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Making cotton cheaper - can present production costs be reduced? : supplement to Bulletin 290

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Making Cotton Cheaper

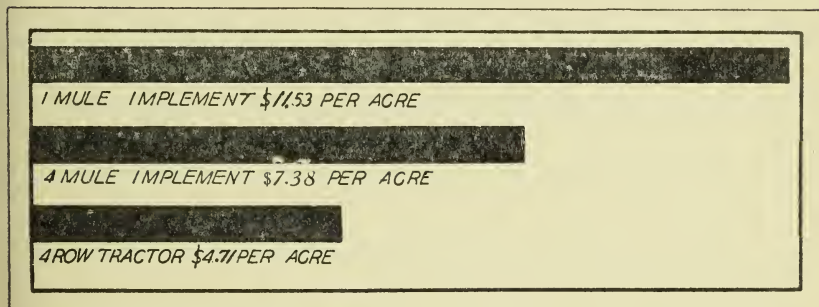
Can Present Production Costs Be Reduced?

(Supplement to Bulletin 290)

DELTA EXPERIMENT STATION

Stoneville, Mississippi

M. G. Vaiden, J. O. Smith, W. E. Ayres



Graphic illustration of variable per acre cotton production costs—Three year averages in Delta Station tests. For detailed data see table seven.

MISSISSIPPI AGRICULTURAL EXPERIMENT STATIONS

State College, Mississippi
W. R. PERKINS, Director

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Summary

Cotton production cost records herein published should be studied along with those in Mississippi Stations Bulletin No. 290. They were materially reduced in 1931 but were still relatively too high on the average to permit profits. Further reductions will be made in 1932 but there is a minimum below which reduction is not possible.

Labor costs are more variable than other items. For this reason costs on plantations using small units of equipment and excessive amounts of labor are much more variable than where maximum use is made of machinery and labor requirements reduced to a minimum.

Fifteen-acre-per-family units can never again be profitable on the average, even in the Delta. Neither labor nor operator will ever be satisfied again with living standards possible under a system requiring so much overhead and the support of so many human beings per unit area. Human demands will continue to exceed possible income. Part of the power now supplied by man must be replaced by mules and machines which are less expensive per unit of power.

No other items were reduced so much in 1931 as tenant charges but because of the human factor these will be the first to rise when business revives. Farm labor's daily income is still below that of industrial labor. Only farm machines and power can equalize it. Farm labor must do more work per family else farms cannot compete with industry for labor. Industries have mechanized in self defense as the farms must do as rapidly as possible. From 30 to 50% of present Delta farm labor must ultimately be replaced by machinery if plantations are to escape foreclosure.

The production of farm necessities at home materially reduced operating costs in 1931. This can be continued and increased. The home production of feed is now economical and safe in the Delta. Food production can probably be made much more economical through the use of commercial type storage machinery and methods for meats, fruits, and vegetables which can be economically produced on Delta plantations.

Plantation accounts should be so kept and analyzed that operators can separate profitable and unprofitable expenditures and eliminate the latter. A way must be found to pay plantation labor after, rather than before, the labor is performed. (There are two bad paymasters. One pays in advance, the other never.) Radical reduction in labor population offers one partial means of escape.

Putting labor on a cash or day basis will increase its efficiency 50 to 100%.

As cultivating machinery is improved, more hoeing can be eliminated by cross plowing. Cotton chopping machines will also assist. Soil enrichment will make checked (either check-planted or plowed into checks) cotton compete in production with drilled cotton, thereby eliminating more hoeing.

Mechanical harvesting equipment can easily reduce operating labor 75% from one-mule-methods requirements. This will materially reduce housing, supervision, and other overhead and make cotton production profitable.

Pickers and strippers have been wonderfully improved in the past year. Their perfection to the point of commercial production and economical use is a matter of only a very few years. Their production and use will make possible maximum, economical use of much more production machinery and will greatly accelerate its improvement.

The South will not retrograde. Machine production will be rapidly increased in cotton growing as it has in the industries. Planters should accelerate their present evolution in the direction of labor replacement by practical, economical farm machines now available.

MAKING COTTON CHEAPER

Can Present Production Costs Be Reduced?

M. G. Vaiden, J. O. Smith, W. E. Ayres

During both 1930 and 1931 production cost records have been kept on ten Delta plantations in the hope that ways and means of more economical production might be found. Records for 1930 were published a year ago as Bulletin No. 290, which is still available. The same methods were used in 1931 as in 1930. General statements contained in Bulletin 290 apply to this publication.

All data indicate that, though production costs were reduced in 1931 and will certainly be reduced further in 1932, the per family acreage must be increased if cotton production (or Southern farm production, for that matter) continues to compete with American industry for labor. Farmers must produce more farm necessities at home and farm labor be thereby enabled to work a higher percentage of the time.

Delta lands ill-adapted to cotton may profitably grow feed and food crops. With the development of economical methods of artificial forage crops drying there will come, in the Delta, a feed crops industry second to none on any like area. Where feed is abundantly and economically grown livestock production often develops.

For many reasons production costs in the Delta have been excessive. These have all but "sunk the cotton production boat." In 1930 advances to tenants on five plantations averaged \$30.00 per cotton acre, and the average total operating expense was more than \$40.00 per acre. Cheap cotton brought the realization that cotton could pay no such expense together with an average necessary additional charge of more than \$20.00 per acre for administration and other fixed overhead.

Table 1 gives detailed expenses of operating the same 5 plantations in 1931 as are given in table 1, page 9 of Bulletin 290 for 1930.

Table 1-A shows what determined efforts to reduce expenses can accomplish in one year. Plantation No. 1 reduced its tenant charges from \$47.42 per cotton acre in 1930 to \$22.03 in 1931, or a reduction of 53.5%. Plantation No. 5 reduced its tenant charge 42.6% and No. 2, 33.6%. Plantations 3 and 4 did not reduce their tenant charges but made worthwhile reductions in other items of expense. The average reduction in tenant charges for the 5 plantations was \$9.99 per cotton acre or 33.3%. For the three plantations which did all the reducing of tenant charges the average was \$16.88 per cotton acre or 43.0%.

