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COTTON PRODUCTION PRACTICES IN THE CORPUS CHRISTI AREA, 1947

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

This report presents an analysis of cotton production practices followed in the Corpus Christi cotton area in 1947. A brief description also is included for production practices on the other major crop--combine-type grain sorghums. The study was conducted cooperatively by the Texas Agricultural Experiment Station and the Bureau of Agricultural Economics, USDA.

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 in the seven Texas areas under study will be issued later to the press and public. These areas are: Corpus Christi, Coast Prairie, Rolling Plains, Lower Rio Grande Valley, High Plains, Northeast Sandy Lands and Black Prairie.

Procedure

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

In the Corpus Christi cotton area, a small cotton enterprise included those farms which had less than 100 acres in cotton. Farms with a medium-sized cotton enterprise had from 100 to 250 acres in cotton. Large cotton enterprises consisted of farms having 250 acres or more in cotton. Subsequent references made to a particular size group in the report refer to the above-mentioned classification.

* Respectively, associate professor, Department of Agricultural Economics and Sociology, Texas Agricultural Experiment Station, and agricultural economist, Bureau of Agricultural Economics, USDA. Assistance in organizing the study and in reviewing this report was given by C. A. Bonnen, TAES, and E. L. Langsford, per-
USDA. The total number of cotton farms, they accounted for nearly 40 percent of
with acreage and production.

The information upon which this report is based was obtained through personal interviews with cooperating farmers. Data were obtained for 104 farms, which included 39 small cotton farms, 34 medium-sized farms and 31 large farms.

Trends in Acreage, Yield and Production of Cotton, 1928-47

Acreage devoted to cotton in the Corpus Christi cotton area has declined sharply since 1933 when the cotton adjustment programs were initiated, Table 1. The decline was given further impetus during the latter part of the war and the immediate postwar years because of relatively high grain prices and low power and labor requirements for the grain-sorghum crop. Following the slump in grain prices in 1948, the acreage planted to cotton shows some increase in 1949.

Table 1. Estimated acreage, yield and production of cotton, Corpus Christi cotton area, 1928-47

Year	Acres ^{1/}	Production	Yield	Year	Acres ^{1/}	Production	Yield
	Thousands:	Thousand	Pounds		Thousands:	Thousand	Pounds
		bales ^{2/}				bales ^{2/}	
1928	436.0	139.5	154	1938	279.2	132.2	227
1929	432.0	210.1	233	1939	255.1	141.3	266
1930	403.0	214.3	255	1940	234.6	95.8	196
1931	425.6	159.3	180	1941	230.2	95.1	198
1932	375.6	112.7	144	1942	230.0	135.5	283
1933	409.6	163.1	266	1943	226.0	140.1	298
1934	287.0	100.8	169	1944	220.0	86.4	188
1935	313.0	135.8	208	1945	188.5	78.3	199
1936	328.0	114.7	168	1946	147.5	72.1	235
1937	357.0	179.6	241	1947	188.5	117.4	298

^{1/} Acreage in cultivation, July 1.

^{2/} 500 lb. gross weight bales.

Source: USDA Agricultural Statistics and Crops and Markets.

Distribution of cotton farms, acreage of cotton, and production by size of cotton enterprise are listed in Table 2. Although large farms made up only 12 percent of the total number of cotton farms, they accounted for nearly 45 percent of the total acreage and production.

Table 2. Distribution of farms, acreage of cotton and production by size of cotton enterprise, 1944

Size group (acres in cotton)	Number of farms		Cotton acreage		Cotton production		Percent
	Number	Percent of total	Thousand acres	Percent of total	Thousand bales	Percent of total	of farms having tractors
Small, under 100	1124	66.3	67.1	28.6	26.2	27.3	91.9
Medium, 100-249	373	22.0	65.7	28.0	26.6	27.8	99.5
Large, 250 & over	199	11.7	101.8	43.4	43.0	44.9	100.0
Total	1696	100.0	234.6	100.0	95.8	100.0	94.5

Source: Special Cotton Report, U. S. Census, 1945 and TAES Circular 117.

Land, Livestock and Labor Organizations

The 1947 land, livestock, and labor organizations are shown in Table 3.

Small Cotton Farms. The small cotton farms averaged 170 acres with 154 acres of cropland. These farms ranged in size from 40 to 500 acres and cropland ranged from 39 to 450 acres. The small farms had an average of 34 percent of the cropland in cotton, 60 percent in grain sorghum and 6 percent in miscellaneous crops such as corn, Sudan, cabbage and onions. Pasture land, homestead, and the like, include all land not in cropland, the major portion of which is pasture land. Milk cows, hogs and chickens were the principal livestock found on the small farms. The majority of the small cotton farms were operated by only one family as the regular labor force, with seasonal laborers performing most of the harvesting operation. Only a few of the farms had either share croppers or wage families.

Medium-sized Cotton Farms. The medium-sized cotton farms averaged 377 acres with 349 acres of cropland, Table 3. These farms ranged in size from 175 to 1,000 acres with a range in cropland of 175 to 850 acres. An average of 42 percent of the cropland was in cotton and 55 percent in grain sorghum. The remaining 3 percent of the cropland was devoted to corn, vegetables, Sudan, oats and cane. One farm had 17 acres of Rhodes grass. Milk cows, other cattle and chickens were the principal livestock on the medium-sized cotton farms. Eighty-two percent of the farms had one or more wage families, but only 2 farms had share croppers.

