



- Tenure and Mechanization of
- *the Cotton Harvest,*
- Texas High Plains

in cooperation with the  
UNITED STATES DEPARTMENT OF AGRICULTURE

## S U M M A R Y

Cotton farmers on the High Plains of Texas are unable to rely on either all handpulling or all machine-stripping. Handpulling depends on the timely appearance of an adequate supply of migratory workers who will stay through the season. Machine-stripping depends on a frost early enough to permit harvesting over a period of 4 or 5 weeks. The advantage of one method over the other may shift from season to season, depending on such factors as the size of the labor supply and level of wage rates for handpulling, yield of cotton, particularly on nonirrigated land, and date of the first killing frost.

An additional set of factors affects the method of harvest that the individual farmer will use. These include the presence on the farm of workers skilled in handling machine operations, whether he is willing to risk waiting until he can machine-strip and whether he owns or rents his farm.

In 1951 and 1952, 8 percent of the farmers handpulled their entire crop; in 1951, 8 percent machine-stripped their entire crop and in 1952, 16 percent did so. The remainder handpulled part of their crop, then stripped the balance. In 1951, a severe labor shortage was anticipated but failed to materialize; in 1952, the labor supply was adequate as expected. Handpulling rates in 1951 ranged from \$1.50 to \$2.00 per hundred pounds of seed cotton; in 1952, the range was \$1.50 to \$1.75. The first killing frost in 1951 occurred October 31. In 1952, the first killing frost was on October 7. In 1951, irrigated cotton yielded .98 bale per acre; nonirrigated cotton, .27 bale. In 1952, irrigated cotton yielded .83 bale per acre and nonirrigated cotton, .17 bale.

The plentiful supply of labor and lower wage rates in 1952 reduced the economic advantage of stripping. The early first frost in 1952 permitted farmers to machine-harvest their entire crop, or to handle it as they wished. The first frost in 1951 came after a large part of the crop had been handpulled. Light yields in 1952 made machine-harvesting relatively expensive, yet handworkers would have been unable to make subsistence wages in much of the nonirrigated cotton.

Tenancy appeared in both the 1951 and 1952 surveys as an obstacle to the use of mechanized methods, more so in 1951. The basic effect of tenancy evolves from the customary share-rental arrangements in the area. Returns from a share-rented farm are divided between two parties. If either wants to be certain of his money he will put on pressure to expedite the harvest. The pressure in favor of early handharvesting is greatly reduced, however, if machine operations can begin early in the season.

Landlords seriously object to machine-harvesting because it may result in grade losses and reduce their returns, while a saving in harvesting costs accrues only to the tenants. Recent analyses indicate, however, that grade losses are a matter of time of harvesting rather than of method.

The influence of tenancy on mechanization varies from year to year, depending on such factors as the date when machine-harvesting can be started; the yield of the crop, particularly on nonirrigated acreages, and the proportion of irrigated and nonirrigated acreage farmed by tenants.

Tenants stripped 26 percent of their cotton in 1951 and 41 percent in 1952; owners stripped 68 and 45 percent of their cotton, respectively.

The 1952 season indicates the proportion of machine-harvesting that tenants are likely to use when they are under minimum pressure as to method of harvest. This proportion is approximately the same as that for owner-operators.

The 1951 season shows the effect of tenancy in a year when the frost comes late. Landlords become anxious over grade losses and encourage tenants to handharvest. Tenants with small resources also may prefer not to risk waiting to harvest by machine.

Seasonal factors also influence the selection of harvesting methods by owner-operators, but they are better able to make their choice according to the economic advantage of one method over another.

Farmers generally regard stripping as a method for the final clean-up rather than for the entire harvest. These attitudes do not vary greatly with tenure groups. The method used by tenants might be made to correspond more closely to their preferences if the economic disadvantages to landlords were changed by revisions in rental contracts. These should afford protection to landlords in years of late frosts and consequent grade losses.

Strippers in the High Plains were not put to maximum use in 1951 and 1952. If ginning facilities were adequate to handle all stripped cotton with little delay, strippers could be used nearer to their capacity and farmers might be able to place more reliance on machine methods.

Present harvesting methods call for two distinct labor forces. Handpulling is done largely by seasonal workers who come into the area in crews from South and East Texas. Machine-harvesting operations are largely done by the farm family and regular hired workers. Sufficient employment must be provided for the hand workers to keep them coming in year after year. This necessarily reduces the extent of machine-harvesting.

Workers skilled in the operation and maintenance of mechanical equipment are of increasing importance. Yet the movement of such workers away from High Plains farms in 1951 and 1952 was heavy despite special profit-sharing arrangements designed to hold them.

# *Tenure and Mechanization of the Cotton Harvest, Texas High Plains*

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A SURVEY OF LABOR USE ON COTTON FARMS ON THE High Plains in 1951 indicated that manpower requirements had been greatly reduced through the use of mechanized harvesting equipment.<sup>1</sup> Forty percent of the cotton crop in the sample counties, Lubbock and Crosby, was harvested mechanically in that year. The other 60 percent was handpulled by an estimated 58,000 workers. The use of mechanized equipment varied significantly, however, from farm to farm and particularly with the tenure status of the farm operator. Full owners harvested more than two-thirds of their cotton by machine while tenants machine-harvested only one-fourth. This difference pointed to the need for a more intensive study of tenure aspects of cotton harvesting on the High Plains, especially to determine whether rental agreements or some other aspect of the tenure relationship restricted the use of mechanized methods in the harvest.

## THE 1951 AND 1952 SURVEYS

The 1951 survey was designed to check the efficiency of manpower use in the tight labor situation that accompanied the conflict in Korea. It was made on the High Plains, which exemplified a labor-deficit area in which any sizable manpower deficiency might affect farm production. This survey indicated the importance of mechanized harvest equipment in reducing manpower needs. It pointed up the important role that the farm family and regular hired workers play on mechanized cotton farms. The results also pointed to the land tenure system as an apparent cause for less machine-harvesting and consequently for a less effective use of available manpower.

The major objective of the resurvey made during the 1952 season was to recheck the relationship between tenure status and mechanization of the harvest, and to ascertain whether tenancy acted as a hindrance to the adoption of mechanized methods. The resurvey would also check the other significant factors that enter into the decision to harvest mechanically or by hand methods.

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<sup>1</sup>"Cotton and Manpower, Texas High Plains," Joe R. Moth-  
eral, William H. Metzler and Louis J. Ducoff, Bulletin  
762, Texas Agricultural Experiment Station. 1953.

The same farmers who had reported in 1951 were called on again in 1952 to obtain comparable results for the two seasons. Several factors affected the comparability of results of the 1951 and 1952 surveys. Returns were obtained in 1952 from only 294 of the 324 farmers who had reported in 1951. A few of the 1951 respondents had moved outside the survey area; others had lost their crops entirely because of adverse weather. A few more were away on business or could not be contacted for other reasons.

