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COTTON PRODUCTION PRACTICES IN THE BLACK PRAIRIE AREA, 1947



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COTTON PRODUCTION PRACTICES IN THE BLACK PRAIRIE AREA, 1947

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A belt-wide study of cotton practices involving the major producing areas was made in 1948 based on 1947 production. Seven areas in Texas were included. The study was designed to obtain information relating to practices followed in producing cotton; to determine variations in production practices with respect to the degree of mechanization and other techniques; and to evaluate the economic significance of new production practices.

This report presents an analysis of the practices followed in the production of cotton in the Black Prairie area 1/ of Texas in 1947. The other areas studied in a similar manner in the State are: Corpus Christi, Coast Prairie, Rolling Plains, Lower Rio Grande Valley, High Plains and Northeast Sandy Lands. The study was conducted cooperatively by the Texas Agricultural Experiment Station and the Bureau of Agricultural Economics, United States Department of Agriculture.

This publication is not intended for general distribution. It was prepared for agricultural economists and other professional workers engaged in similar studies in other states, and for county agents and farmers who cooperated in supplying information on cotton production practices. A summarized report of practices followed in the seven areas is to be issued later.

Procedure

The sample was designed to obtain information from approximately the same number of farms having small, medium and large cotton enterprises. Data was obtained only on farms where cotton was grown in 1947.

Subsequent references in this report to a particular size-group have the following meanings: small farms include those with less than 20 acres of cotton; medium-sized farms from 20 to 49 acres; and large farms 50 or more acres of cotton in 1947. As the power used, whether animal or tractor, influenced the type of equipment, some of the practices, and the production requirements, it was found desirable to show some of the results by type of power available as well as by size of the cotton enterprise.

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1/This type-of-farming area for the most part includes the soil area frequently referred to as "Blackland Prairie".

Trends in Acreage, Yield and Production of Cotton, 1928-48

The proportion of farms that grow cotton in the area has shown a progressive decline and the percentage of total cropland devoted to cotton has decreased. As acreage became smaller, production in the area likewise diminished. In 9 of the last 10 years the yield per acre has fallen below the State average, Table 1. Nevertheless, the Black Prairie, up to and including 1948, was the most important cotton growing area in Texas.

Table 1. Estimated cotton acreage, yield and production, 1928-48

Year	Cotton acreage 1/		Production 2/		Yield per acre	
	Area 14.	: State	Area 14.	: State	Area 14	: State
	1,000 acres.		1,000 bales		Pounds	
1928	5,766	: 17,409	1,851	: 5,105	154	: 141
1929	5,674	: 17,578	1,360	: 3,940	115	: 108
1930	5,372	: 16,689	1,580	: 4,037	141	: 116
1931	5,069	: 14,979	1,937	: 5,320	183	: 170
1932	4,426	: 13,592	1,313	: 4,500	142	: 159
1933	4,942	: 15,623	1,424	: 4,428	189	: 189 3/
1934	3,433	: 10,685	985	: 2,401	138	: 108
1935	3,484	: 10,964	816	: 2,956	112	: 129
1936	3,768	: 12,080	1,064	: 2,933	135	: 116
1937	3,881	: 12,769	1,506	: 5,154	186	: 193
1938	2,842	: 9,163	1,045	: 3,086	176	: 165
1939	2,828	: 8,874	934	: 2,846	159	: 157
1940	2,757	: 8,873	976	: 3,234	170	: 180
1941	2,455	: 8,119	611	: 2,652	119	: 161
1942	2,521	: 8,430	772	: 3,038	147	: 177
1943	2,406	: 7,915	834	: 2,823	166	: 171
1944	2,392	: 7,114	764	: 2,646	153	: 179
1945	2,428	: 6,029	678	: 1,794	134	: 143
1946	2,536	: 6,283	555	: 1,669	105	: 128
1947	2,631	: 8,426	937	: 3,431	170	: 196
1948	2,606	: 8,793	872	: 3,150	163	: 176
	:	:	:	:	:	:

1/ Acreage in cultivation, July 1.

2/ 500-pound gross weight bales.

3/ Based on planted acres less acres removed in 1933 reduction program.

Source: Circular 117, TAES, and BAE estimates.

In 1944, the last year for which Census data are available, farms having less than 20 acres of cotton comprised a third of the farms reporting cotton in the area, but accounted for only 11 percent of the acreage and production of cotton, Table 2. About half of the acreage and production was on the so-called "large farms" which had 50 or more acres in cotton, although these farms accounted for only 22 percent of the total number of farms.

Table 2. Cotton acreage, production and farms having tractors, 1944

Item		Size-group			Total
		Small	Medium	Large	
Farms reporting	(No.)	20,800	27,843	13,670	62,313
Do.	(Pct.)	33.3	44.7	22.0	100.0
Acres of cotton	(No.)	239,743	876,335	1,143,667	2,259,745
Do.	(Pct.)	10.6	38.8	50.6	100.0
Bales produced	(No.)	80,929	285,826	365,234	731,989
Do.	(Pct.)	11.1	39.0	49.9	100.0
Farms having tractors	Do.	23.5	50.8	82.4	48.6

Source: Special Cotton Report, U. S. Census, 1945.

Farm Organization

The way in which the sample farms were organized is indicated in Tables 3 and 4. The use made of land resources is summarized in Table 3. None of the large farms used animal-power exclusively. As an average, on small farms, most of the land was owned whereas on the medium-sized and large farms, most of it was rented. No share-croppers were employed on small farms and production by croppers on farms in the other groups was unimportant.

