

- Adjustment Problems and Goals
- of Dryland Cotton Farmers
- on the High Plains

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## Summary

The purpose of this study is to obtain a better understanding of the major adjustment problems which dryland crop farmers on the High Plains are facing, and how these problems are affected by the high risks of the area.

Data were obtained in personal interviews with 82 randomly selected commercial dryland cotton farmers in Dawson and Howard counties. These farmers had increased the median size of their operating unit from 260 acres in 1947 to 450 acres in 1957. Approximately two-thirds of this increased acreage came from renting additional land while one-third came from purchase. Despite this progress, serious obstacles were preventing many of the operators from making additional adjustments in size. Approximately three-fifths of the farmers thought it would be profitable to purchase more land, but were deterred because of the high down payment required or because land was not available.

About one-third of the farmers thought they could increase income by keeping more livestock. Reasons given most frequently for not adding more livestock were the lack of feed because of the recent drouth, lack of owned capital and unwillingness to borrow, lack of facilities and, on tenant-operated farms, reluctance of the landlord to have livestock on the farm. About one-third of the operators also thought that the purchase of new items of machinery and equipment would be profitable. Most of these operators were delaying the purchases in hope of a big crop year when they could pay cash instead of buying on credit.

The farmers generally were aware of the odds which they face in making a crop. The expectation patterns for rainfall, yields and income were

slightly more conservative than records for the area over the past 30 years indicate. When they were asked to suggest the best means of meeting the risks of dryland farming, the answer given most frequently was flexibility in adjusting to weather conditions.

Despite the recent severe drouth, nearly half of the farmers interviewed were free of debt. For those farmers who had debts, the amount of credit outstanding averaged \$8,500. About three-fourths of this amount was secured by real estate mortgages, while the remainder was either secured by chattel mortgages or was unsecured.

About 9 out of 10 farmers indicated that they had been able to obtain all the credit they had asked for and would like to use. The major capital difficulty lay in the small amounts which credit agencies would loan in comparison with the amounts which purchasers were forced to pay for land. The intense competition for land usually resulted in available tracts going to those with the most capital. A number of farmers who would like to increase the size of their farm unit and who were able to obtain credit, refrained from borrowing because they were uncertain the purchase would be profitable or because they were unwilling to incur heavy debts which they felt would increase their risks.

Since many of the farmers were uncertain whether land purchases would be profitable, more research is needed to answer questions such as the extent to which the purchase of an additional tract might affect income and risk, and the size and variability of income forthcoming from different size units. More research also is needed on the types of livestock feeding systems specifically adapted to dryland farms.

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# Adjustment Problems and Goals of Dryland Cotton Farmers on the High Plains

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GREATER CHANGES AND ADJUSTMENTS probably have occurred in Texas agriculture during the past 20 years than during any other 20-year period in history. This rapid rate of change is expected to continue.

The rapid adoption of new technology and labor-saving devices has caused sharp increases in the size of unit which one family can operate profitably. The average size farm in Texas, for example, has increased from 367 acres in 1945, to 498 acres in 1954. Because of these developments, the amount of capital needed to operate commercial farms also has risen sharply.

Farmers usually make adjustments in size or in new technology because the changes enable them to produce a larger volume of product from the resources which they control, or to decrease their per unit costs. Thus they are able to attain at least a temporary increase in income. As more and more farmers adopt these changes, total farm production increases; unless there is an offsetting increase in demand, farm prices drop to adjust to the larger output.

The farmers who do not or cannot make these adjustments find themselves at an increasing disadvantage. Eventually they may reach a position where they must adjust or discontinue farming. Several reasons may account for their slowness in making changes. They may not possess the necessary capital themselves and may be unable or unwilling to borrow or rent. A large part of this unwillingness may arise from lack of knowledge about how profitable the adjustment might be. If farm enlargement is a problem, additional land may not be available within an economical working distance of the home place, or it may be available but the price may appear to be higher than justified by agricultural productivity. Risk, uncertainty and inertia also may be important in retarding adjustments, especially in areas where production is highly uncertain because of weather hazards. Older farm operators may be particularly reluctant to assume the obligations and uncertainties involved in adjustments requiring additional heavy capital outlays. Some farmers actually may prefer operating a small unit, even though it means a small income, because they will have more leisure and less strain.

## Purpose of Study

The purpose of this study is to obtain a better understanding of farmers' subjective attitudes toward making adjustments and of the major adjustment problems they are facing. More specifically, the objectives include determining if the operators are farming in the area they prefer, if they are engaged in the type of farming they prefer, if there are adjustments which the operators would like but have been unable to make, what the major obstacles are that retard desired adjustments and whether the availability of adjustment credit is a major problem.

This information should be helpful in directing research and extension work toward areas where some of the more important adjustment problems lie. In the past, research on adjustments has been directed primarily toward determining the degree of economic profitability without much attention being given to the means or strategies by which adjustment goals might be attained and of farmers' attitudes toward making them.

Dryland crop farms in the High Plains were selected for the initial study of these problems, since this is an area involving high risks, and available information suggests that labor-saving machinery and large-sized units are needed for economic operation.

## Procedure

Data on land use, livestock on farms, adjustment preferences and goals and attitudes toward using credit for adjustment purposes were obtained from 82 dryland cotton farmers in Dawson and Howard counties. The names of the farmers were drawn at random from the cotton allotment records in the county Agricultural Stabilization and Conservation Service offices.

Since this study is restricted to commercial dryland cotton farmers, the names of all farmers who operated less than 160 total acres or 50 acres in cotton during 1957 were eliminated. The purpose of this was to exclude part-time farms and those units considered too small to produce sufficient farm income for future expansion. The names of the remaining farmers then were reviewed with the county agricultural agents; operators whose incomes were primarily from sources other than dryland farming were removed from the list. A few of the farmers included in the

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survey did some irrigating; they were retained because they had been irrigating only a short time and because the amount of irrigating they did was small compared to the amount of dryland farming.

## Characteristics of Operators Interviewed

Since an objective of this study is to determine some of the major adjustment problems and goals of commercial farm operators, it is desirable to know the background of the farm operators, the number of years the operators have been farming, tenure status, sources of income and the progress made in adjustments during the past. These factors might be expected to affect, in some degree, the answers given by the farm operators interviewed.

