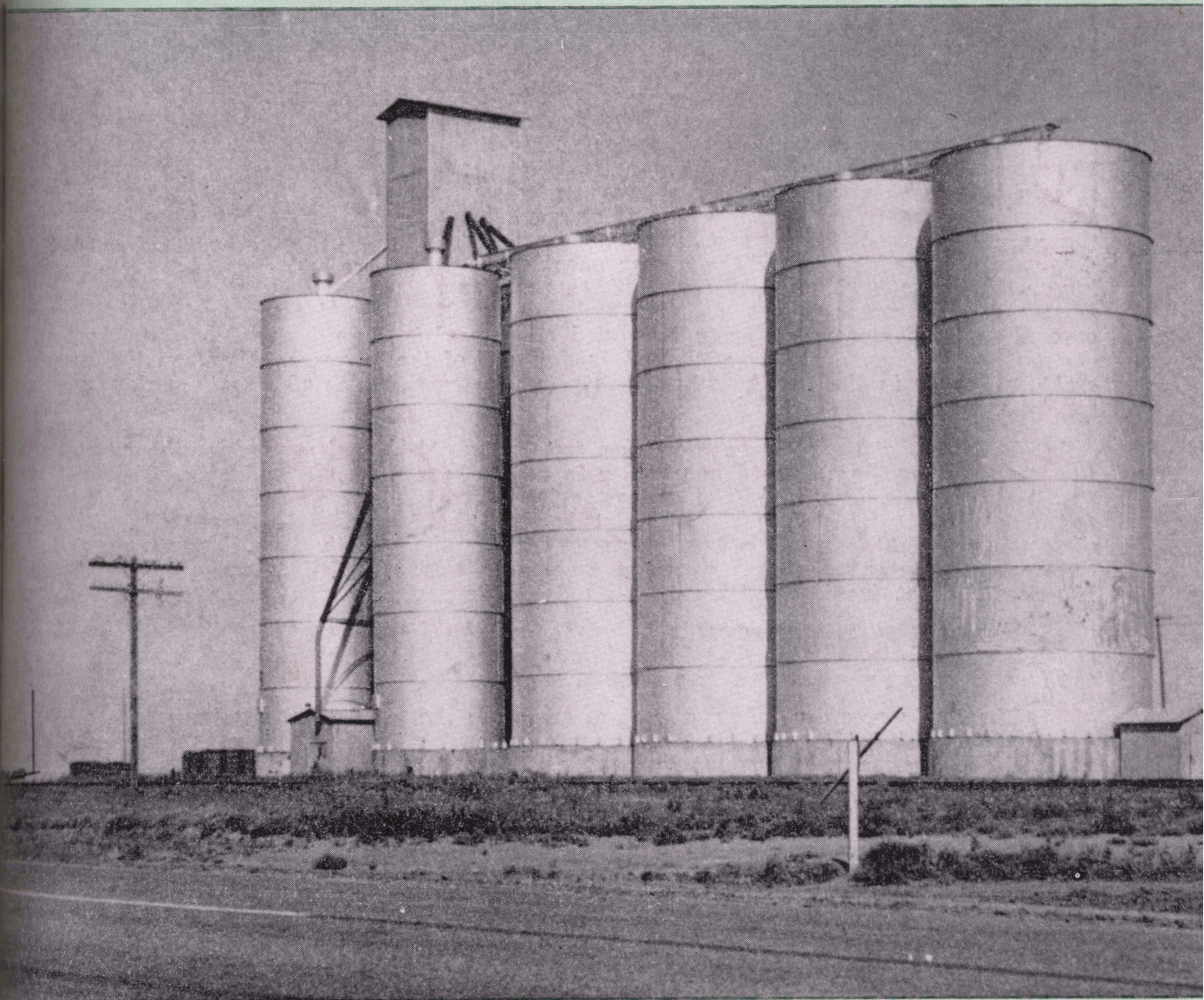# Seasonal Price Change and Costs of Storing Grain Sorghum in the Coastal Bend

TEXAS AGRICULTURAL EXPERIMENT STATION

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SUMMARY

This is a study of economic factors important to farmers in the Coastal Bend when deciding whether to sell grain sorghum at harvest or to store it in commercial elevators for later sale. During the harvest months of June and July, the grain sorghum price in the Coastal Bend usually is similar to the average Texas price, with the June price slightly above and the July price slightly below the State price. After July the Coastal Bend prices move away from, and above, the average Texas price.

If price later in the season moves above the harvest price by an amount that more than covers the farmer's storage costs, he stands to profit by storing his grain. There are usually greater margins between June and July harvest prices and prices later in the season if the available grain sorghum price data in the Coastal Bend area rather than the average Texas price are used. Even so, seasonal price behavior during the 10 seasons, 1946-47 through 1955-56, was such that the margin between harvest and later prices usually was insufficient to cover the farmer's cost of storage. At times price decreased after harvest instead of increasing. This would add to his losses if the farmer were depending on the market in his operations. With charges for storage that prevailed in the Coastal Bend during 1956, price increases would have more than covered costs of storage on grain harvested and stored in June during 2 of the 10 years studied, and on grain harvested and stored in July during 5 of the 10 years. However, there was no general consistency in the months when peak prices occurred, which adds to the risk of storing grain for future sale.

With the price-support program in effect it has not been necessary for the farmer to rely on the market altogether in deciding whether to sell at harvest or store. If the effective Commodity Credit Corporation loan rate (the support price minus the storage costs until the March 31 forfeit date) was greater than the price at harvest, the farmer could benefit by putting grain in storage under CCC loan. If prices later moved above the effective rate by an amount that more than covered the costs of redeeming the grain he could pay off the loan and sell on the market. If prices did not increase sufficiently to redeem the grain, he could forfeit it to the government.

The price-support program in effect during the 10-year period probably affected the seasonal margins between prices at harvest and later in the marketing season, making them less than would have prevailed in a free market.

The study provides information for computing the costs of redeeming grain sorghum from CCC loan in the area in order for the farmer to determine whether the market price in any month is such that he can reap a profit by paying off his loan and selling the grain on the market. It also provides an outline of the different charges the farmer incurs when storing his grain under each of three alternative storage situations available to him.

Figure 1. Coastal Bend area and the Eighth Crop Reporting District.

ACKNOWLEDGMENTS

Seasonal Price Change and Costs of Storing Grain Sorghum in the Coastal Bend

CLARENCE A. MOORE and HOWARD S. WHITNEY*

GRAIN SORGHUM HAS BEEN INCREASING IN IM-portance as a source of income to Texas farmers. Acres harvested in Texas have doubled in about 15 years from slightly over 2 million in the late Thirties to over 4 million in the Fifties. Actually, acreage harvested was 5,782,000 in 1954, and 6,297,000 (an all-time high) in 1955. It fell back to 4,777,000 in 1956.