Large Cotton Farms. The cotton farms with 250 acres or more in cotton ranged from 500 to 1,710 acres, and averaged 936 acres, Table 3. Cropland accounted for an average of 92 percent of the total land. Acres in crops ranged from 500 to 1,450 acres. An average of about 45 percent of the cropland was in cotton and 50 percent in grain sorghum. The remaining 5 percent of cropland was used principally for vegetables, corn, Sudan and flax. One farm had 650 acres in Rhodes grass. Only two farms reported workstock. Milk cows and chickens were the principal livestock on the large cotton farms. A smaller proportion of the farms kept chickens, and flocks were smaller on the large farms than on farms in the other size groups.

Table 3. Land, livestock and labor organization by size of cotton enterprise 1/

Items	Size group 2/								
	Small			Medium			Large		
	Farms: rptg.:	Aver- age:	Usual range:	Farms: rptg.:	Aver- age:	Usual range:	Farms: rptg.:	Aver- age:	Usual range:
	Pct.:	Acres		Pct.:	Acres		Pct.:	Acres	
Land:									
Total land	100	170	100-200	100	377	240-400	100	936	660-1160
Cropland	100	154	95-190	100	349	230-360	100	862	640-1000
Pasture and miscl. Cropland	100	16	1-10	100	28	10-40	100	74	10-100
Cotton	100	53	40-80	100	148	120-160	100	384	300-450
Corn	62	3	3-5	35	4	5-15	19	5	3-15
Grain sorghum	100	92	40-90	100	193	100-180	100	429	250-450
Other crops	44	6	2-10	26	4	5-20	26	44	20-100
Vegetables double cropped	10	(4)	(5-65)	12	(5)	(10-20)	19	(27)	(100-200)
	Farms: rptg.:	Aver- age:	Usual range:	Farms: rptg.:	Aver- age:	Usual range:	Farms: rptg.:	Aver- age:	Usual range:
	Pct.:	Number		Pct.:	Number		Pct.:	Number	
Livestock:									
Workstock	10	0.2	2	9	0.2	2	.6	0.6	8-10
Milk cows	90	2.5	2	79	2.3	2	71	2.1	2-3
Other cows	18	1.8	1-5	32	4.9	3-10	13	5.2	-
All other cattle	38	1.5	1-3	68	3.0	1-3	36	12.2	1-5
Brood sows	15	0.3	1	18	0.3	1	13	0.6	2-4
Other hogs	49	3.7	2-4	41	1.8	1-4	32	3.5	2-6
Hens and pullets	95	90.1	25-75	94	59.5	12-50	68	70.3	25-50
	Farms: rptg.:	Aver- age:	Usual	Farms: rptg.:	Aver- age:	Usual	Farms: rptg.:	Aver- age:	Usual
	Pct.:	Number		Pct.:	Number		Pct.:	Number	
Labor:									
Operator:									
Families	100	1.1	1	100	1.1	1	100	1.2	1
Available workers	100	1.7	1	100	2.0	2	100	1.5	1
Cropper:									
Families	13	0.1	1	6	0.1	2	6	0.2	-
Available workers	13	0.2	1	6	0.2	2	6	0.4	-
Hired or wage hands:									
Families	18	0.2	1	82	1.2	1	94	3.4	3
Available workers	18	0.3	1	82	2.7	2	94	8.3	8

1/ Usual range or usual number in table relates only to those farms reporting.

2/ 39 small farms, 34 medium farms, 31 large farms.

Only 2 of the large farms had croppers. The remaining farms maintained at least one wage family and on one farm, as many as 8 were found. The more usual number of wage families on the large farms was 3, which provided about 8 available farm workers.

Land Tenure

Approximately half of the land was operated under lease either on one-third and one-fourth basis or for cash rent, but principally the former. A more complete picture of the tenure situation may be obtained from Table 4.

Table 4. Proportion of land operated by owners and tenants and proportion of operators who were tenants or owners

	Size group			All farms
	Small	Medium	Large	
	Percent	Percent	Percent	
Total land owned	51	45	51	49
Total land rented	49	55	49	51
Farm operators that were owners only	41	24	23	30
Farm operators that were tenants only	44	44	29	39
Farm operators that were combination tenant and owner	15	32	48	31

Under the usual third and fourth tenure arrangements for cotton and grain sorghums, the tenant furnished all power and labor for the crops. Seed, fertilizer and poison were paid for by the tenant. Ginning expenses for cotton were divided, and the landlord paying one-fourth and the tenant three-fourths. The tenant, in turn, received three-fourths of the cotton crop, while the landlord received one-fourth. The harvesting expenses for grain sorghum were divided, the landlord paying one-third and the tenant two-thirds. The tenant, in turn, received two-thirds of the grain sorghum crop, while the landlord received one-third.

Planting and Spacing Practices

A summary of planting practices by size of farm is listed in Table 5. Very little replanting occurred. Cotton was planted solid in the drill on all farms.

Stoneville, Delfos and Lankart were the principal varieties grown. Most of the farmers planted seed that was first or second year from the breeder. As compared with home-grown seed, a larger proportion of the purchased seed was both treated and delinted.