### AGE AND TENURE

About one-half, 52 percent, of the dryland farm operators interviewed were part owners. Only 12 percent were full owners while 36 percent were full tenants. Table 1 shows that the proportion of farmers who were full owners was considerably lower among the dryland cotton farmers than among farmers in most other sections of the State, while the proportion of tenancy and part ownership was considerably higher.

Part of these differences might be accounted for by the fact that the census data include many small units which were excluded in the survey of Dawson and Howard counties. Nevertheless, the small proportion of full owners and the large proportion of part owners in Dawson and Howard counties are significant because they indicate that many ownership units are small and that the leasing of additional land may be the principal means by which farmers in the area have been enlarging their farm operations. They also suggest that there may be some unusual factors in the area which either retard progress toward full farm ownership or make leasing a more attractive alternative than in most parts of the State.

The majority of the farmers interviewed were in the middle-aged group, about two-thirds being between 35 and 55 years old. The average age was 47 years, with only 11 percent being less than 35. However, these men were not older than farmers generally over the State. The 1955 cen-

TABLE 1. PERCENT DISTRIBUTION OF FARM OPERATORS ACCORDING TO TENURE

Operators	Dryland farmers interviewed in Howard and Dawson counties	All commercial farmers in Texas 1954 census
Full owners	12	40
Part owners	52	29
Full tenants	36	31
Total	100	100

TABLE 2. MEDIAN SIZE OF FARM BY TENURE GROUPS

Tenure	Size, acres
Full owners	354
Part owners	495
Tenants	440
All farm operated	450

sus shows that the average age of all farmers in Texas was 51 years, with 12 percent being less than 35.

### YEARS ON FARM

The dryland farmers had been on the same farm an average of 15 years. About 85 percent had been operating their farms 5 years or longer while about 60 percent had been operating the same place 10 years or longer. By tenure groups the average was 10 years for full tenants as compared with 18 years for full owners.

Most of the farm operators had been farming long enough to become familiar with the physical conditions of farming in the area. The number of young men who have started farming in these two counties during recent years has been small.

### SIZE OF FARM AND LAND USE

The median size of farm was 450 acres, Table 2. In this study the median instead of the arithmetic mean is used as a measurement of central tendency because it gives a better indication of the size of the more typical or representative dryland farms in the area. The median is the midpoint in any array or list. In this instance, it means that one-half the farms are larger than 450 acres and one-half are smaller.

On these typical dryland crop farms, about 39 percent of the total land area during 1957 was in grain sorghum, 31 percent in cotton, 8 percent in the soil bank or conservation reserve, 17 percent in permanent grass and 5 percent in other crops or farmstead roads and waste. On full owner operated farms, the proportion of the total farmland in the soil bank or conservation reserve was 16 percent as compared with 5 percent for farms operated by full tenants.

### SOURCES OF INCOME

The sources of gross cash income received during 1957 by the 82 dryland crop farmers are shown in Table 3 by tenure groups.

Cotton accounted for nearly two-thirds of the cash income for the 82 farms. Grain, the next most important source, accounted for less than one-fifth of the total. The major differences by tenure groups were that tenants depended slightly more on cash crops and off-farm work and less on livestock and the soil bank than did the owners.

Livestock, however, were not a major source of income for most farm operators. Of the 82 farms, fewer than one-fourth had any income at



all from cattle and only 6 reported that cattle accounted for more than 10 percent of their 1957 incomes; most of these were farms which had considerable permanent grassland. Only 7 of the 82 farms reported income from hogs. The relative unimportance of livestock on these farms may be attributed partly to the effects of the drouth. A number of the farmers interviewed stated that they had kept more livestock before the lack of feed forced curtailment.

### PROGRESS IN MAKING ADJUSTMENTS IN SIZE

The farmers have been making considerable progress in increasing the size of their operating unit over the past 10 years, Table 4. This progress occurred despite a very severe drouth during the latter part of the period.

Several different means were used to increase the size of operating unit. About one-half of the 82 farmers rented additional land to increase the size of their operations. Generally they rented tracts neighboring the home place, but a few of the tenants moved to different but larger farms.

Only 15 percent of the farm operators purchased additional land to increase the size of operations, suggesting that lack of capital, inability to find available land or unwillingness to assume additional risks may have been important retarding factors. About 5 percent of the farmers were operating a smaller sized farm unit at the end of the 10-year period than at the beginning, and these were mostly older men approaching retirement.

### Adjustment Preferences and Goals

The development of irrigation from wells does not appear to be economically favorable in the dryland areas of Dawson and Howard counties. Several of the farmers were irrigating a little but the supply of water on most of the farms was too small or too uncertain to warrant the cost of irrigation development. Dryland crop farming yields and income in this area are highly variable and uncertain. Acreages generally are large and operating costs are low compared with most other areas; years of good rainfall, therefore, may bring very high income. On the other hand, very low rainfall may occur over an extended period of time bringing several successive years of crop failures or near failures. TAES MP-236, "Income Variations Due to Yields on Dryland Cotton Farms on the High Plains of Texas," gives a more complete discussion of the variability problem and its economic implications on the High Plains.

The first step in the survey was to determine if the operators were dryland farming in this area through preference or through circumstances. About three out of five farmers, 62 percent, stated that they preferred dryland farming to any other alternative. Most of the remaining

TABLE 3. PERCENTAGE DISTRIBUTION OF CASH INCOME RECEIVED DURING 1957 BY 82 DRYLAND CROP FARMERS IN DAWSON AND HOWARD COUNTIES

Source	Full owners	Part owners	Full tenants	All farms
	Percent			
Cotton	56.5	60.9	66.9	62.5
Cattle	7.2	2.7	0.8	2.6
Hogs	2.5	0.6	1.0	1.0
Grain	14.8	16.8	18.2	17.0
Poultry	3.0	1.6	.0	1.2
Soil Bank	13.0	9.7	3.4	7.9
Other farm	.0	0.8	.0	0.4
Off farm	2.2	4.8	7.9	5.6
Oil royalty	0.3	2.0	.0	1.1
Other nonfarm	0.5	0.1	1.8	0.7

two-fifths preferred irrigated farming, although some preferred a farm that was part dryland and part irrigated. In this way they would avoid complete crop failures during dry years and would still benefit from the high income of dryland farming during wet years. A few of the farmers preferred ranching. Only 2 of the 82 farm operators stated that they would prefer an occupation other than farming or ranching.

