas | -- | 3 | 9 | 66 | 132 | 18 | 1 | 4 | 1 | 233 | 8 | 1 | 3 | 1 | 11 | 51 | 19 | 12 | 8 | 14 | 4 | 9 | 140 |
| Denver | 1 | -- | -- | 81 | 32 | -- | -- | -- | -- | 116 | 216 | 182 | 254 | 224 | 174 | 54 | 20 | 183 | 271 | 269 | 214 | 274 | 2785 |
| Fort Worth | 1 | -- | 7 | 22 | 32 | 11 | 2 | 6 | 2 | 83 | 33 | 43 | 61 | 44 | 30 | 6 | 1 | 5 | 44 | 39 | 64 | 58 | 428 |
| Kansas City | -- | 2 | 1 | 37 | 20 | -- | -- | -- | -- | 60 | 65 | 36 | 38 | 54 | 81 | 15 | -- | 70 | 126 | 124 | 41 | 30 | 680 |
| New Orleans | -- | -- | -- | 24 | 53 | 9 | -- | -- | -- | 86 | 7 | 44 | 45 | 46 | 14 | 1 | 1 | 12 | 25 | 49 | 32 | 43 | 324 |
| Other | -- | -- | -- | -- | -- | -- | -- | -- | -- | --- | 145 | 133 | 132 | 134 | 124 | 28 | 1 | 33 | 80 | 127 | 141 | 129 | 1209 |

**Figure 13. Monthly carlot unloads of Texas and Colorado potatoes in destination markets, 1955.**

production and national disposable personal income explained only 12 percent of price variation. Since the analysis yielded such a low percentage explanation for price variations for early winter potatoes the analysis was applied to early summer potato prices. Local production, competing production and national disposable income explained only 23 percent of the price variation for early summer potatoes. Such low coefficients do not enable us to predict reliably how prices will react when these three factors change. Potato prices are difficult to predict from year to year.

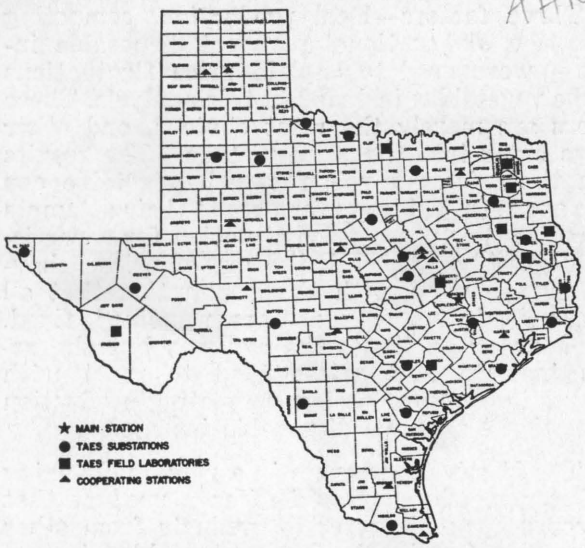
## CONCLUSIONS

Most of the vegetables that may be grown in the West Texas area are high-cost crops. The grower must tie up a rather large amount of capital in the crop by the time it is ready for market. Since prices for vegetables fluctuate rather drastically, the grower may experience large losses or large gains. It has long been a "rule-of-thumb" in the vegetable business that a grower must be able to absorb at least 3 successive years of financial losses.

Three factors—local production, competing production and national personal disposable income — were used to explain price fluctuations for the vegetables included in this analysis. These factors are merely the most obvious, and other things enter into the price picture. The results from the price analysis for each vegetable can serve as useful guides to farmers in their attempts to predict the future price situation for a particular vegetable. These indicators of price behavior were obtained with the assumption that all other price-influencing factors remained fixed. This assumption limits the analysis but the results indicate how prices tend to react with changes in local production, competing production and national personal disposable income.

To effectively compete in a rapidly changing market, a producer should offer a product that the consumer will prefer to products from other producers. Quality in fresh vegetables is perhaps the most important characteristic that influences consumers to prefer a specific product. Packaging of vegetables and advertising techniques have been used effectively by various fruit and vegetable-producing regions to gain a place in the market for their commodity.

The fact that California has moved into the Central States markets during past years demonstrates that West Texas producers cannot depend on a transportation advantage alone as a competitive weapon. The quality of vegetables offered for sale should be kept high and every attempt made to hold cost down. However, cost should not be held down at the expense of yield. Many vegetables in the California and Arizona areas have an average per-acre yield two to four times as great as Texas yields. By increasing yields the fixed costs of producing an acre can be spread over more units of produce.




**Location of field research units of the Texas Agricultural Experiment Station and cooperating agencies**

# State-wide Research

★

**The Texas Agricultural Experiment Station is the public agricultural research agency of the State of Texas, and is one of ten parts of the Texas A&M College System**

## ORGANIZATION

IN THE MAIN STATION, with headquarters at College Station, are 16 subject-matter departments, 2 service departments, 3 regulatory services and the administrative staff. Located out in the major agricultural areas of Texas are 21 substations and 9 field laboratories. In addition, there are 14 cooperating stations owned by other agencies. Cooperating agencies include the Texas Forest Service, Game and Fish Commission of Texas, Texas Prison System, U. S. Department of Agriculture, University of Texas, Texas Technological College, Texas College of Arts and Industries and the King Ranch. Some experiments are conducted on farms and ranches and in rural homes.

## OPERATION

THE TEXAS STATION is conducting about 400 active research projects, grouped in 25 programs, which include all phases of agriculture in Texas. Among these are:

- Conservation and improvement of soil
- Conservation and use of water
- Grasses and legumes
- Grain crops
- Cotton and other fiber crops
- Vegetable crops
- Citrus and other subtropical fruits
- Fruits and nuts
- Oil seed crops
- Ornamental plants
- Brush and weeds
- Insects
- Beef cattle
- Dairy cattle
- Sheep and goats
- Swine
- Chickens and turkeys
- Animal diseases and parasites
- Fish and game
- Farm and ranch engineering
- Farm and ranch business
- Marketing agricultural products
- Rural home economics
- Rural agricultural economics
- Plant diseases

Two additional programs are maintenance and upkeep, and central services.

*Research results are carried to Texas farmers, ranchmen and homemakers by county agents and specialists of the Texas Agricultural Extension Service*

**AGRICULTURAL RESEARCH seeks the WHATS, the WHYS, the WHENS, the WHERES and the HOWS of hundreds of problems which confront operators of farms and ranches, and the many industries depending on or serving agriculture. Workers of the Main Station and the field units of the Texas Agricultural Experiment Station seek diligently to find solutions to these problems.**

*Today's Research Is Tomorrow's Progress*