Some farmers came under a different classification in 1952 than they had in 1951. Two ten-

## CONTENTS

	Page
Summary.....	2
Introduction.....	3
The 1951 and 1952 Surveys.....	3
The 1951 and 1952 Seasons.....	4
Changes in Harvesting Methods, 1951 to 1952.....	5
Tenure and Methods of Harvest.....	5
Farmers' Explanations for 1951	
Harvest Patterns.....	6
Preferences as to Method of Harvest.....	6
Reasons for Preferences.....	7
Types Planted.....	8
Rental Arrangements.....	8
Irrigation and Yields as Factors in the Method of Harvest.....	9
Wage Rates as Factors in the Method of Harvest.....	10
Wage Rates, 1951 and 1952.....	10
Labor Supply Aspects.....	11
Source of Hand Labor.....	11
Labor Turnover.....	11
Extension of Tenure Rights to Regular Farm Workers.....	12
Other Factors that Affect the Method of Harvest.....	12
Relationship of Tenancy to Other Factors.....	12
Method of Sampling.....	13
Acknowledgments.....	14
Appendix.....	14

ants had become owners. Three full owners had rented land, so that in 1952 they were classified as part owners. The largest number of changes came because farmers increased their cotton acreages. In 1951, 27 percent of the farmers interviewed had less than 125 acres in cotton; in 1952 only 19 percent had less than that number (Table 1). The proportion of farmers who had medium-size acreages (125 to 249 acres) and large acreages (more than 250) each increased by 4 percent.

Changes in size of farm operations were generally in the direction of larger acreages in cotton. Cotton was highly profitable and, in addition, some farmers desired to build up a large acreage base in view of probable acreage allotments in future seasons. Sometimes this meant a reduction in land in grain sorghum, wheat or other crops; at other times it meant adding additional land to the farm or even moving to a different farm. Eleven of the operators contacted in 1951 were on different farms in 1952, 11 more had rented-in additional acres and 3 had bought more land.

### THE 1951 AND 1952 SEASONS

Growing conditions on the High Plains vary from year to year, with changes in rainfall, in the blowout of crops and other weather factors. Harvesting methods must be adapted to yields, the size of the harvest labor force and the level of handpulling rates. The use of machine methods also depends on the date of the first frost and the capacity of the local gins.

Yields on the High Plains were good in 1951 but a severe labor shortage was anticipated. The Armed Forces and defense industries had taken many seasonal and regular workers out of the farm labor force. Furthermore, Texas farmers

TABLE 1. CHANGE IN CHARACTERISTICS OF SAMPLE FARMS, LUBBOCK AND CROSBY COUNTIES, 1951-52

	Number of farms		Percent of farms	
	1951	1952	1951	1952
	— Number —	— Percent —		
Farms reporting	324	294	100	100
Tenure of operator				
Full owners	97	99	30	34
Part owners	78	47	24	16
Tenants and others	149	148	46	50
Size of cotton operation				
Large (250 acre and over)	110	113	34	38
Medium (125-249 acre)	126	125	39	43
Small (Under 125 acre)	88	56	27	19
Irrigation <sup>1</sup>				
None	96	74	30	25
Up to half	33	27	10	9
Over half	119	75	37	26
All	76	118	23	40

<sup>1</sup>Figures relate to irrigation of harvested cottonland. No record was obtained on the irrigation of all acres planted or acreage abandoned. Abandonment of nonirrigated acreages was not unusual in 1952.

had increased their cotton planting 75 percent over the previous year. The routes of migratory handharvesting crews lead first to South, then to Central Texas and finally north to the High Plains. Farmers on the Plains anticipated that only a trickle of the usual stream of harvest workers would arrive in time to handpull their cotton. Many prepared to use artificial defoliants if an early frost did not defoliate their cotton.

The anticipated labor shortage failed to develop. Drought had resulted in light yields of cotton in all producing areas between the Lower Rio Grande Valley and the High Plains. Many farmers on the High Plains, still apprehensive about the labor supply, raised their picking rates during the season to attract and hold handpulling crews.

A second important aspect of the harvest situation is the weather. A killing frost or a series of light frosts is necessary to deaden the leaves and permit efficient stripper operation. About 10 days after such a frost, farmers can begin to change from handsnapping to machine-harvesting. The average date for such a frost is November 4, but in some years it does not occur until late in the month. In such years, cold weather is likely to hamper farmers in completing the harvest, and grade and price losses are severe. In 1951, the first killing frost occurred on October 31 and strippers were in the fields by November 10. The major problem was lack of ginning capacity to handle all the cotton brought in from the strippers. So the season was favorable and the harvest was practically complete by December 10.

The 1952 season followed a significantly different pattern. Plantings were heavier than in 1951, but growing conditions were less favorable. Yields across the State were expected to be below normal; on the High Plains they were expected to be down by at least 20 percent. As a result, farmers had less concern about the adequacy of the labor supply. Doubts were still further allayed by increased facilities for bringing imported labor onto the High Plains. The relatively plentiful supply of labor kept wage rates below those of 1951.

The heavy frost of October 7 permitted machine-harvesting to begin by the middle of October. A frost that early in the season meant that High Plains farmers would be able to harvest their entire crop by hand or by machine as they wished. Their choice, however, was affected by the fact that handsnappers were already at work in some fields, and that some farmers had already made work commitments with crews for the harvest season, or at least for the first time over the field. No doubt some tenants were committed to landlords to handpull all or part of the crop.

Irrigation also must be considered in any examination of 1951 and 1952 data. Much of the increased planting in 1952 was on marginal nonirri-

gated land, which would yield a profitable return only if rainfall was favorable. Actually, some of this marginal acreage was abandoned because of the dry season and only 16 percent of the 1952 crop was obtained from nonirrigated land. In 1951, moisture conditions were more favorable and more of the crop—27 percent—was from non-irrigated acreages.

#### CHANGES IN HARVESTING METHODS, 1951 TO 1952

Analyses of machine-harvesting costs for 1947, 1948 and 1949 indicated that machine-harvesting of the entire crop ordinarily had an economic advantage over handharvesting.<sup>2</sup> Grade losses were more than offset by reduced harvesting costs. It was pointed out, however, that this economic advantage varied with several factors. Among these were the level of wage rates for handsnapping, the yield per acre of cotton and the size of a farm's cotton acreage. These factors may cause the economy of machine-harvesting to vary sharply from year to year.

High Plains farmers in 1952 were in a position to weigh the economies of stripping versus handharvesting and to select the method that would yield the highest return. Their decision was neither to handharvest their entire crop nor to harvest it all by machine. Instead, most farmers chose to go over all their good acreage by hand and then to strip it by machine on the second time over the field. Acreages with light yields were stripped by machine the first time over.

Forty-two percent of all bales harvested were machine-harvested in 1952, as compared with 40 percent the year before (Table 2). Yet since the crop was lighter in 1952, fewer bales were stripped than in the previous year. Eight percent of the farm operators handpulled all their cotton in

<sup>2</sup>"Economics of Mechanical Cotton Harvesting in the High Plains Cotton Area of Texas," M. N. Williamson, Jr., Q. M. Morgan and Ralph H. Rogers, Bulletin 735, Texas Agricultural Experiment Station. 1951.

both 1951 and 1952, but 16 percent stripped all their cotton in 1952, as compared with 8 percent in 1951. The percentage of farmers who combined handpulling with stripping, therefore was 84 percent in 1951 and 76 percent in 1952.

The most striking shift in harvesting methods was that full owners cut back on machine-harvesting while tenants increased their use of machines. Full owners machine-harvested only 45 percent of their cotton, as compared with 68 percent in 1951. Tenants machine-harvested 41 percent of their cotton, as compared with 26 percent in 1951.