Each of the farm operators who said that he would rather do something besides dryland farming was asked why he did not do so. More than half mentioned the heavy capital investment required of alternatives such as farming irrigated land or ranching. This usually was coupled with other comments such as that they were too old for a major change, the supply of water was too uncertain, or they were tied to the home place. Tenants usually stated that they were unable to find an irrigated farm to rent. Several were working off the farm until they acquired sufficient capital to purchase a place of their own. Most of the men, however, apparently had no plans other than to continue dryland farming.

### ADJUSTMENTS IN SIZE

*Size preferences.* The next step in the survey was to determine the farmers' major goals in dryland farming, particularly the size of farm

TABLE 4. MEDIAN SIZE OF FARM OPERATED, 82 FARMS IN DAWSON AND HOWARD COUNTIES, 1947-57

Year	Acres owned	Acres rented	Total acres operated
1957	160	290	450
1956	157	280	437
1955	143	276	419
1954	140	202	342
1953	120	213	333
1952	120	214	334
1951	120	183	303
1950	120	174	294
1949	120	170	290
1948	100	166	266
1947	100	160	260

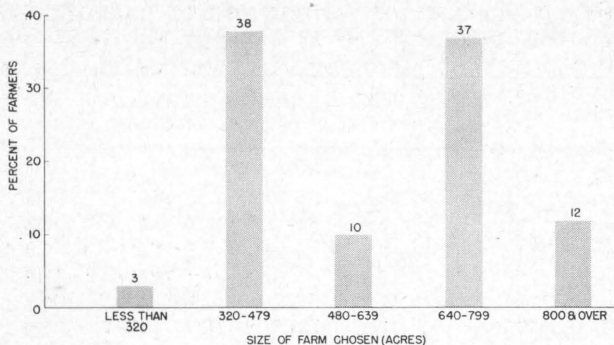


Figure 1. Size of farm which dryland farmers said they would like best to own and operate.

unit. Each operator was asked the size of dryland crop farm he would like best to own and operate, assuming current acreage controls and prices and assuming he could pay cash for the farm. Of the 82 farmers interviewed, 30 mentioned 640 acres, 27 mentioned 320 acres, 10 specified a size larger than 640 acres and 2 a size smaller than 320 acres, Figure 1. Those who mentioned larger sized units usually were operating the larger sized farms already. The size of farm the operators said they would like best to own and operate usually did not vary substantially from the size currently being operated. The median size mentioned was 500 acres, as compared with the median size of 450 acres for the farms currently being operated. Only two-fifths of the farmers mentioned a size larger than their present unit. It should be kept in mind, however, that most of the farmers were renting a substantial portion of the land they were operating and were sharing the income from the rented land with the landlord. Evidently many of them assumed that if they owned the land clear, it would provide sufficient income for their needs and they would not wish to operate more land.

Each of the farm operators also was asked to state the size of farm he would like best to

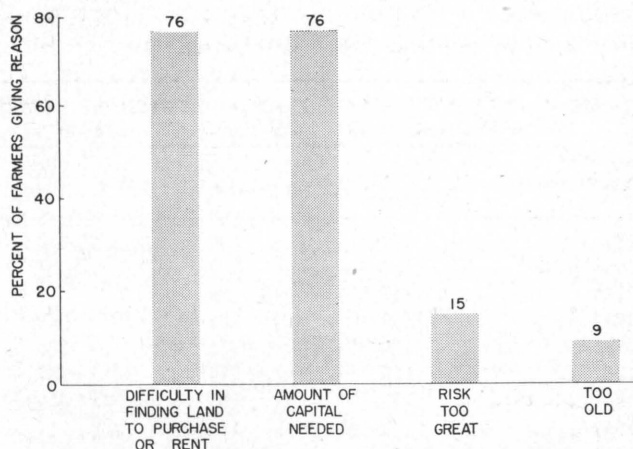


Figure 2. Reasons given by farmers for not operating the size farm they thought would be most profitable. (Most farmers gave more than one reason.)

own and operate assuming that instead of paying 100 percent cash he had to go into debt for one-fourth the purchase price, for one-half the purchase price and for three-fourths the purchase price.

A debt of *one-fourth* the purchase price did not affect the size of farm chosen significantly. Of 81 farmers answering the question, 77 said they would choose the same size farm as they would if they could pay 100 percent cash, while 4 would choose a smaller sized farm.

A debt of *one-half* the purchase price brought more varied responses. Of the 81 farmers, 60 said they would choose the same sized farm, but 15 chose a smaller sized unit, 3 a larger one while 3 said they would not buy if they had to go into debt that much. When a debt of *three-fourths* of the purchase price was mentioned, only 39 said they would choose the same sized farm, 15 would choose a smaller and 3 a larger unit, while 24 said they would not buy.

These questions referred to hypothetical situations where machinery, equipment and labor were not limiting factors. The operators next were asked to designate the size of farm they thought would be most profitable to operate with their *present* machinery, equipment, debts and tenure arrangement. The median size mentioned was 600 acres as compared with the median of 450 acres which they were currently operating, and the median of 500 acres which they would have preferred to operate had they owned all the land free of debt. Slightly more than two-fifths of the operators stated that they would be able to operate more land profitably with their present machinery, equipment and labor.

*Problems of adjustments in size.* The preceding data indicate that a number of the farmers thought that the addition of more land to their farm unit would have been profitable and that they would have preferred to operate more land if it were available. The next step was to try to find what prevented them from adjusting to the size they preferred.

Each of the farmers who thought that larger sized units would be more profitable was asked why he did not operate more land. The reasons given most frequently were the amount of capital needed for down payment for the purchase of additional land and the scarcity of additional land either for rent or purchase, Figure 2. A few mentioned that they had considered purchasing neighboring tracts which were for sale but they either thought the price was too high or they did not want to go into debt. These usually were the older operators.

Each operator was asked whether he thought the *purchase* of more land would be profitable. This question also involved the problems encountered by tenants and part owners in reaching the status of full farm ownership. Of the 82 farmers asked this question, 52 or slightly more than



three-fifths thought it would be profitable for them to purchase more land. The remainder either thought land purchase would not be profitable to them or they were undecided. Reasons given most frequently for thinking that the purchase of more land might not be profitable were the high price of land, the uncertainty of weather and price, the necessity of getting more machinery and equipment if more land were added and the belief that more land might increase income but it also might increase the chance of loss.