Table 5. Planting seed, seed treatment and rate of seeding

Item		Size group			All farms
		Small	Medium	Large	
Total acres in sample	(Acres):	2,065	5,177	11,859	19,101
Proportion of acres replanted	(Percent):	8	6	4	5
Proportion of farms using:					
Home-grown seed only	Do.	10	12	13	12
Purchased seed only	Do.	67	29	29	43
Both purchased and home-grown	Do.	23	59	58	45
Proportion of seed delinted:					
Home-grown seed	Do.	13	24	15	18
Purchased seed	Do.	57	67	65	64
All planting seed	Do.	43	11	35	37
Proportion of seed treated:					
Home-grown seed	Do.	10	26	22	22
Purchased seed	Do.	54	58	90	76
All planting seed	Do.	40	38	49	45
Rate of seeding--delinted seed					
Average amount per acre	(Pounds)	26	25	20	24
Common amount per acre	Do.	24	24	16-24	24
Rate of seeding--non-delinted seed:					
Average amount per acre	(Pounds)	29	28	29	29
Common amount per acre	Do.	32	32	32	32
Proportion of farms planting following varieties:					
Stoneville only	Do.	54	29	23	37
Delfos only	Do.	15	21	19	18
Lankart only	Do.	3	23	13	13
Stoneville and Delfos only	Do.	13	12	16	13
Other and mixed varieties	Do.	15	15	29	19
Proportion of farms planting seed:					
1 to 2 years from breeder	Do.	95	97	97	96
3 years or more from breeder	Do.	5	3	3	4

The usual rate of seeding non-delinted cottonseed was one bushel or 32 pounds per acre. On farms planting delinted seed, the usual rate was 24 pounds per acre on small and medium sizes and about 20 pounds on the large farms.

Most of the farmers used some method of spacing cotton within the row, Table 6. The small cotton farms resorted principally to hand chopping; the larger farms tended to rely more heavily on machine chopping. Cross plowing was practiced on only one farm in the sample. The usual spacing was 8 inches for hand chopping and 6 inches for machine chopping. A few farmers used a 38-inch width for rows but the majority had 36-inch rows.

Table 6. Method of spacing cotton *set 10 poison was used*

Item	Number of years poison used last 10	Size group			All farms
		Small	Medium	Large	
Cotton planted	(Acres)	2,065	5,177	11,859	19,101
Method of spacing planted solid: <u>1/</u>					
No spacing					
Proportion of farms	(Percent)	5	12	16	11
Proportion of acreage	Do.	5	10	15	12
Hand chopped					
Proportion of farms	Do.	85	59	52	67
Proportion of acreage	Do.	86	51	38	47
Machine chopped					
Proportion of farms	Do.	5	41	61	34
Proportion of acreage	Do.	4	39	47	41
Cross plowed					
Proportion of farms	Do.	5	-	-	2
Proportion of acreage	Do.	5	-	-	1
Usual spacing in row					
Hand chopped	(Inches)	8	8	8	8
Machine chopped	Do.	7	6	6	6
Cross plowed	Do.	7	-	-	7
Proportion of farms reporting:					
36 inch rows	(Percent)	87	61	87	83
38 inch rows	Do.	13	29	13	17

1/ A combination of methods of spacing was used on some farms.

Fertilizer, Poison and Defoliation Practices

Fertilizer. Out of the 104 farms visited, only 15 used any fertilizer on cotton. Fertilizer was used on only 10 percent of the recorded cotton acreage. One of the small farms used 4-12-4 on 10 acres. In the medium-sized group, 4 farms used 20 percent superphosphate on 333 acres. In the group of large farms 10 used fertilizer, principally superphosphate, on 1,545 acres. As the entire acreage of cotton was not covered on the majority of farms using fertilizer, records could not be obtained as to differences in yields where fertilizer was applied.

Poison. The principal types of cotton insects found are flea hoppers and boll weevils. Calcium arsenate, DDT and sulphur were the important types of poisons used to combat the insects; they were used either individually or in various combinations. Of the 104 farms studied, 83 or 80 percent used poison at least once and some as many as 5 times. The poison was applied as a dust by either a pull type duster or an airplane. The usual amounts applied were 7 to 10 pounds at each application.

Since this study was made, new chemical insecticides have been introduced and are being used in the area with better control of cotton insects. The new insecticides being used are toxaphene and benzene hexachloride.

An indication of the frequency of poisoning during the 10 years previous to 1947 may be obtained from Table 7. It is interesting to note that only a small

Table 7. Number of years during last 10 poison was used

Number of years poison used during last 10	Size group		
	Small	Medium	Large
	Percent of farms	Percent of farms	Percent of farms
0	-	-	-
1	-	-	-
2	4	-	3
3	8	7	-
4	4	4	4
5	-	7	3
6	-	-	4
7	13	18	7
8	13	18	18
9	4	-	-
10	54	46	61

percentage of the farms in all size groups poisoned 5 years or less out of 10, while 71 percent of the small, 64 percent of the medium size, and 79 percent of the large farms poisoned for insects at least 8 out of the last 10 years.