Nearly all farms produced corn and the acreage of corn was second only to cotton--in fact, on the small, tractor-powered farms, the acreage of corn was nearly double the average acreage of cotton.

Sorghums for grain and hay and a miscellany of other hay crops comprised most of the remaining cropland.

"Other crops" was a significant item only on the medium-sized and large farms operated by tractor-power. Here the percentage of cropland so used was 16 and 10, respectively. Percentagewise, the amount of pasture per farm was significant in all size-groups. However, much of this was untended, open pasture. It was often on the more sloping and eroded land which afforded but little in the way of feed, as evidenced by the small livestock inventories, Table 4.

Some of the farms carried a fair sized herd of beef cattle--cows and young stock, but ordinarily, livestock was not an important enterprise. Most farms had a few milk cows, kept mainly to supply home needs. Flocks of chickens large enough to produce beyond the needs of the farm family were common, although in no case in the sample was there a farm with an established commercial flock.

The resident labor force, by size-groups, is presented in Table 5. Share-cropper labor was significant on the medium-sized and large farms. In these two groups where tractor-power was used, wage hands living on the farm were relied upon as a source of labor on a very small number of farms.

Table 3. Land organization by size of cotton enterprise and type of power

Item	Size-group								
	Small			Medium			Large		
	Farms:	acre-	crop-	Farms:	acre-	crop-	Farms:	acre-	crop-
rptg.:	age :	land	rptg.:	age :	land	rptg.:	age :	land	
	Pct.:	No. :	Pct.	Pct.:	No. :	Pct.	Pct.:	No. :	Pct.
Animal-power farms:									
Acres operated	100 :	52 :	-	100 :	95 :	-	- :	- :	-
Owned	60 :	33 :	-	50 :	55 :	-	- :	- :	-
Rented	50 :	19 :	-	54 :	40 :	-	- :	- :	-
Cropland harvested:									
Cotton	100 :	14 :	51	100 :	29 :	57	- :	- :	-
Wage	100 :	14 :	51	75 :	22 :	42	- :	- :	-
Cropper	- :	- :	-	29 :	7 :	15	- :	- :	-
Corn	100 :	10 :	37	96 :	15 :	30	- :	- :	-
Sorghum	80 :	3 :	12	62 :	5 :	10	- :	- :	-
Grain	30 :	1 :	3	4 :	- :	-	- :	- :	-
Hay	70 :	2 :	9	62 :	5 :	10	- :	- :	-
Other hay	- :	- :	-	8 :	1 :	1	- :	- :	-
Other crops	- :	- :	-	33 :	1 :	2	- :	- :	-
Total	- :	27 :	100	- :	51 :	100	- :	- :	-
Pasture:									
Rotation	- :	- :	-	- :	- :	-	- :	- :	-
Other open	90 :	20 :	-	75 :	28 :	-	- :	- :	-
Total	- :	20 :	-	75 :	28 :	-	- :	- :	-
All other land:	40 :	5 :	-	42 :	16 :	-	- :	- :	-
Tractor-power farms:									
Acres operated	100 :	95 :	-	100 :	110 :	-	100 :	207 :	-
Owned	83 :	79 :	-	56 :	49 :	-	38 :	60 :	-
Rented	17 :	16 :	-	61 :	61 :	-	79 :	147 :	-
Cropland harvested:									
Cotton	100 :	12 :	31	100 :	35 :	46	100 :	109 :	65
Wage	100 :	12 :	31	90 :	32 :	42	95 :	93 :	56
Cropper	- :	- :	-	10 :	3 :	4	27 :	16 :	9
Corn	100 :	23 :	58	95 :	20 :	27	94 :	34 :	20
Sorghum	67 :	3 :	7	64 :	7 :	9	45 :	6 :	4
Grain	50 :	2 :	4	34 :	4 :	5	14 :	3 :	2
Hay	67 :	1 :	3	44 :	3 :	4	37 :	3 :	2
Other hay	17 :	2 :	4	11 :	1 :	2	5 :	1 :	1
Other crops	- :	- :	-	41 :	12 :	16	45 :	16 :	10
Total	- :	40 :	100	- :	75 :	100	- :	166 :	100
Pasture:									
Rotation	- :	- :	-	7 :	1 :	-	12 :	1 :	-
Other open	100 :	40 :	-	72 :	26 :	-	61 :	26 :	-
Total	- :	40 :	-	- :	27 :	-	64 :	27 :	-
All other land:	50 :	15 :	-	52 :	8 :	-	58 :	14 :	-

Table 4. Livestock organization by size of cotton enterprise and type of power

Livestock organization	Size-group									
	Small			Medium			Large			
	: Av. : Av. per		Farms: per : farm		: Av. : Av. per		Farms: per : farm		: Av. : Av. per	
	rptg.:	farm:	rptg.	rptg.:	farm:	rptg.	rptg.:	farm:	rptg.	
	Pct.:	No.:	No.:	Pct.:	No.:	No.:	Pct.:	No.:	No.:	
Animal-power farms:	:	:	:	:	:	:	:	:	:	
Workstock	100 :	3.0 :	3.0	88 :	3.3 :	3.4	- :	- :	-	
Milk cows	100 :	1.7 :	1.7	96 :	3.8 :	3.9	- :	- :	-	
Beef cows	20 :	.6 :	3.0	12 :	1.5 :	12.3	- :	- :	-	
Other cattle	30 :	.7 :	2.3	58 :	2.3 :	3.9	- :	- :	-	
Brood sows	10 :	.1 :	1.0	12 :	.3 :	2.0	- :	- :	-	
Hens and pullets	90 :	63.0 :	70.0	100 :	106.0 :	106.0	- :	- :	-	
Tractor-power farms:	- :	:	:	:	:	:	:	:	:	
Workstock	67 :	1.2 :	1.8	36 :	.8 :	2.2	38 :	.9 :	2.3	
Milk cows	100 :	4.5 :	4.5	90 :	2.8 :	3.1	90 :	2.0 :	2.3	
Beef cows	17 :	.5 :	3.0	31 :	1.2 :	3.9	32 :	3.1 :	9.7	
Other cattle	83 :	7.2 :	8.6	59 :	1.9 :	3.2	67 :	7.0 :	10.4	
Brood sows	33 :	.3 :	1.0	30 :	.4 :	1.5	31 :	.6 :	1.8	
Hens and pullets	100 :	239.0 :	239.0	97 :	107.0 :	111.0	94 :	79.0 :	84.0	