No other items of expense have been reduced so much, on the average, as tenant charges, nor can they be, for the reason that they have never been so unnecessarily and unreasonably high. Cotton planting cannot be profitably so long as total expenses are more than \$46.00 per acre and gross proceeds from \$30.00 to \$40.00. The day is not yet that the "little" pot will contain the "big" one.

Tenant expenses can be further reduced through the use of two-row implements and increased acreage per family. This is being done quite satisfactorily by some Delta planters. This, of course, complicates picking problems. The old idea of "deadbeating" will continue to prevail, so long as any class of labor is paid in advance, which has ever been the practice with the present tenant system.

Table 2 shows that in 1931, as in 1930, quarter-hand charges were much greater than when half-hands were used. The difference in 1931 was \$14.29 per cotton acre or practically 100% more. Risks have never been greater than

now on tenant advances. Total tenant charges in 1931 were practically 50% more with quarter than with half hands. In general there is another additional risk with quarter hands because their workstock is usually very inferior and unable to properly prepare and cultivate their crops. Feed furnished their workstock is often used for other purposes and the workstock is half-starved.

There is much comfort in production cost figures on plantation No. 5 in 1931 for those who are absolutely "wedded" to the tenant system. The total production cost of \$29.02 per cotton acre compares favorably with the average of \$29.37, Table 4, on the five tractor operated plantations. It is proof, positive, that production costs can be held within plantation income.

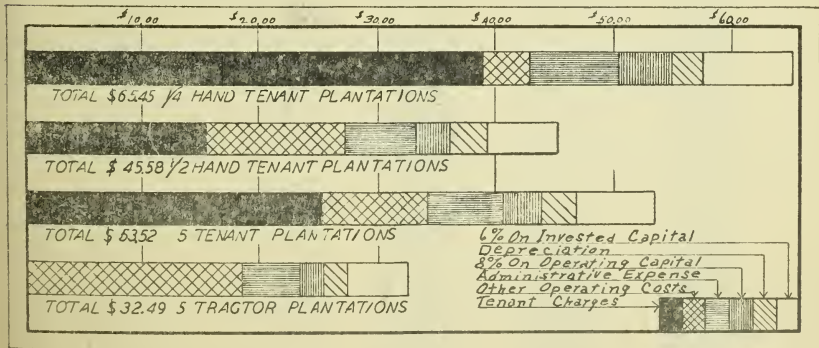
TABLE 1—Actual Per Acre Cost of Operation Using Different Tenant Systems In Cotton Production

Line No.	ITEMS CHARGED	Part of Crop Retained by Landlord and Plantation Number					Average Five Plantations	
		1/4	1/4	1/2	1/2	1/2	1931	1930 and 1931
		1	2	3	4	5		
	Tenant Charges							
1	Cash crop advances -----	\$.41	\$ 1.40	\$.06	\$.03	\$ 2.62	\$.90	\$ 6.19
2	Moving expense -----					.08	.02	.06
3	Merchandise -----	9.55	19.89	8.00	10.10	2.87	10.08	7.58
4	Doctor and drugs -----	1.49	.63	.46	.41	.26	.53	.70
5	Feed -----	3.25	6.59		.46		2.06	2.84
6	Land rented to tenants -----	2.29	1.68		.91		.97	.82
7	Cotton seed -----	.90	1.18		.08		.43	.69
8	Fertilizers -----	1.05		1.78	.01		.57	1.88
9	Shop work -----	.26	.08		.02		.07	.06
10	Infestation expense -----							.11
11	Extra labor for crops -----	.06	.30	1.73	1.60	.09	.76	1.12
12	Live stock sales -----							.54
13	Harvesting help -----	2.77	3.95	4.09	3.19	4.09	3.62	2.41
14	Total tenant charges -----	22.03	35.10	16.12	16.81	10.01	20.01	25.00
	Other Necessary Costs							
15	Ditches, roads, fences, shop -----	.27		1.21	1.24	1.94	.93	1.24
16	House repairs -----	.16		.24	1.03	.13	.31	.52
17	Feed and barn expense -----	2.52		6.31	6.11	2.36	3.46	3.28
18	Fertilizers -----	1.50		1.18	.01		.54	1.27
19	Cotton seed -----	.27		.69	.91	1.23	.62	.82
20	Hay crops -----	.88	.25	1.43	2.04	.99	1.12	1.04
21	Corn crops -----	.65			.26		.18	.23
22	Sundry supplies -----	.12		.07	.29		.10	.16
23	Misc. extra labor -----	.38		.08	.57	.47	.30	.28
24	Total operating expense not charged tenant -----	6.75	.25	11.21	12.46	7.12	7.56	8.84
25	Total operating expense -----	28.78	35.35	27.33	29.27	17.13	27.57	33.84
	Administration							
26	Mgrs., bkkprs. & office -----	2.31	2.67	3.83	5.15	1.93	3.18	3.28
27	Insurance -----	.24	.54	.27	.35	.12	.31	.32
28	Taxes -----	2.88	3.61	2.51	3.07	2.95	3.00	2.98
29	Total administration -----	5.43	6.82	6.61	8.57	5.00	6.49	6.58
30	Total adm. & opr. exp. -----	34.21	42.17	33.94	37.84	22.13	34.06	40.42
31	8% on adm. & opr. exp. -----	2.75	3.37	2.72	3.03	1.77	2.73	3.33
32	Depreciation -----	3.41	2.64	2.68	3.62	1.94	2.86	3.02
33	6% on invested capital -----	9.45	7.82	5.94	7.84	3.18	6.84	6.75
34	Total production cost -----	49.82	56.00	45.28	52.33	29.02	46.49	53.52