The increase in acreage devoted to the crop has been greater in some areas of the State than in others. Farmers in the Coastal Bend were just turning to the production of grain sorghum in the late Thirties. The agricultural census shows 64,000 acres harvested in 1939 in a 13-county area, Table 1. The 1954 acreage was almost eight times as large as the 1939 acreage, and was 54 percent greater than the 1949 census figure.

Farm adjustments of this type and extent in an area create new problems, especially where one product, such as grain sorghum, is involved. This study analyzes the problem of whether to sell grain sorghum at harvest or store for later sale.

If the farmer sells his grain at harvest, he has no further costs since ownership of the grain passes to the buyer at that time. If he retains ownership and stores the grain, he incurs storage and handling expenses until it is sold. In order for him to profit from storing, the price later in the season must be sufficiently greater than the harvest price to more than pay all costs of hold-ing the grain.

This study provides information about (1) the seasonal change in prices of grain sorghum in the Coastal Bend area, (2) the costs of stor-ing and holding the grain in commercial ele-vators and warehouses, (3) the relationship be-tween the seasonal change in price and the costs of holding the grain in storage and (4) other considerations that may affect profits from storing grain sorghum.

SEASONAL PRICES

The production of grain sorghum, as well as its consumption as feed for livestock, is wide-spread. The consumption and production areas are not always the same, since livestock is fed in many areas where grain sorghum is not pro-duced or is produced in amounts insufficient for total feed grain needs. Therefore, seasonal price behavior in the Coastal Bend is affected by grain sorghum production conditions and feed consumption needs in areas far removed from that area.

Grain sorghum prices also are affected by the production and prices of other feed grains, especially corn. The possible effect of the government's price-support program on the sea-sonal behavior of grain sorghum and other feed grain prices cannot be ignored.

Information on grain sorghum prices specific to the Coastal Bend area is limited; no official published price series is available. Most of the analysis in this study relies on unpublished re-ported midmonth farm prices for grain sorghum in the Eighth Crop Reporting District, supplied by the Division of Agricultural Estimates, USDA. The location of the Eighth District compared with the Coastal Bend area is shown in Figure 1.

Since harvest of grain sorghum usually starts in June and reaches its peak in July in the

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*Assistant professors, Department of Agricultural Econo-mics and Sociology, Texas Agricultural Experiment Station.

Counties	Years			
	1939	1944	1949	1954
	— —	— — Acres	— —	— —
Aransas	83	1,240	735	1,156
Bee	2,436	7,369	14,532	21,484
Calhoun	586	2,302	2,858	21,218
DeWitt	6,000	3,386	4,740	5,230
Goliad	1,608	1,382	2,992	6,285
Jim Wells	2,357	14,355	33,574	39,810
Karnes	1,887	10,660	9,905	15,670
Kleberg	2,852	7,181	8,224	15,363
Live Oak	1,668	7,295	24,161	22,183
Nueces	24,558	95,410	132,506	185,054
Refugio	1,592	8,379	11,726	26,077
San Patricio	14,660	65,763	68,048	119,985
Victoria	3,997	2,957	7,261	14,677
Total	64,284	227,679	321,262	494,192
Increase from previous census year (percent)		254	41	54

Coastal Bend, the marketing season in this study
begins in June and ends the following May.

Eighth District and Texas

Figure 2 shows the normal relationship be-
tween the behavior of seasonal prices in the
Eighth District and Texas as a whole for mid-
month farm prices over the 10 seasons, 1946-47
through 1955-56.

The June harvest of grain sorghum in the
Coastal Bend area draws a favorable seasonal
price since it is the first of the season's "new-
crop" grain sorghum on the market in Texas.
The June price in that area is usually above the
Texas price.

The average July price in the Coastal Bend
is below the average Texas price because of
heavy harvest in the area at that time. As grain
sorghum harvest moves north and west from the
Coastal Bend, the price in the Eighth District
tends to pull away from, and above, the average
Texas farm price. Two reasons for this relation-
ship are: the pressure of heavy harvest supplies
on price in areas farther north and west tends
to depress the average Texas price as compared
with the Coastal Bend price; and the coastal
shipping points are nearer the Coastal Bend farm
grain markets, so less transportation costs must
be deducted from the shipping point prices than
in Central, North and Northwest Texas.

The tendency for the average Coastal Bend
price to pull away from, and above, the average
Texas price for grain sorghum as the harvest
season advances north and west of the Coastal
Bend area was true on both the early and the late
parts of the 10-year period as shown in parts
(A) and (B) of Figure 3.

There were greater margins between the aver-
age June and July harvest month prices and the
peak prices later in the season in the Eighth
District than in Texas as a whole.

Deviation from Average

Individual monthly prices, from which the
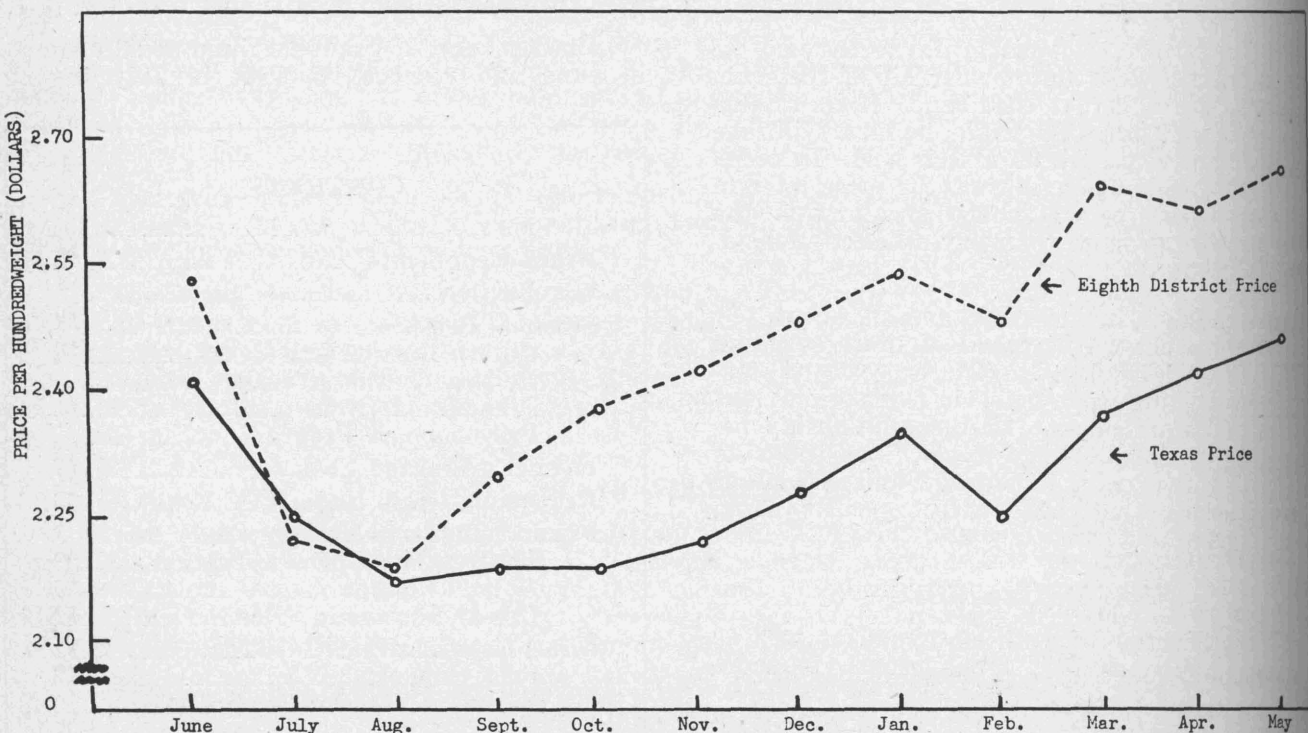averages were computed, varied widely, Table 2.