Defoliation. One farm in the small size group, 3 in the medium-sized group, and 4 of the large farms attempted defoliation. This was on a total of 983 acres of cotton. From 20 to 30 pounds of calcium cyanamid was applied by airplane. The date of application varied from the middle of August to the first of September. For the area, these dates were rather late in the season. Results varied from poor to very effective.

Labor and Machinery Hired and Wages for Specific Operations

Labor. The major part of the cotton chopping, picking and snapping in 1947 was done by workers who did not live on the farm, Table 8. As mentioned earlier, most of the farms with 100 acres or more in cotton had one or more wage families living on the place who performed regular farm work, drove tractors and performed part of the hoe and harvest labor.

Wages. The usual wage rates for specific operations are shown in Table 9. Although wage rates varied widely for different operations, those shown are the more common. Rates for cotton picking varied from \$1.25 to \$3.50 per 100 pounds of seed cotton, depending on the yield, competition for labor and time of year. Day rates varied from \$2.00 to \$6.00 depending on the competition for labor and the type of work.

Machinery. Thirty of the 104 farmers interviewed hired airplanes to poison either part or all of their cotton acreage. The usual charge was 3 cents per pound of dust applied. On the 8 farms that attempted defoliation, the operation was done by plane at a usual charge of 3 cents per pound. Very few farms hired any other machinery work done on cotton.

Table 8. Percentage of hired labor performed by non-farm residents

Operations	Size group		
	Small Percent of farms	Medium Percent of farms	Large Percent of farms
Cotton chopping:			
0-25 percent	16	20	19
26-50 percent	10	6	13
51-75 percent	0	6	19
76-100 percent	74	68	49
Cotton picking:			
0-25 percent	8	3	0
26-50 percent	2	0	3
51-75 percent	0	6	6
76-100 percent	90	91	91
Cotton snapping:			
0-25 percent	23	12	13
26-50 percent	0	0	3
51-75 percent	0	6	6
76-100 percent	77	82	78
Regular farm work:			
0-25 percent	72	76	97
26-50 percent	8	6	3
51-75 percent	10	6	0
76-100 percent	10	12	0

Table 9. Usual wage rates for specific operations

	Dollars
Cotton chopping:	
Rate per day	4.00
Rate per hour	0.50
Rate per acre	2.00
Cotton picking, including hauling:	
Rate per 100 pounds seed cotton	2.50
Cotton snapping, including hauling:	
Rate per 100 pounds seed cotton	2.25
Regular farm work:	
Rate per day	4.00
Tractor drivers:	
Rate per day	4.00

A large portion of the combining and hauling of the grain-sorghum crop was performed by outside machines on a custom basis. Either part or all of the combining of grain sorghum was hired on 67 percent of the small farms, 62 percent of the medium-sized farms and 55 percent of the large farms. The usual rate for combining was 20 cents per 100 pounds of grain. The rate for trucking was 10 cents per 100 pounds. A few farmers hired some row binding done. Very few of the farmers did any custom work for others with their equipment.

Farm Machinery

The percentage of farms reporting particular machines, the average number of each machine and the usual number are shown in Table 10.

Table 10. Farm machinery reported by size of cotton enterprise

Item	Size group								
	Small			Medium			Large		
	Farms:	Aver-	Usual	Farms:	Aver-	Usual	Farms:	Aver-	Usual
	rptg.:	age :		rptg.:	age :		rptg.:	age :	
	Pct.:	Number		Pct.:	Number		Pct.:	Number	
Pick-up 1/4 to 3/4 ton	15	0.2	-	38	0.4	-	68	0.8	1
Trucks 1 1/2 to 2 tons	15	0.2	-	24	0.3	-	68	0.8	1
Tractors	100	1.4	1	100	2.2	2	100	4.8	4-6
Breaking plows	21	0.2	-	47	0.8	-	61	1.0	1
Middle busters or listers:									
4-row	13	0.1	-	24	0.4	-	42	0.9	1
3-row	74	0.8	1	85	1.4	2	97	2.8	3
2-row	41	0.4	-	35	0.4	-	26	0.6	-
Disks:									
Tandem	87	0.9	1	100	1.6	2	100	3.2	2-4
Row disk	18	0.2	-	18	0.2	-	29	0.5	-
Disk harrows	18	0.2	-	3	-	-	-	-	-
Section harrows	51	0.5	-	76	0.8	1	97	1.7	2
Planters:									
4-row	69	0.8	1	97	1.5	2	100	3.0	3
2-row	36	0.4	-	18	0.2	-	13	0.1	-
Cultivators:									
4-row	62	0.7	1	91	1.5	2	100	3.9	4
2-row	44	0.5	-	35	0.6	-	19	0.3	-
Grain drills	8	0.1	-	12	0.1	-	16	0.2	-
Mowers	8	0.1	-	21	0.2	-	19	0.2	-
Combines:									
4-row	5	0.1	-	-	-	-	19	0.3	-
3-row	-	-	-	3	-	-	13	0.3	-
2-row	26	0.3	-	56	0.6	1	52	1.2	1-2
Cotton poison machine	67	0.7	1	82	0.8	1	97	1.1	1
Stalk cutter--principally									
2-row	95	1.0	1	97	1.3	1	100	2.6	2
Trailers	54	0.9	1	44	1.0	-	71	2.9	3
Rollers	41	0.4	-	56	0.7	1	81	1.9	2
Machine choppers--2-row	8	0.1	-	41	0.4	-	74	1.2	1-2
Row binders	28	0.3	-	24	0.3	-	23	0.3	-
Scratchers or weeders	26	0.3	-	15	0.1	-	29	0.6	-
Fertilizer distributor	5	0.1	-	9	0.1	-	23	0.3	-

Pick-up trucks and larger trucks were found on some farms in all size groups. The majority of the farms in the large size group had both a pick-up and a large truck.