Each of the 52 operators who thought that buying land would be profitable was asked why he did not make the purchase. Many gave more than one reason but the main one, mentioned by nearly 4 out of 5 of the farmers, was the size of down payment required. The selling prices of land in the area were considerably above the amounts loaned by lending agencies, leaving a substantial amount of capital which purchasers would need to furnish themselves. Many of the farmers said they were unable to raise this amount of capital. Others could make the down payment but did not wish to go into debt for the remainder of the purchase price. A few stated that they had considered buying land during the past but had refrained because they did not want to assume the extra risks involved.

The second most important reason, given by about 2 out of 5 of the farmers, was the difficulty of finding land for sale within a practicable distance of the home place. Some stated that additional land was not available for purchase at any price, and others felt that the prices of available tracts were too high. Several stated that they were too old to think of buying more land. A few said they planned to buy when they had acquired more capital or when conditions appeared a little more favorable or less uncertain. The drouth had seriously retarded the plans of some, although apparently it had no pronounced effect upon land prices or upon reducing the demand for land in the area.

#### ADJUSTMENTS IN LIVESTOCK

Most of the dryland crop farmers kept little or no livestock. Each operator was asked whether he thought more livestock would be profitable on his place. Of the 82 farmers, only 28, or about 1 out of 3, thought that income could be increased by adding more livestock.

These 28 men then were asked why they did not keep more livestock if they thought it would be profitable. A variety of reasons were given, no one answer being predominant. About one out of five stated that he usually kept more livestock on hand or had definite plans for adding more in the future. About the same number gave their reason as lack of owned capital to purchase livestock and unwillingness to borrow. Several of the tenants mentioned the lack of facilities for livestock or that the landlord prohibited it. Other reasons given were lack of feed because of the drouth, illness in the family, age of operator, the

risk involved of buying and selling, and the belief that although livestock might be profitable, the capital and labor required could be used more profitably elsewhere.

#### ADJUSTMENTS IN MACHINERY AND EQUIPMENT

Farming more land and producing more livestock are two major adjustments dryland farmers in Dawson and Howard counties might make to increase income. A third possibility might be the purchase of major pieces of machinery and equipment which would increase the timeliness and effectiveness of farming operations. Each of the 82 farm operators was asked whether he thought it would be profitable for him to purchase any additional items of machinery and equipment.

About one-third of the farmers thought that the purchase of new items would be profitable. A second small tractor, cotton strippers and combines were mentioned most frequently as being equipment needed. Items less frequently mentioned included deep breaking rigs, trailers, stalk cutters, dusters, sand fighters and silage harvesters. When asked why they had not purchased these items, slightly more than one out of three replied that he planned to acquire the items in the near future. The remainder gave as reasons the lack of capital and unwillingness to borrow or to go deeper in debt. They preferred to wait for a big crop year when they could pay cash rather than buy on credit.

The farmers in the area recently had experienced a severe drouth of several years. To determine the extent to which the drouth might have retarded the replacement of needed equipment, each of the 82 farmers also was asked whether he thought the replacement of old items of machinery and equipment would be profitable on his farm. About one out of three farmers thought that some replacement would be profitable. However, the operators who answered "yes" to this question were not always the same as those who answered "yes" to the question of whether they thought it would be profitable to purchase additional items of machinery. In fact, slightly less than one-half, 47 percent, of the farmers answered "no" to both questions. Tractors were the items mentioned most frequently as needing replacing. The only other items which were mentioned with much frequency were combines and cotton strippers.

Only 4 of the 29 farmers who thought any replacement of equipment would be profitable stated that they had plans for purchasing within the near future. The remainder usually replied that they preferred trying to get by with their old equipment rather than borrowing or going deeper in debt to purchase replacements. Several stated that they were discouraged by the high cost of new machinery and would not buy until forced to do so.

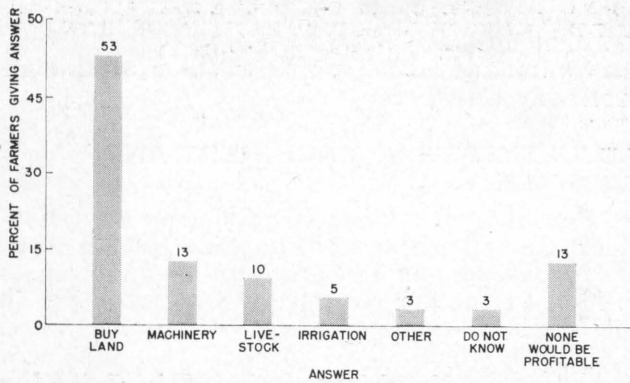


Figure 3. Answers given by farmers to the question, "What major farm investment do you think would be most profitable to you?"

### PROFITABILITY OF ADJUSTMENTS

Each of the farm operators was asked what adjustment he thought would be most profitable for his place. Slightly over one-half thought that the addition of more land would be the most profitable, Figure 3. About 13 percent mentioned new machinery and equipment, while 13 percent thought no major adjustment would be profitable. The remainder mentioned livestock or irrigation or else were undecided.

While about one-half of the farm operators thought that the addition of more land would be the most profitable adjustment they could make, approximately the same proportion indicated it also would involve the most risk and uncertainty, particularly if debts were incurred. This is one of the hazards faced by farmers who increase size of operations in a region of highly fluctuating income. An operator with a small farm unit and no outside income faces decreasing chances for survival unless he can increase his business to a size comparable to other farms which produce the same products. At the same time, by increasing size of business he increases the possibility for greater losses during adversity. As one farmer expressed it, "buying more land may be the biggest risk but it is also the best risk."

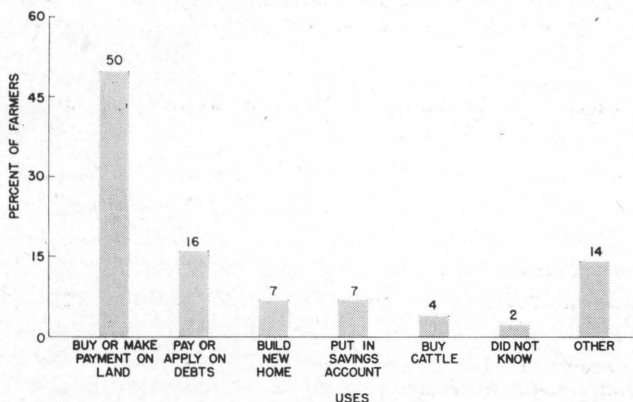


Figure 4. Uses which dryland farmers indicated they would make of a gift of \$5,000 which they could use as they wished.