Table 5. Resident labor force by size of cotton enterprise and type of power ^{1/}

Item	Size-group									
	Small			Medium			Large			
	Farms: Aver-:		Farms: Aver-:		Farms: Aver-:		Farms: Aver-:		Farms: Aver-:	
	rptg.:	age :	Usual	rptg.:	age :	Usual	rptg.:	age :	Usual	
	Pct.:	Number	Pct.:	Number	Pct.:	Number	Pct.:	Number		
Animal-power farms:	:	:	:	:	:	:	:	:		
<u>Operator</u>	:	:	:	:	:	:	:	:		
Families	100 :	1.0 :	1	100 :	1.0 :	1	- :	- :	-	
Available workers	100 :	1.8 :	2	100 :	2.0 :	2	- :	- :	-	
<u>Cropper</u>	:	:	:	:	:	:	:	:		
Families	- :	- :	-	19 :	.2 :	1	- :	- :	-	
Available workers	- :	- :	-	19 :	.5 :	3	- :	- :	-	
Tractor-power farms:	:	:	:	:	:	:	:	:		
<u>Operator</u>	:	:	:	:	:	:	:	:		
Families	100 :	1.0 :	1	100 :	1.0 :	1	100 :	1.0 :	1	
Available workers	100 :	1.8 :	2	100 :	3.0 :	3	100 :	3.0 :	3	
<u>Cropper</u>	:	:	:	:	:	:	:	:		
Families	6 :	- :	-	10 :	.1 :	1	28 :	.3 :	1	
Available workers	6 :	- :	-	10 :	.2 :	1	28 :	1.0 :	4	
<u>Hired or wage hands</u>	:	:	:	:	:	:	:	:		
Available workers	- :	- :	-	3 :	- :	1	10 :	- :	2	

^{1/} "Usual" in table relates only to those farms reporting.

The proportion of farms hiring non-farm resident labor and the amount of such labor employed for chopping, hoeing and harvesting cotton are given in Table 6. As might be expected, the amount of off-the-farm labor hired increased with the size of the cotton enterprise. Part of the crop was harvested by snapping on only the larger farms operated with tractor power.

Table 6. Non-farm resident labor used in producing cotton

Operation by size and power-groups	Percentage of operation done by non-resident hired labor					
	None	Under 25	25-49	50-74	75-99	100
<u>Small</u>						
Animal-power farms:						
Chopping and hoeing	55	9	-	9	18	9
Picking	36	18	-	-	36	10
Tractor-power farms:						
Chopping and hoeing	71	-	29	-	-	-
Picking	43	-	29	14	14	-
<u>Medium</u>						
Animal-power farms:						
Chopping and hoeing	46	4	8	13	21	8
Picking	37	4	4	17	17	21
Tractor-power farms:						
Chopping and hoeing	28	3	8	20	13	28
Picking	16	2	8	15	20	39
<u>Large</u>						
Animal-power farms:						
Chopping and hoeing	-	-	-	-	100	-
Picking	-	-	33	-	67	-
Tractor-power farms:						
Chopping and hoeing	12	2	7	7	9	63
Picking	3	-	4	8	9	76
Snapping	45	1	1	1	4	48

In summarizing Table 7, it may be noted that more than half of the small farms used horses or mules for power, about one in 20 had both tractor and animal power, and the remaining 39 percent relied entirely on tractors. In the medium-sized group, 72 percent of the farms were tractor-powered, a fourth used animals and a small group had both tractor and animal-power. Most of the large farms - nearly 95 percent, had tractors, while the remainder were divided between strictly animal and animal-tractor-powered farms. It is evident that tractor numbers increased as the size of the cotton acreage increased.

Planting and Spacing Practices

In the preceding section of this report the general characteristics of cotton farms in the area were examined. In this section current production practices on these farms are presented.

Table 7. Farms using different types of power

Size group and type of power	Proportion of all farms using	All farms	Farms having:		
			Wage cotton only	Wage and cropper : cotton	Cropper cotton only
	Percent	Number	Number	Number	Number
Small farms:					
Tractor	38.9	7	6	-	1
Animal	55.6	10	10	-	-
Tractor and animal	5.5	1	1	-	-
Total	100.0	18	17	-	1
Medium-sized farms:					
Tractor	71.8	61	55	-	6
Animal	24.7	21	17	1	3
Tractor and animal	3.5	3	3	-	-
Total	100.0	85	75	1	9
Large farms:					
Tractor	94.3	83	59	20	4
Animal	3.4	3	3	-	-
Tractor and animal	2.3	2	2	-	-
Total	100.0	88	64	20	4

The planting seed used, either purchased, home grown, or in combination, is indicated in Table 8. A high proportion of farms in all size-groups used purchased seed. The tendency to use both purchased and home grown seed increased with the size of the cotton enterprise.