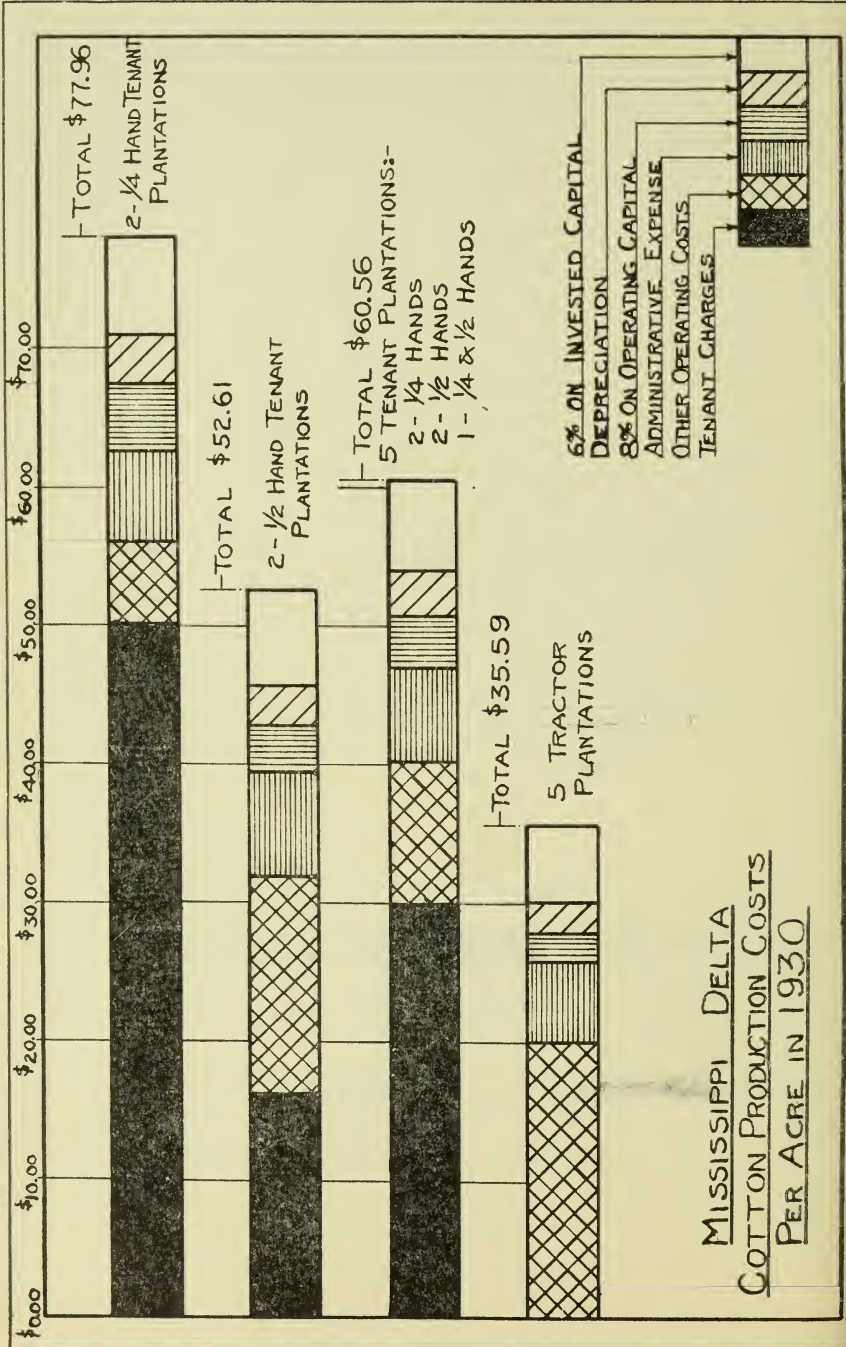
ALL COSTS BASED ON COTTON ACREAGE

TABLE 1-A—Tenant Operations of 1930 and 1931 Compared in Dollars of Expense Per Cotton Acre

EXPENSE ITEMS	Pltn No.	1930	1931	Decreases of 1931	
				Dollars	Percent
Tenant Charges -----	1	\$47.42	\$22.03	\$25.39	53.5
Other Nec. costs -----	1	7.19	6.75	.44	4.7
Administration, Etc. -----	1	7.66	5.43	2.23	29.1
Total Production cost -----	1	78.86	49.82	29.04	36.8
Tenant Charges -----	2	52.90	35.10	17.80	33.6
Other Nec. costs -----	2	3.70	.25	3.45	93.2
Administration, Etc. -----	2	5.59	6.82	—23	—1.8
Total Production cost -----	2	77.07	56.00	21.07	27.3
Tenant Charges -----	3	15.87	16.12	—25	—1.5
Other Nec. costs -----	3	16.06	11.21	4.85	30.2
Administration, Etc. -----	3	6.79	6.61	.18	2.7
Total Production cost -----	3	51.01	45.28	5.73	11.2
Tenant Charges -----	4	16.40	16.81	—41	—2.4
Other Nec. costs -----	4	15.24	12.46	2.78	18.2
Administration, Etc. -----	4	8.35	8.57	—22	—2.6
Total Production cost -----	4	54.21	52.33	1.88	3.5
Tenant Charges -----	5	17.46	10.01	7.45	42.6
Other Nec. costs -----	5	8.32	7.12	1.20	14.4
Administration, Etc. -----	5	4.93	5.00	—07	—1.4
Total Production cost -----	5	41.65	29.02	12.63	30.3
Tenant Charges -----	Avg.	30.00	20.01	9.99	33.3
Other Nec. costs -----	Avg.	10.11	7.56	2.55	25.2
Administration, Etc. -----	Avg.	6.67	6.49	.18	2.7
Total Production cost -----	Avg.	60.56	46.49	14.07	23.2



Yazoo-Mississippi Delta production costs, average 1930 and 1931, when different systems of growing cotton were used. For detailed data see tables two and four.