Figure 2. Seasonal price change, Texas and Eighth District, 10-year average. Average of midmonth farm prices 1946-47
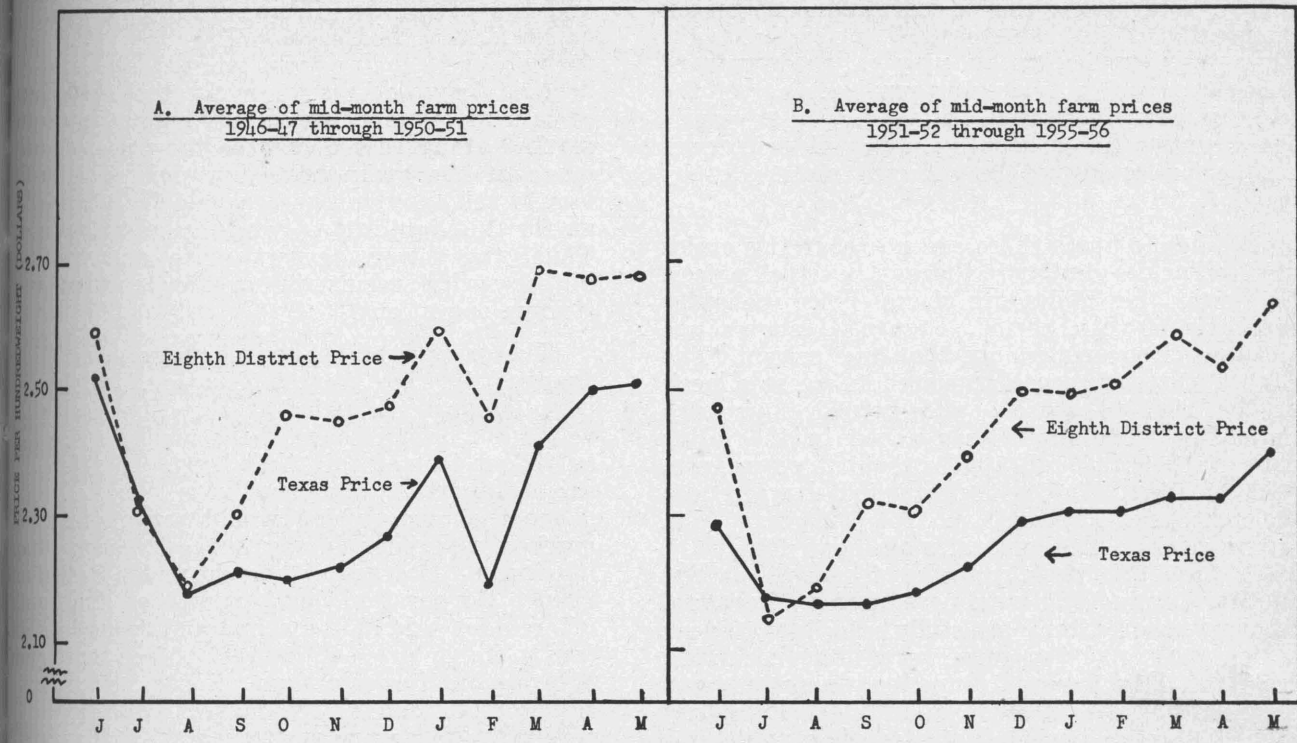through 1955-56.

Figure 3. Seasonal price change, Texas and Eighth District, 5-year periods.

For example, while the average July price in the 10-year period was $2.22 per 100 pounds, the lowest July price was $1.71 and the highest was $3.17. The July price varied from 95 cents above the average to 51 cents below it, an absolute range of $1.46.

In general, prices during the last 5 years of the 10-year period varied less than in the first 5 years since the price-support program played a greater role in the latter period. The only exceptions were the August, September and October prices.

These data indicate that what is generally true regarding the direction and extent for the seasonal behavior of prices based on an average covering several years would not necessarily occur in any one year. There is risk and uncertainty in predicting seasonal price margins for planning purposes. The risk is greater if the margins between the harvest and later prices vary widely in amounts from year to year or if the peak prices from year to year are not consistent during the time they occur—that is, if 1 or 2 months cannot be designated as the time in which the seasonal prices usually reach a peak.

Trends and Cycles

Because the direction and extent of the seasonal behavior of price are important in a study such as this, it is necessary to consider the extent that long-run trends of many years or

TABLE 2. AVERAGE MONTHLY GRAIN SORGHUM PRICES AND THE RANGE BETWEEN HIGH AND LOW MONTHLY PRICES BY PERIODS, EIGHTH DISTRICT, 1946-47 THROUGH 1955-56

Item	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
	— — — — — — Dollars per 100 pounds — — — — — —											
10-year period												
Average price	2.53	2.22	2.19	2.30	2.38	2.42	2.48	2.54	2.48	2.64	2.61	2.66
Range: high	3.41	3.17	2.82	3.12	3.21	3.36	3.68	3.79	3.09	3.60	3.68	3.58
low	1.99	1.71	1.52	1.66	1.47	1.72	1.86	1.93	2.04	2.00	2.05	2.09
Absolute range	1.42	1.46	1.30	1.46	1.74	1.64	1.82	1.86	1.05	1.60	1.63	1.49
First 5-years												
Average price	2.59	2.31	2.19	2.30	2.46	2.45	2.47	2.59	2.45	2.69	2.68	2.69
Range: high	3.41	3.17	2.69	3.12	3.21	3.36	3.68	3.79	3.09	3.60	3.68	3.58
low	1.99	1.75	1.77	1.77	1.84	1.81	1.86	1.93	2.06	2.20	2.13	2.09
Absolute range	1.42	1.42	.92	1.35	1.37	1.55	1.82	1.86	1.03	1.40	1.55	1.49
Second 5-years												
Average price	2.47	2.13	2.18	2.31	2.30	2.39	2.49	2.49	2.51	2.58	2.53	2.63
Range: high	2.93	2.61	2.82	3.09	3.00	2.96	2.98	2.98	2.94	2.90	2.92	2.92
low	2.20	1.71	1.52	1.66	1.47	1.72	1.86	1.96	2.04	2.00	2.05	2.23
Absolute range	.73	.90	1.30	1.43	1.53	1.24	1.12	1.02	.90	.90	.87	.69

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shorter recurring cycles of more than one season in length affect the seasonal price behavior. There was no discernible upward or downward long-run trend in grain sorghum prices over the 10-year period studied, indicating the results drawn from the seasonal behavior of price over the period could not be affected materially by trend.