Production practices followed in planting and spacing cotton are indicated by the data in Table 9. The majority of the operators on small and medium-sized farms, and about half of those on large farms, planted solid in the row and spaced by hand chopping. On about half of the large farms, and on less than a fourth of the small and medium-sized farms where operator-wage cotton was grown, hill-drop planting was practiced. Use of mechanical or flameing equipment for spacing cotton was not found.

Treatment of seed, varieties most commonly used, years from breeder, and rate of seeding are summarized in Table 10. One-fourth of the purchased seed was delinted and a much smaller percentage of home grown seed was so treated. Ceresan treatment was common with purchased seed and more than a third of the home grown seed had such application.

Rowden and Mebane varieties were used on most farms and "white-sack seed,"-- seed direct from the breeder--was purchased in the majority of cases. Home grown seed was generally two years from the breeder.

Practically no difference was evident in the amount of seed used per acre whether or not it was delinted.

Table 8. Planting seed

Item	Size-group			All farms
	Small	Medium	Large	
Farms in sample (Number)	18	85	88	191
Cotton acreage (Acres)	246	2,822	9,702	12,770
Farms using:				
Home grown seed only (Number)	2	13	11	26
Proportion of group (Percent)	11	15	13	14
Cotton planted (Acres)	33	436	923	1,392
Proportion of group acreage (Percent)	13	15	10	11
Purchased seed only (Number)	12	46	31	89
Proportion of group (Percent)	67	54	35	46
Cotton planted (Acres)	152	1,549	3,042	4,743
Proportion of group acreage (Percent)	63	55	31	37
Home grown and purchased seed (Number)	4	26	46	76
Proportion of group (Percent)	22	31	52	40
Cotton planted--purch.seed (Acres)	33	273	1,753	2,059
Proportion, group ac. (Percent)	13	10	18	16
Cotton planted--h.g.seed (Acres)	28	564	3,984	4,576
Proportion, group ac. (Percent)	11	20	41	36
Total acreage, home grown seed (Acres)	61	1,000	4,907	5,968
Proportion total cotton acreage (Percent)	25	35	51	47
Total acreage, purchased seed (Acres)	185	1,822	4,795	6,802
Proportion total cotton acreage (Percent)	75	65	49	53

Table 9. Method of planting and spacing cotton

Item	Size-group					
	Small		Medium		Large	
	Oper.:	Crop- wage : per	Oper.:	Crop- wage : per	Oper.:	Crop- wage : per
Cotton planted (Acres)	228	: 18	2,512	: 310	8,264	: 1,438
Method of planting:						
<u>Solid in drill</u>						
Farms in group (Percent)	82	: -	75	: 40	42	: 48
Proportion, group ac. Do.	84	: -	73	: 40	41	: 48
<u>Hill dropped</u>						
Farms in group Do.	18	: 100	25	: 60	58	: 52
Proportion, group ac. Do.	16	: 100	27	: 60	59	: 52
Spacing, planted solid:						
<u>None</u>						
Farms in group Do.	-	: -	12	: -	8	: 17
Proportion, group ac. Do.	-	: -	12	: -	4	: 6
<u>Hand chopped</u>						
Farms in group Do.	100	: -	86	: 100	90	: 75
Proportion, group ac. Do.	100	: -	87	: 100	95	: 93
<u>Cross plowed</u>						
Farms in group Do.	-	: -	2	: -	2	: 8
Proportion, group ac. Do.	-	: -	1	: -	1	: 1

Table 10. Seed treatment, varieties used and rate of seeding

Item		Size-group			All farms
		Small	Medium	Large	
Farms in sample	(Number)	18	85	88	191
Acreage planted	(Acres)	246	2,822	9,702	12,770
Purchased seed:					
Amount delinted	(Percent)	26	22	26	25
Amount treated (Ceresan)	Do.	78	82	84	83
Varieties - Rowden	Do.	76	76	72	73
Mebane	Do.	6	10	12	11
All other	Do.	18	14	16	16
Year bought - 1947	Do.	63	66	75	73
1946	Do.	25	21	14	16
Not known	Do.	12	13	11	11
Home grown seed:					
Amount delinted	Do.	-	6	10	8
Amount treated (Ceresan)	Do.	-	16	48	38
Varieties - Rowden	Do.	83	82	75	77
Mebane	Do.	-	3	12	9
All other	Do.	17	15	13	14
Year bought - 1946	Do.	-	3	2	2
1945	Do.	86	72	79	77
1944	Do.	14	3	3	3
Not known	Do.	-	22	16	18
Seed used per acre:					
Delinted	(Pounds)	19	18	17	18
Non-delinted	Do.	22	19	19	19

Poisoning Practices

Poisoning to control insect damage is not a regular or widespread practice, Table 11. The large farms made more frequent use of poisons, but even in this group 45 percent either did no poisoning, or at most, had poisoned only twice in the last 10 years.

Table 11. Number of years during last 10 that poison was used

Number of years	Size-group			All farms
	Small	Medium	Large	
	Pct.	Pct.	Pct.	
1 - 3	88	77	60	75
4 - 6	6	13	20	13
7 - 10	6	10	20	12

Harvesting Practices

Cotton harvesting practices are presented in Table 12. All cotton was hand harvested. The major portion was picked and snapping was strictly a scrapping operation.

Although share-croppers harvested a higher proportion of their crop with family labor than was the case on operator-wage cotton farms, more than a third of the cotton on cropper farms in the medium and large-sized groups was picked by hired labor.