A comparison of the cropping system and feed purchases of the plantations operated with tenants in 1930 and 1931 accounts, in part, for the high cotton production costs in 1931. In 1930 72.9% of the average total plantation acreage was planted to cotton. Little feed was planted and the extremely dry summer prevented normal production on the acreage devoted to feed. As a consequence feed for the 1931 crop was an important part of production costs. Feed crops expense in 1931 was also heavy and feed production good. The 1931 crop was charged, therefore, with feed for two crops. The feed expense in 1932 will be limited, largely, to feed production for 1933. Mule power will compete, nearer on an equal basis, with mechanical power in cotton production the current year. Charging feed for two years against one year's cotton

TABLE 2—Average Per Acre Cost of Operation Using Different Tenant Systems in Cotton Production

Line No.	ITEMS CHARGED	Part of Crop Retained by Landlord, and Plantation No.		Average Five Plantations	
				1931	1930 and 1931
		$\frac{1}{4}$	$\frac{1}{2}$		
		1 & 2	3, 4 & 5		
	Tenant Charges				
1	Cash crop advances -----	\$.90	\$.90	\$.90	\$ 6.19
2	Moving expense -----	—	.02	.02	.06
3	Merchandise -----	14.77	6.99	10.08	7.58
4	Doctor and drugs -----	.76	.38	.53	.70
5	Feed -----	4.92	.16	2.06	2.84
6	Land rented to tenants -----	1.98	.30	.97	.82
7	Cotton seed -----	1.04	.03	.43	.69
8	Fertilizers -----	.52	.59	.57	1.88
9	Shop work -----	.17	.01	.07	.06
10	Infestation expense -----	—	—	—	.11
11	Extra labor for crops -----	.18	1.14	.76	1.12
12	Livestock sales -----	—	—	—	.54
13	Harvesting help -----	3.36	3.79	3.62	2.41
14	Total tenant charges -----	28.60	14.31	20.01	25.00
	Other Necessary Costs				
15	Ditches, roads, shop -----	.13	1.47	.93	1.24
16	House repairs -----	.08	.47	.31	.52
17	Feed and barn expense -----	1.26	4.93	3.46	3.28
18	Fertilizers -----	.75	.40	.54	1.27
19	Cotton seed -----	.13	.95	.62	.82
20	Hay crops -----	.56	1.19	1.12	1.04
21	Corn crops -----	.32	.09	.18	.23
22	Sundry supplies -----	.06	.09	.10	.16
23	Misc. extra labor -----	.19	.37	.30	.28
24	Total oper. exp. not chg. to tenants -----	3.50	10.26	7.56	8.84
25	Total operating expense -----	32.10	24.57	27.57	33.84
	Administration				
26	Mgr., bkkprs., and office -----	2.49	3.64	3.18	3.28
27	Insurance -----	.39	.24	.31	.32
28	Taxes -----	3.24	2.84	3.00	2.98
29	Total administration -----	6.12	6.72	6.49	6.58
30	Total adm. & opr. expense -----	38.22	31.29	34.06	40.42
31	8% on adm. & opr. expense -----	3.06	2.52	2.73	3.33
32	Depreciation -----	3.02	2.75	2.86	3.02
33	6% on invested capital -----	8.62	5.65	6.84	6.75
34	Total production cost -----	52.93	42.21	46.49	53.52

ALL COSTS BASED ON COTTON ACREAGE

acreage, which in 1931 was only 63.1% of the average total plantation acreage, makes the comparison of tenant and mechanical operation unfair. Comparisons in 1932 will be very interesting.

TABLE 3—The Cropping System on the 5 Tenant Operated Plantations 1931

Plan- ta- tion No.	No. of Cab- ins	Percentage of Total Acreage Used For							
		Cotton	Corn	Hay	Other Feed	Woods	Ditches Roads	House Sites	Pas- ture
1	75	64.4	11.2	—	13.7	3.8	1.9	3.8	1.2
2	21	62.8	19.8	6.6	4.4	—	1.8	4.4	.2
3	43	71.4	.9	—	13.9	.9	6.0	6.0	.9
4	44	53.6	6.4	2.6	10.9	17.6	3.3	5.6	—
5	27	69.6	5.3	3.0	6.6	6.0	6.1	1.6	1.8
Avg	42	63.1	9.5	2.5	10.4	5.5	3.5	4.5	1.0

TABLE 4—Actual Per Acre Cost of Operation Using Tractor System in Cotton Production

Line No.	ITEMS CHARGED	PLANTATION NUMBER					Average Five Plantations	
							1931	1930 and 1931
		6	7	8	9*	10*		
1	Operating Costs							
1	Preparing land -----	\$ 1.14	\$ 1.44	\$ 1.27	\$ 1.38	\$.91	\$ 1.33	\$ 1.72
2	Planting cotton -----	.40	.53	.77	.32	.16	.44	.75
3	Chopping cotton -----	1.32	1.52	2.63	2.87	3.54	2.38	2.53
4	Cultivation -----	.62	3.13	2.48	1.63	.83	1.74	1.81
5	Applying fertilizers -----	.10	.19	.26	—	.08	.13	.27
6	Infestation expense -----	—	.01	—	—	1.40	.29	.31
7	Misc. payroll & exp. -----	.05	.14	.11	—	.36	.14	.08
8	Ditches, roads, etc. -----	.34	.06	.22	.12	.15	.18	.42
9	House repairs -----	.01	.03	—	—	—	.01	.05
10	Tractor and imp. rprs. ---	2.22	1.33	.91	.98	.23	1.14	1.15
11	Feed and hostler -----	.08	—	—	—	—	.02	.07
12	Cotton harvesting -----	3.87	7.39	4.59	6.59	4.93	5.48	4.98
13	Fertilizers -----	2.61	2.86	2.57	—	3.09	2.23	3.04
14	Cotton seed -----	1.02	.45	.61	.80	1.81	.94	1.01
15	Total operating cost ----	14.07	19.08	16.42	15.19	17.49	16.45	18.19
	Administration							
16	Mgrs. & kkkprs. & office ---	2.57	2.18	3.66	1.70	1.75	2.37	2.49
17	Taxes -----	2.28	2.81	3.56	3.32	2.98	2.99	3.09
18	Insurance -----	.09	—	—	—	—	.02	.03
19	Total adm. expense -----	4.94	4.99	7.22	5.02	4.73	5.38	5.61
20	Total adm. & opr. exp. ---	19.01	24.07	23.64	20.21	22.22	21.83	23.80
21	8% on adm. & opr. exp. ---	1.52	1.93	1.89	1.62	1.70	1.75	1.91
22	Depreciation -----	1.78	1.83	1.79	.87	1.11	1.47	1.81
23	6% on invested capital ---	4.10	5.03	4.58	3.64	4.25	4.32	4.97
24	Total production exp. ----	26.41	32.86	31.90	26.34	29.36	29.37	32.49