Studies indicate there are no recurring cycles in grain prices similar to those in livestock prices. However, the midmonth farm price behavior over the 10-year period, Figure 4, shows ups and downs covering more than one season. The Eighth District prices appeared to be at a peak in the 1947-48 season, and turned downward thereafter. The low was reached in the latter part of 1949 through 1950 (about 2 years from peak to low). Prices then turned upward and the next peak appeared in 1952 (2 years from low to peak). The general movement downward after the 1952 peak, appears to have reached another low in 1955 with possibilities of gradual recovery thereafter. A study of this 10-year period may give the impression that recurring cycles of 4 or 5 years' duration occur in grain sorghum prices. However, a study of such prices over a 35-year period indicates that while ups and downs as shown in Figure 4 occur, they are not of a consistent cycle nature.

Actually, the data shown in Figure 4 may be interpreted as being a result of inflationary pressure on prices immediately following the end of World War II, unfavorable supply and demand relationships depressing grain sorghum prices in the late Forties, with another upward pressure on prices beginning with the Korean conflict. The cause of these ups and downs of more than 1 year's duration is attributable to conditions in our general economy rather than to the nature of the market for grain sorghum.

Price-support Program

Over a period of years in a free market operation, the difference between the price at harvest and the price later in the marketing season is expected to cover the cost of storage. Since many farmers sell their grain at harvest, some by necessity and others to avoid the risk of uncertain prices later, the heavy supply put on the market at harvest depresses the price. Because much of the grain is sold at harvest, there is less to sell later in the season. The price is bid up for this lighter supply as the season advances. Thus, the lower harvest price and the later higher price result in greater returns from storage operations.

The present price-support program materially changes the free market situation. Its objective is to support the price at a parity level which would not be necessary if the market price were sufficient to maintain that level. Therefore, the price-support rate generally is expected to be above the price which would prevail in a free market, especially during harvest season. Grain moving into storage at harvest under Commodity Credit Corporation loan, decreases the supply offered for sale at that time and tends to maintain a higher price at harvest. Since more grain is available for sale from storage later in the season than under free market conditions, this results in lower prices after harvest than would prevail otherwise. Higher prices at harvest and lower prices later mean a smaller seasonal margin in price under the price-support program than in a free market.

Table 3 compares the Coastal Bend loan-support price at harvest with the Eighth District price of grain sorghum from 1948 through 1955. The market price in June 1948 was considerably above the loan-support level but had decreased $1.14 by the middle of July—7 cents below the lowest county loan-support price in the Coastal Bend. The loan-support price announcement for that year may have caused buyers to bid down the price to a greater extent than normal as harvest got into full swing.

The effective price support (the price the farmer actually obtains if he forfeits his grain)
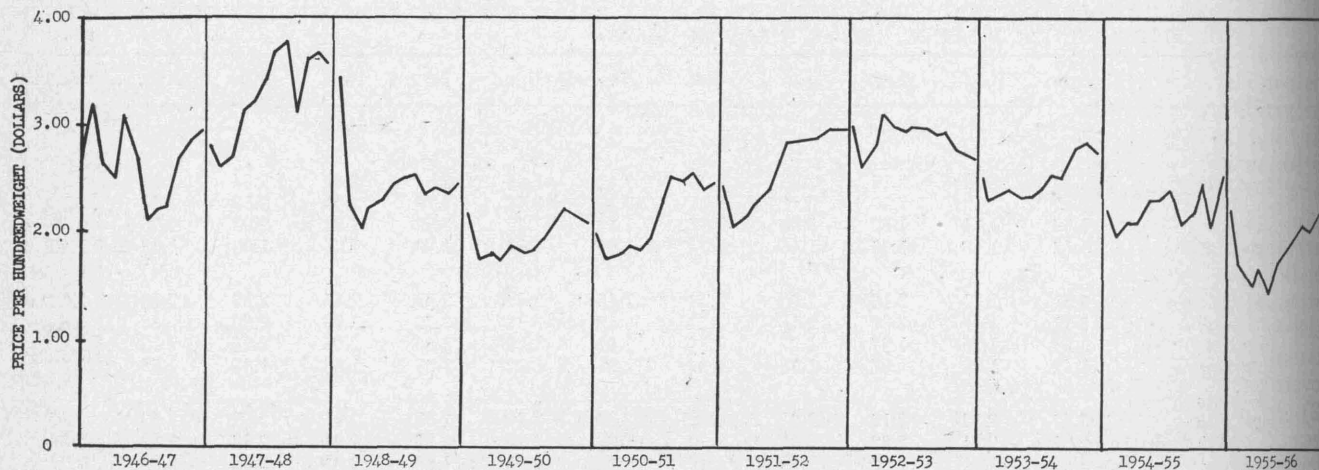

Figure 4. Midmonth farm price for grain sorghum, Eighth District, 1946-47 through 1955-56.

Year	CCC loan-support price[1]	Midmonth farm price for		Decrease from June to July	Difference between lowest support price and	
		June	July		June price	July price
	— — — Dollars per 100 pounds — — —			— — —	Cents per 100 pounds	— — —
1948	2.35 - 2.50	3.41	2.27	114	106	— 7
1949	2.12 - 2.26	2.13	1.75	38	1	—37
1950	1.89 - 2.04	1.99	1.75	24	10	—14
1951	2.19 - 2.35	2.45	2.08	37	26	—11
1952	2.44 - 2.61	2.93	2.61	32	49	17
1953	2.49 - 2.67	2.55	2.31	24	6	—18
1954	2.52 - 2.62	2.22	1.96	26	— 30	—56
1955	1.98 - 2.07	2.20	1.71	49	22	—27

[1] Range from the lowest to highest loan-support price in 13 counties in the Coastal Bend area.

about 30 cents below the basic loan-support price, since storage costs (until March 31) and other handling charges are deducted from the basic support rate. Since the July (heavy harvest) market price was more than 30 cents below the lowest county loan-support price in only 2 of the 8 years, the loan-support price probably was effective in keeping harvest market prices higher by inducing some of the grain into storage under CCC loan during the heavy harvest of grain sorghum in the area. Too, Eighth District June and July prices include price reports from counties farther away from coastal shipping points, as well as Coastal Bend counties. Therefore, the average price is probably lower than the average in Coastal Bend counties because of the higher transportation cost buyers in the farthest counties had to consider when pricing grain.

In summary, whether it pays the farmer to store his grain for later sale depends on an increase in price after harvest large enough to more than cover storage costs. The price-support program tends to decrease the size of the seasonal increase in price, thus giving less returns to storage.