Table 12. Cotton harvesting practices

Item		Size-group		
		Small	Medium	Large
		Oper.--:Crop- wage : per	Oper.--:Crop- wage : per	Oper.--:Crop- wage : per
Cotton harvested	(Acres)	228 : 18	2,512 : 310	8,264 : 1,438
Cotton produced	(Bales)	94 : 5	939 : 110	3,322 : 549
Yield lint per acre	(Pounds)	207 : 139	187 : 177	201 : 191
Proportion of cotton:				
Hand picked	(Percent)	100 : 100	93 : 99	92 : 94
Hand snapped	Do.	- : -	7 : 1	8 : 6
Proportion of cotton picked by:				
Family labor	Do.	53 : 100	32 : 65	7 : 56
Hired labor	Do.	47 : -	68 : 35	93 : 44
Seed cotton and trash per bale:				
Hand picked	(Pounds)	1,425 : 1,425	1,500 : 1,500	1,500 : 1,550
Hand snapped	Do.	- : -	2,000 : 2,000	2,000 : 2,100
Cotton seed per bale:				
Hand picked	Do.	850 : 850	850 : 850	850 : 850
Hand snapped	Do.	- : -	850 : 800	825 : 825

Operations Performed in Producing Cotton

The data concerning cotton production practices that are most essential to understanding the role of the enterprise in any given farm organization or farming system, are presented in Tables 13 through 17. In these tables the operations performed in growing cotton are listed in more or less the chronological order of their performance in the area. This information is presented separately for each size and power-group. The various types of equipment that were used for each operation are specified, and the proportion of farms reporting each operation, along with the proportion of the cotton acreage to which it was applied, are given by the type of equipment used. In addition, the average number of times each operation was performed is given in these tables.

Average yield of 145 pounds of lint per acre, 1943-47.

Labor and Power Requirements per Acre of Cotton

The operations, the times over, the equipment used and the performance rates that were usual for each size and power-group have been selected from Tables 13 through 17. In Table 18 the man and power-hours required for an acre of cotton under these usual conditions are presented for each size and power-group.

Table 13. Production operations and requirements per acre one time over

Small Farms

Operations and size of equipment	Farms reporting	Planted acres covered	Times over	Labor and power per acre once over	
				Man	Animal
				Hours	Hours
	Percent	Percent	Number		
<u>Animal-power farms</u>					
Cutting stalks	(70)	(74)			
1-row cutter	57	41	1.0	1.33	2.66
2-row cutter	43	33	1.0	1.00	2.00
Breaking	(20)	(22)			
Sulky plow	20	22	1.0	2.14	4.28
Bedding	(100)	(100)			
1-row lister or plow	100	100	2.1	1.80	3.60
Cultivating beds	(70)	(68)			
1-row cultivator	57	40	1.2	1.33	2.66
Harrow	43	28	1.0	.90	1.80
Planting	(100)	(100)			
1-row planter	100	100	1.0	1.67	3.34
Replanting	(10)	(6)			
1-row planter	10	6	1.0	1.67	3.34
Cultivating	(100)	(100)			
1-row cultivator	100	100	4.6	2.00	4.00
Chopping and hoeing	(100)	(100)			
Hand	100	100	1.9	6.00	-
Harvesting (202 lbs. lint/ac.)	(100)	(100)			
Picking (5.3 lbs. lint/hr.)	100	100	-	37.6 ^{1/}	-
Hauling to gin	100	100	-	.8	.8 ^{2/}
Picking (av. yield) ^{3/}	-	-	-	27.5 ^{1/}	-

^{1/} Total.

^{2/} Car and trailer.

^{3/} Average yield of 145 pounds of lint per acre, 1943-47.

Table 14. Production operations and requirements per acre one time over

Small Farms

Operations and size of equipment	Farms reporting	Planted acres covered	Times over	Labor and power per acre once over	
				Man	Tractor
	Percent	Percent	Number	Hours	Hours
<u>Tractor-power farms</u>					
Cutting stalks	(67)	(81)			
2-row cutter	67	81	1.0	.50	.50
Breaking	(33)	(24)			
1-bottom plow	33	24	1.0	2.00	2.00
Bedding	(100)	(100)			
2-row lister or plow	100	100	1.4	.95	.95
Cultivating beds	(83)	(95)			
2-row cultivator	36	55	1.0	.90	.90
2-row harrow	47	40	1.1	.35	.35
Planting	(100)	(100)			
2-row planter	100	100	1.0	.80	.80
Cultivating	(100)	(100)			
2-row cultivator	100	100	5.3	.90	.90
Chopping and hoeing	(100)	(100)			
Hand	100	100	1.8	6.50	-
Harvesting (202 lbs. lint/ac.)	(100)	(100)			
Picking (5.3 lbs. lint/hr.)	100	100	-	39.70 ^{1/}	-
Hauling to gin	100	100	-	.7	.7 ^{2/}
Picking (av. yield) ^{3/}	-	-	-	27.5 ^{1/}	-

^{1/} Total.

^{2/} Car and trailer.

^{3/} Average yield of 145 pounds of lint per acre 1943-47.