Further indication of the importance which many operators placed upon the importance of size is given in Figure 4. This chart summarizes the answers which farmers gave when asked what they would do with a gift of \$5,000 in cash which they could use in any way they wished. Their replies reflect what they consider to be the most productive use for additional capital. One-half of the farmers replied that they would use the gift to buy or make a down payment on land, this answer being given much more frequently than any other. Other answers and their frequency included: pay or apply on debts, 16 percent; build new home, 7 percent; put in savings account, 7 percent; and buy cattle, 4 percent.

### Expectations

When considering a major adjustment it is always desirable to plan ahead carefully in order to estimate as accurately as possible how profitable the adjustment will be and the period of time that will be required for the adjustment to pay for itself. Planning is especially difficult in areas where income is highly uncertain because of low rainfall, hail and frost. If farmers have erroneous ideas of their chances for making a good crop, the success of planned adjustments can be seriously jeopardized. For this reason, it is desirable to know how well farmers in the High Plains understand the weather risks which they face. It also is desirable to know what they consider to be the best ways of meeting the risks of dryland farming.

### RAINFALL

The farmers contacted in the sample were requested to estimate the number of years in a 10-year period they would expect annual rainfall to be below 10 inches, between 10 and 20 inches, between 20 and 30 inches and over 30 inches. The average of their expectations is given in Table 5. The expectations of the farmers in both Dawson and Howard counties are rather close together. These farmers expected the largest percentage of the years to have between 10 and 20 inches with about the same percentage of the years having below 10 inches as above 20 inches.

These average expectations were compared with the actual distribution of rainfall at Lamesa, Texas, for the Dawson county farmers and Big Spring, Texas, for the Howard county farmers. The actual distributions were obtained from U. S. Weather Bureau records.

The rainfall expectations of the farmers in Dawson county conformed closely to Weather Bureau records, Table 5. The differences between expectations and the actual rainfall records were tested statistically to determine whether they were significant or whether they could be due only to chance. The results of the test showed that the differences were so small that they could be due to chance.

In Howard county, the differences between rainfall expectations and actual rainfall records



TABLE 5. COMPARISON OF FARMERS' EXPECTATIONS OF ANNUAL RAINFALL DISTRIBUTION TO ACTUAL DISTRIBUTION IN DAWSON AND HOWARD COUNTIES

Annual rainfall, inches	Dawson county			Howard county		
	Average expectations	Actual <sup>1</sup>	Difference <sup>2</sup>	Average expectations	Actual <sup>3</sup>	Difference <sup>4</sup>
	Percent					
0 - 10	24	17	+7	21	7	+14
10 - 20	53	62	-9	56	54	+2
20 - 30	21	17	+4	20	32	-12
Over 30	2	4	-2	3	7	-4

U. S. Weather Bureau Records for Lamesa, Texas, 1910-56. Differences not significant at the 5-percent level.

U. S. Weather Bureau Records for Big Spring, Texas, 1916-56. Differences significant at the 5-percent level.

were so large that they could not be due to chance. The farmers expected more years to have lower rainfall than actually occurred and fewer years to have as high a rainfall as actually occurred.

Thus it appears dryland farmers are aware of the odds they face in terms of annual rainfall. Errors in expectations are not large and tend to be more on the pessimistic side than on the optimistic. These are probably influenced by the recent drought.

#### YIELD AND INCOME

The farmers also were questioned about their expectations of cotton yields. The average expectation of the distribution of cotton yields for the farmers in Howard and Dawson counties is shown in Table 6. The farmers expected yields in more than 50 percent of the years to be below 200 pounds of lint to the acre. The distribution of the farmers' expected yields were below average in a large number of years and ranged from average to high the other years, with a few very high yields.

The average expected yield distribution was compared to the actual yield distribution at the Big Spring station for 1916-56. The yields at the Big Spring station were used since the variation in yields at this station conform closely to the variations an individual farmer would expect. The average yield over the years at Big Spring also is very close to the average yield for Dawson and Howard counties for the last 10 years. The differences in Table 6 were not significant. This indicates that farmers have an accurate picture of the variation that can be expected in cotton production in the area.

The farmers also were asked how many years out of 10 they thought the yield of cotton and grain sorghum would be high enough to get back the cash expenses. The average expected number of years for Howard and Dawson counties farmers was 7.9. In other words, they expected yields would not be high enough to get back their operating expenses approximately 2 years out of 10.

TABLE 6. COMPARISON OF FARMERS' EXPECTATIONS OF YIELD DISTRIBUTION TO ACTUAL DISTRIBUTION, HOWARD AND DAWSON COUNTIES

Yield, pounds of lint	Average expectation	Actual <sup>1</sup>	Difference <sup>2</sup>
0 - 100	18	20	-2
100 - 200	41	41	0
200 - 300	29	29	0
300 - 400	10	5	+5
Over 400	2	5	-3

<sup>1</sup>Distribution of yields at the Big Spring field station, 1916-56.  
<sup>2</sup>Differences not significant at the 5-percent level.

These expectations were compared to data for a cotton-grain sorghum farm developed in TAES MP-236. These data indicate a full owner of a 480-acre farm could expect to recover his cash expenses in 8.8 years out of 10, while a full tenant could expect his cash expenses back in 8.5 years out of 10, with current prices and cotton allotments. Income tax payments also were included as a cost. The average expectations were more conservative than the actual situation at current prices for both the full owner and full tenant.

## Sources of Risk

The farmers in the sample were asked to rank the following sources of risk: (1) variations in weather, such as lack of rain, rain at the wrong time, hail and frost; (2) ups and downs in the prices of items that farmers buy and sell; (3) changes in the farm programs and the actions of congressmen; (4) the actions of people with whom the farmers do business, such as landlords, bankers, custom operators and cotton pickers; and (5) insects, diseases of crops and livestock. Climatic variations as a source of risk were considered most important by 75 percent of the farmers, Table 7. Ten percent of the farmers indicated price variations as the major cause of risk while 5 percent said the changes of the farm program and insects and diseases were the major causes of risks. Most of the farmers in the sam-

TABLE 7. FARMERS' OPINIONS ON CAUSES OF RISK

Cause	Percent of farmers ranking cause first	Average rank
Climate variations	75	1.3
Price variations	10	2.3
Changes in farm program	5	3.6
Actions of people with whom farmers do business	1	4.4
Insects and diseases	5	3.2
No first choice	4	

ple had considerable confidence in the actions of people with whom they did business.