At least one tractor was used on all farms. From 4 to 6 were usual on large farms.

Breaking plows were common only on the large farms but disks, harrows, planters, cultivators and stalk cutters were common in varying numbers on all farms. A lister or middle buster or both were common implements on all farms. Machine cotton choppers were commonly found on the large cotton farms. Only one farm reported a rotary hoe.

Some indication as to the age of farm machinery may be obtained from Table 11 in which all tractors are grouped according to age. It may be noted that the percentage of old tractors is highest on the smaller farms and lowest on the larger farms.

Table 11. Tractor ages by size of cotton enterprise

	Age in years							
	1-3		4-6		7-9		10 and over	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Size of enterprise:								
Small	8	15	10	19	17	32	18	34
Medium	19	25	12	16	15	20	30	39
Large	42	28	48	32	27	18	32	22
All farms	69	25	70	25	59	21	80	29

Average Yield, Method of Harvest and Gin Turn-out

The average yield of lint cotton per acre, the method of harvesting cotton and the gin turn-out of lint and seed are listed in Table 12.

The average cotton yield of 303 pounds of lint per acre on farms studied was 70 pounds higher than the 1937-46 average yield in the Corpus Christi cotton area. Thirty-six percent of the bales harvested were hand snapped in 1947. Only about 10-15 percent of the cotton is normally snapped. The increased amount of snapping was caused mainly by heavy rains in August during harvest. All farms picked at least once and some cotton was snapped on 87 percent of the farms.

The gin load or amount of seed cotton and trash required per 500-pound gross weight bale of lint varied only slightly between size groups of farms, Table 12. On the average, a bale of picked cotton yielded 31 percent lint, 58 percent seed and 11 percent trash. The average bale of snapped cotton was 23 percent lint, 43 percent seed and 34 percent trash.

Table 12. Cotton harvesting practices

Item		Size group			All farms
		Small	Medium	Large	
Acre yield of lint	(Pounds)	293	304	304	303
Proportion of cotton:					
Hand picked	(Percent)	72	64	62	64
Hand snapped	Do.	28	36	38	36
Seed cotton and trash per bale: ^{1/}					
Hand picked	(Pounds)	1575	1555	1545	1560
Hand snapped	Do.	2100	2165	2100	2120
Cottonseed per bale					
Hand picked	(Pounds)	910	895	900	905
Hand snapped	Do.	905	905	895	900
Percent turn-out					
Hand picked					
Lint	(Percent)	30	31	31	31
Seed	Do.	58	58	58	58
Hand snapped					
Lint	(Percent)	23	22	23	23
Seed	Do.	43	42	43	43

^{1/} Figured on 500-pound gross weight bale of lint.

Labor and Power Requirements
Cotton

The number of farms using different types of power is shown in Table 13. Seventy-eight of the 104 farms used 4-row tractor equipment, while 14 farms used a combination of 2- and 4-row equipment. Only one farm used a combination of mule and tractor equipment.

Table 13. Number of farms using different types of power

Type of power and equipment	Size group			All farms
	Small	Medium	Large	
	Number	Number	Number	Number
4-row tractor	21	27	30	78
2-row tractor	10	1	-	11
2- and 4-row tractor	7	6	1	14
Mule and tractor	1	-	-	1
Total	39	34	31	104

The labor and power used in the performance of the usual operations in the production of cotton in 1947 are listed in Table 14. Rates of performance, power and labor requirements, proportion of farms using and cotton acreage covered with different tractor implements are shown in Table 15.

Table 14. Labor and power required per acre for the usual operations in producing cotton

Operations	Times over	4-row tractor-drawn equipment		2-row tractor-drawn equipment	
		Hours per acre		Hours per acre	
		Man	Tractor	Man	Tractor
Seedbed preparations:					
Bedding ^{1/}	3.00	1.14	1.14	1.68	1.68
Disking	1.00	0.40	0.40	0.40	0.40
Planting	1.05	0.28	0.28	0.56	0.56
Rolling	1.05	0.15	0.15	0.15	0.15
Cultivating	4.50	1.17	1.17	2.02	2.02
Machine chop	0.40	0.34	0.17	0.34	0.17
Hand chop and hoe	2.50	13.15	-	13.15	-
Poisoning	2.00	0.18	0.18	0.18	0.18
Total previous to harvest	-	16.81	3.49	18.48	5.16
Harvesting:					
Picking	1.50	28.53	-	28.53	-
Snapping	1.00	13.13	-	13.13	-
Weigh and haul	2.50	1.36	1.36 ^{2/}	1.36	1.36 ^{2/}
Total harvesting	-	43.02	1.36 ^{2/}	43.02	1.36 ^{2/}
Cut stalks and disk	1.00	0.40	0.40	0.40	0.40
Total all operations	-	60.23	5.25	61.90	6.92

^{1/} Bedding done twice followed by disking, then re-bedding before planting.