Table 15. Production operations and requirements per acre one time over

Medium-sized Farms

Operations and size of equipment	Farms reporting	Planted acres covered	Times over	Labor and power per acre once over	
				Man	Animal
				Hours	Hours
<u>Animal-power farms</u>					
Cutting stalks	(94)	(94)			
1-row cutter	78	79	1.0	1.12	2.24
2-row cutter	11	9	1.0	.80	1.60
3-row cutter	5	6	1.0	.45	1.35
Breaking	(11)	(11)			
Sulky plow	11	11	1.0	2.00	6.00
Bedding	(100)	(100)	(2.1)		
1-row lister					
2 mules	83	82	2.2	1.60	3.20
3 mules	11	12	1.5	1.40	4.20
4 mules	6	6	2.0	1.10	4.40
Cultivating beds	(67)	(89)			
1-row cult.; 2 mules	56	54	1.0	1.25	2.50
2-row cult.; 3 mules	11	18	1.5	1.20	3.60
2-sec. harrow; 2 mules	11	11	1.0	.62	1.24
2-sec. harrow; 4 mules	6	6	1.0	.55	2.20
Planting	(100)	(100)			
1-row planter; 2 mules	89	88	1.0	1.50	3.00
2-row planter; 3 mules	11	12	1.0	1.08	3.24
Replanting	(11)	(3)			
1-row planter; 2 mules	11	3	1.0	1.50	3.00
Cultivating	(100)	(100)			
1-row cult.; 2 mules	89	88	5.0	1.50	3.00
2-row cult.; 3 mules	11	12	4.5	1.30	2.90
Chopping and hoeing	(100)	(100)			
Hand	100	100	2.2	5.50	-
Harvesting (168 lbs. lint/ac.)	(100)	(100)			
Picking (5 lbs. lint/hr.)	100	97 ¹ / ₄	-	32.6 ² / ₄	-
Snapping (12 lbs. lint/hr.)	24	3 ¹ / ₄	-	.5 ² / ₄	-
Hauling to gin	100	100	-	.6	.6 ³ / ₄
Picking (av. yield) ¹ / ₄	-	-	-	28.1 ² / ₄	-
Snapping (av. yield) ¹ / ₄	-	-	-	.4 ² / ₄	-

¹/ Proportion of total production so harvested.

²/ Total.

³/ Car and trailer.

⁴/ Average yield of 145 pounds of lint per acre, 1943-47.

Table 16. Production operations and requirements per acre one time over

Medium-sized Farms

Operations and size of equipment	Farms reporting	Planted acres covered	Times over	Labor and power per acre once over	
				Man	Tractor
	Percent	Percent	Number	Hours	Hours
<u>Tractor-power farms</u>					
Cutting stalks	(77)	(76)			
2-row cutter	77	76	1.0	.37	.37
Breaking	(45)	(39)			
2-bottom m.b. plow	21	19	1.0	1.50	1.50
Disk	24	20	1.0	1.50	1.50
Bedding	(98)	(97)			
2-row lister	94	93	2.1	.67	.67
3-row lister	2	2	2.0	.40	.40
Cultivating beds	(87)	(86)			
2-row cultivator	70	71	1.5	.60	.60
Harrow	17	15	1.0	.30	.30
Planting	(100)	(100)			
2-row planter	100	100	1.0	.67	.67
Replanting	(11)	(8)			
2-row planter	11	8	1.0	.67	.67
Cultivating	(100)	(100)			
2-row cultivator	100	100	4.6	.67	.67
Chopping and hoeing	(100)	(100)			
Hand	100	100	2.0	5.00	-
Harvesting (191 lbs. lint/ac.)	(100)	(100)			
Picking (5 lbs. lint/hr.)	100	93 ¹ / ₄	-	35.5 ² / ₃	-
Snapping (12 lbs. lint/hr.)	42	7 ¹ / ₄	-	1.3 ² / ₃	-
Hauling to gin	100	100	-	.7	.7 ³ / ₄
Picking (av. yield) ¹ / ₄	-	-	-	27.0 ² / ₃	-
Snapping (av. yield) ¹ / ₄	-	-	-	1.0 ² / ₃	-

¹/ Proportion of total production so harvested.

²/ Total.

³/ Car and trailer.

⁴/ Average yield of 145 pounds of lint per acre, 1943-47.

Table 17. Production operations and requirements per acre one time over

Large Farms

Operations and size of equipment	Farms reporting	Planted acres covered	Times over	Labor and power per acre once over	
				Man	Tractor
				Hours	Hours
<u>Tractor-power farms</u>					
Cutting stalks	(97)	(97)			
2-row cutter	81	76	1.0	.33	.30
4-row cutter	25	20	1.0	.20	.20
Breaking	(11)	(7)			
Moldboard plow	2	1	1.0	1.92	1.92
Disk	9	6	1.0	.90	.90
Bedding	(100)	(100)			
2-row lister	93	92	2.7	.53	.53
3-row lister	6	7	3.7	.40	.40
4-row lister	1	1	2.0	.40	.40
Cultivating beds	(85)	(84)			
2-row cultivator	64	60	1.3	.56	.56
4-row cultivator	4	6	1.4	.43	.43
2-row stalk cutter	4	8	1.0	.30	.30
4-row stalk cutter	4	5	1.0	.22	.22
Harrow	13	10	1.1	.30	.30
Planting	(100)	(100)			
2-row planter	95	93	1.0	.56	.56
4-row planter	5	7	1.0	.50	.50
Replanting	(9)	(7)			
2-row planter	9	7	1.0	.56	.56
Cultivating	(100)	(100)			
2-row cultivator	96	95	5.1	.60	.60
4-row cultivator	4	5	4.4	.31	.31
Roller	9	8	1.0	.48	.48
Harrow	4	5	3.0	.40	.40
Chopping and hoeing	(100)	(100)			
Hand	100	100	2.1	5.00	-
Harvesting (200 lbs. lint/ac.)	(100)	(100)			
Picking (5 lbs. lint/hr.)	100	93 ^{1/}	-	37.2 ^{2/}	
Snapping (12 lbs. lint/hr.)	55	7 ^{1/}	-	1.4 ^{2/}	
Hauling to gin	100	100	-	.7	.7 ^{3/}
Picking (av. yield) ^{4/}	-	-	-	27.0 ^{2/}	
Snapping (av. yield) ^{4/}	-	-	-	1.0 ^{2/}	

^{1/} Proportion of total production so harvested.