More strippers were in use on the sample farms in 1952 than had been used in 1951—241 as compared with 230—but fewer bales were harvested per stripper—65 as compared with 83 (Table 3).

Apparently little effort was made to use strippers to their potential. In the 1952 season, they were used for an average of about 18 days. Counting use on the home farm only, one-fourth of the strippers were used for less than 10 days and one-third more for less than 20 days. Fewer than 10 percent were used for more than 30 days during the season. In other words, strippers were used by most farmers for cleanup work rather than to harvest the bulk of their crop.

Use of strippers off the home farm was common. Twenty-eight percent of the farmers used their strippers on one or more farms other than their own. The fact that only 16 percent of all bales stripped were from other than the home farms indicates that these jobs ordinarily were not large.

#### TENURE AND METHODS OF HARVEST

The fact that in 1951 owner-operators on the High Plains machine-harvested between two and three times as much of their cotton as did tenants stamps tenancy as a major obstacle to mechanization of the harvest in the area. In that

TABLE 2. METHOD OF HARVESTING COTTON, BY IRRIGATION, SIZE OF FARM AND TENURE OF OPERATOR, SAMPLE FARMS, LUBBOCK AND CROSBY COUNTIES, 1951-52

Irrigation, farm size, tenure	Total farms reporting		Proportion of bales					
			Handpulled first time over		Handpulled second time over		Harvested by machine	
	1951	1952	1951	1952	1951	1952	1951	1952
All bales	324	294	51	46	9	12	40	42
By type of land								
Irrigated	195	193	52	47	9	13	39	40
Nonirrigated	129	101	49	40	9	4	42	56
By size of farm								
Large	110	113	52	45	13	12	35	43
Medium	126	125	36	48	7	11	57	41
Small	88	56	78	41	6	13	16	46
By tenure								
Full owners	97	99	26	43	6	12	68	45
Part owners	78	47	57	44	13	13	30	43
Tenants	149	148	64	48	10	11	26	41

TABLE 3. USE OF MACHINE-STRIppers IN THE COTTON HARVEST, SAMPLE FARMS, LUBBOCK AND CROSBY COUNTIES, 1951-52

Item	1951		1952	
	Number	Percent	Number	Percent
Total farms surveyed	324	100	294	100
Farms with strippers	218	67	226	77
Farms on which work with strippers was done	296	91	270	92
All work	28	8	46	16
Part of it	263	83	224	76
None	28	8	24	8
Total strippers on sample farms	244	100	249	100
Strippers used	230	92	241	97
Farmers who used strippers on other farms	60	28	63	28
Number other farms used on	90	28	89	28
Farmers who used strippers on				
One other farm	43	20	46	20
Two other farms	12	6	13	6
Three or more farms	5	2	4	2
Total bales harvested on home farm with strippers	18,703	100	16,015	100
With own strippers	17,168	92	13,567	85
With custom strippers	1,535	8	2,448	15
Average number bales harvested per stripper	83	65		
On home farms	75	56		
On other farms	8	9		
Average number of days on which each stripper was used	1	18.4		
Days on home farm	1	16.5		
Average bales harvested per stripper per day	1	3.5		

<sup>1</sup>Data for 1951 not available.

year, owners took advantage of a favorable economic margin associated with machine-harvesting. In contrast to tenants, they were in a position to use a stripper without clearing the decision with another party and to buy a stripper with the knowledge that they would be able to use the machine if in the future stripping appeared to be profitable.

The following year, the same group of owners and tenants machine-harvested approximately equal proportions of their cotton, which indicates that the relationship of tenancy to mechanization varies. In some years, tenancy appears to have little restrictive effect on the use of machine methods. The various factors that enter into a farmer's choice of harvesting methods were examined to discover these elements in this relationship. These factors include tenure, yields, wage rates, labor supplies and weather.

#### Farmers' Explanations for 1951 Harvest Patterns

In 1951 owners machine-harvested a great deal more cotton than tenants. When the High Plains farmers were asked why this had occurred, 86 percent replied that landlords were likely to object to machine-harvesting. Fourteen percent gave other reasons, such as reluctance of tenants to invest in strippers and the belief that tenants need the money from the crop at an earlier date than do owners.

One-third of the farmers gave no reason why they thought landlords might object to stripping; one-fifth said that landlords object to field and grade losses; 17 percent said the landlords objected because they made less money if cotton was stripped; 10 percent said that landlords want their money as early as possible. Other reasons given

were that a tenant might not strip because he would be charged more rent, landlords preferred to sell on an early market and some landlords felt that stripping was harmful to the land. There were no significant differences between reasons given by the various tenure groups.

#### Preferences as to Method of Harvest

Each operator in the sample was asked what harvesting method he preferred, assuming he had a freedom of choice. The answers indicated considerable resistance to increased use of machine-harvesting. Of the farmers, 62 percent preferred to handpull all or part of the cotton acreage once or more and then strip (Table 4). These operators said the present stripper is designed for "scrapping" operations, and under normal circumstances should be used for this purpose only. Another 16 percent preferred to handpull the entire crop. Twenty-two percent would strip the entire crop. Not included in these percentages are 28 farmers who said they would choose the most profitable method in any year.

Full owners expressed a preference for handpulling significantly more often than other tenure groups, with 22 percent making this choice. Only 13 percent of the tenants preferred handpulling. Tenants were more likely to prefer to machine-harvest the entire crop than were owners and part owners. Slightly more than one-fourth of the tenants had this preference, as compared with 22 and 12 percent of the owners and part owners, respectively.

Table 4 compares the overall preference pattern with the overall pattern of actual methods used, but does not measure the success of individuals in carrying out their preferred methods.

TABLE 4. METHOD OF HARVESTING PREFERRED AS COMPARED WITH METHOD ACTUALLY USED, BY TENURE, LUBBOCK AND CROSBY COUNTIES, 1952

Tenure, expressed preference and method actually used	All operators	Method of harvesting <sup>1</sup>			Percent
		Handpull entire crop	Handpull then strip	Strip entire crop	
All operators					
Preferred	100	16	62	22	
Used	100	8	76	16	
Full owners					
Preferred	100	22	56	22	
Used	100	13	67	20	
Part owners					
Preferred	100	14	74	12	
Used	100	5	77	18	
Tenants					
Preferred	100	13	61	26	
Used	100	6	80	14	

<sup>1</sup>Twenty-eight farmers stated only that they preferred the most profitable combination of methods in any year; three of these handpulled only, two stripped their entire crop and the rest used a combination of methods.

The patterns of preference and of actual use were similar. Comparatively small proportions of the farmers preferred either handpulling only or stripping only, and relatively few actually used each method. Operators tended to prefer both handpulling and stripping, and in each tenure group more farmers used this method than actually preferred it. Of the owners, 56 percent preferred to handpull and then strip, while 67 percent used the method. Eighty percent of the tenants handpulled and then stripped, although only 61 percent would freely have chosen this method.

Of the tenants, 26 percent preferred to strip their entire crop, but they were the least likely to carry out this practice. The proportions of owners who preferred to use stripping only and who actually did so varied only slightly.

Farmers who preferred to use handharvesting and stripping in combination were highly successful in following their preferences. Of the 164 farmers who preferred this combination, 87 percent used it. Most of the remaining 13 percent machine-harvested all of their crop. The tenure groups differed little in the proportions who used their preferred method of handharvesting and then stripping.