FARMER'S STORAGE COST

The farmer's cost of storing and holding grain sorghum in commercial elevators includes all costs incurred which could be avoided if he sold the grain at harvest. Charges for storing and handling grain in the Coastal Bend area are based on the maximum allowed under the Uniform Grain Storage Agreement of the CCC. Although storage charges are consistent, the farmer's cost varies, depending on the storage condition. Farmers in the Coastal Bend area have three alternatives for storing their grain, each with a different cost situation: (1) grain stored under CCC loan and forfeited to the government on the following March 31; and (2) grain stored under CCC loan and later redeemed before the date of forfeit; and (3) grain stored on the farmer's own account, not under the price-support program.

Five separate charges must be considered in determining the total cost a farmer incurs if he stores grain:

Drying charge. The grain usually is marketed on a 15 percent moisture-content basis during the harvest season. If the grain is stored in commercial elevators, either under CCC loan or on the farmer's own account, it must be dried to 13 percent or less. Charges vary in the area, but the most common charge is 6 cents per 100 pounds for drying grain from 15 to 13 percent.

Uniform-storage charge. This includes the cost of storing, insuring, conditioning and care of the grain in storage. The 1956 rate was .047 cent per bushel per day of storage, or slightly more than 2.5 cents per 100 pounds per month.

Loan-handling charge. If the grain is put in storage under CCC loan there is a 1 cent charge per 100 pounds for executing the loan papers and other CCC office expenses.

Receiving and loading-out charge. This charge, commonly referred to as the "in-and-out" charge, by commercial elevators can be avoided by farmers who sell their grain at harvest. It amounts to 7.25 cents per bushel for receiving and .75 cent per bushel for loading out—a total of 8 cents per bushel, or 14.2857 cents per 100 pounds. If grain under CCC loan is forfeited, the government pays the in-and-out charge and it is not a cost to the farmer. But if the grain is redeemed from CCC loan, the farmer must pay the in and out charge.

Interest. If grain under CCC loan is redeemed, the farmer is charged interest at the rate of 3.5 percent on the amount of the loan for the period of its maturity. If grain is stored by the farmer on his own account, not under the price-support program, interest is a direct cost if he must borrow funds to finance his storage operation. If he uses his own funds to finance storage, and by so doing foregoes an opportunity to use those funds elsewhere at a profit, his interest is an indirect cost of storage. However, if he finances storage with his own funds, which otherwise would be idle and earning no returns

TABLE 4. FARMER'S COST ITEMS UNDER THREE STORAGE SITUATIONS

Type of charge	Stored under CCC loan and		Stored on farmer's own account not under CCC loan
	Forfeited	Redeemed	
Drying	Yes	Yes	Yes
Uniform storage	Yes	Yes	Yes
Loan handling	Yes	Yes	No
Receiving and loading out	No	Yes	Yes
Interest	No	Yes	1

[1]If the farmer finances storage with his own funds, and has no alternative use for those funds during the storage period, interest should not be included as a cost. Otherwise it should be included.

during the storage period, interest should not be counted a cost of storage.

Table 4 indicates the charges the farmer pays when storing grain sorghum under each of the three situations described.

The total storage cost under the three situations, accumulative monthly from the time of harvest, is given in Table 5. The only expenses incurred by the farmer who puts grain under CCC loan and forfeits it the following March 31 are the drying charge, uniform-storage charge and loan-handling charge. These expenses are paid by him at the time he puts grain under CCC loan. If he does not have a warehouse receipt which shows that the full amount of the uniform-storage cost through March 31 has been paid, that amount will be deducted from the basic support price in determining the amount of the loan he receives.

According to CCC deduction rates the uniform-storage cost is 24 cents per 100 pounds if

TABLE 5. FARMER'S COST OF STORING GRAIN SORGHUM IN COMMERCIAL ELEVATORS IN THE COASTAL BEND AREA, 1956

Month	Total cost of storing grain under CCC loan[1]				Cost on grain not in CCC loan[4]	
	If forfeited[2]		If redeemed[3]			
	June	July	June	July	June	July
	— — — Cents per 100 pounds — — —					
July	31		24.4		23.8	
August	31	29	27.6	24.5	27.4	23.9
September	31	29	30.8	27.7	31.0	27.5
October	31	29	33.9	30.8	34.5	31.0
November	31	29	37.1	34.0	38.1	34.6
December	31	29	40.2	37.1	41.6	38.1
January	31	29	43.4	40.3	45.2	41.7
February	31	29	46.6	43.5	48.8	45.3
March	31	29	49.6	46.5	52.2	48.7
April	31	29	53.2	50.1	55.8	52.3
May			56.7	53.6	59.3	55.8

[1]Costs are computed assuming grain is stored about the middle of the two harvest months.
[2]See Table 4, column 1.
[3]See Table 4, column 2. Interest charge after March is computed at 6 percent rather than 3.5 percent since the farmer must redeem his grain not later than March 31.
[4]See Table 4, column 3. Includes a 6 percent interest charge and assumes grain valued at $2 per 100 pounds.

grain is stored the middle of June and 22 cents if stored the middle of July. The 1 cent loan handling charge and 6 cents drying charge sweep the total cost of storing and holding grain which is later forfeited to the government, to 31 and 29 cents from June and July, respectively, by the following March 31 as shown in columns 1 and 2 of Table 5. The cost is a flat charge at the time it is put in storage, covers the period through March 31 (forfeit date), and no additions are made to the total charge in subsequent months.

Columns 3 and 4 show the total accumulative storage costs by months on grain placed under CCC loan and later redeemed by the farmer for sale in private market channels. The farmer pays a receiving and loading-out charge and an interest charge on the loan at 3.5 percent to maturity, in addition to the charges already discussed, if he redeems his grain. Interest was charged at .6 cent per month, an amount consistent with a CCC loan of about $2 per 100 pounds. The in-and-out charge amounts to about 14.3 cents per 100 pounds. If grain was stored the middle of June and redeemed for sale the middle of September, the total cost of storage would amount to approximately 30.8 cents per 100 pounds. If redeemed and sold the middle of the following March it would amount to 49.6 cents. Thus, the farmer's storage cost on grain stored under CCC loan and later redeemed (before March 31) for sale on the market increases from 24.4 cents for 1 month to 56.7 cents per 100 pounds for 11 months of storage.

The cost on grain stored on the farmer's own account not under CCC loan is shown in columns 5 and 6. It is the same as the cost of storage under CCC loan and later redeemed for sale with two exceptions: the farmer does not have the charge of 1 cent per 100 pounds for executing CCC loan papers, and interest is charged at 6 percent rather than the 3.5 percent charged by CCC.

REDEEMING GRAIN UNDER CCC LOAN

A knowledge of storage costs provides a basis for determining the market price at which it would pay the farmer to redeem his grain sorghum from CCC loan for sale on the market. To do so he takes the effective loan-support rate at the time of storage, adds the costs he would incur should he redeem ownership of the grain at a particular time, and if the market price at that time is greater than the effective support price plus the costs, it would pay him to redeem the grain and sell on the market.