^{2/} Truck.

Seedbed Preparations. The methods used and the amount of seedbed preparation varied considerably. The land on all farms was bedded at least once and as many as 4 to 5 times on a number of farms. The majority of farms used a disk in combination with the bedding operation. Although some cotton land was disked as many as 5 times, once over with a tandem disk was the usual practice. Slightly more than a third of the farms used a harrow in preparing the seedbed.

(continued on next page)

Table 15. Rates of performance, power and labor requirements, proportion of farms using and proportion of cotton acreage covered with different tractor implements

Implement used	Proportion:		Times over reporting	Number of machines in sample	Acres covered per 10 hr. day	Hours	
	of farms reporting	of cotton acreage covered				Man	Tractor
	Percent	Percent	No.	Number	Acres	Hours	Hours
<u>Bedding 1/</u>	100.0	99.6	3.00				
4-row middle buster	17.0	20.0	3.12	18	33	0.30	0.30
3-row middle buster	70.8	67.1	3.00	113	26	0.38	0.38
2-row middle buster	22.3	12.3	2.66	30	18	0.56	0.56
<u>Disking</u>	59.2	49.2	2.10				
6-8 foot tandem disk	50.5	38.9	1.80	75	25	0.40	0.40
Other disks	8.7	10.3	3.00	9	-	-	-
<u>Harrowing before planting</u>	36.9	35.4	1.10				
4 section harrow	17.5	25.6	1.10	22	76	0.13	0.13
3 section harrow	13.6	7.7	1.30	20	41	0.24	0.24
2 section harrow	2.9	0.8	1.00	6	28	0.36	0.36
Other harrows	-	1.3	1.00	5	-	-	-
<u>Fertilizing</u>	8.7	11.6	1.00				
4-row distributor	5.8	8.8	1.00	9	43	0.23	0.23
Other distributors	2.9	2.8	1.00	3	-	-	-
<u>Planting 2/</u>	100.0	100.0	1.05				
4-row planter	89.3	96.0	1.05	142	37	0.27	0.27
2-row planter	11.6	4.0	1.03	12	19	0.53	0.53
<u>Rolling</u>	50.5	57.2	1.05				
4-row roller	44.7	50.0	1.05	64	69	0.14	0.14
Other sizes of rollers	5.8	7.2	1.00	5	-	-	-
<u>Harrowing after planting</u>	12.6	12.4	1.00	-	-	-	-
<u>Scratching</u>							
4-row scratcher	19.4	15.7	1.00	24	51	0.20	0.20
<u>Cultivating 3/</u>	100.0	100.0	4.60				
4-row cultivator	82.5	92.1	4.60	85	38	0.26	0.26
2-row cultivator	23.3	7.9	4.60	24	22	0.45	0.45
<u>Hand hoe labor</u>	100.0	100.0	2.50	-	1.90	5.26	-
<u>Machine chopping</u>							
2-row chopper	35.9	41.6	1.00	43	23	0.86	0.43
<u>Defoliate</u>							
Plane	4.9	2.8	1.00	5	-	-	-

(continued on next page)

Table 15. Rates of performance, power and labor requirements, proportion of farms using and proportion of cotton acreage covered with different tractor implements (continued)

Implement used	Proportion of farms reporting	Proportion of cotton acreage covered	Times over	Number of machines in sample	Acres covered per 10 hr. day	Hours per acre once over
	Percent	Percent	No.	Number	Acres	Hours
<u>Poisoning</u> 4/	79.8	83.2	2.30			
8-row duster	32.0	39.3	2.15	38	136	0.07
6-row duster	17.5	14.7	1.85	20	95	0.11
Other dusters	7.8	4.6	1.75	8	-	-
Plane	30.1	45.9	2.55	11	838	0.01
<u>Picking cotton</u>	97.0	92.9	1.50	-	-	-
<u>Snapping</u>	85.4	82.8	1.15	-	-	-
<u>Hauling</u>	100.0	-	-	-	-	-
Truck (contract)	79.6	-	-	-	-	-
Trailer	14.6	-	-	-	-	-
Truck and trailer	5.8	-	-	-	-	-
<u>Cut stalks and disk</u>	90.0	90.0	1.10	-	-	-
2-row stalk cutter and 6 to 8 foot disk	90.4	90.0	1.10	129	25	0.40
<u>Cut stalks</u>	9.6	6.2	1.35	13	23	0.43
2-row stalk cutter						
<u>Disk or turn stalks</u>	6.7	6.0	1.00	-	-	-
Disk	4.8	2.9	1.00	-	-	-
Middle buster	1.9	3.1	1.00	-	-	-

- 1/ One farm used a 2-row, 3-row and 4-row middle buster; 7 farms used both 3- and 4-row busters; and 4 farms used both 2- and 3-row middle busters.
- 2/ Planting includes one farm that used both 2- and 4-row planters.
- 3/ Cultivating includes 6 farms that used both 2- and 4-row cultivators.
- 4/ Sixteen farms covering 4,018 acres used both plane and duster.

Variations in the operations performed and in amount of land preparation may be explained by the fact that most of the cotton crop followed grain sorghums. Harvesting of grain sorghum is usually started in June and completed by the first week in July, while cotton is not planted until the latter part of February or the first part of March. This means 7 to 8 months when the land is usually free from a crop and weed control is a problem. Rainfall was slightly above normal during August, September and October 1946, and January 1947 when the land was being prepared for cotton. Furthermore, some farmers ordinarily work their land more than others.