Farmers who preferred either handpulling only or stripping only had little success in carrying out their preferences. Forty percent of each group harvested according to their usual preference. Owners were slightly more likely to carry out their preferences than were part owners and tenants.

#### Reasons for Preferences

Reasons given by farmers in support of their preferences show disagreement as to the most profitable method. Most of the reasons given were associated with higher profits. Some farm-

ers simply wished to avoid labor problems; others were concerned with risk and harm to the land.

Forty percent of the farmers who expressed a preference for handpulling their entire crop most often contended that a better grade would result (Table 5). These farmers also gave better price in the early market, the avoidance of storm risk and reduction of waste as reasons for preferring to handpull the entire crop.

Reasons for preferring to handpull first and then strip were similar to those for handpulling alone. Farmers who would prefer to machine-harvest some of their cotton, however, appeared to regard stripping as an effective "clean-up" method for low-yielding fields and for scrapping acreages already handpulled. They felt that the combination of handharvesting and stripping had the basic advantages of each method.

Farmers who preferred to strip the entire crop said that the advantages of this method outweighed the advantages of handpulling. Specifically, 46 percent thought that avoiding labor problems was an important reason for their preference. Thirty-six percent said that the method was most profitable and, similarly, 39 percent gave a "cheaper harvest" as their reason.

"To get cotton out of the field early" was often given as a reason for handpulling. This reason has many implications. A farmer may wish to minimize the risk of weather losses, he may want to take advantage of the higher prices ordinarily associated with an early market or he may be acting in response to a landlord's wishes

TABLE 5. REASONS FOR PREFERENCE AS TO METHOD OF HARVESTING COTTON, OPERATORS OF SAMPLE FARMS, LUBBOCK AND CROSBY COUNTIES, 1952

Reasons for preference	All farmers	Farmers with each preference <sup>1</sup>		
		Number	Percent	Percent
All farmers giving reasons <sup>2</sup>	282	100	100	100
Better grade	99	35	40	44
Better price in early market	47	17	20	21
Less waste	52	18	28	22
Get cotton out of field early	29	10	10	14
More profit	42	15	8	10
Cheaper harvest	54	19	0	17
Avoid labor problems	30	11	0	2
Other reasons <sup>3</sup>	39	14	33	13

<sup>1</sup>Percentages do not total 100 because some farmers gave more than one reason.

<sup>2</sup>Twelve farmers gave no reasons for their preference.

<sup>3</sup>Other reasons were that stripping hurts land, given by five farmers; that landlords influenced decision, given by four farmers. Some farmers said that weather, the quantity and quality of the crop, the variety of cotton preferred and other similar facts affected their harvesting preference.

for early harvesting. But there is another aspect of this desire to harvest early. Many farmers prefer to have their money in their pockets as soon as possible. The crop still in the field is regarded as a "bird in the bush." Many farmers and others familiar with the High Plains believe that this preference for early money is a most important reason for the continued large volume of handpulling.

#### Types Planted

The three broad types of cotton the High Plains farmers may plant are: open boll, which usually has longer staple and higher grade but is highly susceptible to storm damage; "stormproof," which has lower grade and shorter staple than open-boll but whose bolls remain almost closed, giving it protection against storm losses; and storm-resistant, whose characteristics fall between the stormproof and open-boll types. No distinction is made between stormproof and storm-resistant types in this study since farmers generally place them in the same class.

The type of cotton planted influences the method of harvesting. Open-boll types usually are handpulled at least one time over because of the risk of storm damage if harvesting is delayed until machine-harvesting can begin. Stormproof and storm-resistant types may be handharvested, but the farmer may wait for machine-harvesting with some assurance that losses from storms will be relatively small.

Farmers of the High Plains, aware of these conditions of risk, fit their harvesting method to the varieties planted. Only 6 percent of the operators in the sample who planted all open-boll types stripped their entire crop. This proportion probably would have been even lower had not the very early frost allowed stripping at an early date. There also is the possibility that some open-boll types planted on nonirrigated land were machine-harvested because of poor yields. Twenty-five percent of those operators who planted all stormproof or storm-resistant types stripped the entire crop. Four percent of the farmers with all stormproof cotton handpulled their entire crop, as compared with 26 percent of the farmers with open-boll types only.

Open-boll types were planted on about 22 percent of the cotton acreage of the sample farms in 1952 (Table 6). Part owners planted the largest proportion of open-boll cotton, 26 percent. There was no difference between proportions planted by owners and tenants; each tenure class had about 21 percent of its cotton acreage in open-boll types. Within tenure classes, size groups varied considerably in the type planted. Thirty-five percent of the acreages of owners of small farms and part owners of medium-size farms were planted to open-boll types while other tenure-size groups had much smaller proportions of open-boll cotton. These differences, however, were observed for relatively small acreages, and they may have been more closely related to irrigation than to tenure

TABLE 6. COTTON ACREAGE PLANTED TO OPEN AND STORMPROOF TYPES ON SAMPLE FARMS, BY SIZE OF FARM AND TENURE OF OPERATOR, LUBBOCK AND CROSBY COUNTIES, 1952

Tenure and farm size	Total cotton acreage	Type of cotton	
		Open-boll	Stormproof
All farms	Acres 72,658	22	78
Full owners	19,338	21	79
Large farms	10,120	18	82
Medium farms	6,385	19	81
Small farms	2,833	35	65
Part owners	15,915	26	74
Large farms	12,970	24	76
Medium farms	2,713	35	65
Small farms	232	0	100
Tenants and others	37,305	21	79
Large farms	22,552	24	76
Medium farms	13,102	14	86
Small farms	1,651	25	75

status. (Open-boll types are planted more often on irrigated than on nonirrigated lands.)

#### Rental Arrangements

If tenancy remains as an obstacle to increased use of machine-harvesting, a part of the cause must lie in the rental arrangement. It is believed generally that some alterations must be made in customary rental arrangements before tenants can gain additional freedom of choice as to harvesting methods. Alterations are necessary because the landlord may receive less total rent when cotton is machine-harvested. (The advantages of machine-harvesting were stated by Williamson, Morgan and Rogers in their previously cited bulletin: "Owner-operators retain full advantage of the lower costs effected by machine use. On rented farms, the tenant benefited but the landlord did not. Returns to landlords during the study, excluding housing costs for migrant labor, averaged \$3 to \$4 less per bale when cotton was harvested mechanically.") A proposed alteration is that the tenant pay one-third rent on cotton that is machine-harvested. This suggestion is impracticable because the economic advantage of machine-harvesting is seldom great enough to allow an additional rent payment of one-third over one-fourth. Assuming a value of \$150 for a bale of cotton, a rent payment of one-third would be \$12.50 in excess of rent payment of one-fourth. Thus, the labor saving to the tenant would need to exceed \$12.50 a bale before he could consider harvesting by machine.

Another proposal is that the tenant pay all ginning costs on machine-harvested cotton instead of the customary three-fourths. The reasoning is that the fourth of the cost of ginning usually paid by the landlord approximates the landlord's part of the loss of grade, staple, yield and early market advantages when cotton is machine-harvested.

Detailed information on rental arrangements was not obtained in 1951. In 1952, however, it was found that relatively few tenants paid either

one-third rent on cotton or all of the ginning costs (Table 7). Ninety percent of the tenants paid one-fourth rent, 6 percent paid cash rent and 1 percent paid one-third rent. Four percent were in effect sharecroppers; they received 50 percent or less of the crop.