The basic loan-support price by counties in the Coastal Bend area varied in 1956 from $2.18 to $2.27 per 100 pounds. The effective loan-support price is computed by deducting the 1 cent loan-handling charge and the uniform-storage charge from the basic support price. The uniform-storage charge is 24 cents if grain is stored

Redeemed middle of	Accumulative cost of redeeming grain			
	In-and-out charge	Interest charge[1]	Uniform storage charge[2]	Total cost[3]
	— — — Cents per 100 pounds — — —			
July	14.2857	.6	2.5536	17.4
August	14.2857	1.2	5.1056	20.6
September	14.2857	1.8	7.7076	23.8
October	14.2857	2.4	10.2612	26.9
November	14.2857	3.0	12.8632	30.1
December	14.2857	3.6	15.4168	33.3
January	14.2857	4.2	18.0188	36.5
February	14.2857	4.8	20.6208	39.7
March	14.2857	5.4	22.9708	42.7

[1]Interest at 3.5 percent on the amount of the loan. This amounts to about .6 cent per 100 pounds per month on a $2 CCC loan.

[2]Computed from the Uniform Grain Storage Agreement rate of .047 cent per bushel per day by converting to cents per 100 pounds per day and multiplying by the days in each month.

[3]Rounded to the nearest tenth of a cent for convenience.

the middle of June and 22 cents if stored the middle of July. The effective support price averaged about $2 per 100 pounds for grain stored the middle of June in the Coastal Bend area.

The farmer faces the alternative, once the grain is stored under CCC loan, of forfeiting it to the government and retaining the effective support price ($2 in our example) or redeeming it, to sell on the market, by paying off the loan.

Table 6 contains the 1956 cost of redeeming the grain sorghum. If the farmer pays his CCC loan in any particular month in order to sell his grain on the market, he must obtain a price that is greater than the effective support price plus the cost, shown in the right column of Table 6, if he is to profit from redeeming the grain. For example, if he redeems the grain in November, and his effective support price was $2 when stored the middle of June, the effective support price plus the cost of 30.1 cents to November is about $2.30. Unless the market price in November exceeds $2.30 per 100 pounds it would not pay him to redeem the loan. If the effective support price were only $1.95 when the grain was put under CCC loan the middle of June, a market price greater than $2.25 ($1.95 + $0.30 redeeming cost) would justify paying off the CCC loan, redeeming his grain and selling it on the market. Similar computations to those in Table 6 can be made for grain stored in July, and will show at what price the farmer can afford to redeem his grain.

PRICE CHANGE AND STORAGE COSTS

The previous analysis of price behavior was based on unpublished data for the Eighth Crop Reporting District of Texas, with prices used as reported. These data were used to compare the District with the Texas price, and to note the longer term nature of the behavior of farm price for grain sorghum.

However, for comparison of the seasonal price change with storage costs to determine the relative merits of selling the grain at harvest or later in the marketing season, an adjustment in the price data is necessary.

A 6 cents drying charge for decreasing the moisture content from 15 to 13 percent was included in the storage costs. Farmers sell grain at harvest as it comes from the field, and the price is based on a 15 percent moisture content. Stored grain must be dried to 13 percent or less, and price quotations later in the season are for 100 pounds of 13 percent grain. Since the grain loses weight when moisture is removed, this weight loss, as well as the drying charge, must be accounted for as a cost of storing. The value of this weight loss depends on the grain selling price at harvest; this price varies from year to year. Therefore, the cost of this weight loss is included in the seasonal prices of the grain sorghum.

In the drying process grain sorghum loses slightly more than 1 pound in moisture weight for each percent of moisture removed. Thus, 100 pounds of 15 percent moisture grain becomes only 97.7 pounds if stored for sale later and dried to 13 percent. To correct for this weight loss, the harvest price per 100 pounds was divided by .977 to obtain a price at harvest that is comparable to the price later in the season for an equivalent 100 pounds of grain at 13 percent moisture content. This adjustment has been made in the June and July prices used for the analysis in this section.

Ten-year Cost-price Situation

Figure 5 shows the relationship between storage costs and the 10-year average change in price from June. Figure 6 compares costs with price margins from July. The storage costs used were those a farmer incurred from storing his grain on his own account not under CCC loan.

If the average situation prevailed, the farmer would have lost money from seasonal decreases in price and incurred storage expenses as well had he consistently stored his grain harvested in June, with the exception of March, April and May. During these 3 months he would have recovered a small part of the storage costs by selling at a price higher than that of the previous June.

Since July is a low price month, the price later in the season (after the low August price) moved above the July price and provided the farmer some returns from his storage. The average returns for the 10-year period would have allowed the farmer to recoup some of the storage costs, but were not sufficient to cover the full storage costs in any month.
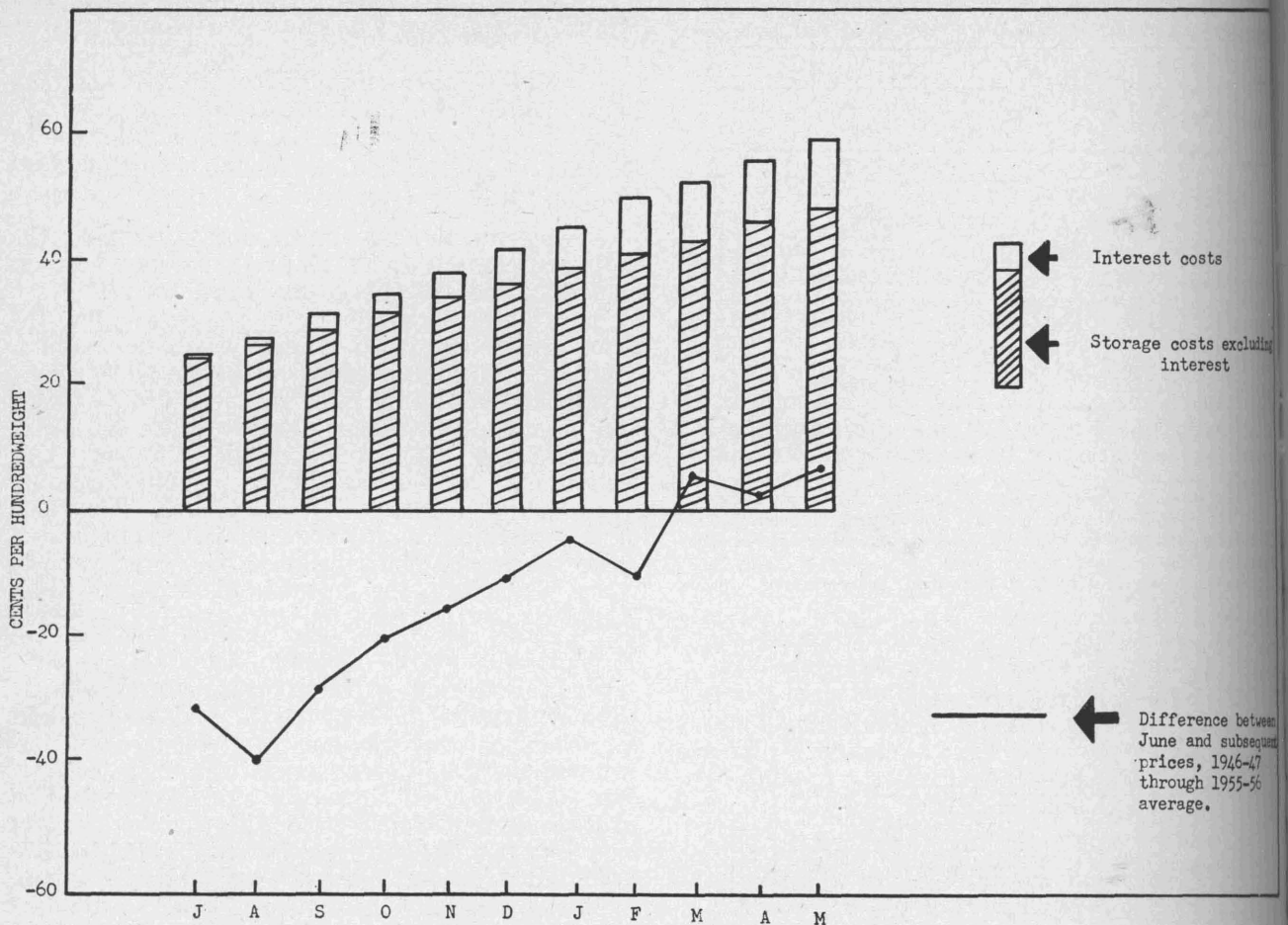
Figure 5. Seasonal price margins from June to subsequent months and the cost of storing grain sorghum.