^{2/} Total.

^{3/} Car and trailer.

^{4/} Average yield of 145 pounds of lint per acre, 1943-47.

The main point shown in Table 18 is the relatively small reduction in man-hours per acre resulting from the present small degree of mechanization in production of cotton. Even with the same size of power and equipment, and with yields held constant, the man-hours required per acre decrease as the size of the cotton enterprise increases. The possibility that farms with the larger cotton enterprises had larger fields and the probability that performance economies in many operations are associated with larger fields, apparently justify this indication.

Table 18. Usual operations, labor and power requirements

Operation	Animal-power farms				Tractor-power farms			
	Size :	Hours per acre			Size :	Hours per acre		
	equip-:Times:	Man	Mule	equip-:Times:	Man	Tractor		
	ment :	over:		ment :	over:			
<u>Small farms</u>	:	:	:	:	:	:		
Cut stalks	1-row:	1	1.33	2.66	2-row:	1	.50	.50
Bed or list	Do. :	2	3.60	7.20	Do. :	2	1.90	1.90
Cultivate beds	Do. :	1	1.33	2.66	Do. :	1	.90	.90
Plant	Do. :	1	1.67	3.34	Do. :	1	.80	.80
Cultivate	Do. :	5	10.00	20.00	Do. :	5	4.50	4.50
Chop and hoe	Hand :	2	12.00	-	Hand :	2	13.00	-
Pick (5.3 lbs. lint/hr.)	Do. :	-	37.60	-	Do. :	-	39.70	-
Haul to gin	- :	-	.82	.82*	- :	-	.73	.73*
Total (202 lbs.lint/ac.)	- :	-	68.35	36.68	- :	-	62.03	9.33
Total (av. yield) 1/	- :	-	58.15	36.68	- :	-	49.73	9.33
	:	:	:	:	:	:		
<u>Medium-sized farms</u>	:	:	:	:	:	:		
Cut stalks	1-row:	1	1.12	2.24	2-row:	1	.37	.37
Bed or list	Do. :	2	3.20	6.40	Do. :	2	1.34	1.34
Cultivate beds	Do. :	1	1.25	2.50	Do. :	1	.60	.60
Plant	Do. :	1	1.50	3.00	Do. :	1	.67	.67
Cultivate	Do. :	5	7.50	15.00	Do. :	5	3.35	3.35
Chop and hoe	Hand :	2	11.00	-	Hand :	2	10.00	-
Pick (5 lbs.lint/hr.)	Do. :	-	32.60	-	Do. :	-	35.50	-
Snap (12 lbs.lint.hr.)	Do. :	-	.50	-	Do. :	-	1.30	-
Haul to gin	- :	-	.60	.60*	- :	-	.67	.67*
Total (186 lbs.lint/ac.)	- :	-	59.27	29.74	- :	-	53.80	7.00
Total (av. yield) 1/	- :	-	54.67	29.74	- :	-	45.00	7.00
	:	:	:	:	:	:		
<u>Large farms</u>	:	:	:	:	:	:		
Cut stalks	:	:	:	:	2-row:	1	.33	.33
Bed or list	:	:	:	:	Do. :	3	1.59	1.59
Cultivate beds	:	:	:	:	Do. :	1	.56	.56
Plant	:	:	:	:	Do. :	1	.56	.56
Cultivate	:	:	:	:	Do. :	5	3.00	3.00
Chop and hoe	:	:	:	:	Hand :	2	10.00	-
Pick (5 lbs. lint/hr.)	:	:	:	:	Do. :	-	37.20	-
Snap (12 lbs. lint/hr.)	:	:	:	:	Do. :	-	1.40	-
Haul to gin	:	:	:	:	- :	-	.70	.70*
Total (199 lbs.lint/ac.)	:	:	:	:	- :	-	55.34	6.74
Total (av. yield) 1/	:	:	:	:	- :	-	44.74	6.74

* Car and trailer.

1/ Based on average area yield of 145 pounds of lint per acre, 1943-47.

In Table 19, labor and power requirements are presented by power-groups only. For this table, the proportions of total man and power-hours accounted for by major operation groups have been calculated. The most significant fact revealed by these proportions is the high percentage of total man-hours accounted for by chopping, hoeing and harvesting--the operations which were not touched by mechanization in the area.

Some Implications of the Survey Data

The foregoing record of the organization of sample cotton farms in the Blackland area and the details of common production practices and performance rates related to cotton growing permit some inferences concerning the future. Both cotton as an important enterprise in the area and the characteristics of the cotton producing farms may be commented on in the light of this study.

The Role of Cotton Production in the Future

The comparative advantage of cotton production in the area depends upon: (1) the relative production efficiency of the area for the commodity, and (2) the attractiveness of alternative uses of resources available in the area.

With regard to efficiency production of cotton in the Black Prairie area does not appear to stand high for these reasons:

1. Yields have continued to fall in comparison with other areas.
2. Several other major areas ^{1/} appear in a better position to extend mechanization of cotton production to include weed and insect control and harvesting. The reasons for this condition are (a) areas having higher yields are better adapted to the use of mechanical harvesting equipment, (b) the present gin equipment in the area is not generally adapted to handle cotton in the condition in which it is harvested by mechanical equipment, (c) the prevalence of Johnson grass complicates the problem of mechanical or chemical weed control, (d) the relatively small fields on many farms--fields often on rolling land that is subject to severe erosion, if not already eroded, and (e) the presence or threat of root-rot, common in soils of high calcium content.