Thirty-one of the rental agreements, or 13 percent, called for payment of all ginning costs. Fifteen of these, however, were cash tenants; thus only 16, or about 7 percent, of the share tenants paid all ginning costs. (About 85 percent of the share-tenants harvested at least a part of their crop with a stripper.)

The 1951 experience suggested that the freedom of choice of tenants as to method of harvest was restricted somewhat by previous agreements with landlords as to types of cotton to be planted and method of harvesting to be used. However, 1952 rental arrangements seldom included such precise agreements. Only 3 percent of the landlords specified the type of cotton that the tenant should plant. (Specification of an open-boll type practically precludes machine-harvest as storm damage may occur before the cotton is ready for stripping.)

About 11 percent of the landlords restricted the method of harvesting through explicit agreement with the tenant. Few of these, however, demanded the use of handharvesting only. Most required that the cotton be pulled at least one time over by hand. Although few landlords and tenants had specific agreements as to method of harvesting, many tenants reported that they were aware their landlord preferred handpulling the first time over.

A fairly large number of tenants were related to their landlords; this relationship may account for some of the freedom of choice tenants appeared to have. However, perhaps because of limited observations, there was little relationship between type of landlord and nature of rental agreements.

## IRRIGATION AND YIELDS AS FACTORS IN THE METHOD OF HARVEST

Cost per bale for machine-harvesting cotton increases rapidly with lower yields. This can be observed from the comparative cost data compiled by Williamson, Morgan and Rogers for 1947, 1948 and 1949:

	BALES PER ACRE		COST PER BALE OF MACHINE-HARVESTING	
	Irrigated land	Non-irrigated land	Irrigated land	Non-irrigated land
1947	0.95	0.44	\$4.70	\$ 7.85
1948	.80	.21	5.25	15.95
1949	.98	.61	4.90	6.90

These data apply to cost of stripping when there has been no previous pulling. Costs per bale for snapping are considerably higher.

The authors calculated that it was advantageous for the farmers to machine-harvest all their cotton in the 2 good years, 1947 and 1949, but that handharvesting was more economical in the lean year, 1948.

These data cannot be fitted directly to the years 1951-52, but they will serve as a rough yardstick. Average yields for these 2 years were:

	BALES PER ACRE	
	Irrigated land	Nonirrigated land
1951	0.98	0.27
1952	.83	.17

On the basis of yield, it appears doubtful that machine-harvesting had any advantage over handharvesting on nonirrigated land in 1951 and on either irrigated or nonirrigated land in 1952. Yet the method used cannot be based always on economic advantage. Data were compiled for 1952 on the proportion of the cotton on irrigated and on nonirrigated land that had been harvested by machine. Fifty-six percent of the cotton from

TABLE 7. RENTAL ARRANGEMENTS BY SHARE OR RENT PAID, LUBBOCK AND CROSBY COUNTIES, 1952

Rental arrangement	All rental agreements	Cash only	Rental rate				Other <sup>1</sup>
			1/4 of crop	1/3 of crop	1/2 of crop		
Total	237	15	212	Number 3	5		2
Share of ginning costs paid by tenant							
All	31	15	15				1
3/4	199		197	1			1
2/3	2			2			
1/2	5		0	0	5		
Type of understanding							
On varieties <sup>2</sup>							
Yes	7		5		1		1
No	228	15	205	3	4		1
On method of harvest							
Yes	27		24	1	1		1
No	210	15	188	2	4		1

<sup>1</sup>One tenant paid one-fourth of handpulled cotton and one-third of machine-harvested cotton.

<sup>2</sup>Two tenants did not answer in regard to an understanding on varieties.

TABLE 8. RELATIONSHIP OF IRRIGATION TO TENURE AND TO METHOD OF HARVESTING COTTON, LUBBOCK AND CROSBY COUNTIES, 1952

Irrigation and tenure	Proportion of total bales from each type of land	Method of harvest		
		All methods	Hand-harvested	Machine-harvested
All bales	100	100	57	43
From irrigated land	84	100	60	40
Full owners <sup>1</sup>	90	100	57	43
Tenants	82	100	63	37
From nonirrigated land	16	100	44	56
Full owners	10	100	39	61
Tenants	18	100	41	59

<sup>1</sup>Data are not shown separately for part owners. Eighty-two percent of their bales were from nonirrigated land.

nonirrigated land had been harvested by machine, as compared with 40 percent from irrigated land (Table 8). Apparently many farmers went into their low-yielding fields with strippers without trying to handpull. As tenants had a considerable acreage in nonirrigated cotton, they may have been forced by circumstances to use machine methods in 1952.

#### WAGE RATES AS FACTORS IN THE METHOD OF HARVEST

The level of wage rates for handpulling has been a significant factor in promoting or delaying the adoption of machine harvesting. An abundant supply of labor at low wage rates in the 1930's delayed the trend toward mechanization. As handpulling rates mounted in the last decade, farmers reduced costs by changing over to machine methods. In recent years, however, wage rates have begun to decline and farmers again are weighing the costs of one method against the other.

#### Wage Rates, 1951 and 1952

Wage rates for the major seasonal operations in cotton dropped from 1951 to 1952. The most common rate for chopping cotton in both seasons was 60 or 65 cents an hour. In 1951, how-

ever, 28 percent of the farmers paid above this rate, as compared with only 11 percent in 1952.

Beginning rates for cotton pulling in 1951 varied widely from farm to farm. Thirty-seven percent of the farmers paid \$1.75 per hundred-weight of seed cotton, but 32 percent paid \$1.50 or less and 29 percent paid \$2.00 or more (Table 9). Forty-four percent of the farmers paid \$1.50, the most common beginning rate for 1952. But 35 percent paid \$1.75 and 14 percent paid \$2.00 or more.

Fifty percent of the farmers raised rates in 1951. These increases might be associated with a shortage of labor or the need to raise rates when a crew moves on to fields having lighter yields of cotton. Increases in rates were less numerous in 1952 despite the light yields. Only 32 percent of the farmers raised their rates.

In 1952, 13 percent of the farmers lowered their rates in the season, as compared with only 4 percent in 1951. Many farmers who paid \$1.75 or more at the beginning of the 1952 harvest lowered their rates during the season.

Pulling rates did not vary greatly with tenure of the operator or with size of the cotton operation (Appendix, Table A), but they differed materially on the basis of irrigation. Forty percent of the farmers on nonirrigated or mainly nonirrigated farms paid \$2 per hundred or above for handpulling, as compared with only 6 percent of those farmers on completely or largely irrigated farms. But rates on 48 percent of the irrigated farms were below \$1.75, as compared with only 25 percent of the nonirrigated farms.