A scoring system was used to rate the sources of risk; the most important source was given a score of 1, the second most important a score of 2, and so forth. Climatic variations had the highest average rank, 1.3, while the actions of people with whom the farmers do business had the lowest average rank, 4.4. Insects and disease had a slightly higher rank than did changes in the farm program, and thus was considered to be a slightly more important source of risk.

#### METHODS OF MEETING RISKS

In order to get some idea of how these farmers have met the risks of dryland farming in the area, the question was asked, "Suppose I were a young farmer from East Texas who moved in as a neighbor and came to you for advice on how to meet the risks of farming here, what would you tell me?" The responses are summarized in Table 8. Being flexible in adjusting to weather conditions was the answer given by 45 percent of the farmers. They indicated that successful farming in the area is a matter of living with the weather and not fighting it. Timeliness of operation to take advantage of favorable weather conditions was one of the major ways of being flexible. Keeping household and business expenses low was given by 38 percent of the farmers. This is related closely to the next most mentioned item, expecting some bad years and building up cash and feed reserves. The farmers thought this action would help reduce the possibility of having to assume heavy fixed payments or expenses when the bad years did come. Not going heavily into debt also is related to this idea.

Thirteen percent of the farmers said they would advise the young farmer to follow his neighbors' examples. Twelve percent of the farmers indicated that it would be desirable to keep some livestock. A few suggested a substantial livestock program but most of the farmers suggesting livestock indicated just a few for home use. Many of the farmers not suggesting livestock

TABLE 8. ADVICE FARMERS WOULD GIVE A YOUNG FARMER TO MEET RISK

Method	Percent of farmers giving method
Be flexible and adjust to weather	45
Keep home and business expenses low	38
Expect some bad years and have cash or feed reserves	18
Do not go heavily into debt	13
Watch neighbors	13
Keep some livestock	12
Prevent wind erosion and maintain soil productivity	11
Work hard	10
No advice	7
Other	6

emphatically pointed out the reasons they did not have a substantial livestock program. They believed that if they did have a livestock program and had a crop failure, the cost of buying feed for the livestock would more than offset any benefits made during the years when there was a good crop. Eleven percent of the farmers mentioned preventing wind erosion and maintaining the soil productivity. They indicated this by such statements as, "If you treat this soil right it will treat you right." Ten percent of the farmers gave the advice of working hard. Perhaps this can be related to item Number 2 of keeping expenses low. Seven percent of the farmers did not want to give advice or had no advice to give.

#### Use of Credit

Scarcity of owned capital is one of the major problems farmers face in making adjustments. Borrowing is one way farmers can increase the amount of capital they control.

#### AMOUNT, SOURCES AND TYPE OF CREDIT OUTSTANDING

Information was obtained from each farmer on the amount of credit he had outstanding at the time of the interview. Despite the recent severe drouth, 39 of the 82 farmers or nearly one-half, were entirely free of debt. The amount of credit outstanding for the other farmers averaged about \$8,500 per operator. About three-fourths of this average amount was secured by real estate mortgages while the remainder was either secured by chattel mortgages or was unsecured. This probably understates the importance of non-real estate credit used. Since the interviews with the farmers occurred in January, many had recently repaid loans obtained for crop production purposes. Consequently, crop production loans were at or near the seasonal low.

Of the total amount of debt outstanding, approximately 21 percent was held by commercial banks. Insurance companies, the Federal Land Bank and individuals each held about 15 percent while the Farmers Home Administration held 12 percent. The remainder (about 21 percent) was divided among production credit associations, merchants, dealers and miscellaneous lenders.

Typically, the younger operators are most deeply in debt. The older farmers, if they have made normal financial progress, usually have repaid most of the heavy debts incurred when they started farming and also are more hesitant to incur new heavy obligations because of a shorter productive life expectancy. This tendency of heavier debt obligations for younger operators was evident among the dryland farmers in Dawson and Howard counties. The debt outstanding for farmers less than 50 years old averaged \$10,655, which was more than two and one-half times greater than the average of \$3,962 for farmers of 50 and over.



## AVAILABILITY OF CREDIT

Many dryland farmers have not made adjustments which they believe would be profitable because they had not accumulated the necessary capital. Even though they believe that the capital could be used profitably, they may not borrow additional capital to make adjustments because of two reasons: (1) they are unable to obtain credit, or (2) they are unwilling to assume the additional risks which they believe borrowing might involve. One of the objectives of this study was to obtain information on the relative importance of these two factors.

Each farm operator was asked whether he had been able to obtain all the credit he had asked for and would like to use. Of the 82 farmers, 73 or about 9 out of 10, replied that they had been able to get all the credit for which they had asked. Seven replied that they had not been able to get all the credit they wanted, while two were noncommittal.

Although these data indicate that most of the farmers had been able to obtain all the credit they wanted, the replies may be misleading. Several of the operators who stated that they had not been refused credit did indicate that lending agencies advised them against borrowing for certain projects which they had in mind. This usually was done during informal discussions and reviews of farming operations and plans; the operators did not consider it a refusal of credit. Most of the operators spoke favorably of the attitude of their lending agencies in granting operating loans and of their cooperation and forbearance during the drouth.

With respect to real estate credit, however, comments from some farmers were not quite as favorable. The major difficulty was in the small amounts which lending agencies would loan compared with the amounts purchasers were forced to pay for land. The differences were so large as to create a major capital hurdle to some of the farmers who wished to purchase land. Nevertheless, the information from these farmers indicated that reluctance to use credit was probably more important than the policies of lending agencies in restricting the greater use of borrowed capital for adjustment purposes. Most of the farmers were adverse to heavy debt obligations, and it is questionable whether many of them actually would have used more liberal real estate credit even had it been available.

## ATTITUDES TOWARD THE USE OF MORE CREDIT

Many dryland farmers refrained from using more credit for adjustments which they believed would be profitable because they thought that use of more credit would involve additional risks they did not wish to assume. One factor contributing to the risk of using more credit is the interest rate or cost. Each of the 82 farmers was asked if he would use more credit for production pur-

poses if interest rates were only 4 percent, if they were 2 percent and if they were zero.