*Not the same as Nos. 9 and 10 in 1930

ALL COSTS BASED ON COTTON ACREAGE

Operating costs on five tractor-operated plantations in 1931 average \$16.45 per cotton acre. This is \$11.12 less than the per cotton acre cost of operation on the five tenant-operated plantations, or a difference of 40%. It is \$0.68 per cotton acre less than the cheapest tenant operation. The cheapest tenant-operator spent only \$3.06 per cotton acre, or 21.7% more, for actual operation in 1931 than the cheapest tractor-operator. In 1930 this difference was \$13.07 per cotton acre or 102.8%. Operating expenses on the three tractor plantations which were the same in 1930 and 1931 were an average of \$4.77 per cotton acre or 28.9% more in 1930 than 1931.

Table 7 gives production cost records at the Delta Station for three years. In 1930 Station records on 4 row tractor equipment differed from the average of the 5 tractor operated plantations by only 22 cents per acre on the same items of expense. In 1931 this difference was only 11 cents per acre.

That the cost of tenant operation is more variable than tractor operation is evident. This will be true so long as labor population is excessive and tenant labor is paid in advance because labor "runs" the plantations in "good times" and the owners "run" them during depressions. The replacement of non-essential labor with tractors, 4-mule cultivators, or other large mechanical units tends to stabilize operation at lower cost and to enable retained farm labor to earn a better living.

Reduction of the farm labor population 30 to 50% is essential to "decent" living standards on the farm. Soap box orators may decry cotton pickers, tractors, two and four-mule machinery but they and other modern farm machines are just as essential to farmers who expect to earn decent livings and fair returns on investments as are linotypes to printers, compressed air and concrete mixing machines to contractors, modern spinning and weaving machines to textile manufacturers, or modern equipment to other American industries. True enough, up-to-date farm equipment reduces the man-power necessary. So does all modern machinery. But Americans will not go backward. It is not up to American farms to absorb, even at pauper wages, either the labor released from modernized industry or non-essential farm-labor replaced by the economical use of adapted farm machines. American genius must find other fields for replaced labor both from modernized farms and industry if peasantry is to be avoided.

Some planters maintain that tractor operation is cheaper but that mules and tenants produce more per acre. The Station is only interested in lowering unit production costs. If this can be done with larger mule units and fewer tenants (fewer mouths to feed and other wants to satisfy) well enough, but the Delta must find ways and means of continuously producing cotton cheaper, relatively, than in the past.

TABLE 5—The Cropping Systems on the 5 Tractor Operated Plantations

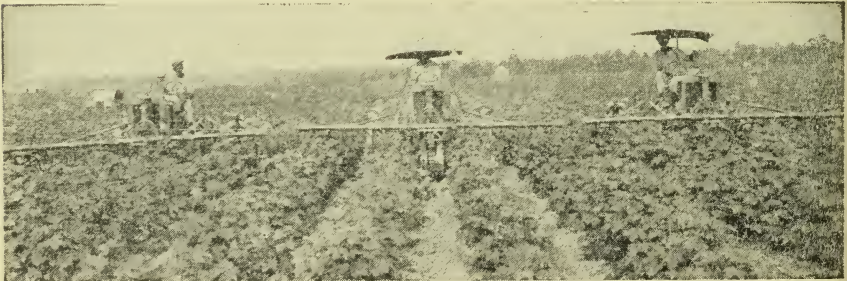
Plan- ta- tion No.	No. of Cab- ins	Percentage of Total Acreage Used For						
		Cotton	Hay Corn	Idle Land	Woods	Ditches Roads	House Sites	Pas- ture
6	4	84.4	—	—	13.4	1.4	.1	—
7	5	97.0	—	—	—	1.9	1.1	—
8	8	71.0	—	—	22.4	5.1	1.5	—
9	10	85.9	—	—	11.3	2.3	.6	—
10	5	70.3	—	—	24.3	4.9	.5	—
Avg.	6.2	84.0	—	—	12.2	2.4	.7	—



Seven 2-mule cultivators do as much cultivating and do it as well as 14 one-mule implements and save 7 men.



14 mules and 4 men with 2-row cultivators cover nearly as much ground as 14 men and 14 mules with one-mule outfits, or 7 men and 14 mules with 2-mule cultivators.



3 men and 3 tractors with 4-row cultivators do still more work, even while the crop is small, than 14 men and 14 mules with one-mule units and more than twice as much after the cotton is large enough to permit running in second gear. This may look 'revolutionary' but it is the simple evolution which has taken place in the Yazoo-Mississippi Delta in the last 10 years.

Stars are invisible when the sun is shining but darkness brings them out. The competition of industry for labor and labor's demands for better living conditions will ultimately force planters to see the necessity for more and more machinery in cotton production. Poor land is unprofitable in any cultivated crop. The thin acres must be built up through the use of legumes or fertilized to produce economically. Both intensive and extensive methods must be employed in reducing costs. Per acre production must be considered and kept up.

Insufficient knowledge of just where operation "leaks" are is responsible for a high percentage of Delta cotton plantation losses. Every average sized Delta plantation can afford the expense necessary to keep sufficient records to be able to trace losses and stop them. With such records unprofitable expenditures can be adjusted or eliminated and production costs reduced thereby.

There is an irreducible minimum below which production costs cannot be economically reduced. Available funds wisely spent in operation often pay dividends far in excess of the risk taken. The cheapest operation is not necessarily the most profitable but it is essential that plantation production expenses be kept below the gross value of the crops grown.