The change in rates means that the economic advantage of machine-harvesting declined considerably from 1951 to 1952. The decline was even more than that from the years 1947, 1948 and 1949, which were used by Williamson, Morgan and Rogers as a basis for their conclusions. The most common rates were approximately:

Year	First time over		Second
	1947	\$2.25	\$2.50
1948	1.75-2.00	2.00-2.25	
1949	2.35	2.00	
1951	1.75	1.75-2.00	
1952	1.50-1.75	1.50-1.75	

TABLE 9. STARTING RATES FOR PULLING COTTON AND CHANGES DURING THE SEASON, SAMPLE FARMS, LUBBOCK AND CROSBY COUNTIES, 1951 AND 1952

Starting rate	Proportion of farmers who							
	Started at indicated rate		Paid starting rate all season <sup>1</sup>		Increased from starting rate		Decreased from starting rate	
	1951	1952	1951	1952	1951	1952	1951	1952
All farmers	100	100	46	54	50	32	4	13
\$1.25 - 1.35 <sup>2</sup>	2	7	0	31	100	63	0	6
1.50 - 1.65	32	44	24	50	76	43	0	6
1.75 - 1.85	37	35	53	51	45	23	2	25
2.00 - 2.10	26	13	64	87	22	3	13	7
2.25 and up	3	1	86	100	14	0	0	0

<sup>1</sup>Most increases and decreases were in terms of 25-cent intervals. A few were of 5 and 10 cents, a few were of 50 cents and one was of \$1.00.

<sup>2</sup>Although these figures are given as a range, all except a few farmers paid the first rate mentioned.

Data for the second time over in 1951 and 1952 are estimates on the basis of wage increases made during the harvest season.

A drop of 25 to 30 percent in handpulling rates can be effective in persuading farmers to handpull, especially when there are handworkers in the area who are willing to work at the lower rates.

Williamson, Morgan and Rogers supplied figures on handpulling rates which would be competitive with machine costs. These apply to the special conditions of the 1948 season but they may be used here for comparative purposes.

	Competitive handpulling rate	Actual rate
	1948	1952
Nonirrigated cotton		
First time over	\$2.05	\$1.75-2.00
Subsequent pulling	2.31	
Irrigated cotton		
First time over	1.48	1.50-1.75
Subsequent pulling	1.69	

No rates were obtained specifically, for "subsequent pulling" under "actual rate," but they would tend in the direction of the higher of the two rates given for the 1952 season.

The data indicate no extensive economic advantage of one method as over the other. Farmers could choose their method on the basis of convenience, preference or circumstances of particular tracts of land.

### LABOR SUPPLY ASPECTS

Labor is a key item in the cotton harvest on the High Plains, regardless of the method of harvesting. Farmers have habitually expressed concern over the supply of handharvesters. They learned in the recent periods of military emergency, however, that capable machine operators were even more vital to their farming operations.

The 1951 and 1952 surveys indicate remarkably similar patterns of labor use (Appendix, Table B). Two distinct labor forces are used in the cotton harvest on the High Plains. Handpulling is performed by hired seasonal workers, most of whom are brought to the area in crews. Machine-harvesting is largely a farm family or regular hired labor operation.

Evidently, High Plains farmers try to maintain both types of labor force. In a season with a late frost, machines would be at a disadvantage and handpullers would be essential. Yet the flow of handworkers can be kept coming only if a dependable proportion of the job is reserved for them even in those seasons when the entire harvest could be handled by machine. This practice necessarily limits the extent of machine-harvesting.

### Source of Hand Labor

Seasonal migration of workers to the cotton harvest in the High Plains is well established. Yet the numbers that come and the time of their arrival depend on seasonal and crop factors, which makes reliance on them uncertain. Time of harvest, earnings per day and similar factors at the locations in which they work before coming to the High Plains all play a part in their seasonal movement.

The sources of harvest labor in 1951 and 1952 were similar. Approximately four-fifths of the workers were Latin-Americans, largely from South Texas; 10 percent were Negroes, some of whom came from East Texas and others from Lubbock; and a small percentage were Anglo-Americans, who also moved in from South Texas (Appendix, Table C).

In 1952, farm operators found it less necessary to recruit harvest workers than in 1951. Forty-five percent of the crews they hired came to their farms looking for work (Appendix, Table D). Thirty-eight percent of the crews were obtained in this way in 1951. These figures do not include 17 percent of the crews which had continuing arrangements with farmers from year to year.

The easier labor situation in 1952 is reflected in the fact that only 13 percent of the farmers gave lack of labor as a problem in 1952, as compared with 93 percent in 1951.

### Labor Turnover

Loss of regular farm workers was ascertained for the entire period, June 1950 to June 1953 (Table 10). A total of 77 left the sample farms in these 3 years, almost twice as many in the second part of the period as in the first. Forty-two farm family workers also left the sample farms. Their movement was heaviest in the early part

TABLE 10. NUMBER OF FAMILY AND REGULAR HIRED WORKERS WHO LEFT COTTON FARMS, JUNE 1950 TO FEBRUARY 1952 AND MARCH 1952 TO JUNE 1953, LUBBOCK AND CROSBY COUNTIES

Reason for leaving	Total number of workers leaving		Regular hired workers		Members of farm operators family	
	June 1950-Feb. 1952	March 1952-June 1953	June 1950-Feb. 1952	March 1952-June 1953	June 1950-Feb. 1952	March 1952-June 1953
Total workers leaving	52	67	27	50	25	17
To go into Armed Forces	27	11	7	5	20	6
To go into nonfarm jobs	10	28	5	18	5	10
To take job on other farm	8	13	8	13	0	0
To farm for self	0	1	0	1	0	0
Other reasons	7	14	7	13	0	1

of the period, and most of them went into the Armed Forces.

Movement to nonfarm employment is of particular significance because ordinarily it means a permanent loss of skilled farm workers. Only 10 of the regular farm workers went into nonfarm jobs in the early part of the period but 28 did in the latter part. Movement of farm family workers to nonfarm work also increased.

Turnovers of handpulling crews is a problem particularly on farms with light yields. Yet it was less common in 1952 than in 1951. In 1951, approximately one-third of the crews left before their jobs were complete and in 1952 only one-fifth did so. Possibly farmers did not want to keep their handworkers as long as usual in 1952 because of the early frost.

#### EXTENSION OF TENURE RIGHTS TO REGULAR FARM WORKERS

As the use of machine methods calls for workers who are skilled in the maintenance and operation of the machines, farmers have devised special methods to keep such workers. One method common on the High Plains is to give them a share of the crop in addition to their regular cash wages. Persons who were paid in this way were regarded as regular hired workers rather than as sharecroppers. Yet enough of the sharecropper arrangement had been borrowed to stimulate a special interest in the operation of the farm business and to get the worker to stay through the entire crop season.

Of 187 regular hired farm workers on whom reports were obtained, half were paid on a strictly cash basis. Usually their pay was by the hour, but pay on a daily or monthly basis also was common. The most frequent rate of pay on an hourly basis was 60 cents; on a daily basis, \$6; on a monthly basis, \$150. These workers also frequently received housing and other perquisites.

The other half of the regular farm workers received some share of the crop in addition to their cash wages. The cash wages these workers received usually were somewhat lower than if they had been paid in cash alone. This usually was on a monthly basis of around \$100, but some workers were paid on an hourly, daily or weekly basis. In addition, they received a share of the proceeds of a given acreage of land. The shares varied so greatly that no common pattern can be presented. Typical shares were: 100 percent of the cotton from 5 to 25 acres, 75 percent of the cotton from 10 to 50 acres and 50 percent of the cotton from 20 to 100 acres. In general, workers paid their shares of cash costs of producing cotton on these acreages.

A few workers received no cash wage; they were paid in a share of the crop only. They were regarded by the operators as hired workers, however, rather than as sharecroppers.