Slightly more than one out of four (28 percent) farmers replied that they would use more credit if interest rates were reduced to 4 percent. A slightly larger proportion, 34 percent, would use more credit if interest rates were 2 percent while 35 percent would use more credit if interest rates were zero. These data indicate that interest rates were not a deciding factor in influencing the decisions of the majority of the farmers regarding the use of credit for production purposes.

Each farmer also was asked if he would use more credit to buy land if interest rates were 4 percent, if they were 2 percent and if they were zero. A larger proportion of farmers indicated that interest rates would make a difference when land purchases were concerned. Nearly two out of three, 63 percent, indicated that they would use more credit if interest rates were only 4 percent. Nearly three out of four, 73 percent, said they would use more credit if interest rates were 2 percent, and the same number said they would use more credit if interest rates were zero. Possibly these data are more a reflection of farmers' interest in acquiring more land than an indication of the extent to which more credit for land purchases might be used if interest rates were lowered. It seems likely that high land prices and difficulty in finding land available still would be highly important in preventing many operators from purchasing farms. When answering the preceding question many operators probably had in mind situations where they thought land prices would be favorable and land would be available for purchase.

The interest rate or cost is only one of the considerations which may limit the use of borrowed capital. When a farmer borrows money, he obligates himself to certain repayment commitments, consisting of both principal and interest. The uncertainty of being able to meet repayments may be an important impediment to the use of credit for adjustment purposes in areas of extreme weather variability such as the High Plains. Variable repayment plans possibly may reduce this uncertainty. For example, repayment schedules, instead of being fixed, might vary according to crop yields or income. Thus loan repayments would fluctuate with repayment ability and would not constitute an inflexible obligation which the borrower might be required to meet regardless of the amount of his income.

To check on how important variable repayment terms might be in reducing the uncertainty involved in using credit, each of the 82 operators was asked if he would use more credit if repayment terms were more flexible. Forty-six percent replied that they would use more credit; 45 percent replied that they would not, and 9 percent were noncommittal. A number of those who indicated that they would not use more credit stated that the policies of their lending agencies

were flexible already; these agencies merely renewed or extended the loans when a poor crop year made repayment extremely difficult or impossible. Consequently, they felt a schedule calling for variability would have little additional effect in reducing the uncertainty they faced.

## Implications of Findings

This study indicates that dryland farmers in the High Plains have made considerable progress in adjustments in size of farm. Nevertheless, major problems exist which retard a more rapid rate of change. Some of the problems involve forces which are outside the control of the operator. For example, the demand for available land is so great that the farmer with a small acreage is fortunate if he can purchase additional land at a price he feels justified by potential earnings and within the range of his capital. The intense competition for land usually results in available tracts going to those with the most capital.

The difficulties encountered in expanding size through the acquisition of more land suggest that an alternative possibility might be a more intensive use of existing resources. Since the labor of many cotton farmers is not fully utilized during the winter, time is available for supplementary enterprises such as livestock feeding. Moreover, the High Plains is an area of surplus grain production. Research conducted by the Texas Agricultural Experiment Station indicates that there is an opportunity for profitable marketing of grain sorghum through feeder cattle. The results of this research are given in TAES Bulletin 880, "Economics of Cattle Feeding Systems for West Texas."

The results of the survey among dryland farmers, however, indicate that many operators usually do not keep livestock. The uncertain feed supply was the reason given most frequently by farmers for not keeping cattle. They could not anticipate very far ahead how much homegrown feed might be available for livestock. To purchase feed during years of short supply means the use and risk of more capital and greater uncertainty. During years of heavier rainfall and greater feed supplies, the demand for cattle in the area is greater, resulting in higher prices for feeder cattle and lower margins. This type of operation requires considerable knowledge, skill and experience. Many of the crop farmers did not have this background and generally were indifferent or skeptical to the suggestion that livestock might have a greater place on their farms.

Since uncertainty and lack of knowledge appeared to be major factors retarding the use of more livestock, there appears to be a need for more research and education in this area. More information is needed on the importance of livestock as a means of using resources more productively.

More information also is needed on the types of livestock systems and management specifically adapted to dryland farms, the resources needed and the probabilities of profits or losses under each system.

One means of reducing some of the costs and uncertainties of livestock feeding on dryland farms might be to store grain and silage during wet years for feeding during periods of drought when more time would be available and the cost of feeder cattle might be lower. A few of the farmers were considering this type of operation but had refrained from it because they were uncertain of the results. More research could reduce this uncertainty.

This survey indicates that most of the farmers in the area can obtain all the nonreal estate credit they wish to use. Most also have had little difficulty in obtaining real estate credit providing they had sufficient capital to pay the difference between the purchase price of land and the maximum loan values of the lending agencies. More liberal loans, however, might have a limited effect in relieving the capital problems of farmers who wish to increase the size of their land holdings. There is not only the question of whether the income from the land would be sufficient to repay larger loans, but also whether the higher values might eventually result in the bidding up of land prices to even higher levels and leave the farmers who have limited capital no better off than before. More adequate information on the probable levels and variability of agricultural income with different sized units would do much to relieve this uncertainty. Information of this nature also should help reduce some of the uncertainties faced by lending institutions.

The survey also indicates that many dryland farmers have been using either no credit or very limited amounts. In fact, a number of them suggested conservative use of credit as one of the ways of reducing the risks and uncertainties faced by farmers in the area. Farmers often refrain from using credit to make adjustments because they feel that an increase in debt will increase their risks. However, in some instances the productive use of credit actually may reduce rather than increase the risk and uncertainty which farmers face.

An example of the effects of productive credit use upon income are illustrated in Figure 5, in which annual reinvestment income on a 240-acre owner operated debt free dryland cotton farm is compared with annual reinvestment income on a 480-acre mortgaged farm, over the 41-year period 1916-1956. Reinvestment income was computed by subtracting from gross farm income the cash "out-of-pocket" expenses for crop production, family living and mortgage repayments. This information was developed from data given in TAES MP 236, "Income Variations Due to Yields on Cotton Farms on the High Plains of Texas."



In computing annual income, 1955 prices, costs and land use were assumed and actual historical yields of cotton and grain sorghum at the Big Spring station were used.

The mortgage on the 480-acre farm was assumed to be a 20-year amortized loan of \$24,000 bearing an interest rate of 5½ percent. Annual payments on this loan would amount to \$2,009. This amount was deducted each year from income. Actually, a 20-year term loan would not be outstanding over the entire 41-year period. Loan repayments were deducted from income for each of the 41 years because the purpose of this analysis is to give a comparison of the risk faced by the operator of a 240-acre debt-free farm and of a 480-acre mortgaged farm regardless of when the debt might have been incurred.