The usual procedure in preparation for the 1947 crop was to give the land four cultivations before planting. As all of the cotton land was bedded an equivalent of 3 times, the usual requirements indicate 3 bedding operations in Table 14. A 3-row middle buster was commonly used on 4-row tractor farms and the 2-row buster was the principal type used on 2-row tractor farms. As the majority of the farmers used a 6 to 7-foot tandem disk and the total acreage of cotton was covered an equivalent of one time, a disking operation is included in usual requirements. A harrowing operation is included for 35 percent of the land.

Preparation of the seedbeds began during the first part of August or September and extended over the period until planting time.

Planting. As previously mentioned, most of the cotton was planted during the latter part of February and the month of March. A very small proportion of the crop was replanted in 1947, as may be noted from usual requirements, Table 14. Rolling the row behind the planter was a common practice. This operation was either performed separately or in combination with planting. The majority of the farms performed the operation separately and used a 4-row roller.

Cultivation. The number of cultivations following planting varied from 3 to 7 times among individual farms. A small percentage of the farms used either a harrow or 4-row scratcher for the first cultivation. The usual number of cultivations was between 4 and 5, including harrowing and scratching.

Hand Hoe Labor. The major portion of the cotton acreage was chopped or spaced once and hoed twice. Two-row machine choppers were used on about 40 percent of the cotton. Several farms used machines on only part of the acreage. Machine choppers were more common on the larger farms. The amount of hoe labor, 13 hours per acre, required in 1947 was unusually high and a little more than twice the normal amount of labor required. ^{1/} This may be partly explained by the fact that rainfall was slightly above normal in April and nearly 2 inches above normal in May.

Poisoning. The total acreage of cotton was poisoned an equivalent of slightly over two and one-third times, but twice over was usual. Six and 8-row dusters were commonly used to distribute poison. However, 29 percent of the farms used an airplane for all or part of the acreage covered. Usual requirements shown in Table 14 are based upon a 6- to 8-row duster.

Harvesting. As mentioned earlier, 64 percent of the bales harvested was hand picked and 36 percent was hand snapped. No mechanical pickers were used. Harvesting must be completed by a definite date because of the pink bollworm situation. The deadline date varies from year to year depending upon the weather, but usually it falls around September 15. Most of the farmers began picking cotton around July 15 to 20 in 1947.

The usual harvesting requirements are based on an average yield of 303 pounds of lint cotton per acre. An average of 200 pounds of picked seed cotton and 360 pounds of snapped seed cotton was gathered by each laborer in a 10-hour day. Cotton was hauled by truck on 80 percent of the farms. Hauling was contracted along with picking and weighing.

The harvesting labor requirements shown in Table 14 are above normal because the 1947 yield was 70 pounds above average. With an average yield of 233 pounds of lint per acre, the harvesting labor requirements would have been 33 hours per acre.

Destroy Stalks. Because of the pink bollworm, farmers are required to destroy all cotton stalks in the area by a certain date. Stalks were cut with a 2-row stalk cutter and disked under with a 6- to 8-foot tandem disk as one operation on 90 percent of the farms. Some of the farmers performed each operation separately, while on 2 farms a middle buster was used instead of a disk to turn the stalks.

Total Labor and Power Requirements. The usual operations in producing cotton on farms using 4-row tractor equipment required a total of 60.2 hours of man labor and 5.2 hours of tractor work per acre in 1947. On farms using 2-row tractor equipment the totals were 61.9 hours of man labor and 6.9 hours of tractor work. The 1947 requirements are higher than usual because of conditions favorable to weed growth and above normal cotton yields.

When comparing the requirements of the two types of equipment shown in Table 14, the 4-row tractor-drawn equipment shows a saving of only 1.7 hours per acre of man labor and tractor work. Bedding, planting and cultivating operations make up this difference. Other operations were performed with the same type of equipment. If 4-row tractor farms had used a 4-row middle buster rather than a 3-row, the difference would have been slightly larger. The advantage of using 4-row tractor-drawn equipment lies in the performance of the critical operations of planting and cultivating.

Combine Grain Sorghum

Combine type maize was the only other major crop on most of the cotton farms. Sorghums harvested for grain accounted for 60 percent of the cropland on small farms, 55 percent on the medium-sized farms and 50 percent on the large farms.

The range in yield per acre on 36 farms was from 1,000 to 3,750 pounds. The average yield was 2,600 pounds of grain per acre, while the 5-year average yield was reported to be 2,400 pounds. On farms studied, 100 percent of the harvested crop was sold.

The majority of the farmers planted Martin's combine maize. The usual rate of planting was 7 to 8 pounds per acre. Planting was done during the latter part of February and the first part of March. Fifty-eight percent of the farms used treated seed.

The amounts of labor and power required per acre for the usual operations performed in producing grain sorghums in 1947 are listed in Table 16. Four-row tractor equipment was used on 34 of the 36 farms on which records were obtained.