This is an average situation and shows what would have occurred had the farmer stored consistently on his own account, not under CCC loan. It does not adequately show what occurred in any 1 year. Too, the seasonal margin between harvest and later prices registered during the period of this study probably was affected by the price-support program.

Annual Change

Tables 7 and 8 show the relationship between costs of storing and seasonal price margins from June and July to later months, respectively, by seasons. In 2 of the 10 seasons, 1946-47 and 1947-48, the increase in price after June more than covered the costs of storage, Table 7. In the 1946-47 season the farmer could have pro-

TABLE 7. COST OF STORING GRAIN SORGHUM COMPARED WITH PRICE CHANGES FROM JUNE BY SEASONS, 1946-47 THROUGH 1955-56, COASTAL BEND AREA

Month	Storage cost[1]	Seasonal price change from June by years[2]									
		1946-47	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56
		Cents per 100 pounds									
July	23.8	56[2]	—20	—117	—39	—25	—38	—33	—25	—26	—50
Aug.	27.4	1	—18	—147	—41	—25	—39	—18	—26	—17	—73
Sept.	31.0	—16	25	—125	—41	—20	—22	9	—21	—15	—59
Oct.	34.5	42[2]	34	—119	—31	—20	—12	0	—27	3	—78
Nov.	38.1	5	49[2]	—106	—37	—12	12	— 4	—28	6	—53
Dec.	41.6	—55	81[2]	— 99	—32	15	30	— 2	—23	14	—39
Jan.	45.2	—46	92[2]	— 97	—25	44	33	— 2	— 7	—17	—29
Feb.	48.8	—43	22	—111	—12	43	33	— 6	— 9	— 8	—21
Mar.	52.2	1	73[2]	—107	2	50	37	—10	12	14	—25
Apr.	55.8	14	81[2]	—110	— 5	36	41	—24	21	—22	—14
May	59.3	23	71[2]	—104	— 9	40	41	—27	13	25	— 2

[1]Costs for grain stored on the farmer's own account, not under CCC loan.
[2]These figures are seasonal price increases that more than cover storage costs.

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TABLE 8. COST OF STORING GRAIN SORGHUM COMPARED WITH PRICE CHANGES FROM JULY BY SEASONS, 1946-47 THROUGH 1955-56, COASTAL BEND AREA

Month	Storage cost[1]	Seasonal price change from July by years									
		1946-47	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56
		Cents per 100 pounds									
Aug.	23.9	— 55	2	—30	— 2	0	— 1	15	— 1	9	—23
Sept.	27.5	— 72	45[2]	— 8	— 2	5	16	42[2]	4	11	— 9
Oct.	31.0	— 14	54[2]	— 2	8	5	26	33[2]	— 2	29	—28
Nov.	34.6	— 51	69[2]	11	2	13	50	29	— 3	32	— 3
Dec.	38.1	—111	101[2]	18	7	40[2]	68	31	2	40[2]	11
Jan.	41.7	—102	112[2]	20	14	69[2]	71	31	18	9	21
Feb.	45.3	— 99	42	6	27	68[2]	71	27	16	18	29
Mar.	48.7	— 55	93[2]	10	41	75[2]	75	23	37	40	25
Apr.	52.3	— 42	101[2]	7	34	61[2]	79	9	46	4	36
May	55.8	— 33	91[2]	13	30	65[2]	79	6	38	51	48

[1]Costs for grain stored on the farmer's own account and not under CCC loan.
[2]These figures are seasonal price increases that more than cover storage costs.

fited if he had stored grain sorghum harvested in June and sold it in either July or October, with most returns being made from July sale. In the 1947-48 season the seasonal price increase was more than sufficient to cover storage costs in 6 of the following months.

The farmer could have made a profit from storing July grain sorghum under the conditions specified in 5 of the 10 years, Table 8. The seasonal increase in price after July harvest was more than sufficient to cover costs of storing in the 1947-48, 1950-51, 1951-52, 1952-53 and 1954-55 seasons. The seasonal increase in price from July was not sufficient to cover storage costs in 3 of the first 5 and 2 of the last 5 of the 10 seasons covered in the study.