These considerations relating to efficiency are subject to change as a result of technical improvements and discoveries. At present, however, these items lessen the comparative advantage of cotton production in the area as compared with other important segments of the Cotton Belt.

As to alternative uses of available resources, careful examination leads to the conclusion that cotton holds and will probably continue to hold an advantage over other enterprises to the extent that present acreage may be expected to prevail. The following considerations appear to support such an inference.

1. The size and nature of land holdings seem generally to exclude systems of farming of a more extensive nature than that based upon cotton production.

^{1/} In particular, the Mississippi River Delta areas, the High Plains cotton area of Texas and the various irrigated areas in Southwestern states and California. In 1948, these areas accounted for 43 percent of the cotton produced in the United States.

Table 19. Summary of labor and power requirements per acre of cotton

Item	Animal-power farms				Tractor-power farms			
	Man		Animal		Man		Tractor	
	:Pct. of total	:Cumulative pct.	:Pct. of total	:Cumulative pct.	:Pct. of total	:Cumulative pct.	:Pct. of total	:Cumulative pct.
Usual operations: (1947 survey) <u>1/</u>	:	:	:	:	:	:	:	:
Land preparation	6.3	9.7	12.6	38.0	2.7	4.7	2.7	38.6
Planting	1.6	2.5	3.2	9.6	.7	1.2	.7	10.0
Cultivating	8.7	13.4	17.4	52.4	3.6	6.2	3.6	51.4
Chopping and hoeing	11.7	18.1	-	-	11.0	19.1	-	-
Harvesting <u>2/</u>	35.7	55.2	-	-	39.0	67.6	-	-
Hauling to gin	.7	1.1	-.*	-	.7	1.2	-.*	-
Total	64.7	100.0	33.2	100.0	57.7	100.0	7.0	100.0
Usual operations: (5-year av.) <u>3/</u>	:	:	:	:	:	:	:	:
Land preparation	6.3	10.9	12.6	38.0	2.7	5.8	2.7	38.6
Planting	1.6	2.8	3.2	9.6	.7	1.5	.7	10.0
Cultivating	8.7	15.1	17.4	52.4	3.6	7.7	3.6	51.4
Chopping and hoeing	11.7	20.2	-	-	11.0	23.5	-	-
Harvesting	28.8	49.8	-	-	28.0	60.0	-	-
Hauling to gin	.7	1.2	-.*	-	.7	1.5	-.*	-
Total	57.8	100.0	33.2	100.0	46.7	100.0	7.0	100.0

1/ Summary for 34 farms using animal power (870 acres of cotton), and 151 farms using tractor power (11,628 acres of cotton).

2/ Average yield on animal-power farms, 175 pounds of lint per acre; on tractor-power farms, 198 pounds of lint per acre.

3/ Average yield in all Black Prairie counties, 145 pounds of lint per acre, 1943-47.

* Car and trailer used to haul cotton to gin.

2. Apparently there is no generally adapted cash crop that can compete with cotton production under the prevailing size and nature of land holdings.
3. Intensive farming systems based upon production of livestock and livestock products apparently will appeal primarily to farmers who now have small cotton enterprises. In 1944 these farms accounted for about 10 percent of the cotton acreage of the area, Table 2.
4. The way in which the area has held about a constant proportion of the total acreage of cotton in the United States, despite a worsening of its efficiency in cotton production in relation to other major areas, suggests that the attraction of alternative uses for production resources is stronger in these other areas than is the case in the Black Prairie area.

On the whole it appears likely that the acreage of cotton will not diminish significantly. A cotton acreage allotment program could affect this situation, but in such an event, the relative position of cotton in the area as compared with competing areas would not differ materially.

Future Characteristics of Farms Growing Cotton

The principal change which may be expected in the operating units that produce cotton is a continuing adjustment of farm size to the production equipment which is now or which may become available. Specifically, this will probably mean that cotton will be produced principally on somewhat fewer, but larger farms. It seems reasonable to believe that many farms which now have small cotton enterprises will, if they continue to grow cotton, expand the scale of their operations. Such a gradual expansion appears to have been occurring on the basis of mechanization as it has developed to the present time. There are good reasons to believe that if in the future mechanical cotton equipment becomes more specialized than that now generally used, it will accelerate the upward adjustment in the size of operating units.

Another factor which will probably contribute to fewer small cotton enterprise farms will be the attraction of dairy and poultry farming to units such as this survey indicates these farms to be. A farm might be principally a dairy or poultry farm, and still handle a small acreage of cotton. Enterprise combinations such as these are not common, however, for commercial dairy or poultry production requires rather full, year-long utilization of operator and family labor. Such requirements are not complementary to cotton production. If, in addition, modern equipment for cotton production remains expensive and becomes relatively more specialized, it would appear to be even less likely than at present that farms primarily concerned with dairy and poultry production would also grow cotton.

Although some increase in the size of farms producing cotton seems probable for the future, no indications of a widespread development of extremely large operating units are apparent. It may be recalled that the average large tractor farm in this survey grew only about 100 acres of cotton and contained 166 acres of cropland. Several cotton farms in especially adapted localities in the Black Prairie area resemble the large plantation operations in the Delta, but none of these were in the sample under study and they are unusual.

More detailed over-all cost studies than are afforded by this report would be necessary to determine the point at which increasing size of the operating unit for cotton production fails to result in economies in production. Under existing conditions, this optimum size probably is not much greater than the acreage represented by the larger farms in the study.