Good crops, high prices, and scarcity of labor led operators into the bad habit of investing from \$50.00 to \$250.00 in tenant families when they moved on the place and before a furrow was run. Tenants often owe more than \$10.00 per cotton acre before the crop is planted.

By many, the "furnish" is considered the largest expense item. A study of plantation books for the past ten years will convince that food and clothing expense for tenants is small compared with combined expenditures for extra labor for chopping, plowing, picking, moving expense, payment of old accounts to prior landlord, Christmas money, cash out of which the average tenant will argue the "boss," doctor bills, etc. So much of this is paid in advance that there is little incentive for tenants to work. Many planters have literally given their plantations to tenants for unfulfilled promises to work. The one way of escape is through greatly reduced labor population.

Machines are already available which will satisfactorily eliminate a high percentage of previously-considered-necessary plow-cultivation labor. Satisfactory one-row cotton choppers are available which will most surely be converted to operate with two and four row cultivating units. Fields can be cross-plowed to eliminate the first chopping. Check-row cotton produces satisfactory yields on fertile soils and eliminates 60 to 80% of the hoe labor. Cross plow-

TABLE 6—Comparison of Per Acre Cost of Operations of Various Systems Used in Cotton Production—1931 and 2 Year Average

ITEMS CHARGED	Part of Crop Retained by Landlord and Plantation Number					
	$\frac{1}{4}$	$\frac{1}{2}$	Avg.	Tractor	Tenant	Tractor
	1 & 2	3, 4 & 5	1-5	System 6-10	2 yr. av 1-5	2 yr. av. 6-10
Tenant Charges -----	28.60	14.31	20.01	—	25.00	—
Other operating costs -----	3.50	10.26	7.56	16.45	8.81	18.19
Administrative expense -----	6.12	6.72	6.49	5.38	6.58	5.61
8% on operating capital -----	3.06	2.52	2.73	1.75	3.33	1.91
Depreciation -----	3.02	2.75	2.86	1.47	3.02	1.81
6% on invested capital -----	8.63	5.65	6.84	4.32	6.75	4.97

ing can be done with power equipment with the hills 20 inches apart if the steering mechanism can be made absolutely positive. This will permit check-cultivation on thinner soils and will eliminate more hoe labor through more shade from the cotton crop.

Less available progress has been made in cotton harvesting machinery than in that for cotton production, but great advancement has been made in the former in the last ten years. Continuous improvements will be made. In 1931 five cotton picker manufacturers seriously worked with their machines in the Delta and other Southern fields, finding their weak and impractical points. Among these was the Gyrocotn Harvester of Geo. R. Meyercord and Associates of Chicago, whose financial cooperation made these cost studies possible. The 1931 models showed much improvement over those of 1930. More improvement is expected in the next two years than for the past six or eight.

During the past much progress has been made in picking higher grades and higher percentages of the crop. Wheel traction has been improved on the self-contained machines but traction is unimportant for the reason that any of the picking mechanisms can be attached to crawler-type, or other tractors

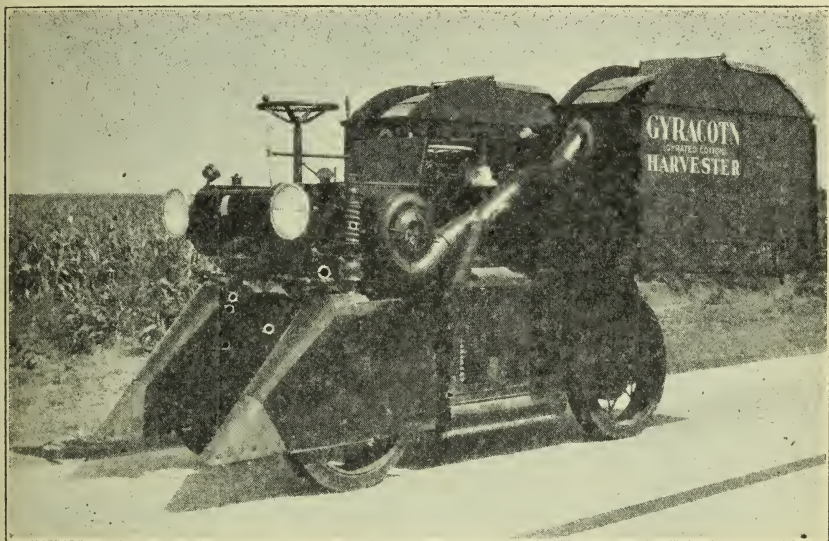
**TABLE 7—Cultivation Costs with Various Units of Equipment
1929-30-31 at the Delta Experiment Station**

Operations	Dollars Per Acre for Operations With Various Units of Equipment					
	½ Row or One Horse	1 Row or 2 Horse (1)	1 Row or 2 Horse (2)	2 Row or 4 Horse	2 Row Tractor	4 Row Tractor
	Average for 1929 and 1930					
Breaking, cutting, or disking stalks -----	0.90	0.64	0.64	0.51	0.37	0.37
Preparing seed bed (disking, bedding and harrowing) -----	3.08	2.45	2.45	1.66	0.73	0.73
Distributing Fertilizer -----	0.61	0.48	0.48	0.48	0.46	0.42
Dragging and planting -----	0.64	0.50	0.50	0.50	0.52	0.48
7 Cultivations -----	7.86	6.28	5.70	4.96	4.54	3.24
Total for operations having variable cost -----	13.09	10.35	9.77	8.11	6.62	5.24
	1931 (3)					
Breaking, cutting, or disking stalks -----	0.60	0.55	0.52	0.50	0.39	0.41
Preparing seed bed (disking, bedding and harrowing) -----	2.34	2.18	2.13	1.66	0.89	0.92
Distributing fertilizer -----	0.41	0.40	0.37	0.49	0.35	0.29
Dragging and planting -----	0.59	0.60	0.58	0.70	0.55	0.44
7 Cultivations -----	4.48	3.37	3.20	2.57	1.84	1.61
Total for operations having variable cost -----	8.42	7.10	6.80	5.92	4.02	3.67
	3 Year Average					
Breaking, cutting or disking stalks -----	0.80	0.61	0.60	0.51	—	0.38
Preparing seed bed (disking, bedding and harrowing) -----	2.84	2.36	2.31	1.66	—	0.79
Distributing fertilizer -----	0.54	0.46	0.45	0.49	—	0.37
Dragging and planting -----	0.62	0.52	0.52	0.56	—	0.47
7 Cultivations -----	6.73	5.31	4.87	4.16	—	2.70
Total for operations having variable cost -----	11.53	9.26	8.78	7.38	—	4.71
Estimated No. acres per man---	15	24	30	50	—	120

(1) Walking Cultivator. (2) Riding Cultivator. (3) 3-row tractor equipment used because 2-row is becoming obsolete in this section.