In seedbed preparation, some farmers harrowed rather than disked but disking was more common. As only one-third of the land was rolled after planting, this operation was not included as usual. All farms used a cultivator and a few used a scratcher or weeder for cultivation after planting. One-fourth of the farms did some hand hoeing of grass and weeds. This was not a common practice.

The usual type of combine used was a 2-row. Some farms used a 4-row. The usual requirements shown in Table 16 are based on a two-row combine for harvest and a truck for hauling. Harvesting was accomplished during the latter part of June and the first part of July.

The usual practice was to cut and disk the stalks soon after harvest. A total of 4.1 man hours and tractor hours per acre was required for the usual operations in producing grain sorghums.

Table 16. Labor and power required per acre for the usual operations performed in producing grain sorghums

Operations	Times over	4-row tractor-drawn equipment	
		Hours per acre	
		Man	Tractor
Seedbed preparation			
Bedding	3.00	1.14	1.14
Disking	1.00	0.40	0.40
Planting	1.00	0.27	0.27
Cultivating	3.00	0.78	0.78
Total previous to harvest		2.59	2.59
Harvest			
Combining	1.00	0.56	0.56
Hauling ^{1/}	1.00	0.56	0.56
Total harvest		1.12	1.12
Cut stalks and disk	1.00	0.40	0.40
Total all operations		4.11	4.11

^{1/} Hauling by a 1½ to 2 ton truck.

Possibilities for Further Changes in Production Practices

Although cotton is still the most important cash crop in the Corpus Christi area, the acreage devoted to it has declined steadily since 1929. According to U. S. Census figures, cotton accounted for 88 percent of the cropland harvested in 1929 and only 45 percent in 1944. On the other hand, sorghums harvested for grain increased from less than 2 percent of cropland harvested in 1929 to 35 percent in 1944. Although later area figures for grain sorghums are not available, it is known that the acreage has increased appreciably and further decreases in the acreage of cotton have occurred since 1944.

Probably the most important reason for the increase in grain sorghum acreage and decrease in cotton acreage since the beginning of the war is the complete mechanization of the grain sorghum crop. This occurred with the introduction of the combine-type sorghums during the early war years and was accompanied by an increase in both the demand for and the price of feed grains. Furthermore, the labor supply on farms decreased because many farm people left the farms for military services and industrial employment. As both cotton and grain sorghums were well adapted to most sections of the area, many farmers turned to the crop with the lower labor requirements.

In 1947, only slightly more than 4 hours of labor were expended per acre in producing grain sorghums with 4-row tractor equipment. For cotton, the total labor requirements were slightly over 60 hours per acre with the same type of equipment. Such a difference in labor required places cotton at a disadvantage during periods of labor scarcity.

Two operations, hand hoeing and hand harvesting, made up 93 percent of the total labor requirements for cotton. No hoeing was required for combine sorghums and mechanized harvesting made up only 27 percent of total labor requirements.

The total of over 13 hours of hand hoe labor required per acre of cotton in 1947 may be greatly reduced or eliminated in the future. The thinning operation may be reduced by such practices as planting to a stand, cross plowing and machine chopping. The hand hoeing of weeds and grass may be reduced or eliminated through the use of rotary hoes, flame cultivators and chemicals and by improved seedbed preparation. Flame cultivation and chemical weed control are still in the experimental stage but show promise.

The development of an efficient mechanical harvester, along with a successful defoliant for cotton offers great possibilities for reducing labor requirements. The only mechanical picker in commercial production at present is a one-row machine. Several of these machines were tried in the area in 1948 and some will be tried in 1949. Farmer estimates indicate that the present one-row machine will pick about 7 to 8 acres in 10 hours. Most farmers interviewed were of the opinion the initial cost and upkeep of the machine were too high for this rate of performance, considering the average yield of cotton in the area. Due to pink bollworm control requirements and the threat of storm damage, a farmer must get his crop out as rapidly as possible.

To properly visualize possible future cotton production practices, it is necessary to make certain assumptions. Planting cotton to a stand would eliminate the thinning operations. Although not in general use in this area, rotary hoes have reduced hand hoeing in some sections of the cotton belt. Flame cultivators have also been used successfully when mounted on the tractor and used simultaneously with regular cultivators. Assuming that cotton is planted to a stand, that one additional cultivation is needed with rotary hoe attachment, and that flaming is practiced along with regular cultivation, the labor requirements previous to harvest could be reduced from about 17 hours per acre, as in 1947, to about 4 hours.

Making a further assumption that a 2-row mechanical picker will be developed which will pick 12 acres in 10 hours and that an extra man is required to haul the cotton, then the harvesting labor requirements would be slightly over 3 hours per acre as compared to 43 hours in 1947. It is assumed that the cotton acreage would be picked over twice by machine.

Under the above assumptions of complete mechanization, total labor requirements per acre of cotton would be 7 to 8 hours as compared with 60 hours for cotton and 4 hours for grain sorghums in 1947. A saving of over 50 hours of labor per acre of cotton would not necessarily mean that the crop could be produced more profitably. Relative costs of labor and machinery together with the effect of mechanical harvesting on the quality of cotton would be the determining factors. The cotton grower would still be faced with the necessity of deciding how much machinery to substitute for labor.

Although the above assumptions include equipment and practices which are far from realization, it is not too early for farmers and farm leaders to think about the possibilities for changes in cotton production practices and to make plans to meet these changes.

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