Figure 5 shows the reinvestment incomes over the period considered for each size of farm. Even with the heavy mortgage payment subtracted, the operator of the 480-acre farm would have fared better than the operator of the 240-acre tract except during periods of severe drouth such as in 1917-18 and 1951-56. During these periods, substantially heavier losses would have incurred on the larger farm. The extent to which the operator might be more vulnerable during periods of drouth would depend upon the reserves which he might have accumulated during the years of high income and upon the willingness of the lending agency to carry him over the period of adversity. As indicated previously, most of the operators contacted in this survey indicated that lending agencies in the area did not insist upon a rigid schedule of repayments during the recent drouth period. This analysis indicates that most 480-acre farm operators should have little difficulty in recovering losses and in paying delinquent loan installments over time with 1955 costs and prices.

While the owner of a 240-acre farm would have smaller losses during periods of severe drouth than the owner of a 480-acre mortgaged farm, he also would have less opportunity to build up reserves during periods of more plentiful rainfall. This is true even when differences in expenses for machinery and equipment are considered. Because of smaller income prospects over time, lending agencies might be more reluctant to finance the 240-acre operator during periods of drouth or sickness when necessity might force him to seek credit. Furthermore, he might be more vulnerable to a rising cost trend because he does not have the volume of business necessary to operate successfully on narrow margins.

The foregoing analysis suggests that in this instance the use of credit to enlarge the size of a 240-acre farm unit, particularly by the younger operator, is likely to reduce rather than increase risks, providing the operator exercises prudent

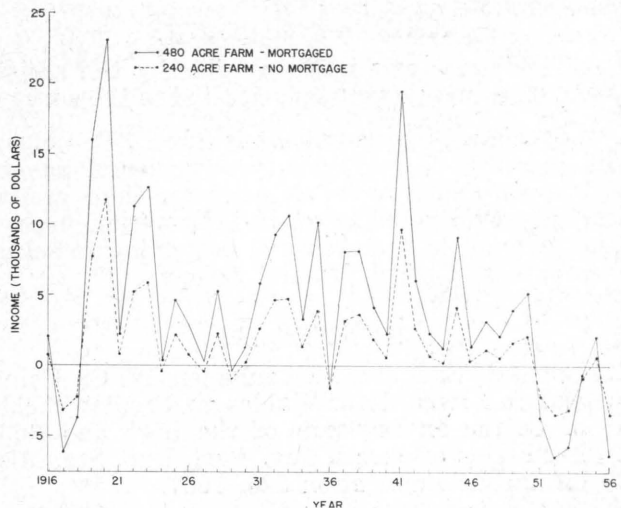


Figure 5. Annual reinvestment income on a 480-acre mortgaged farm compared with annual reinvestment income on a 240-acre farm with no mortgage, 1916-56.

financial management. Prudent management means that the operator must not squander all the earnings of lush years in nonfarm expenditures. High priority should be given to replacing needed items of machinery and equipment, to making needed farm improvements, and to building up reserves for the years of low yields. Allowances for some flexibility in loan repayments also are important.

One major instance where use of credit to enlarge the size of the farm unit might increase rather than reduce the risk would be where the operator made the purchase immediately prior to a prolonged period of drouth and consequently had little opportunity to build up reserves. For this reason, the vulnerability of the operators would be less if they did not incur heavy real estate debt obligations until they had major items of machinery and equipment paid for. Furthermore, weather records indicate that periods of prolonged drouth as occurred during 1951-1956 are rare. This suggests that the probabilities are small for such a pronounced drop in income as is shown in Figure 5 for that period.

Many farmers prefer to follow courses of action which appear likely to give the least chance for heavy losses, even though the chances for a higher income also are smaller. The purpose of the preceding discussion was to point out that there may be instances where remaining on a small farm unit may involve greater chances for insolvency than using credit to enlarge the size of farm. With the rapid changes which are occurring in agriculture, it is likely that the operators of small farm units who have no sources of outside income will find it increasingly difficult to meet the expenses for farm operation and family living. This is a point that many operators on small sized farm units need to consider.

## Acknowledgments

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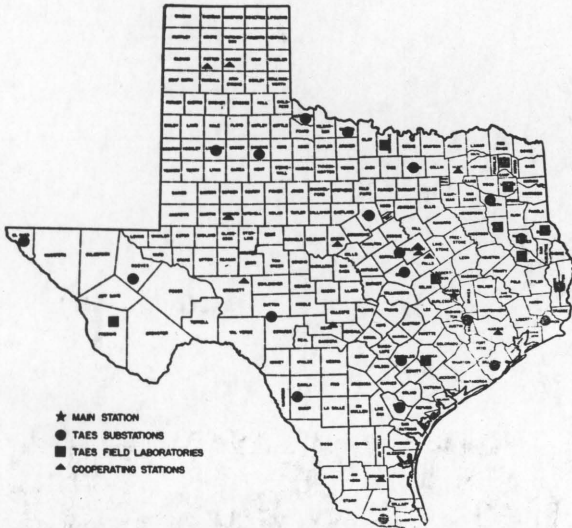
## References

1. Burnett, Earl and Moldenhauer, W. C., Using Rainfall Records as Guides to Predict Yields of Cotton on Drylands of the High and Rolling Plains of Texas, Tex. Agri. Exp. Sta. Miscellaneous Publication 223, 1957.
2. Hildreth, R. J. and Thomas, G. W., Farming and Ranching Risk as Influenced by Rainfall, Tex. Agri. Exp. Sta. Miscellaneous Publication 154, 1956.
3. Hughes, W. F., Keating, F. E., Jones, J. H. and Moldenhauer, W. C., Economic Returns from Grain Sorghum Fed to Steer Calves on Dryland Farms of the High Plains, Tex. Agri. Exp. Sta. Miscellaneous Publication 295, 1958.
4. Magee, A. C., Marion, P. T., Fisher, C. E. and Hughes, W. F., Economics of Cattle Feeding Systems for West Texas, Tex. Agri. Exp. Sta. Bulletin 880, 1957.
5. Martin, J. R. and Hildreth, R. J., Income Variations Due to Yields on Dryland Cotton Farms on the High Plains of Texas, Tex. Agri. Exp. Sta. Miscellaneous Publication 236, 1957.



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