Production costs that were constant (fertilizer, hoeing and picking) for all equipment are not tabulated. The fertilizer was distributed with one, two, and four-row planters. In 1929 and 1930 man labor was figured at \$0.20 per hour; mules \$0.10; tractor and driver at \$0.65; when pulling 4-row cultivator, \$0.70. In 1931 man labor was figured at \$0.12½ per hour; mules, \$0.10; tractor and driver, when pulling 3-row equipment, \$0.55; 4-row equipment, \$0.60.

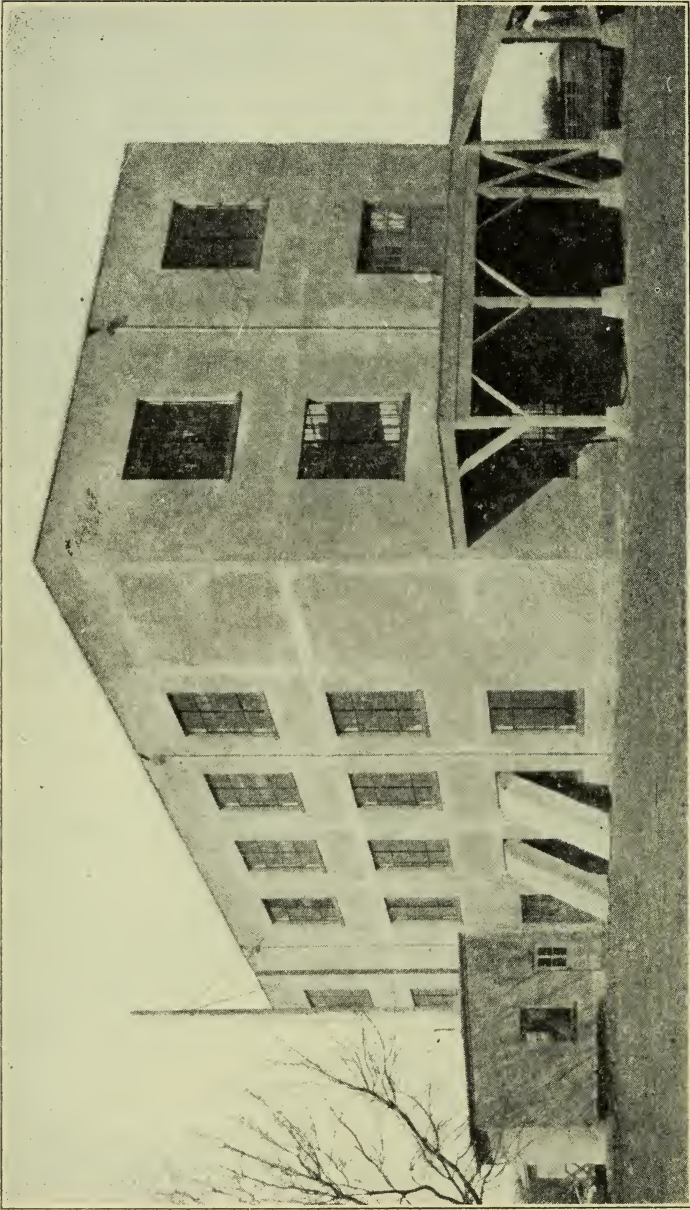
which have plenty of both power and traction. The outlook for mechanical harvesting equipment—pickers for early season work and good grades (for color) and strippers with which to economically finish the job—is very promising.



The Station expects commercial production of successful mechanical cotton pickers within the near future, followed by the use of much less hand labor in production as well as harvesting. Two or three cotton pickers are rapidly approaching practical, mechanical, usable perfection. Several others are under construction.



One hundred men and women picking Delta cotton, at Lombardy, Mississippi, April 5, 1932, which should have been picked previous to November 1, 1931. A minimum of 30% of the value of this thousand acres of cotton was lost due to delayed harvesting. Mechanical pickers will eliminate much if not most of such losses which cost Southern cotton growers millions annually.

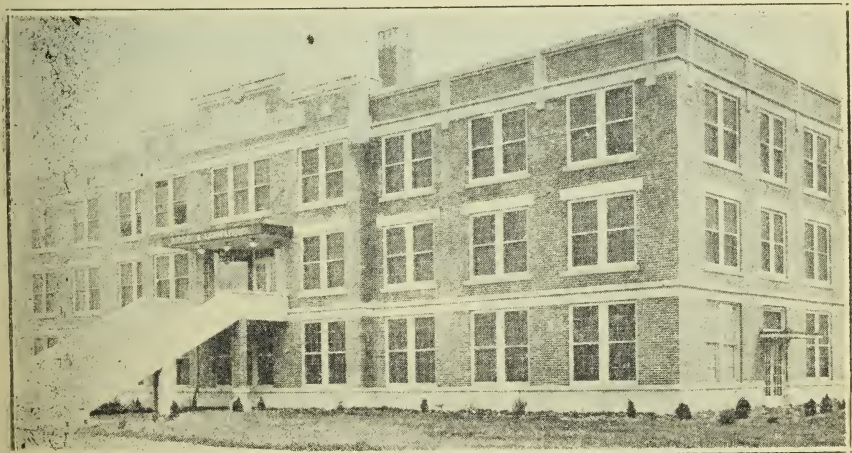


Cotton Research Laboratory and Experimental Gin erected at the Delta Experiment Station in 1930 by the United States Department of Agriculture. Very valuable information is being collected here, by the Bureau of Agricultural Engineering and Agricultural Economics of the Department, on drying, cleaning, ginning, and fiber testing of cotton. Information obtained from thousands of these tests annually should enable ginners to leave in cotton all the value placed there by Mother Nature.