Even though, in practice, such workers are not tenants but workers who receive a bonus in kind, they have some tenure rights in a certain acreage for the balance of the crop season. This hybrid type of arrangement increases labor costs. However, it appears to be especially well adapted to mechanized High Plains cotton farms, on which there is a special need for capable and dependable regular farm workers.

#### OTHER FACTORS THAT AFFECT THE METHOD OF HARVEST

Size of operation is an important factor affecting the use of mechanical methods. Small operators machine-harvested only 16 percent of their cotton in 1951, but in 1952 they had the highest proportion of machine-harvested—46 percent (Table 2). Small operators had most of their cotton handpulled before frost in 1951. Apparently their lack of resources caused them to want to make sure of a return. In 1952, they could machine-harvest and still be sure of their return.

Lack of ginning capacity also acts as a limiting factor on machine-harvesting. Ginning capacity is approximately one-third of the capacity of the strippers in these two counties.<sup>3</sup> Yet it would not be practicable financially for ginners to step up ginning capacity to handle the output from all strippers in the area. Farmers dislike to pile their seed cotton in the fields but this is commonly done in the machine-harvesting period. Other farmers operate their strippers only as they are able to get their trailers back from the gins. Some said they hauled their cotton as much as 65 or 70 miles to get it ginned and get their trailers back in the field.

Several of these factors point to the importance of the time element. Probably the most important effects are the losses in grade and in price as the season advances. Studies indicate that loss in grade is a matter of time and of weather rather than of method of harvesting. Cotton drops approximately 1 grade in quality for each 4 weeks it is left in the field.<sup>4</sup> Most farmers want to take advantage of high, early-season grades and prices. Probably this is more important to small operators, to tenants and to landlords than it is to larger operators and to those who do not need to share their proceeds with someone else.

#### RELATIONSHIP OF TENANCY TO OTHER FACTORS

To sum up the relationships between tenancy and other factors involved in the use of machine methods, it is likely that owners stripped a small

<sup>3</sup>"Storing of Seed Cotton As an Aid to More Efficient Ginning and Marketing," J. M. Ward, W. E. Paulson and D. L. Jones, Bulletin 765, Texas Agricultural Experiment Station. 1953.

<sup>4</sup>"Mechanical Harvesting of Cotton as Affected by Varietal Characteristics and Other Factors," H. P. Smith, D. T. Killough, D. L. Jones and M. H. Byrom, Bulletin 580, Texas Agricultural Experiment Station. 1939.

proportion of their cotton in 1952 for at least three reasons. First, it was evident well before the 1952 harvest began that workers would be relatively plentiful, as cotton yields were light along the migratory labor routes that led to the High Plains. The plentiful labor supply materialized, and owners were in a position to exercise their preferences as to harvest method. Seventy-eight percent of the owners expressed the preference "to handharvest all or part of the crop if labor is available." (Eighty percent of the owners followed this practice.)

Secondly, the supply of labor was relatively plentiful, wage rates were lower in 1952 than in 1951. Costs of stripping remained about the same or tended upward. Thus, the economic advantage of stripping was greatly reduced, and owners were likely to reduce their use of strippers.

A third reason for the reduction in stripping by owners may lie in the early maturity of the fields in 1952. The October 7 frost halted the maturing process of the cotton plants. Fairly early in the cotton harvest season bolls quit growing and began to open. Owners were still exercising their preference to handharvest at least a part of their crop. This operation may have resulted in the handharvesting of a greater part of the total yield than it would have if the frost had come on the average date of November 4 and the cotton had matured later. In other words, the handharvest operation in 1952 left a smaller part of the crop to be stripped than was the case in 1951.

Tenants were affected by the same factors which led owner-operators to strip less cotton in 1952 than in 1951. But the unusually early killing frost which resulted in owners stripping less cotton may have brought about more stripping by tenants. Stripping which comes later in the season presents three major obstacles to its use by tenants. It causes landlords to wait longer for their rent, to lose the price advantage associated with early marketing and to stand to lose grade, staple and yield through prolonged exposure of the cotton to weather. The early frost of 1952 permitted stripping at about the same time hand-snapping was getting well underway. Tenants, who did not have these objections, were free to strip more cotton.

The economic advantage of stripping, however, was still positive in 1952 for many fields and for many operators. Those tenants who had some extra freedom of decision took advantage of this positive margin. If the economic advantage had been greater, they might have wanted to do even more stripping.

The reactions of tenants to a favorable supply of labor was probably much like that of owner-operators. Seventy-four percent of the tenants generally preferred to handharvest at least a part of their crop. In 1952, 86 percent followed this

practice. If harvest workers had been less plentiful, tenants probably would have preferred to use strippers more.

An additional characteristic of the 1952 season tended to bring about increased use of strippers by tenants. Yields from nonirrigated cottonland dropped from 0.27 bale per acre in 1951 to 0.17 bale in 1952. Much nonirrigated cotton was too poor to harvest by hand and was stripped or abandoned. This factor tended to increase stripping by both owners and tenants. Owners stripped 61 percent of their nonirrigated cotton and tenants 59 percent. Tenants, however, had 50 percent of their total cotton acreage on non-irrigated land, while only 41 percent of the owner-operators' cotton was nonirrigated. Low yields on nonirrigated land had more effect on the harvest practices of tenants than on those of owners.

Tenants may have increased their use of strippers for reasons that could not be ascertained adequately in two brief surveys. It is likely that a portion of the lag in harvesting methods associated with tenure is disappearing. Landlords probably are becoming more tolerant of machine-harvesting, at least as a clean-up or scraping device, or landlords may now realize that grade is not always lowered by machine-harvesting. Tenants and landlords may have adopted lease revisions which provide that landlords are to be compensated for whatever losses they may incur when tenants choose to strip their cotton. This possibility is not borne out by information obtained on 1952 rental arrangements, but compensation or other revisions could have been provided for in "informal" agreements.

#### METHOD OF SAMPLING

Area sampling was used as the basis for selecting the farmers interviewed in the 1951 survey. According to the master sample of agriculture, there were 626 sample segments in Lubbock and Crosby counties. From these, a geographically stratified random sample of 96 segments was selected. All cotton producers with farm headquarters inside these segments were included in the sample. The sampling rate, therefore, was 15.3 percent.

In 1951, schedules were obtained for 324 of a total of 372 farms identified in the sample segments. In 1952, an effort was made to obtain a report from each farmer who had been interviewed the previous year. Reports were obtained from 294, or 91 percent, of the 1951 respondents. Nonrespondents included those who had moved outside the sample counties, those who had produced no cotton in 1952 because of adverse weather and those who still had holdings in the sample area but who could not be located.

Some of the data for 1951 were expanded into area totals. No attempt was made to expand the 1952 data.