The data show no particular consistency of the months in which profits were possible. Most consistent profits could have been made on grain stored in July and sold the following December—
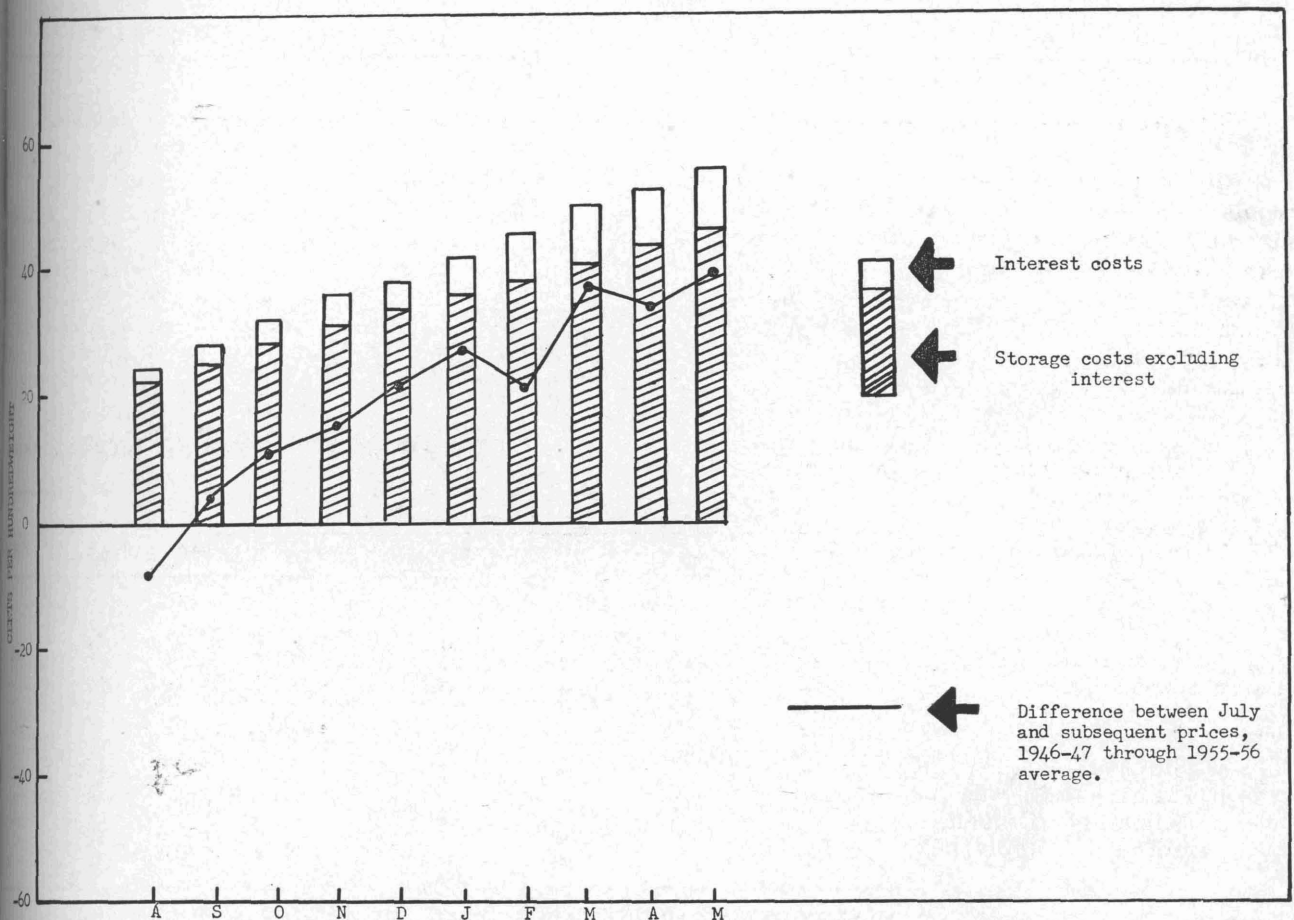

Figure 6. Seasonal price margins from July to subsequent months and the cost of storing grain sorghum.

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in 4 of the 10 years. Profits could have been made in 3 of the 10 years if the month of sale had been January, March, April or May. This points up the considerable risk the farmer would have incurred in storing July grain for later sale merely as a result of uncertainty as to the month in which it usually is best to sell.

Ups-and-downs in Price

The farmer stands a better chance of profiting from storage if he can determine whether economic conditions may cause an upward swing in prices of more than a season's duration. The seasonal pattern of price behavior is fairly consistent, but seasonal margins (between harvest and later prices) tend to be greater on an upswing. The 2 years in which profits were possible from June storage of grain sorghum were marked by a general price upswing. Although seasonal margins were not sufficient to cover storage costs during the general upswing of 1950-51 and 1951-52, they were sufficient to recuperate a considerable part of the storage costs on grain harvested and stored in June.

Profit potentials on grain stored in July show a similar relationship to the general upswing in prices. A comparison of Table 8 with Figure 4 shows that the years in which profit potentials were greatest, both in size and in the number of months during which seasonal price margins more than covered costs, were years when prices showed a general upward movement —1947-48, 1950-51 and 1951-52, for example.

OTHER CONSIDERATIONS

Numerous conditions affect the extent of the farmer's profits or losses from storing in any 1 year. Any condition that causes the cost of storage to be lower, or that causes the price increase after harvest to be greater, would increase profits from storing grain sorghum. Conditions that increase the cost of storage, or cause price increases after harvest to be less, would decrease the profits from storing.

Price Supports

The discussion in the preceding section about profit potentials from storing assumed the farmer stored his grain on his own account and not under CCC loan in the price-support program. However, the price-support program in effect over the 10-year period in which seasonal price behavior was studied probably affected the size of the margin between harvest prices and prices later in the season, and resulted in smaller returns to storage operations than if prices had been set in a free market. The reasons for this are (1) more grain was induced into storage at harvest under CCC loan, tending to distribute more evenly the supply held for sale throughout the marketing season, and (2) the effective price support level probably is used as a gauge in buyers' price-bidding operations. This level sets a minimum price below which buyers will be unable to purchase grain sorghum at harvest and a maximum price above which they feel it is unnecessary to go later because of the bargaining value of the support price alternative.

The storage profit potentials open to a farmer who does not make use of the price-support program probably would be materially improved if most farmers were operating outside the program, or if the program were not in effect.

The present price-support program gives the farmer the following alternatives: (1) to sell his grain sorghum on the market at harvest, (2) to store his grain (not under CCC loan) in commercial elevators for later sale; (3) to store his grain under CCC loan, and either forfeit the grain to the government or redeem the grain before the date of forfeit and sell it on the market.

The farmer who is concerned primarily with obtaining the greatest income would sometimes consider the first, but never the second, alternative listed. Number 1 would be considered as an alternative to storing the grain only when the CCC effective loan price is below the harvest market price. And should the decision be to store, he certainly would choose to store under CCC loan rather than outside the loan. For should prices decrease after harvest and go below the loan level he could recoup some of the loss from storage by forfeiting to the CCC.

If the effective loan support price is above the harvest market price the farmer cannot lose, and may possibly gain, by putting his grain sorghum under CCC loan. For he may still redeem the grain before the forfeit date if the market price moves up enough above the effective loan level to more than cover the costs of redeeming it.

Farmer's Need for Ready Cash

A farmer with pressing debts, or with a need for cash in other operations at harvest time, may obtain better returns by selling his grain immediately, either in the good will of his creditors or in financial returns from his other operations than he could obtain from storing his grain sorghum for future sale in those years when profits are possible. The need for ready cash at harvest should be balanced against the returns he can expect from storing to determine which may be the most profitable in the long run. The government's CCC loan program, in its present form, relieves the farmer from this financial pressure.