To many, the factor of waste with mechanical cotton harvesting equipment appears exceedingly large. Few appreciate that waste is not so great as it appears. Each lock dropped on the ground or left on the stalk is fluffed up, stringy, and more noticeable than ten which have fallen and been beaten into the ground by rains. First, the waste is much less than it appears. Second, improvements which will come from field experience will eliminate much if not most of present-day machine waste. Mechanical harvesting machinery may never do as nearly a perfect job as hand pickers. Lack of labor often means appalling losses both in weight and grade. Field losses in the Arkansas Delta on the 1918 cotton crop picked January 21st was 11.1% more than on the same standard varieties having 82% of the crop picked October 1st and the remainder a month later. The loss in total value was 33.6% (Arkansas Station Circular 47). Such losses in seasons of good weather as prevailed in late 1918 and early 1919 are much less than during bad seasons. Being usual, partially invisible, and seldom measured, little thought is given to such losses.

Grade figures are available on 1,476,800 bales of cotton for the 9 years, 1922-30. Of this baleage 2.14% was good middling; 15.07% strict middling; 30.04% middling; 26.55% strict low middling; 15.13% low middling; 4.57% strict good ordinary; 2.77% good ordinary; 2.07% strict ordinary, and 1.61% ordinary. The average was 1-6 of a grade above strict low middling. To avoid high percentages of low grades under present harvesting methods very large numbers of pickers are necessary.

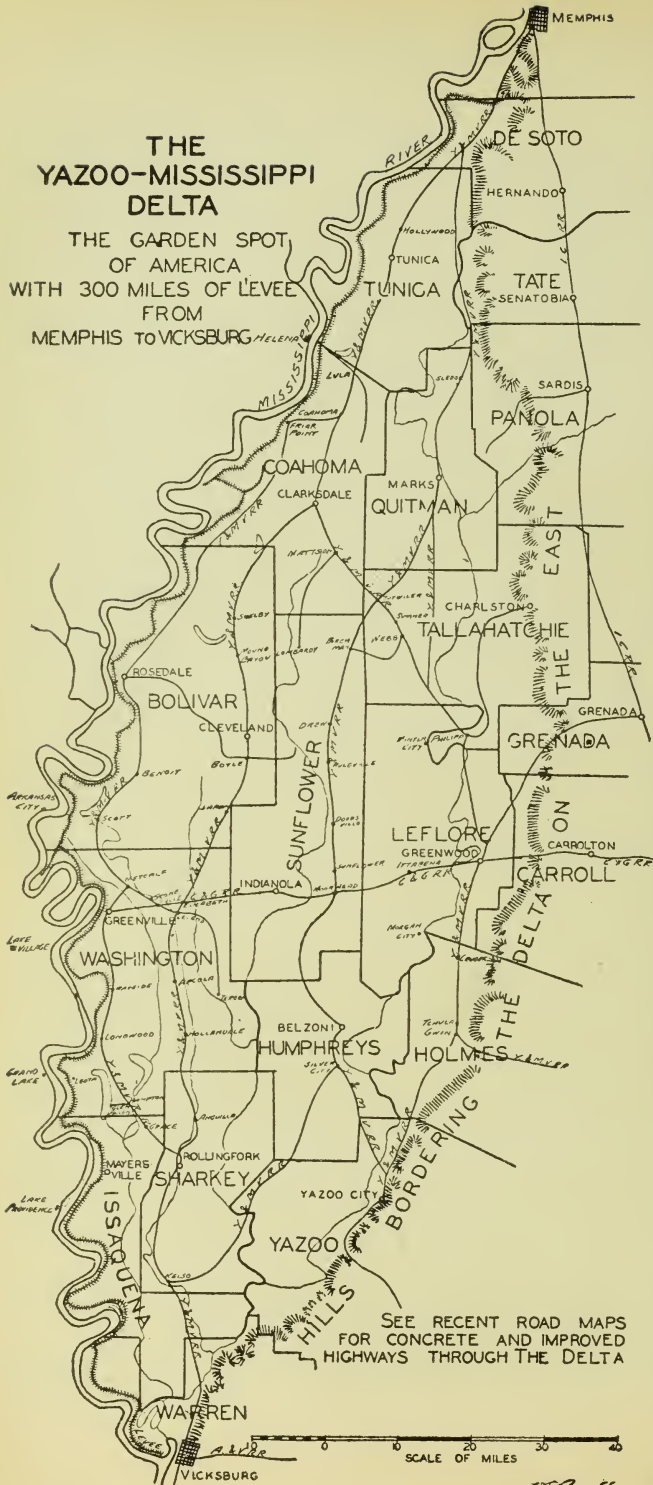
When an abundance of mechanical harvesting equipment is available with which to harvest the crop as rapidly as it opens the color and intrinsic value can be maintained. Gin and mill machinery is already available which economically removes trash if mechanical equipment harvests cotton rougher than hand labor. The latter may or may not be true. It is entirely possible, and quite probable, that within a few years mechanically harvested crops may be intrinsically more valuable in the aggregate, than are similar hand-picked crops today, due primarily to the time factor which nowadays causes vast disregarded losses. Cotton picked by two different types of mechanical pickers well distributed over the belt in the fall of 1931 averaged above low middling.



Office and Laboratory building of the Delta Experiment Station.

**THE
YAZOO-MISSISSIPPI
DELTA**

THE GARDEN SPOT
OF AMERICA
WITH 300 MILES OF LEVEE
FROM
MEMPHIS TO VICKSBURG



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SEE RECENT ROAD MAPS
FOR CONCRETE AND IMPROVED
HIGHWAYS THROUGH THE DELTA

SCALE OF MILES

W.E. Allen, C.E.