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## APPENDIX

**TABLE A. COTTON-PULLING RATES PAID FOR THE GREATEST PART OF SEASON AS RELATED TO IRRIGATION, SIZE OF FARM AND TENURE, SAMPLE FARMS, LUBBOCK AND CROSBY COUNTIES, 1952**

Irrigation, size of farm, tenure	All farmers	Percentage of farmers who paid designated rate for greatest part of season			
		1.25 - 1.35	1.50 - 1.65	1.75 - 1.85	2.00 - 2.10 and up
All farms	100	3	39	43	15
By irrigation					
Mostly irrigated	100	3	45	46	6
Mostly dryland	100	0	25	34	41
Acres in cotton					
Large	100	4	39	41	16
Medium	100	1	44	43	12
Small	100	3	29	47	21
Tenure					
Owners	100	4	35	45	16
Tenants	100	2	43	41	14

**TABLE B. PERCENTAGE OF COTTON OPERATIONS PERFORMED BY SPECIFIED TYPES OF LABOR, SAMPLE FARMS, LUBBOCK AND CROSBY COUNTIES, 1951-52**

Operation and type of labor used	Percentage of operation performed by each type of labor							
	All farms		Small farms		Medium farms		Large farms	
	1951 <sup>1</sup>	1952 <sup>2</sup>	1951	1952	1951	1952	1951	1952
Cultivating	100	100	100	100	100	100	100	100
Operator and family	59	61	85	80	74	78	49	51
Regular hired labor	32	37	4	18	19	21	42	47
Local seasonal	8	2	9	2	5	1	9	2
Other	1		2		2		0	
Hoeing and chopping	100	100	100	100	100	100	100	100
Operator and family	9	11	29	33	15	16	4	7
Regular hired labor	11	14	1	11	9	14	13	14
Local seasonal	39	34	48	27	38	37	38	32
Migratory	41	41	22	29	38	33	45	47
Handpulling	100	100	100	100	100	100	100	100
Operator and family	2	1	9	12	1	2	1	4
Regular hired labor	3	6	2	5	2	2	4	7
Local seasonal	13	12	25	14	14	13	11	11
Migratory	82	81	64	69	83	83	84	82
Stripper operation	100 <sup>3</sup>	100	100	100	100	100	100	100
Operator and family	46	48	50	54	48	60	45	41
Regular hired labor	25	29	2	8	12	13	34	39
Local seasonal	16	6	20	12	22	5	13	6
Migratory	2	2	3	1	2	3	1	2
Exchange	1		6		2		0	
Custom	10	15	19	25	14	19	7	12

<sup>1</sup>Averages weighted by average size of farm in each size group: small, 77.8 acres in cotton; medium, 178.7 acres in cotton and large, 477.6 acres in cotton. Percentages are shown as a total of each operation, exclusive of farms on which the specific operation was not performed. On 1 percent of the sample farms there was no hoeing or chopping; on 9 percent no handpulling; and on 9 percent no machine-stripping. Cultivating was done on all farms.

<sup>2</sup>Percentages weighted by average size of farm in each size group: small, 84.1 acres; medium, 178.4 acres; large, 403.9 acres.

<sup>3</sup>Less than 1 percent of stripping operation was done by exchange. Most of this occurred on medium-size farms. Not considered in percentages.

<sup>4</sup>Less than 0.5 of 1 percent.

TABLE C. PERCENTAGE OF HARVEST CREW WORKERS FROM SELECTED HOME BASE AREAS, BY TYPE OF WORKER.  
LUBBOCK AND CROSBY COUNTIES, 1951-52<sup>1</sup>

Home base	All workers <sup>2</sup>		Anglo-American		Latin-American		Negro		Others	
	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952
All bases	100	100	100	100	100	100	100	100	100	100
Lubbock	8	5	8	7	4	3	40	16	0	0
Other places on High Plains	5	8	11	20	5	8	5	10	0	0
East Texas	7	7	38	4	2	2	36	51	0	5
South Texas	67	68	27	54	78	80	9	6	0	0
Elsewhere in Texas	3	3	2	11	3	2	7	14	0	0
Other states	1	1	7	0	1	3	0	1	0	5
Outside U. S.	2	3	0	0	0	0	0	0	93	90
Don't know	7	5	7	4	7	5	3	2	7	0
Percentage of workers of each type	100	100	4	8	83	79	11	10	2	3

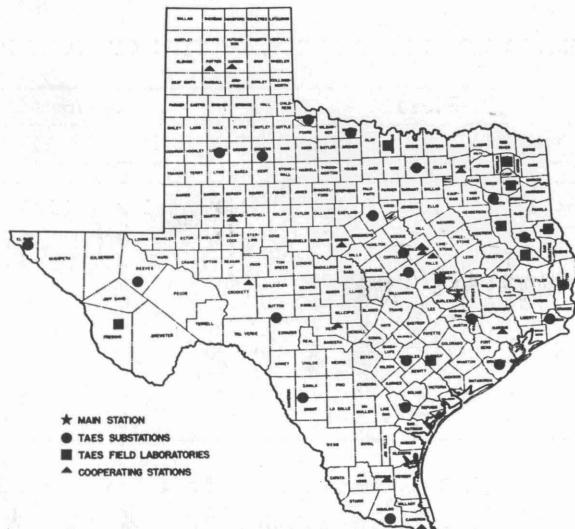
<sup>1</sup>Applies only to crews in handpulling.

<sup>2</sup>In 1952, 6,837 crew workers were employed on the sample farms; 553 were Anglo-Americans, 5,383 were Latin-Americans, 682 were Negroes and 219 were "other," including Mexican Nationals.

<sup>3</sup>Less than 0.5 of 1 percent.

TABLE D. METHOD OF OBTAINING COTTON-PULLING CREWS, SAMPLE FARMS, LUBBOCK AND CROSBY COUNTIES, 1951-52

Method of recruitment and year	All crews	Crews by size of farm			Type of crew		
		Small	Medium	Large	Anglo-American	Latin-American	Negro
All crews	100	100	100	Percent 100	100	100	100
Crew came to farm—1951	38	38	41	35	43	38	43
1952	45	47	48	42	51	44	48
Operator located crew—1951	38	41	36	38	39	38	37
1952	30	33	33	28	27	31	33
Continued arrangement from previous year—1951	17	18	13	22	15	18	18
1952	17	7	15	21	9	18	15
Other crews—1951	7	3	10	5	3	6	2
1952	8	13	4	9	13	7	4



Location of field research units in Texas maintained by 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 nine parts of the Texas A&M College System**

**I**N 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, including the Texas Forest Service, the Game and Fish Commission of Texas, the U. S. Department of Agriculture, University of Texas, Texas Technological College and the King Ranch. Some experiments are conducted on farms and ranches and in rural homes.

**R**ESEARCH BY THE TEXAS STATION is organized by programs and projects. A program of research represents a coordinated effort to solve the many problems relating to a common objective or situation. A research project represents the procedures for attacking a specific problem within a program.

**T**HE TEXAS STATION is conducting about 350 active research projects, grouped in 25 programs which include all phases of agriculture in Texas. Among these are: conservation and improvement of soils; conservation and use of water in agriculture; grasses and legumes for pastures, ranges, hay, conservation and improvement of soils; grain crops; cotton and other fiber crops; vegetable crops; citrus and other subtropical fruits; fruits and nuts; oil seed crops—other than cotton; ornamental plants—including turf; brush and weeds; insects; plant diseases; beef cattle; dairy cattle; sheep and goats; swine; chickens and turkeys; animal diseases and parasites; fish and game on farms and ranches; farm and ranch engineering; farm and ranch business; marketing agricultural products; rural home economics; and rural agricultural economics. Two additional programs are maintenance and upkeep, and central services.

**R**ESEARCH RESULTS are carried to Texas farm and ranch owners and homemakers by specialists and county agents of the Texas Agricultural Extension Service.